<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Experts’ Name</th>
<th>Designation and Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Dr. Kulwinder Singh</td>
<td>Professor, Punjabi University. Patiala</td>
</tr>
<tr>
<td>2.</td>
<td>Dr. Sunita Gupta</td>
<td>Head and Professor, Deptt. of Psychology, G.N.D.U. Amritsar</td>
</tr>
<tr>
<td>3.</td>
<td>Dr. Rupan Dillon</td>
<td>Professor, Deptt. of Psychology, G.N.D.U. Amritsar</td>
</tr>
<tr>
<td>4.</td>
<td>Dr. Vishal Sood</td>
<td>Professor, I.C.D.E.O.L. H.P.U. Shimla</td>
</tr>
<tr>
<td>5.</td>
<td>Dr. J.S. Rana</td>
<td>Principal, M.B.B.G.D. College of Education, Manssowal</td>
</tr>
<tr>
<td>6.</td>
<td>Dr. Kulbhushan Sharma</td>
<td>Principal, Jupiter college of Education, Marri, Una (H.P.)</td>
</tr>
<tr>
<td>7.</td>
<td>Dr. Simran Kaur Sandhu</td>
<td>Principal, Shivalik Hills College of Education, Patti, Nangal</td>
</tr>
<tr>
<td>8.</td>
<td>Dr. Harjeet Kaur</td>
<td>Principal, G.N.D. College of Education, Majatari</td>
</tr>
<tr>
<td>9.</td>
<td>Dr. Darshan Pal Kaur</td>
<td>Head and Professor, Deptt. of English, G.T.B. Khalsa College, Shri Anandpur Sahib</td>
</tr>
<tr>
<td>10.</td>
<td>Dr. C.S. Mann</td>
<td>Associate Professor, Govt. College Beetan Una (H.P.)</td>
</tr>
<tr>
<td>11.</td>
<td>Dr. G. S. Sodi</td>
<td>Retired Professor, Panjab University, Chandigarh.</td>
</tr>
<tr>
<td>12.</td>
<td>Dr. Harish Sharma</td>
<td>Retired Professor, Panjab University, Chandigarh.</td>
</tr>
<tr>
<td>13.</td>
<td>Mr. Sumit Kumar</td>
<td>Lecturer in Physics, G.P.G. College Una (H.P.)</td>
</tr>
<tr>
<td>14.</td>
<td>Mr. Gulshan Rai</td>
<td>Lecturer in Chemistry, G.P.G. College Una (H.P.)</td>
</tr>
<tr>
<td>15.</td>
<td>Mrs. Pawan Kalsi</td>
<td>Lecturer in Botany, G.P.G. College Una (H.P.)</td>
</tr>
<tr>
<td>16.</td>
<td>Dr. Ashwani Kumar</td>
<td>Lecturer in Zoology, G.P.G. College Una (H.P.)</td>
</tr>
<tr>
<td>17.</td>
<td>Dr. Dhiraj</td>
<td>Principal, S.B.H.S.M. Khalsa College of Education Mahilpur.</td>
</tr>
<tr>
<td>18.</td>
<td>Dr. Sandeep Kumar</td>
<td>Assistant Professor, S.B.H.S.M. Khalsa College of Education Mahilpur</td>
</tr>
<tr>
<td>19.</td>
<td>Dr. Harminder kaur</td>
<td>Assistant Professor, S.B.H.S.M. Khalsa College of Education Mahilpur</td>
</tr>
<tr>
<td>Sr. No.</td>
<td>Experts’ Name</td>
<td>Designation and Address</td>
</tr>
<tr>
<td>---------</td>
<td>--------------------</td>
<td>-------------------------------------------------------------</td>
</tr>
<tr>
<td>20.</td>
<td>Dr. Monika Sharma</td>
<td>Assistant Professor, M.C. College of Education, Bhanopali, Sri Anandpur Sahib</td>
</tr>
<tr>
<td>21.</td>
<td>Dr. Komal Sharma</td>
<td>Principal, H.C.S. School, Patti, Nangal</td>
</tr>
<tr>
<td>22.</td>
<td>Sh. Mohinder Pal</td>
<td>TGT English, G.H. School, Nangran, Nangal</td>
</tr>
<tr>
<td>23.</td>
<td>Sh. Gurdeep Sharma</td>
<td>Lecturer in Chemistry, G.B.S.S. School Nangal</td>
</tr>
<tr>
<td>24.</td>
<td>Sh. Som Nath</td>
<td>Principal, Govt. School Una (H.P.)</td>
</tr>
<tr>
<td>25.</td>
<td>Sh. Suresh Bhardwaj</td>
<td>Retired Principal, Govt. School Una (H.P.)</td>
</tr>
<tr>
<td>26.</td>
<td>Sh. K. Pabla</td>
<td>Lecturer in Physics, Govt. School Una (H.P.)</td>
</tr>
</tbody>
</table>
Blended Learning Modules in Science Subject

Developed By

Iqbal Singh
Blended Learning Modules

The Blended Learning Modules, “Design of Instructional Event”, aims at contributing to engage the students and effective learning development in the subject of Science. In other words, Blended Learning is a pedagogical approach facilitated by a teacher. The Blended Learning Modules in Science subject was constructed and standardized by investigator for the students of ninth class.

Module

A module is one type of instructional material with which a learner can acquire knowledge, skill and attitude in learning environment. It differs from other type of instructional material. It is self-contained and independent of live instruction from the subject.

Objectives

In blended learning modules, each module has certain objectives. Main objectives are given below:

1. Engagement in Students
2. Effective Learning

Selection of the Strategies and Approaches:

For the development of blended learning modules, following strategies and approaches were decided:

![Diagram of Blended Learning Strategies]

- Peer Group
- One to One Interaction
- Collaborative Learning
- Face to Face Interaction
- Web Based Instruction
- Outdoor Experience
- EDUSAT Learning
Appendices

A figure of specification was prepared on the basis of advice of the experts of the concerned areas to give weightage of topics to each strategy of blended learning modules in the subject of Science from ninth class. The detail is given below:

A table of specification was prepared to give weightage of topics to each strategy of blended learning modules in the subject of Science from ninth class. The detail is given below:

<table>
<thead>
<tr>
<th>SR.NO.</th>
<th>STRATEGIES</th>
<th>TOPICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Face to Face Instruction</td>
<td>Matter, Is Matter Around Us Pure?, Solution, Separation of Components of A Mixture, Writing Chemical Formulae, Cell, Structural Organisation of a cell, Tissues-Plant Tissues, Tissues-Animal Tissue, Graphical Representation of Motion, Fee Fall, Mass, Weight, Why Do We Fall Ill and Non-Infectious Diseases.</td>
</tr>
</tbody>
</table>
To develop the blended learning modules, the lesson plans were developed, keeping in mind the topics and the objectives, on one the hand and content of items on other hand.

One of the major steps in instructional design is the selection and sequencing of the content. After defining the objectives, the content matter should be considered in the light of the objectives and learner capability. The content is arranged in such a way that it clearly leads to the achievement of the objectives already defined.

**Content:**

For development of blended learning modules, important topics were selected which class IX students of Science must master. These topics need understanding of concepts, principles and applications which the students find difficult to understand. The following topics in the subject of Science from the syllabus of ninth class were taken for the development of blended learning modules:

**Table 4.1**

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Topics</th>
<th>Sr. No</th>
<th>Topics</th>
<th>Sr. No</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Matter</td>
<td>18.</td>
<td>Ozone</td>
<td>35.</td>
<td>Work</td>
</tr>
<tr>
<td>5.</td>
<td>Writing Chemical Formulae</td>
<td>22.</td>
<td>Structure of Human Ear</td>
<td>39.</td>
<td>Cropping Patterns</td>
</tr>
<tr>
<td>7.</td>
<td>Structural Organisation of a cell</td>
<td>24.</td>
<td>The Oxygen Cycle Atom</td>
<td>41.</td>
<td>Thomson’s Model of Atom</td>
</tr>
<tr>
<td>8.</td>
<td>Tissues-Plant Tissues</td>
<td>25.</td>
<td>The Carbon Cycle</td>
<td>42.</td>
<td>Rutherford’s Model of Atom</td>
</tr>
<tr>
<td>10.</td>
<td>Graphical Representation of Motion</td>
<td>27.</td>
<td>Uniform Circulation of Motion</td>
<td>44.</td>
<td>Diversity in Living Organisms-2</td>
</tr>
<tr>
<td>12.</td>
<td>Why Do We Fall</td>
<td>29.</td>
<td>Force</td>
<td>46.</td>
<td>Thrust and Pressure</td>
</tr>
<tr>
<td>15.</td>
<td>Structure of Atoms</td>
<td>32.</td>
<td>Third Law of Motion</td>
<td>49.</td>
<td>Wave Motion-1</td>
</tr>
<tr>
<td>17.</td>
<td>The Greenhouse Effect</td>
<td>34.</td>
<td>Archimedes’ Principle</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The following points were considered while framing the blended learning modules’ lesson plans:

i. The language used should be simple.
ii. Lesson Plans should be clear and understandable.
iii. Strategies of blended learning modules should be according to the lesson plans.

To develop the blended learning modules, the lesson plans were developed with the help of the book, Roles Redefined, ‘A New Perspective in Lesson Planning’ and subject matter from the text books recommended by PSEB Mohali, NCERT New Delhi, CBSE New Delhi and ICSE New Delhi.

**Design of modules:**

Design of blended learning modules as given below:

1. There are four modules.
2. Each module consists different teaching styles.
3. Each module based on different topic from the syllabus of Science subject.
4. Each topic has a sequence of activities.
Blended Learning
Module - 1
on
Face to Face Strategy in Science

Topics:

1. Matter
2. Is Matter Around Us Pure
3. Solution
4. Separation of Components of A Mixture
5. Writing Chemical Formulae
6. Cell
7. Structural Organisation of a cell
8. Tissues-Plant Tissues
9. Tissues-Animal Tissues
10. Graphical Representation of Motion
11. Fee Fall, Mass, Weight
12. Why Do We Fall Ill
13. Non- Infectious Diseases
Introduction:
Face to Face strategy which the learner learns with interaction in the form of question-answers techniques.

Objectives:
1. To engage the students
2. Active participation promotes fast learning and longer retention.
3. Learning in small steps with feedback accelerates the process of learning.
4. Individual differences result into different learning styles.

Methodology to be used:
The topics were assigned a day before using face to face strategy. After that question-answer technique will be used.
THIS MODULE PRESENTS AN OVERVIEW ON DIFFERENT TOPICS FROM YOUR SYLLABUS IN THE SUBJECT OF SCIENCE WITH FACE TO FACE STRATEGY:

PAY ATTENTION AS IT WILL HELP YOU TO UNDERSTAND THE SUBJECT MATTER EASILY
Lesson Plan-1

<table>
<thead>
<tr>
<th>Subject</th>
<th>Science</th>
<th>Class</th>
<th>IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>Matter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duration</td>
<td>30 Minutes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Expected Cognitive Behaviour Outcomes:**

Enable the learners to:

**Remember:** Define the matter.

**Understand:** Comprehend the Physical nature of matter.

**Apply:** Use the concept of states of matter.

**Analyze:** Examine the Characteristics of particles.

**Evaluation:** Justify the states of matter.

**Create/Problem Solving:** To solve the problems related topic matter.

**Resource Material Required:**

Text Book, Notebook, Black Board and Pictures

**Outline/Summary of the Concept:**

Everything in this universe is made up of material which scientists have named matter i.e. air, food, stars, drop of water etc. Matter is made up of particles and they are small beyond our imagination and are called physical nature of matter. Characteristics of particles of matter are that particles of matter have space between them, continuously moving and attracting each other. There are three states of matter that is solid, liquid and gas. Solid matter has a definite shape, distinct boundaries and fixed volumes. Liquid matter has no fixed shape but has a fixed volume. Gaseous matter is highly compressible as compared to solid and liquid.

**Methodology to be used:**

Face to Face Strategy, Lecture-cum-Demonstration and Discussion Methods

**Entry Behaviour Testing:**

The investigator will ask the following questions:

1. Name the basic elements of life.
2. What is the composition of air?
3. What is the composition of water?
4. What is the meaning of matter?

**Presentation:** Today, we will study about the matter.
<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation /Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Matter</td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the learner: What is matter?</td>
<td>Learner will give the answer: everything in this universe is made up of material which scientists have named matter</td>
<td></td>
<td>Investigator will ask: Investigator will ask: What is matter?</td>
</tr>
<tr>
<td>Examples of matter</td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the learner: Give the examples of matter.</td>
<td>Learner will give the answer: air, food, stars, drop of water etc.</td>
<td></td>
<td>Investigator will ask: What are examples of matter?</td>
</tr>
<tr>
<td>Physical nature of matter</td>
<td>Investigator will try to involve the learners by performing activities with ball. Learners will perform the activities.</td>
<td>Investigator will ask the learner: What is the Physical nature of matter?</td>
<td>Learner will give the answer: matter is made up of particles.</td>
<td>Black-Board</td>
<td>Investigator will ask: What is the physical nature of matter?</td>
</tr>
<tr>
<td>Size of particles</td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the learner: How small are these particles of matter?</td>
<td>Learner will give the answer: they are small beyond our imagination</td>
<td>Black-Board</td>
<td>Investigator will ask: What is the size of matter?</td>
</tr>
<tr>
<td>Characteristics of particles of matter</td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the learner: What are the characteristics of particles of matter?</td>
<td>Learner will give the answer: characteristics of particles of matter are that particle of matter have space between them, continuously moving and attracting each other.</td>
<td></td>
<td>Investigator will ask: Explain the one characteristic of matter.</td>
</tr>
</tbody>
</table>
Appendices

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation/Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>States of matter</td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the learner: What are the states of matter?</td>
<td>Learner will give the answer there are three states of matter that is solid, liquid and gas.</td>
<td><img src="image" alt="Solid" /></td>
<td>Investigator will ask: Name the states of matter.</td>
</tr>
<tr>
<td>What do you mean by solid state of matter?</td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the learner: What do you mean by solid state of matter?</td>
<td>Learner will give the answer solid matter has a definite shape, distinct boundaries and fixed volumes.</td>
<td><img src="image" alt="Solid" /></td>
<td>Investigator will ask: What do you mean by solid state of matter?</td>
</tr>
<tr>
<td>What do you mean by liquid state of matter?</td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the learner: What do you mean by liquid state of matter?</td>
<td>Learner will give the answer liquid matter has no fixed shape but have a fixed volume.</td>
<td><img src="image" alt="Liquid" /></td>
<td>Investigator will ask: What do you mean by liquid state of matter?</td>
</tr>
<tr>
<td>What do you mean by gaseous state of matter?</td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the learner: What do you mean by gaseous state of matter?</td>
<td>Learner will give the answer gaseous matter is highly compressible as compared to solid and liquid.</td>
<td><img src="image" alt="Gas" /></td>
<td>Investigator will ask: What do you mean by gaseous state of matter?</td>
</tr>
</tbody>
</table>

Generalization:

The learner will be able to know about the matter and states of matter i.e. solid, liquid and gaseous.

Terminal Behaviour Testing:

The investigator will form peer groups. After that he will give them five minutes for mutual discussion. Then he will ask questions from the learners.

1. What is matter?
2. What is the size of matter?
3. What do you mean by gaseous state of matter?
Creative Assignment:

Perform activity which shows the states of matter at home and make a report in your notebook.

References:

SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.
SCIENCE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.
http://www.assignmenthelp.net/assignment_help/states-of-matter
https://www.nasa.gov/audience/forstudents/k-4/dictionary/Matter.html
http://www.bioreactors.eu/en/application/mini-4-gas/
http://clipart-library.com/solid-science-cliparts.html

*****
Lesson Plan-2

<table>
<thead>
<tr>
<th>Subject</th>
<th>Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>Is Matter Around Us Pure?</td>
</tr>
<tr>
<td>Class</td>
<td>IX</td>
</tr>
<tr>
<td>Duration</td>
<td>30 Minutes</td>
</tr>
</tbody>
</table>

Expected Cognitive Behaviour Outcomes:
Enable the learners to:

**Remember:** Express the pure substance.

**Understand:** Comprehend the mixture.

**Apply:** Use the concept of separation of compound of a mixture.

**Analyze:** Examine the homogeneous and heterogeneous mixture.

**Evaluation:** Justify the difference between elements and components.

**Create/Problem Solving:** To solve the problems related to the mixture.

Resource Material Required:

Text Book, Notebook, Black Board and Pictures

Outline/Summary of the Concept:

A pure substance consists of a single type of particles. Mixtures are constituent by more than one kind of matter known as a substance. A mixture which has a uniform constitution throughout called homogeneous mixture. A mixture which contain physically distinct and have non-uniform composition is called heterogeneous mixture. On the basis of their chemical composition, substances can be classified either elements or compound. Elements as a basic form of matter that cannot be broken down into simpler substance by chemical reaction. Elements divided into metal and non-metals. Metals are lustrous, heat conductor, ductile and sonorous. Non-metals are usually variety of colour, poor conductor of heat non-lustrous and non-sonorous. A compound is a substance composed of two or more elements, chemically combined with one another in a fixed proportion.

Methodology to be used:

Face to Face Strategy, Lecture-cum-Demonstration and Discussion Methods
Entry Behaviour Testing:
The investigator will ask the following:
1. Name the matter around us.
2. What is matter?
3. Is Matter Around Us Pure?
4. What is the meaning of mixture?
5. What is an element?

Presentation: Today, we will study about Is Matter around Us Pure?

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation /Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pure Substance</td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the learner: What is pure substance?</td>
<td>Learner will give the answer: A pure substance consists of a single type of particles.</td>
<td><img src="resource.image" alt="image" /></td>
<td>Investigator will ask: Investigator will ask: What is pure substance?</td>
</tr>
<tr>
<td>Mixtures</td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the learner: What is pure mixture?</td>
<td>Learner will give the answer: Mixtures are constituent by more than one kind of matter known as a substance.</td>
<td><img src="resource.image" alt="image" /></td>
<td>Investigator will ask: What are pure mixtures?</td>
</tr>
<tr>
<td>Types of mixtures</td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the learner: What are the various types of mixture?</td>
<td>Learner will give the answer: There are two types of mixture i.e. Homogeneous and Heterogeneous mixture</td>
<td><img src="resource.image" alt="image" /></td>
<td>Investigator will ask: Name the types of mixtures.</td>
</tr>
<tr>
<td>Homogeneous Mixture</td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the learner: What is Homogeneous mixture?</td>
<td>Learner will be unable to give the answer and investigator will explore the answer: A mixture which has a uniform constitution throughout called homogeneous mixture.</td>
<td><img src="resource.image" alt="image" /></td>
<td>Investigator will ask: What is Homogeneous mixture?</td>
</tr>
<tr>
<td>Content Highlights</td>
<td>Engagement</td>
<td>Explanation /Elaboration</td>
<td>Exploration</td>
<td>Resource Material</td>
<td>Evaluation</td>
</tr>
<tr>
<td>--------------------</td>
<td>------------</td>
<td>--------------------------</td>
<td>-------------</td>
<td>-------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Heterogeneous Mixture</td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the learner: What is Heterogeneous mixture?</td>
<td>Learner will be unable to give the answer and investigator will explore the answer: A mixture which contain physically distinct and have non-uniform composition called heterogeneous mixture.</td>
<td><img src="image" alt="Heterogeneous Mixture" /></td>
<td>Investigator will ask: What is Heterogeneous mixture?</td>
</tr>
<tr>
<td>Elements</td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the learner: What are elements?</td>
<td>Learner will give the answer: Elements as a basic form of matter that cannot be broken down into simpler substance by chemical reaction.</td>
<td><img src="image" alt="Elements" /></td>
<td>Investigator will ask: What are elements?</td>
</tr>
<tr>
<td>Metals</td>
<td>Investigator will try to involve the learners by asking a question. Learners will unable to give the answer.</td>
<td>Investigator will elaborate: Metals are lustrous, heat conduct, ductile and sonorous.</td>
<td>Learner will give the example of metal: Gold, Silver and Iron</td>
<td><img src="image" alt="Metal" /></td>
<td>Investigator will ask: What is metal?</td>
</tr>
<tr>
<td>Non-Metals</td>
<td>Investigator will try to involve the learners by asking a question. Learners will unable to give the answer.</td>
<td>Investigator will elaborate: Non-metals are usually variety of colour, poor conductor of heat non-lustrous and non sonorous.</td>
<td>Learner will give the example of non-metal: Oxygen, Iodine and Carbon.</td>
<td><img src="image" alt="Non-Metal" /></td>
<td>Investigator will ask: What is non-metal?</td>
</tr>
<tr>
<td>Compound</td>
<td>Investigator will try to involve the learners by asking a question. Learners will unable to give the answer.</td>
<td>Investigator will explain: A compound is a substance composed of two or more elements, chemically combined with one another in a fixed proportion.</td>
<td>Learner will give the answer: Gas highly compressible as compared to solid and liquid.</td>
<td><img src="image" alt="Compound" /></td>
<td>Investigator will ask: What do you mean by compound?</td>
</tr>
</tbody>
</table>
Generalization:
The learner will be able to know about the pure substance, homogeneous and heterogeneous mixture, metal, non-metal and compound.

Terminal Behaviour Testing:
The investigator will give five minutes to learners for one to one interaction on the taught topic. After that he will ask questions from them.

1. What is pure substance?
2. What is the difference between homogeneous and heterogeneous mixture?
3. What is the difference between metals and non-metals?

Creative Assignment: Collect some metals and non-metals from your surroundings.

References:
SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.
SCIENCE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.
www.ekshiksha.org.in
https://byjus.com/chemistry/mixtures/
https://www.tutorialspoint.com/chemistry_part1/chemistry_metals_and_non_metals_2.htm
http://slideplayer.com/slide/8279112/
https://www.newslugz.com/what-is-a-compound-definitions-examples-let-us-learn-basics/

*****
Lesson Plan-3

<table>
<thead>
<tr>
<th>Subject</th>
<th>Science</th>
<th>Class</th>
<th>IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>Solution</td>
<td>Duration</td>
<td>30 Minutes</td>
</tr>
</tbody>
</table>

Expected Cognitive Behaviour Outcomes:

Enable the learners to:

**Remember:** Express the solution.

**Understand:** Comprehend the solution.

**Apply:** Use the concept of solution.

**Analyze:** Examine the solvent and solute.

**Evaluation:** Justify the difference between solvent and solute.

**Create/Problem Solving:** To solve the problems related to the solution.

Resource Material Required:

Text Book, Notebook, Black Board and Pictures

Outline/Summary of the Concept:

Mixtures are constituent by more than one kind of matter known as a substance. Mixture has two types i.e. homogeneous and heterogeneous mixture. A solution is a homogeneous mixture of two or more substance. Solution as a liquid that contains either solid, liquid or a gas dissolved in it. In solution, there is homogeneity at the particle level. A solution has a solvent and a solute as its components. The component of the solution that dissolves the other component in it is called solvent. The component of the solution that is dissolved in the solvent is called solute. The concentration of a solution is the amount of solute present in a given amount (mass or volume) of solution, or the amount of solute dissolved in a given mass or volume of solvent.

Methodology to be used:

Face to Face Strategy, Lecture-cum-Demonstration and Discussion Methods

Entry Behaviour Testing:

The investigator will ask the following questions:

1. What is the meaning of mixture?
2. What are the types of mixture?
3. What is solution?
### Presentation: Today, we will study about solution.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation /Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixture</td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the learner: What is pure mixture?</td>
<td>Learner will give the answer: Mixtures are constituent by more than one kind of matter known as a substance.</td>
<td><img src="image" alt="Mixture" /></td>
<td>Investigator will ask: What are pure mixtures?</td>
</tr>
<tr>
<td>Types of mixtures</td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the learner: What are the various types of mixture?</td>
<td>Learner will give the answer: There are two types of mixture: Homogeneous and Heterogeneous mixture</td>
<td><img src="image" alt="Mixture" /></td>
<td>Investigator will ask: Name the types of mixtures.</td>
</tr>
<tr>
<td>Solution</td>
<td>Investigator will try to involve the learners by asking a question.</td>
<td>Investigator will ask the learner: What is solution? Investigator will explore the answer: A solution is a homogeneous mixture of two or more substance. Solution as a liquid that contains either solid, liquid or a gas dissolved in it. In solution there is homogeneity at the particle level.</td>
<td>Learner will be unable to give the answer.</td>
<td><img src="image" alt="Solution" /></td>
<td>Investigator will ask: What is solution?</td>
</tr>
<tr>
<td>Solvent</td>
<td>Investigator will try to involve the learners by asking a question.</td>
<td>Investigator will ask the learner: What is Heterogeneous mixture? Investigator will explore the answer: a solution has a solvent and a solute as its components. The component of the solution that dissolves the other component in it is called solvent.</td>
<td>Learner will be unable to give the answer.</td>
<td><img src="image" alt="Solution" /></td>
<td>Investigator will ask: What is solvent?</td>
</tr>
<tr>
<td>Content Highlights</td>
<td>Engagement</td>
<td>Explanation /Elaboration</td>
<td>Exploration</td>
<td>Resource Material</td>
<td>Evaluation</td>
</tr>
<tr>
<td>--------------------</td>
<td>------------</td>
<td>--------------------------</td>
<td>-------------</td>
<td>-------------------</td>
<td>------------</td>
</tr>
<tr>
<td><strong>Solute</strong></td>
<td>Investigator will try to involve the learners by asking a question.</td>
<td>Investigator will ask the learner: What are elements? Investigator will explore the answer: The component of the solution that is dissolved in the solvent is called solute.</td>
<td>Learner will be unable to give the answer.</td>
<td><img src="image" alt="Solution" /></td>
<td>Investigator will ask: What is solute?</td>
</tr>
<tr>
<td><strong>Concentration of a solution</strong></td>
<td>Investigator will try to involve the learners by asking a question.</td>
<td>Investigator will elaborate: The concentration of a solution is the amount of solute present in a given amount (mass or volume) of solution, or the amount of solute dissolved in a given mass or volume of solvent.</td>
<td>Learner will give the answer: Mass and volume.</td>
<td><img src="image" alt="Concentrated solution" /></td>
<td>Investigator will ask: explain the concentration of a solution</td>
</tr>
</tbody>
</table>

**Generalization:**
The learner will be able to know about the solvent, solute and concentration of a solution.

**Terminal Behaviour Testing:**
The investigator will form the groups of five learners for collaborative learning and he will give the five minutes for the mutual discussion. After that he will ask questions from the learners.

1. What is solution?
2. What is the solute?
3. What is the solvent?
4. Explain the concentration of a solution.

**Creative Assignment:**
Make the list of different types of solutions.

**References:**

SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.

SCIENCE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.


https://www.askiitians.com/iit-jee-solutions-colligative-properties/
Lesson Plan-4

<table>
<thead>
<tr>
<th>Subject</th>
<th>Science</th>
<th>Class :</th>
<th>IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>Separation of Components of A Mixture</td>
<td>Duration</td>
<td>30 Minutes</td>
</tr>
</tbody>
</table>

**Expected Cognitive Behaviour Outcomes:**

Enable the learners to:

**Remember:** Express the method of separation.

**Understand:** Comprehend the concept of separation.

**Apply:** Use the method of separation.

**Analyze:** Examine the techniques of separation.

**Evaluation:** Justify the results of separation.

**Create/Problem Solving:** To solve the problems related to the method of separation.

**Resource Material Required:**

Text Book, Notebook, Black Board and Pictures

**Outline/Summary of the Concept:**

A pure substance consists of a single type of particles. Mixture is constituted by more than one kind of pure form of matter. A mixture which has a uniform constitution throughout called homogeneous mixture. A mixture which contains physically distinct and have non-uniform composition is called heterogeneous mixture. Mixture can be separated by different method and techniques. We can use evaporation method to separate the volatile components from its non-volatile solute. Sometime the solid particles in a liquid are very small and pass through a filter paper. For such particles the filtration technique cannot be used for separation. Such mixtures are separated by centrifugation. Dye is a mixture of two or more colours. The coloured component that is more soluble in water rises faster and in this way the colours get separated by chromatography. Distillation method is used when components of a mixture containing two miscible liquids that boil without decomposition and have difference in their boiling point. We can obtain different gases from air by fractional distillation method. Crystallization a process that separates a pure solid in the form of its crystals from a solution.
Methodology to be used:

Face to Face Strategy, Lecture-cum-Demonstration and Discussion Methods

Entry Behaviour Testing:

The investigator will ask the questions from the learners.

1. Name the matter around us.
2. What is matter?
3. Is Matter Around Us Pure?
4. What is the meaning of mixture?
5. How can we get pure substances?

Presentation: Today, we will study about Separation of components of a mixture

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation /Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixtures</td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the learner: What are mixtures?</td>
<td>Learner will give the answer: Mixtures are constituent by more than one kind of matter.</td>
<td><img src="Mixture.png" alt="Image" /></td>
<td>Investigator will ask: What are mixtures?</td>
</tr>
<tr>
<td>Separation of volatile components from its non-volatile solute.</td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the learner: How can we get separate volatile components from its non-volatile solute?</td>
<td>Learner will give the answer: We can use evaporation method to separate the volatile components from its non-volatile solute.</td>
<td>![Image](Separating Mixture Suspension.png)</td>
<td>Investigator will ask: How can we get separate volatile components from its non-volatile solute?</td>
</tr>
<tr>
<td>Centrifugation Technique</td>
<td>Investigator will try to involve the learners by asking a question. How can we get separate if solid particles in a liquid are very small and pass through a filter paper? Learners will unable to give the answer.</td>
<td>Investigator will explain: If solid particles in a liquid are very small and pass through a filter paper. For such particles the filtration technique cannot be used for separation. Such mixtures are separated by centrifugation.</td>
<td>Investigator will ask the example and learner will give example: Cream from milk</td>
<td>![Image](Centrifugation Technique.png)</td>
<td>Investigator will ask: What is centrifugation technique?</td>
</tr>
</tbody>
</table>
### Generalization:

The learner will be able to know about the evaporation, centrifugation, chromatography, distillation and crystallization method.

### Terminal Behaviour Testing:

The investigator will give five minutes to learners for one to one interaction on the taught topic. After that he will ask questions from them.

1. What is mixture?
2. What is centrifugation technique?
3. What is chromatography technique?
4. What is distillation method?
5. What is crystallization method?
**Creative Assignment:**

Perform activity based on evaporation and crystallization method at home and write the results.

**References:**

SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.

SCIENCE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.


https://byjus.com/chemistry/centrifugation/

https://en.wikipedia.org/wiki/Paper_chromatography


http://www.docbrown.info/page01/ElCpdMix/ElCpdMix2c.htm

*****
Lesson Plan-5

<table>
<thead>
<tr>
<th>Subject</th>
<th>Science</th>
<th>Class</th>
<th>IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>Writing Chemical Formulae</td>
<td>Duration</td>
<td>30 Minutes</td>
</tr>
</tbody>
</table>

Expected Cognitive Behaviour Outcomes:

Enable the learners to:

Remember: Express the method of writing chemical formulae.

Understand: Comprehend the concept of writing chemical formulae.

Apply: Use the writing chemical formulae in examination.

Analyze: Examine the techniques of writing chemical formulae.

Evaluation: Justify the results of writing chemical formulae.

Create/Problem Solving: To write another chemical formulae compound.

Resource Material Required:

Text Book, Notebook, Black Board and Pictures

Outline/Summary of the Concept:

The chemical formula of a compound is a symbolic representation of its composition. The combining power or capacity of an element is known as its valency. The valencies or charges on the ion must balance. When a compound consists of a metal and a non-metal, the name or symbol of the metal is written first. Names of metals are written on the left side whereas those of non-metals are written on the right side. While writing the chemical formulae for compounds, we write the constituent elements and their valencies and we must cross over the valencies of the combining atoms.

Methodology to be used:

Face to Face Strategy, Lecture-cum-Demonstration and Discussion Methods

Entry Behaviour Testing:

The investigator will ask the question from the learners:

1. What are symbols?
2. What is valency?
3. What are the rules of writing the chemical formulae?
4. How we can write the chemical formulae
**Presentation:** Today, we will study about writing chemical formulae.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation /Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chemical Formula</strong></td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the learner: What is chemical formula?</td>
<td>Learner will give the answer: The chemical formula of a compound is a symbolic representation of its composition.</td>
<td>H₂SO⁴</td>
<td>Investigator will ask: What is chemical formula?</td>
</tr>
<tr>
<td><strong>Valency</strong></td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the learner: What is valancy?</td>
<td>Learner will give the answer: The combining power or capacity of an element is known as its valency. The valencies or charges on the ion must balance.</td>
<td>![Valency Diagram]</td>
<td>Investigator will ask: What is valancy?</td>
</tr>
<tr>
<td><strong>How to write chemical formulae?</strong></td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the learner: Do you know, How to write chemical formulae?</td>
<td>Learner will give the answer: No, not at all.</td>
<td>![Molecular Structure]</td>
<td>Investigator will ask: Do you know How to write chemical formulae?</td>
</tr>
<tr>
<td><strong>How to write chemical formulae?</strong></td>
<td>Investigator will try to involve the learners by using blackboard. Learners will show keen interest.</td>
<td>Investigator will elaborate: How to write chemical formulae? When a compound consists of a metal and a non-metal, the name or symbol of the metal is written first. Names of metals are written on the left side whereas those of non-metals are written on the right side. While writing the chemical formulae for compounds, we write the constituent elements and their valencies and we must cross over the valencies of the combining atoms.</td>
<td>Learner will show keen interest and give the answer of the investigator.</td>
<td>![Zinc Hydroxide]</td>
<td>Investigator will ask: Do you know How to write chemical formulae?</td>
</tr>
</tbody>
</table>
Appendices

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation /Elaboration/</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examples of writing chemical formulae</td>
<td>Investigator will try to involve the learners by asking write another chemical formula. Learners will write chemical formulae.</td>
<td>Investigator will explain: How to write another chemical formula?</td>
<td>Learner will write chemical formulae.</td>
<td>[Image of Chemical Formula: $\text{AlCl}_3$]</td>
<td>Investigator will ask write chemical formula.</td>
</tr>
</tbody>
</table>

Generalization:
The learner will be able to know about chemical formulae, valency and how to write chemical formulae?

Terminal Behaviour Testing:
The investigator will form peer groups. After that he will give them five minutes for mutual discussion. Then he will ask questions from the learners.

1. What is chemical formula?
2. How to write chemical formulae?
3. Write another chemical formula with an example.

Creative Assignment:
Do practice to write chemical formulae with help of examples.

References:
SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.
SCIENCE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.
http://kuntal.org/msipstudentslogin/pages/view/1173/chapter-5-chemistry
https://www.youtube.com/watch?v=mQpNjm7xB30
https://www.slideshare.net/nazimah55/how-to-write-chemical-formulacomplete

*****

xxviii
Lesson Plan-6

<table>
<thead>
<tr>
<th>Subject</th>
<th>Science</th>
<th>Class</th>
<th>IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>Cell</td>
<td>Duration</td>
<td>30 Minutes</td>
</tr>
</tbody>
</table>

Expected Cognitive Behaviour Outcomes:

Enable the learners to:

**Remember:** Express the cell.

**Understand:** Comprehend the plant and animal cell.

**Apply:** Use the knowledge of cell.

**Analyze:** Examine the prokaryotic and eukaryotic cell.

**Evaluation:** Justify the difference between plant and animal cell.

**Create/Problem Solving:** To solve the problems related to the topic.

**Resource Material Required:**

Text Book, Notebook, Black Board and Pictures

**Outline/Summary of the Concept:**

The fundamental organisational unit of life is the cell. In the plant cell, cell wall, plastids dictyosomes are present, nucleus lies on side in the peripheral cytoplasm, reserve food is starch, centrosome absent, large vacuoles occurs, present and plant cell are larger in size and cannot change their shape. In the animal cell, cell wall, plastids are absent, centrosomes, large vacuoles, complex Golgi apparatus and nucleus are present and stored food material is glycogen. Animal cells are smaller in size and can change their shape. Prokaryotic cell smaller in size, cell organalles, mitosis, nucleus and nucleolus are absent. A single prochromosome is present. Eukaryotic cell larger in size, membrane bound cell organelles, a typical mitosis, nucleus and nucleolus are present. Two to several chromosomes are present.

**Methodology to be used:**

Face to Face Strategy, Lecture-cum-Demonstration and Discussion Methods

**Entry Behaviour Testing:**

The investigator will ask the following questions:
1. What is unit of life?
2. What are cells?
3. What is the difference between plant and animal cells?
4. What is the difference between prokaryotic and eukaryotic cells?

**Presentation:** Today, we will study about cell.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation /Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cell</strong></td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the learner: What is cell?</td>
<td>Learner will give the answer: The fundamental organisational unit of life is the cell.</td>
<td>![Plant Cell Image]</td>
<td>Investigator will ask: What is cell?</td>
</tr>
<tr>
<td><strong>Plant Cell</strong></td>
<td>Investigator will try to involve the learners by showing pictures. Learners will show keen interest.</td>
<td>Investigator will explain: The plant cell, cell wall, plastids dictyosomes are present, nucleus lies on side in the peripheral cytoplasm, reserve food is starch, centrosome absent, large vacuoles occurs, present and plant cell are larger in size and cannot change their shape.</td>
<td>Learner will clarify their doubts.</td>
<td>![Plant Cell Image]</td>
<td>Investigator will ask: How cell divide?</td>
</tr>
<tr>
<td><strong>Animal Cell</strong></td>
<td>Investigator will try to involve the learners by showing pictures. Learners will show keen interest.</td>
<td>Investigator will explain: The animal cells, cell wall, plastids are absent, centrosomes, large vacuoles, complex Golgi apparatus and nucleus are present and stored food material is glycogen. Animal cell are smaller in size and can change their shape.</td>
<td>Learner will clarify their doubts.</td>
<td>![Animal Cell Image]</td>
<td>Investigator will ask: What is physical nature of matter?</td>
</tr>
</tbody>
</table>
**Generalization:**

The learner will be able to know about the cell, Plant cell, animal cell, prokaryotic cell and eukaryotic cell.

**Terminal Behaviour Testing:**

The investigator will form the groups of five learners for collaborative learning and he will give the five minutes for the mutual discussion. After that he will ask questions from the learners.

1. **What are cells?**
2. **What is the difference between plant and animal cell?**
3. **What is the difference between prokaryotic and eukaryotic cell?**

**Creative Assignment:**

Draw the well-labeled diagrams of plant, animal, prokaryotic and eukaryotic cell.
Appendices

References:

SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.

SCIENCE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.


http://pulpbits.net/5-plant-cell-activities-for-kids/childrens-plant-cell-activities/
https://sites.google.com/a/students.mgsd.k12.nc.us/adonis-abdullah/9th-grade/honors-
http://www.sparklebox.co.uk/previews/11851-11875/sb11866-label--animal-cell-
worksheets.html#.WnlGU9R95kg

*****
Lesson Plan-7

<table>
<thead>
<tr>
<th>Subject</th>
<th>Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class</td>
<td>IX</td>
</tr>
<tr>
<td>Topic</td>
<td>Structural Organisation of a cell</td>
</tr>
<tr>
<td>Duration</td>
<td>30 Minutes</td>
</tr>
</tbody>
</table>

**Expected Cognitive Behaviour Outcomes:**

Enable the learners to:

**Remember:** Express the cell.

**Understand:** Comprehend the organelles.

**Apply:** Use the knowledge of cell.

**Analyze:** Examine how a cell is organized?

**Evaluation:** Justify the function of organelles.

**Create/Problem Solving:** To solve the problems related to the topic.

**Resource Material Required:**

Text Book, Notebook, Black Board and Pictures

**Outline/Summary of the Concept:**

The fundamental organizational unit of life is the cell. Cell has special components called organelles. Plasma membrane or cell membrane of the cell separates the contents of the cell from its external environments. Another rigid outer covering called cell wall. Nucleus has a double-layered covering called nuclear membrane. Nucleus contains chromosomes, which are visible as rod-shape structures. The cytoplasm is the fluid content inside the plasma membrane. It also contains many specialized cell organelles. The Endoplasmic Reticulum is a large network of membrane-bound tubes and sheets. The Golgi apparatus consists of a system of membrane-bound vesicles arranged approximately parallel to each other in stacks called cisterns. Lysosomes are a kind of waste disposal system of the cell. Lysosomes are also known as the suicide bags of a cell. Mitochondria are known as the powerhouses of the cell. The energy is released by mitochondria in the form of ATP (Adenosine triphosphate) molecules. Plastids that are present only in plant cells which contains the pigment ‘chlorophyll’ are known as chloroplasts. Vacuoles are storage sacs for solid or liquid contents.
**Methodology to be used:**
Face to Face Strategy, Lecture-cum-Demonstration and Discussion Methods

**Entry Behaviour Testing:**
The investigator will ask the following questions:

1. What is cell?
2. What do you mean by cell organelles?
3. What is the function of cell organelles?
4. What are the different types of organelles?
5. What is the structural organisation of a cell?

**Presentation:** Today, we will study about structural organisation of a cell.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement/Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cell</strong></td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the learner: What is cell?</td>
<td>Learner will give the answer. The fundamental organizational unit of life is the cell.</td>
<td>Investigator will ask: What is cell?</td>
</tr>
<tr>
<td><strong>Plasma Membrane</strong></td>
<td>Investigator will try to involve the learners by showing picture. Learners will give the answer.</td>
<td>Investigator will explain Plasma membrane or cell membrane of the cell separates the contents of the cell from its external environments.</td>
<td>Learner will clarify their doubts.</td>
<td>Investigator will ask: What is plasma membrane?</td>
</tr>
<tr>
<td><strong>Cell Wall</strong></td>
<td>Investigator will try to involve the learners by showing picture. Learners will perform the activities.</td>
<td>Investigator will explain Another rigid outer covering called cell wall.</td>
<td>Learner will clarify their doubts.</td>
<td>Investigator will ask: What do you mean by cell?</td>
</tr>
<tr>
<td><strong>Nucleus</strong></td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will explain Nucleus has a double layered covering called nuclear membrane. Nucleus contains chromosomes, which are visible as rod-shape structures.</td>
<td>Learner will clarify their doubts.</td>
<td>Investigator will ask: What is nucleolus?</td>
</tr>
<tr>
<td>Content Highlights</td>
<td>Engagement</td>
<td>Explanation /Elaboration</td>
<td>Exploration</td>
<td>Resource Material</td>
</tr>
<tr>
<td>--------------------</td>
<td>------------</td>
<td>--------------------------</td>
<td>-------------</td>
<td>-------------------</td>
</tr>
<tr>
<td><strong>Cytoplasm</strong></td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will explain: The cytoplasm is the fluid content inside the plasma membrane. It also contains many specialized cell organelles.</td>
<td>Learner will clarify their doubts.</td>
<td><a href="#">Cytoplasm</a></td>
</tr>
<tr>
<td><strong>Endoplasmic Reticulum</strong></td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will explain: The Endoplasmic Reticulum is a large network of membrane-bound tubes and sheets.</td>
<td>Learner will clarify their doubts.</td>
<td><a href="#">Endoplasmic Reticulum</a></td>
</tr>
<tr>
<td><strong>Golgi Apparatus</strong></td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will explain: The Golgi apparatus consists of a system of membrane-bound vesicles arranged approximately parallel to each other in stacks called cisterns.</td>
<td>Learner will clarify their doubts.</td>
<td><a href="#">Golgi Apparatus</a></td>
</tr>
<tr>
<td><strong>Lysosomes</strong></td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will explain: Lysosomes are a kind of waste disposal system of the cell. Lysosomes are also known as the suicide bags of a cell.</td>
<td>Learner will clarify their doubts.</td>
<td><a href="#">Lysosomes</a></td>
</tr>
<tr>
<td><strong>Mitochondria</strong></td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will explain: Mitochondria are known as the powerhouses of the cell. The energy is released by mitochondria in the form of ATP molecules.</td>
<td>Learner will clarify their doubts.</td>
<td><a href="#">Mitochondria</a></td>
</tr>
<tr>
<td><strong>Plastids</strong></td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will explain: Plastids that are present only in plant cells which contains the pigment ‘chlorophyll’ are known as chloroplasts.</td>
<td>Investigator will ask: What is Plastids?</td>
<td><a href="#">Plastids</a></td>
</tr>
</tbody>
</table>
Appendices

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement /Elaboration</th>
<th>Explanation</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vacuoles</td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will explain: Vacuoles are storage sacs for solid or liquid contents.</td>
<td>Investigator will ask: What is vacuole?</td>
<td>Investigator will ask: What is vacuole?</td>
<td></td>
</tr>
</tbody>
</table>

**Generalization:**

The learner will be able to know about cell, plasma membrane, cell wall, nucleus, cytoplasm, endoplasmic reticulum, golgi apparatus, lysosomes, mitochondria, plastids and vacuoles.

**Terminal Behaviour Testing:**

The investigator will give five minutes to learners for one to one interaction on the taught topic. After that he will ask questions from them.

1. What is nucleus?
2. What are mitochondria?
3. What do you mean by lysosomes?

**Creative Assignment:**

Write short note on suicidal bags and power house of the cell.

**References:**

SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.
SCIENCE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.
http://pulpbits.net/5-plant-cell-activities-for-kids/childrens-plant-cell-activities/
http://slideplayer.com/slide/8217646/
http://www.thinkscience.org/cellbook/cellwall.html
https://schools.aglasem.com/2307
https://jrobinsonparletteorganelles.weebly.com/basic-cell-components.html
http://www.stephsnature.com/lifescience/ER.htm
https://sites.google.com/site/chsanatomyphysiology27/home/golgi-apparatus
https://byjus.com/biology/lysosomes-structure-function/
http://science.halleyhosting.com/sci/soph/energy/resp/notes/mito.htm
http://www.sivabio.50webs.com/plastids.htm
Lesson Plan-8

<table>
<thead>
<tr>
<th>Subject</th>
<th>Science</th>
<th>Class</th>
<th>IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>Tissues-Plant Tissues</td>
<td>Duration</td>
<td>30 Minutes</td>
</tr>
</tbody>
</table>

Expected Cognitive Behaviour Outcomes:

Enable the learners to:

**Remember**: Express the tissues.

**Understand**: Comprehend the plant tissues.

**Apply**: Use the knowledge of plant tissues.

**Analyze**: Examine plant tissues?

**Evaluation**: Justify the function of plant tissues.

**Create/Problem Solving**: To solve the problems related to the topic.

**Resource Material Required**:

Text Book, Notebook, Black Board and Pictures

**Outline/Summary of the Concept**:

A group of cells that is similar in structure and/or works to achieve a particular function forms a tissue. Tissue is a group of cells similar in structure and functions. In other words, a cluster of cell is called tissue. Plant tissues are two main types meristematic and permanent tissues. The growth of plants occurs only in certain specific regions. This is because dividing tissue, also known as meristematic tissue, is located only at these points. Meristematic Tissue is divided into apical, intercalary and lateral meristem. Cells take up a specific role and lose the ability to divide. As a result, they form a permanent tissue. Permanent Tissue is again divided into two type i.e. simple permanent tissue and complex permanent tissue. Simple permanent tissue is made of one type of cells which look like each other. Parenchyma tissue provides packing, chlorenchyma tissue performs photosynthesis, arencyma tissue gives buoyancy and collenchymas tissue provides flexibility, sclerenchyma tissue makes the plant hard and stiff. Complex permanent tissues are made of more than one type of cells. All these cells coordinate to perform a common function. Xylem and phloem are example of such complex tissue. Xylem consists of tracheids, vessels, xylem parenchyma and xylem fibers. Xylem allows the transport of water and minerals.
vertically. Phloem is made up of four types of elements: sieve tubes, companion cells, phloem fibers and the phloem parenchyma. Phloem transports food from leaves to other parts of the plant.

**Methodology to be used:**

Face to Face Strategy, Lecture-cum-Demonstration and Discussion Methods

**Entry Behaviour Testing:**

The investigator will ask the following questions:

1. What is cell?
2. What do you understand by plant tissue?
3. What are the types of permanent tissue?

**Presentation:** Today, we will study about plant tissue.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement /Elaboration</th>
<th>Explanation</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tissue</strong></td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the learner: What is Tissue?</td>
<td>Learner will give the answer: A group of cells that is similar in structure and/or works to achieve a particular function forms a tissue. Tissue is a group of cells similar in structure and functions. In other words, a cluster of cell is called tissue.</td>
<td></td>
<td>Investigator will ask: What is Tissue?</td>
</tr>
<tr>
<td><strong>Meristematic Tissues</strong></td>
<td>Investigator will try to involve the learners by asking a question. Name the types of plant tissue and Explain</td>
<td>Investigator will explain: The meristematic tissue the growth of plants occurs only in certain specific regions. This is because dividing tissue, also known as meristematic tissue</td>
<td>Learner will listen carefully.</td>
<td></td>
<td>Investigator will ask: What are the types of meristematic tissue?</td>
</tr>
<tr>
<td>Content Highlights</td>
<td>Engagement</td>
<td>Explanation /Elaboration</td>
<td>Exploration</td>
<td>Resource Material</td>
<td>Evaluation</td>
</tr>
<tr>
<td>-------------------</td>
<td>------------</td>
<td>--------------------------</td>
<td>-------------</td>
<td>------------------</td>
<td>------------</td>
</tr>
<tr>
<td>one plant tissue. Learners will give the answer.</td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>is located only at these points. Meristematic Tissue is divided into apical, intercalary and lateral meristem.</td>
<td>Learner will give the answer: Cells take up a specific role and lose the ability to divide. As a result, they form a permanent tissue and it is divided into two types: Simple permanent tissue and complex permanent tissue.</td>
<td>Investigator will ask: What is permanent tissue?</td>
<td></td>
</tr>
<tr>
<td><strong>Permanent Tissues</strong></td>
<td>Investigator will ask the learner: What is permanent tissue?</td>
<td>Learner will give the answer: Cells take up a specific role and lose the ability to divide. As a result, they form a permanent tissue and it is divided into two types: Simple permanent tissue and complex permanent tissue.</td>
<td>Investigator will ask: What is permanent tissue?</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Simple Permanent Tissue</strong></td>
<td>Investigator will try to involve the learners by asking a question. Investigator will ask the learner: What is simple tissue? Investigator will explain: The simple permanent tissue are made of one type of cells which look like each other. All these cells are coordinate to perform functions. Parenchyma tissue provides packing, chlorenchyma tissue performs photosynthesis, areenchyma tissue gives buoyancy and collenchymas tissue provides flexibility, sclerenchyma tissue makes the plant hard and stiff. Learner will be unable to give the answer: What is simple tissue?</td>
<td></td>
<td>Investigator will ask: What is simple permanent tissue?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Appendices

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation /Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complex Permanent Tissue.</td>
<td>Investigator will try to involve the learners by asking a question.</td>
<td>Investigator will ask the learner: What is simple tissue? Investigator will explain: The complex permanent tissue are made of more than one type of cells. All these cells coordinate to perform a common function. Xylem and phloem are example of such complex tissue.</td>
<td>Learner will be unable to give the answer: What is complex tissue?</td>
<td><img src="image" alt="Complex Tissue" /></td>
<td>Investigator will ask: Explain the Complex Tissue.</td>
</tr>
<tr>
<td>Xylem</td>
<td>Investigator will try to involve the learners by asking a question.</td>
<td>Investigator will ask the learner: What is xylem? Investigator will ask the question: then explain xylem and phloem are example of complex tissue. Xylem consists of tracheids, vessels, xylem parenchyma and xylem fibers. Xylem allows the transport of water and minerals vertically.</td>
<td>Learner will be unable to give the answer: What is xylem?</td>
<td><img src="image" alt="Xylem" /></td>
<td>Investigator will ask: What is xylem?</td>
</tr>
<tr>
<td>Phloem</td>
<td>Investigator will try to involve the learners by asking a question.</td>
<td>Investigator will ask the learner: What is phloem? Investigator will explain: Phloem is made up of four types of elements: sieve tubes, companion cells, phloem fibers and the phloem parenchyma. Phloem transports food from leaves to other parts of the plant.</td>
<td>Learner will be unable to give the answer: What is phloem?</td>
<td><img src="image" alt="Phloem" /></td>
<td>Investigator will ask: What do you mean by phloem?</td>
</tr>
</tbody>
</table>

### Generalization:

The learner will be able to know about the tissue, meristematic tissues, permanent tissues, simple permanent tissue, complex permanent tissue, xylem and phloem.
Terminal Behaviour Testing:

The investigator will form peer groups. After that he will give them five minutes for mutual discussion. Then he will ask questions from the learners.

1. What is meristematic tissue?
2. What is a permanent tissue?
3. What do you mean by xylem and phloem?

Creative Assignment:
List the difference between xylem and phloem.

References:
SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.
SCIENCE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.
https://byjus.com/biology/animal-tissue-vs-plant-tissue/
http://igcse-biology-edexcel.blogspot.in/2015/12/252-describe-role-of-xylem-in.html
https://www.diffen.com/difference/Phloem_vs_Xylem.

*****
Lesson Plan-9

<table>
<thead>
<tr>
<th>Subject</th>
<th>Science</th>
<th>Class</th>
<th>IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>Tissues-Animal Tissues</td>
<td>Duration</td>
<td>30 Minutes</td>
</tr>
</tbody>
</table>

Expected Cognitive Behaviour Outcomes:

Enable the learners to:

**Remember:** Express the tissues.

**Understand:** Comprehend the animal tissues.

**Apply:** Use the knowledge of animal tissues.

**Analyze:** Examine plant and animal tissues?

**Evaluation:** Justify the function of animal tissues.

**Create/Problem Solving:** To solve the problems related to the topic.

Resource Material Required:

Text Book, Notebook, Black Board and Pictures

Outline/Summary of the Concept:

Tissue is a group of cells similar in structure and functions. Animal tissues can be epithelial, connective, muscular and nervous tissue. The covering or protective tissues in the animal body are epithelial tissues. Depending on shape and function, epithelial tissue is classified as squamous, cuboidal, columnar, ciliated and glandular. Different types of connective tissues in our body include areolar tissue, adipose tissue, bone, tendon, ligament, cartilage and blood. Muscular tissue consists of elongated cell also called muscle fibres. Striated, unstriated and cardial are three types of muscle tissues. Nervous tissue is made of neurons that receive and conduct impulses.

Methodology to be used:

Face to Face Strategy, Lecture-cum-Demonstration and Discussion Methods

Entry Behaviour Testing:

The investigator will ask the following questions:

1. What is tissue?
2. What do you mean by plant tissue?
3. What are animal tissues?
**Presentation:** Today, we will study about animal tissues.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation /Elaboration/</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tissue</td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the learner: What is tissue?</td>
<td>Learner will give the answer: Tissue is a group of cells similar in structure and functions.</td>
<td><img src="image1.png" alt="Resource Material" /></td>
<td>Investigator will ask: What is tissue?</td>
</tr>
<tr>
<td>Animal Tissue</td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the learner: What is animal tissue?</td>
<td>Learner will give the answer: Animal tissues can be epithelial, connective, muscular, and nervous tissue.</td>
<td><img src="image2.png" alt="Resource Material" /></td>
<td>Investigator will ask: What is animal tissue?</td>
</tr>
<tr>
<td>Epithelial Tissue</td>
<td>Investigator will try to involve the learners by asking a question.</td>
<td>Investigator will ask the learner: What is epithelial tissue? Investigator will explain: The covering or protective tissues in the animal body are epithelial tissues. Depending on shape and function, epithelial tissue is classified as squamous, cuboidal, columnar, ciliated and glandular.</td>
<td>Learner will be unable to give the answer of the question: What is epithelial tissue?</td>
<td><img src="image3.png" alt="Resource Material" /></td>
<td>Investigator will ask: What is epithelial tissue?</td>
</tr>
<tr>
<td>Connective Tissue</td>
<td>Investigator will try to involve the learners by asking a question.</td>
<td>Investigator will ask the learner: What is connective tissue? Investigator will explain: Different types of connective tissues in our body include areolar tissue, adipose tissue, bone, tendon, ligament, cartilage and blood.</td>
<td>Learner will be unable to give the answer of the question: What is connective tissue?</td>
<td><img src="image4.png" alt="Resource Material" /></td>
<td>Investigator will ask: What is connective tissue?</td>
</tr>
</tbody>
</table>
Muscular Tissue

Investigator will try to involve the learners by asking a question.

Investigator will ask the learner: What is muscular tissue?

Investigator will explain: Muscular tissue consists of elongated cell also called muscle fibres. Striated, unstriated and cardial are three types of muscle tissues.

Learner will be unable to give the answer of the question: What is muscular tissue?

Investigator will ask:

What is muscular tissue?

Nervous Tissue

Investigator will try to involve the learners by asking a question.

Investigator will ask the learner: What is nervous tissue?

Investigator will explain: Nervous tissue is made of neurons that receive and conduct impulses.

Learner will be unable to give the answer of the question: What is nervous tissue?

Investigator will ask:

What is nervous tissue?

Generalization:

The learner will be able to know about the animal tissues, epithelial tissue, connective tissue, muscular tissue and nervous tissue.

Terminal Behaviour Testing:

The investigator will give five minutes to learners for one to one interaction on the taught topic. After that he will ask questions from them.

1. What is epithelial tissue?
2. What is connective tissue?
3. What do you mean by muscular tissue?
4. What is nervous tissue?

Creative Assignment:

List the difference between ligament and tendon.
References:
SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.
SCIENCE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.
http://www.articlesweb.org/health/human-body-tissues-different-types-and-their-importance
https://socratic.org/questions/what-are-the-three-general-cell-shapes-of-epithelial-tissue
https://www.slideshare.net/aayushivasani/connective-tissue-60078215
https://www.scientistcindy.com/muscle-tissue.html
http://hcsnervoussystem.weebly.com/make-a-neuron.html

*****
Lesson Plan-10

<table>
<thead>
<tr>
<th>Subject</th>
<th>Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>Graphical Representation of Motion</td>
</tr>
<tr>
<td>Class</td>
<td>IX</td>
</tr>
<tr>
<td>Duration</td>
<td>30 Minutes</td>
</tr>
</tbody>
</table>

**Expected Cognitive Behaviour Outcomes:**

Enable the learners to:

- **Remember**: Express the motion.
- **Understand**: Comprehend the graphs.
- **Apply**: Use the knowledge of graphical representation of motion in the examination.
- **Analyze**: Examine the making of graphs.
- **Evaluation**: Justify the value of graphs.
- **Create/Problem Solving**: To solve the problems related to the topic in the tests.

**Resource Material Required:**

Text Book, Notebook, Black Board and Pictures.

**Outline/Summary of the Concept:**

Graphs provide a convenient method to present basic information about variety of events. To describe the motion of an object, we can use line graphs. Graphing or plotting is done with reference to two lines or coordinate, the one the vertical or y-axis, the other the horizontal or x-axis. The point of intersection of x-axis and y-axis is called origin. A distance versus time graph is a graph that shows distance on the y-axis and time on the x-axis. Line graphs show dependence of one physical quantity, such as distance or velocity, on another quantity, such as time.

**Methodology to be used:**

Face to Face Strategy, Lecture-cum-Demonstration and Discussion Methods

**Entry Behaviour Testing:**

The investigator will ask the following questions:

1. What is motion?
2. What is the method to present basic information about variety of events?
3. What do you mean by graph?
Presentation: Today, we will study the topic graphical representation of motion.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement /Elaboration</th>
<th>Explanation</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graphs</td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the learner: What is a graph?</td>
<td>Learner will give the answer: Graphs provide a convenient method to present basic information about variety of events. To describe the motion of an object, we can use line graphs.</td>
<td><img src="image" alt="Graph" /></td>
<td>Investigator will ask: What is a graph?</td>
</tr>
<tr>
<td>How can graph or plotting be done?</td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the learner: How can graph or plotting be done? Investigator will explain: Graphing or plotting is done with reference to two lines or coordinate, the one the vertical or y-axis, the other the horizontal or x-axis. The point of intersection of x-axis and y-axis is called origin.</td>
<td>Learner will be unable to give the answer the question: How can graph or plotting be done?</td>
<td><img src="image" alt="Graph" /></td>
<td>Investigator will ask: How can graph or plotting be done?</td>
</tr>
<tr>
<td>How Distance vs. Time Graphs be plotted?</td>
<td>Investigator will try to involve the learners by asking a question. Learners will perform the activities.</td>
<td>Investigator will ask the learner: How distance can be measure? Investigator will explain: A distance versus time graph is a graph that shows distance on the y-axis and time on the x-axis.</td>
<td>Learner will be unable to give the answer the question: How distance can be measure?</td>
<td><img src="image" alt="Graph" /></td>
<td>Investigator will ask: How distance can be measure?</td>
</tr>
</tbody>
</table>
### Generalization:

The learner will be able to know about the graphs, how can graph or plotting be done? How can the distance be measured? Also draw the line graphs.

### Terminal Behaviour Testing:

The investigator will form the groups of five learners for collaborative learning and he will give the five minutes for the mutual discussion. After that he will ask questions from the learners.

1. What is a graph?
2. How can graph or plotting be done?
3. How can the distance be measured?

### Creative Assignment:

Do practice, how to plot graph?

### References:

SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.

SCIENCE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.


---

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement Highlights</th>
<th>Explanation/Elaboration</th>
<th>Exploration Highlights</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line graphs</td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the learner: How small are these particles of matter? Investigator will explain: Line graphs show dependence of one physical quantity, such as distance or velocity, on another quantity, such as time.</td>
<td>Learner will be unable to explain line graph.</td>
<td><img src="image" alt="Line Graph" /></td>
<td>Investigator will ask: What is the size of matter?</td>
</tr>
</tbody>
</table>
Lesson Plan-11

<table>
<thead>
<tr>
<th>Subject</th>
<th>Science</th>
<th>Class</th>
<th>IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>Free Fall, Mass and Weight</td>
<td>Duration</td>
<td>30 Minutes</td>
</tr>
</tbody>
</table>

**Expected Cognitive Behaviour Outcomes:**

Enable the learners to:

**Remember:** Express the free fall.

**Understand:** Comprehend the mass.

**Apply:** Use the knowledge of free fall, mass, weight in daily life.

**Analyze:** Examine the making of mass.

**Evaluation:** Justify the value of weight.

**Create/Problem Solving:** solve the problems related to the topic in the tests.

**Resource Material Required:**

Text Book, Notebook, Black Board and Pictures.

**Outline/Summary of the Concept:**

Whenever objects fall towards the earth under the gravitational force alone, we say that the objects are in free fall. The mass of an object is the measure of its inertia. Inertia is the natural tendency of an object to resist a change in its state of motion or of rest. Greater the mass, the greater is the inertia. The mass of an object is constant and does not change from place to place. Weight of body is the force with which the earth attracts it. The weight is equal to the product of mass and acceleration due to gravity. The weight may vary from place to place but the mass stays constant.

**Methodology to be used:**

Face to Face Strategy, Lecture-cum-Demonstration and Discussion Methods

**Entry Behaviour Testing:**

The investigator will ask the following questions:

1. What is gravity?
2. What do you mean by force of attraction by earth?
3. What is free fall?
4. What do you mean by mass of an object?
5. What is weight?

**Presentation:** Today, we will study about free fall, mass and weight.
<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation /Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Free fall</strong></td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the question: What is free fall? Whenever objects fall towards the earth under the gravitational force alone, we say that the objects are in free fall.</td>
<td>Learner will give the answer:</td>
<td><img src="image1.png" alt="Image" /></td>
<td>Investigator will ask: What is free fall?</td>
</tr>
<tr>
<td><strong>How can inertia be measured?</strong></td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the question: How can inertia be measured? The mass of an object is the measure of its inertia.</td>
<td>Learner will give the answer:</td>
<td><img src="image2.png" alt="Image" /></td>
<td>Investigator will ask: How can inertia be measured?</td>
</tr>
<tr>
<td><strong>Inertia</strong></td>
<td>Investigator will try to involve the learners by asking a question. Learners will perform the activities.</td>
<td>Investigator will ask the question: What is the inertia? Inertia is the natural tendency of an object to resist a change in its state of motion or of rest.</td>
<td>Learner will give the answer:</td>
<td><img src="image3.png" alt="Image" /></td>
<td>Investigator will ask: What is the inertia?</td>
</tr>
<tr>
<td><strong>Relationship between mass and Inertia</strong></td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the question learner: What is the Relation between mass and Inertia? Greater the mass, the greater is the inertia.</td>
<td>Learner will give the answer:</td>
<td><img src="image4.png" alt="Image" /></td>
<td>Investigator will ask: What is the relationship between mass and Inertia?</td>
</tr>
<tr>
<td><strong>Relationship between mass and place</strong></td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the question: What is the Relation between mass and place? The mass of an object is constant and does not change from place to place.</td>
<td>Learner will give the answer:</td>
<td><img src="image5.png" alt="Image" /></td>
<td>Investigator will ask: What is the relationship between mass and place?</td>
</tr>
</tbody>
</table>
Investigator will try to involve the learners by asking a question. Learners will give the answer.

Investigator will ask the question learner: What weight?

The weight is equal to the product of mass and acceleration due to gravity.

Investigator will ask: What is weight?

Investigator will ask: What is the relationship between weight and gravity?

Investigator will ask: What is the relationship between weight and mass?

Investigator will give the answer: The weight may vary from place to place but the mass stays constant.

Investigator will ask: What is free fall?

Investigator will ask: What is inertia?

Investigator will ask: What do you mean by weight?

Investigator will ask: What is the relationship between weight and mass?

Do activity which shows the relationship between weight and gravity?
Appendices

References:
SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.
SCIENCE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.
http://www.batesville.k12.in.us/physics/phynet/mechanics/kinematics/FreeFallIntro.html
https://www.miniphysics.com/inertia.html
http://idahoptv.org/sciencetrek/topics/gravity/facts.cfm
http://hyperphysics.phy-astr.gsu.edu/hbase/mass.html

*****
Lesson Plan-12

<table>
<thead>
<tr>
<th>Subject</th>
<th>Science</th>
<th>Class</th>
<th>IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>Why Do We Fall Ill</td>
<td>Duration</td>
<td>30 Minutes</td>
</tr>
</tbody>
</table>

Expected Cognitive Behaviour Outcomes:

Enable the learners to:

**Remember:** Express the health.

**Understand:** Comprehend the causes of disease.

**Apply:** Use the knowledge of how to prevent from disease?

**Analyze:** Examine the acute and chronic disease.

**Evaluation:** Justify the value of preventive measures.

**Create/Problem Solving:** To solve the problems related to the topic of disease.

**Resource Material Required:**

Text Book, Notebook, Black Board and Pictures.

**Outline/Summary of the Concept:**

Health is a state of physical, mental and social well-being. Disease means disturbed ease. In other words, literally means being uncomfortable. Diseases are classified as acute or chronic, depending on their duration. Disease may be due to infectious or non-infectious causes. Infectious agents are spread through air, water and physical contact or vectors.

**Methodology to be used:**

Face to Face Strategy, Lecture-cum-Demonstration and Discussion Methods.

**Entry Behaviour Testing:**

The investigator will ask the following questions:

1. What is health?
2. What do you mean by disease?
3. What is the acute or chronic disease?
4. What is the infectious or non-infectious cause of disease?
5. Why do we fall ill?
**Presentation**: Today, we will study about why we fall ill.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation /Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td>Investor will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the learner: What is health? Learner will give the answer: Health is a state of physical, mental and social well-being.</td>
<td>Investigator will ask: What is health?</td>
<td><img src="image" alt="Health" /></td>
<td></td>
</tr>
<tr>
<td>Disease</td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the learner: What is disease? Learner will give the answer: Disease means disturbed ease. In other words, literally means being uncomfortable.</td>
<td>Investigator will ask: What is disease?</td>
<td><img src="image" alt="Disease" /></td>
<td></td>
</tr>
<tr>
<td>Classification of Diseases</td>
<td>Investigator will try to involve the learners by activities with ball. Learners will perform the activities.</td>
<td>Investigator will ask the learner: What is the Classification of Diseases? Learner will give the answer i.e. Diseases are classified as acute or chronic, depending on their duration.</td>
<td>Investigator will ask: What is the Classification of Diseases?</td>
<td><img src="image" alt="Classification" /></td>
<td></td>
</tr>
<tr>
<td>Causative Agents of Diseases</td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the learner: What are the Causative Agents of Disease? Learner will give the answer: Disease may be due to infectious or non-infectious causes.</td>
<td>Investigator will ask: What are the Causative Agents of Disease?</td>
<td><img src="image" alt="Causative Agents" /></td>
<td></td>
</tr>
<tr>
<td>Infectious agents of diseases</td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the learner: What are the Infectious agents? Learner will give the answer: Infectious agents are spread through air, water and physical contact or vectors, bacteria, virus, protozoans etc.</td>
<td>Investigator will ask: What are the Infectious agents?</td>
<td><img src="image" alt="Infectious agents" /></td>
<td></td>
</tr>
<tr>
<td>Examples of Infectious agents of diseases</td>
<td>Investigator will try to involve the learners by asking a examples. Learners will give the examples.</td>
<td>Investigator will ask the learner: Give the examples of infectious agents of diseases: Common cold, dengue fever, influenza and AIDS etc.</td>
<td>Investigator will ask: Give the examples of infectious agents of diseases.</td>
<td><img src="image" alt="Examples" /></td>
<td></td>
</tr>
</tbody>
</table>
Generalization:

The learner will be able to know about the health, disease, classification of diseases, causative agents of diseases, infectious agents and examples of infectious agents of diseases.

Terminal Behaviour Testing:

The investigator will form the groups of five learners for collaborative learning and he will give the five minutes for the mutual discussion. After that he will ask questions from the learners.

1. What is health?
2. What is disease?
3. What do you mean by infectious agents of diseases?
4. Give the examples of infectious agents of diseases.

Creative Assignment:

Make the list of infectious agents of diseases.

References:

SCIENCe Textbook for Class IX, Punjab School Education Board, Mohali Punjab.

SCIENCe Textbook for Class IX, National Council of Educational Research and Training, New Delhi.

http://therockdose.com/category/health
https://www.slideshare.net/hhc/knowing-the-disease-concept-of-disease-in-homoeopathy-ii
https://www.slideshare.net/ms_yam/y8-humans-10-infectious-diseases
https://www.slideshare.net/carlosamade58/public-health-and-infectious-disease

*****
Lesson Plan-13

<table>
<thead>
<tr>
<th>Subject</th>
<th>Science</th>
<th>Class</th>
<th>IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>Non- Infectious Diseases</td>
<td>Duration</td>
<td>30 Minutes</td>
</tr>
</tbody>
</table>

Expected Cognitive Behaviour Outcomes:

Enable the learners to:

**Remember**: Express the non-infectious diseases.

**Understand**: Comprehend the non-Infectious agents.

**Apply**: Use the knowledge of how to prevent from disease?

**Analyze**: Examine the infectious or non-infectious diseases.

**Evaluation**: Justify the value of means of spread of diseases.

**Create/Problem Solving**: To solve the problems related to the topic disease.

Resource Material Required:

Text Book, Notebook, Black Board and Pictures.

Outline/Summary of the Concept:

Health is a state of physical, mental and social well-being. Disease means disturbed ease. In other words, disease literally means being uncomfortable. Non-infectious diseases that are not caused by infectious agents. Diseases are spread through air, water and physical contact or vectors, bacteria, virus, protozoans etc. Our body is very large when compared to the microbes. So there are many possible places, organs or tissues, where they could go and spread or cause the disease. To reduce the effect of the disease and to kill the cause of the disease are the principles of treatment. There are two ways or principles of prevention of diseases i.e. one general and one specific to each disease. The general way of infectious diseases can be prevented by public health hygiene measures that reduce exposure to infectious agents. The specific way of infectious diseases can also be prevented by using immunization.

Methodology to be used:

Face to Face Strategy, Lecture-cum-Demonstration and Discussion Methods
Entry Behaviour Testing:
The investigator will ask the following questions:
1. What is health?
2. What is disease?
3. What do you mean by infectious agents of diseases?
4. Why do we fall ill?

Presentation: Today, we will study about non-infectious diseases.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation /Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the learner: What is health?</td>
<td>Learner will give the answer: Health is a state of physical, mental and social well-being.</td>
<td></td>
<td>Investigator will ask: What is health?</td>
</tr>
<tr>
<td>Disease</td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the learner: What is disease?</td>
<td>Learner will give the answer: Disease means disturbed ease. In other words, disease literally means being uncomfortable.</td>
<td></td>
<td>Investigator will ask: What is disease</td>
</tr>
<tr>
<td>Non-infectious Diseases</td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the learner: What is the non-infectious disease?</td>
<td>Learner will give the answer: Non-infectious diseases that are not caused by infectious agents.</td>
<td>Non-infectious Diseases</td>
<td>Investigator will ask: What is the non-infectious disease?</td>
</tr>
<tr>
<td>How do infectious diseases spread?</td>
<td>Investigator will try to involve the learners by asking a question.</td>
<td>Investigator will ask the learner: How do infectious diseases spread? Learner will be unable to give the answer.</td>
<td></td>
<td>How do infectious diseases spread?</td>
<td>Investigator will ask: How do infectious diseases spread?</td>
</tr>
<tr>
<td>Content Highlights</td>
<td>Engagement</td>
<td>Explanation /Elaboration</td>
<td>Exploration</td>
<td>Resource Material</td>
<td>Evaluation</td>
</tr>
<tr>
<td>-------------------</td>
<td>------------</td>
<td>--------------------------</td>
<td>-------------</td>
<td>-------------------</td>
<td>------------</td>
</tr>
<tr>
<td>bacteria, virus, protozoans etc. Our body is very large when compared to the microbes. So there are many possible places, organs or tissues, where they could go and spread or cause the disease.</td>
<td>Investigator will try to involve the learners by asking a question.</td>
<td>Investigator will ask the learner: What are principles of treatment? Investigator will explain: To reduce the effect of the disease and to kill the cause of the disease are the principles of treatment.</td>
<td>Learner will be unable to give the answer.</td>
<td>Investigator will ask: What are principles of treatment?</td>
<td></td>
</tr>
</tbody>
</table>

### Principles of Treatment

<table>
<thead>
<tr>
<th>Principles of Prevention</th>
<th>Investigator will try to involve the learners by asking a question.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investigator will ask the learner: What are principles of prevention? Investigator will explain: There are two ways or principles of prevention of diseases-one general and one specific to each disease. The general way of infectious diseases can be prevented by public health hygiene measures that reduce exposure to infectious agents. The specific way of infectious diseases can also be prevented by using immunization.</td>
<td>Learner will be unable to give the answer.</td>
</tr>
</tbody>
</table>

### Generalization:

The learner will be able to know about the non-infectious diseases, principles of treatment and prevention and how do infectious diseases spread?
Terminal Behaviour Testing:

The investigator will form peer groups. After that he will give them five minutes for mutual discussion. Then he will ask questions from the learners.

1. How do infectious diseases spread?
2. What are principles of treatment?
3. What are principles of prevention?

Creative Assignment: Make the list of infectious and non-infectious agents’ diseases.

References:

SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.

SCIENCE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.

http://therockdose.com/category/health


http://5thgrademirobriga.blogspot.in/

http://slideplayer.com/slide/6658071/

https://www.slideshare.net/shiva23082002/why-do-we-fallill

****
Blended Learning

Module - 2

on

Web Based

Instructions

in

Science

Topics:

1. Sublimation
2. Structure of Atoms
3. Evaporation
4. The Greenhouse Effect
5. Ozone
6. Immunisation
7. Kinetic Energy
8. Potential Energy
9. Structure of Human Ear
10. The Water Cycle
11. The Oxygen Cycle
12. The Carbon Cycle
13. The Nitrogen Cycle
Introduction:

Web Based Instruction strategy have 24/7 access to all learning content, have served in a supplementary role, which the learner learns with different website in the classroom.

Objectives:

i. To increase learner engagement.
ii. To improve learning effectiveness.
iii. High motivation facilitates fast learning with A-V Resources.
iv. Individual differences results into different learning styles.
THIS MODULE PRESENTS AN OVERVIEW OF DIFFERENT TOPICS FROM YOUR SYLLABUS IN THE SUBJECT OF SCIENCE WITH WEB BASED INSTRUCTION STRATEGY:

PAY ATTENTION AS IT WILL HELP YOU TO UNDERSTAND THE SUBJECT MATTER EASILY
Lesson Plan-14

<table>
<thead>
<tr>
<th>Subject</th>
<th>Science</th>
<th>Class</th>
<th>IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>Sublimation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duration</td>
<td>30 Minutes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Expected Cognitive Behaviour Outcomes:
Enable the learners to:

**Remember:** Define the sublimation.

**Understand:** Comprehend the process of sublimation.

**Apply:** Use the examples of sublimation.

**Analyze:** Examine the process of sublimation.

**Evaluation:** Justify the reason behind the process of sublimation.

**Create/Problem Solving:** To use the examples of sublimation.

**Resource Material Required:**
Computer/Laptop, Internet and LFT/ Projector

**Outline/Summary of the Concept:**

A change of state directly from solid to gas without changing into liquid state (or vice versa) is called sublimation. Solid Ammonium Chloride and Naphthalene are the examples of sublimation. Sublimation in Ammonium Chloride: When crushed ammonium chloride and common salt are heated in apparatus, ammonium chloride converts into gaseous state and, after that, common salt remains as residue. Heat plays an important role in sublimation process. Without the addition of energy (heat) to the process, solid would not sublimate into gaseous state.

**Methodology to be used:**
Lecture-cum-Demonstration and Discussion Methods

**Entry Behaviour Testing:**
The investigator will ask the following questions:

1. Name the states of matter.
2. What is the meaning of solid state?
3. What is the meaning of liquid state?
4. What is the meaning of gaseous state?
5. What is sublimation?
**Presentation:** Today, we will study about the sublimation.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement/Elaboration</th>
<th>Explanation/Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Meaning of sublimation</strong></td>
<td>Investigator will try to involve the learners by using internet. Learners will see the lesson on screen.</td>
<td>Investigator will elaborate with the help of websites that a change of state directly from solid to gas without changing into liquid state (or vice versa) is called sublimation.</td>
<td>Investigator will ask the learner: What is sublimation?</td>
<td></td>
<td>Investigator will ask: What is sublimation?</td>
</tr>
<tr>
<td><strong>Examples of sublimation</strong></td>
<td>Investigator will ask the learners to give the examples of sublimation. Learners will listen carefully.</td>
<td>Investigator will give examples of sublimation: Solid Carbon dioxide and Naphthalene</td>
<td>Investigator will ask the learner: Give example of sublimation.</td>
<td></td>
<td>Investigator will ask: Give example of sublimation.</td>
</tr>
<tr>
<td><strong>Process of sublimation with example</strong></td>
<td>Investigator will try to involve the learners by using internet and website.</td>
<td>Investigator will elaborate: Sublimation in Ammonium Chloride: When crushed ammonium chloride and common salt are heated in apparatus, ammonium chloride converts into gaseous state and, after that, common salt remains as residue.</td>
<td>Investigator will ask the learner: Give example of sublimation.</td>
<td></td>
<td>Investigator will ask: Give example of sublimation.</td>
</tr>
<tr>
<td><strong>Role of heat in sublimation process.</strong></td>
<td>Investigator will try to involve the learners by internet and website.</td>
<td>Investigator will elaborate with the help of websites: The role of heat in sublimation process. Heat plays an important role in sublimation process. Without the addition of energy (heat) to the process, solid would not sublime into gaseous state.</td>
<td>Investigator will ask the learner: Is sublimation possible without the heat?</td>
<td></td>
<td>Investigator will ask: What is the role of heat in sublimation process?</td>
</tr>
</tbody>
</table>
Generalization:

The learner will be able to know about the process of sublimation, role of heat in sublimation and examples of sublimation.

Terminal Behaviour Testing:

The investigator will give five minutes to learners for one to one interaction on the taught topic. After that he will ask questions from them.

1. What is the meaning of sublimation?
2. Name the few examples of sublimation.
3. What changes are seen in the states of matter?

Creative Assignment:

What is the meaning of sublimation? Explain with special reference to daily life examples.

References:

SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.
SCIENCE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.
Dr.S.C. Kheterpal & Dr.S.N.Dhawan (2016).Pardeep’s Science,Chemistry, Pardeep Publications, Opposite Sitla Mandir Jalandhar-144008 (Pb.)
https://socratic.org/questions/which-of-the-following-cannot-be-separated-by-sublimation-when-it-is-mixed-with-

*****
Lesson Plan-15

<table>
<thead>
<tr>
<th>Subject</th>
<th>Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class</td>
<td>IX</td>
</tr>
<tr>
<td>Topic</td>
<td>Structure of Atom</td>
</tr>
<tr>
<td>Duration</td>
<td>30 Minutes</td>
</tr>
</tbody>
</table>

**Expected Cognitive Behaviour Outcomes:**
Enable the learners to:

**Remember:** Define the atom.

**Understand:** Comprehend the Nucleus.

**Apply:** Use the knowledge of atom.

**Analyze:** Examine the Proton and Electron

**Evaluation:** Justify the reason behind the Structure of Atom.

**Create/Problem Solving:** To draw the diagram.

**Resource Material Required:**
Computer/Laptop, Internet and LFT/ Projector

**Outline/Summary of the Concept:**

An atom is the smallest particle of the element that can exist independently and retain all its chemical properties. Atoms are made up of three particles: protons, neutrons and electrons. Nucleus is made up of Protons and Neutrons. Protons are positively charged particles found within atomic nuclei. The number of protons in an atom defines what element it is. For example, carbon atoms have six protons. Neutrons are uncharged particles found within atomic nuclei (except for hydrogen-1). A neutron’s mass is slightly larger than that of a proton. Electrons have a negative charge and are electrically attracted to the positively charged protons. Electrons surround the atomic nucleus in pathways called orbital. The atomic number is defined as the total number of protons present in the nucleus of an atom.

**Methodology to be used:**
Lecture-cum-Demonstration and Discussion Methods

**Entry Behaviour Testing:**
The investigator will ask the following questions:

1. Name the states of matter.
2. What is the meaning of solid state?
3. What is the meaning of liquid state?
4. What is the meaning of gaseous state?
5. What is sublimation?

**Presentation:** Well, students, today we will discuss about the interesting topic atoms with the help of websites.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation /Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Atom</strong></td>
<td>Investigator will try to involve the learners by using internet Learners will see the lesson on screen</td>
<td>Investigator will elaborate with help of websites: An atom is the smallest particle of the element that can exist independently and retain all its chemical properties. Atoms are made up of three particles: protons, neutrons and electrons.</td>
<td>Investigator will ask the learner: What is atom? Student will give answer.</td>
<td><img src="image" alt="Atom Diagram" /></td>
<td>Investigator will ask: What is atom?</td>
</tr>
<tr>
<td><strong>Nucleus</strong></td>
<td>Investigator will try to involve the learners by using internet Learners will see the lesson on screen</td>
<td>Investigator will ask a question: What is nucleus? Investigator will explain: Nucleus is made up of Protons and Neutrons.</td>
<td>Investigator will ask the learner: What is nucleus? Student will give answer.</td>
<td><img src="image" alt="Nucleus Diagram" /></td>
<td>Investigator will ask: What is nucleus?</td>
</tr>
<tr>
<td><strong>Protons</strong></td>
<td>Investigator will try to involve the learners by using internet Learner will see the lesson on screen</td>
<td>Investigator will give explain: Protons are positively charged particles found within atomic nuclei. The number of protons in an atom defines what element it is. For example, carbon atoms have six protons.</td>
<td>Investigator will ask the learner: How many protons are there in carbon?</td>
<td><img src="image" alt="Protons Diagram" /></td>
<td>Investigator will ask: How many protons are there in carbon?</td>
</tr>
<tr>
<td><strong>Neutrons</strong></td>
<td>Investigator will try to involve the learners by internet and website.</td>
<td>Investigator will elaborate with help of websites: Neutrons are uncharged particles found within atomic nuclei. A neutron’s mass is slightly larger than that of a proton.</td>
<td>Investigator will ask the learner: Give example of sublimation.</td>
<td><img src="image" alt="Neutrons Diagram" /></td>
<td>Investigator will ask: What is a neutron?</td>
</tr>
<tr>
<td>Content Highlights</td>
<td>Engagement</td>
<td>Explanation /Elaboration</td>
<td>Exploration</td>
<td>Resource Material</td>
<td>Evaluation</td>
</tr>
<tr>
<td>--------------------</td>
<td>------------</td>
<td>--------------------------</td>
<td>-------------</td>
<td>-------------------</td>
<td>------------</td>
</tr>
<tr>
<td><strong>Electrons</strong></td>
<td>Investigator will try to involve the learners by internet and website.</td>
<td>Investigator will elaborate: Electrons have a negative charge and are electrically attracted to the positively charged protons. Electrons surround the atomic nucleus in pathways called orbital.</td>
<td>Investigator will ask the learner to explain electron.</td>
<td>![Diagram of atomic structure]</td>
<td>Investigator will ask: What is electron?</td>
</tr>
<tr>
<td><strong>Atomic Number</strong></td>
<td>Investigator will try to involve the learners by internet and website.</td>
<td>Investigator will elaborate with help of websites: The atomic number is defined as the total number of protons present in the nucleus of an atom.</td>
<td>Investigator will ask the learner: What is atomic number?</td>
<td>![Diagram of atomic structure]</td>
<td>Investigator will ask the learner: What is atomic number?</td>
</tr>
</tbody>
</table>

**Generalization:**
The learner will be able to know about the atom, nucleus, protons, neutrons, electrons and atomic number.

**Terminal Behaviour Testing:**
The investigator will form the groups of five learners for collaborative learning and he will give the five minutes for the mutual discussion. After that he will ask questions from the learners.
1. What is atom?
2. What is nucleus?
3. What is atomic number?
4. How many protons are in carbon?

**Creative Assignment:**
What is the structure of atom? Draw the structure of atom.

**References:**
SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.
SCIENCE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.

*****

lxviii
Lesson Plan-16

<table>
<thead>
<tr>
<th>Subject</th>
<th>Science</th>
<th>Class</th>
<th>IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>Evaporation</td>
<td>Duration</td>
<td>30 Minutes</td>
</tr>
</tbody>
</table>

Expected Cognitive Behaviour Outcomes:

Enable the learners to:

Remember: Define the evaporation.

Understand: Comprehend the evaporation.

Apply: Use the knowledge of evaporation.

Analyze: Examine the process of evaporation.

Evaluation: Justify the reason behind the evaporation.

Create/Problem Solving: To solve the problem related to evaporation.

Resource Material Required:

Computer/Laptop, Internet and LFT/ Projector

Outline/Summary of the Concept:

The phenomenon of change of a liquid into vapours at any temperature below its boiling point is called evaporation. If surface area is increased, the rate of evaporation increases. If temperature is increased, the rate of evaporation increases. If the amount of water in air is already high, the rate of evaporation decreases. If wind speed is increased, the rate of evaporation increases. In an open vessel, the liquid keeps on evaporating. The particles of liquid absorb energy from the surrounding to regain the energy lost during evaporation. This absorption of energy from the surrounding makes the surrounding cold.

Methodology to be used:

Lecture-cum-Demonstration and Discussion Methods

Entry Behaviour Testing:

The investigator will ask the following questions:

1. Name the states of matter.
2. What is the meaning of liquid state?
3. What is the process, when liquid changes into vapours at any boiling point called?
4. What is evaporation?
**Presentation:** Well, students, today we will discuss about the interesting topic evaporation with the help of websites.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation /Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Evaporation</strong></td>
<td>Investigator will try to involve the learners by using internet. Learners will see the lesson on screen.</td>
<td>Investigator will elaborate with the help of websites: The phenomenon of change of a liquid into vapours at any temperature below its boiling point is called evaporation.</td>
<td>Investigator will ask the learner: What is evaporation? Learner will give answer.</td>
<td><img src="image.png" alt="Image" /></td>
<td>Investigator will ask: What is evaporation?</td>
</tr>
<tr>
<td><strong>Effect of surface area on evaporation</strong></td>
<td>Investigator will try to involve the learners by using internet. Learners will see the lesson on screen.</td>
<td>Investigator will elaborate with the help of websites: If a surface area is increased the rate of evaporation increases.</td>
<td>Investigator will ask the learner: What is Effect of surface area on evaporation? Learner will give answer.</td>
<td><img src="image.png" alt="Image" /></td>
<td>Investigator will ask: What is the effect of surface area on evaporation?</td>
</tr>
<tr>
<td><strong>Effect of temperature on evaporation</strong></td>
<td>Investigator will try to involve the learners by using internet. Learners will see the lesson on screen.</td>
<td>Investigator will elaborate with the help of websites: If temperature is increased, the rate of evaporation increases.</td>
<td>Learner will listen carefully.</td>
<td><img src="image.png" alt="Image" /></td>
<td>Investigator will ask: What is the effect of temperature on evaporation?</td>
</tr>
<tr>
<td><strong>Effect of humidity on evaporation</strong></td>
<td>Investigator will try to involve the learners by internet and website.</td>
<td>Investigator will elaborate with the help of websites: If the amount of water in air is already high, the rate of evaporation decreases. The liquid keeps on evaporating.</td>
<td>Investigator will ask the learner: Give example of sublimation.</td>
<td><img src="image.png" alt="Image" /></td>
<td>Investigator will ask: What is the effect of humidity on evaporation?</td>
</tr>
<tr>
<td><strong>Effect of wind speed on evaporation</strong></td>
<td>Investigator will try to involve the learners by internet and website.</td>
<td>Investigator will elaborate with the help of websites: If wind speed is increased the rate of evaporation increases.</td>
<td>Investigator will ask the learner: Explain the electron.</td>
<td><img src="image.png" alt="Image" /></td>
<td>Investigator will ask: What is the effect of wind speed on evaporation?</td>
</tr>
<tr>
<td>Content Highlights</td>
<td>Engagement</td>
<td>Explanation /Elaboration</td>
<td>Exploration</td>
<td>Resource Material</td>
<td>Evaluation</td>
</tr>
<tr>
<td>-------------------</td>
<td>------------</td>
<td>--------------------------</td>
<td>-------------</td>
<td>------------------</td>
<td>------------</td>
</tr>
<tr>
<td>How does evaporation cause cooling?</td>
<td>Investigator will try to involve the learners by internet and website.</td>
<td>Investigator will elaborate with the help of websites: In an open vessel, the liquid keeps on evaporating. The particles of liquid absorb energy from the surrounding to regain the energy lost during evaporation. This absorption of energy from the surrounding makes the surrounding cold.</td>
<td>Investigator will ask the learner: How does evaporation cause cooling?</td>
<td></td>
<td>Investigator will ask the learner: How does evaporation cause cooling?</td>
</tr>
</tbody>
</table>

**Generalization:**
The learner will be able to know about the evaporation, factors affecting evaporation and how does evaporation cause cooling?

**Terminal Behaviour Testing:**
The investigator will give five minutes to learners for one to one interaction on the taught topic. After that he will ask questions from them.
1. What is evaporation?
2. What is the effect of temperature on evaporation?
3. What is the effect of humidity on evaporation?
4. What is the effect of wind speed on evaporation?
5. How does evaporation cause cooling?

**Creative Assignment:**
What is evaporation? Make the list of examples which shows the evaporation phenomenon.

**References:**
SCIENECE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.
SCIENECE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.
http://www.ssc.education.ed.ac.uk/BSL/chemistry/evaporationd.html
https://www.slideshare.net/ShivanshJagga/evaporation-shivansh9-b

lxxi
Lesson Plan-17

<table>
<thead>
<tr>
<th>Subject</th>
<th>Science</th>
<th>Class</th>
<th>IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>The Greenhouse Effect</td>
<td>Duration</td>
<td>30 Minutes</td>
</tr>
</tbody>
</table>

**Expected Cognitive Behaviour Outcomes:**

Enable the learners to:

- **Remember**: explain the greenhouse effect.  
- **Understand**: Comprehend the greenhouse effect.  
- **Apply**: Use the knowledge of greenhouse effect.  
- **Analyze**: Examine the process of greenhouse effect.  
- **Evaluation**: Justify the reason behind the greenhouse effect.  
- **Create/Problem Solving**: To solve the problem related to greenhouse effect.  

**Resource Material Required:**

Computer/Laptop, Internet and LFT/ Projector  

**Outline/Summary of the Concept:**

Life on Earth depends on resources like soil, water and air and energy of Sun. Air is the mixture of many gases. Some gases prevent the escape of heat from the Earth. An increase in the percentage of such gases in the atmosphere would cause the average temperature to increase world-wide which is called the greenhouse effect. Carbon dioxide is one of the greenhouse gases. An increase in the carbon dioxide content in the atmosphere would cause more heat to be retained by the atmosphere and lead to global warming.  

**Methodology to be used:**

Lecture-cum-Demonstration and Discussion Methods  

**Entry Behaviour Testing:**

The investigator will ask the following questions:

1. Name the gases on Earth.  
2. Which gases are useful for life?  
3. Which gases are harmful for life?  
4. What will happen if percentage of carbon dioxide increases in the atmosphere?
**Presentation:** Well, students, today we will discuss about the interesting topic of the greenhouse effect with the help of websites.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation /Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air</td>
<td>Investigator will try to involve the learners by asking question. Learners will give the answer.</td>
<td>Investigator will ask the question: What is air?</td>
<td>Learner will give the answer: Air is the mixture of many gases.</td>
<td><img src="image" alt="Diagram of Air Composition" /></td>
<td>Investigator will ask: What is air?</td>
</tr>
<tr>
<td>The Greenhouse Effect</td>
<td>Investigator will try to involve the learners by using internet Learners will see the lesson on screen</td>
<td>Investigator will elaborate with help of websites: Some gases prevent the escape of heat from the Earth. An increase in the percentage of such gases in the atmosphere would cause the average temperature to increase world-wide which is called the greenhouse effect</td>
<td>Investigator will ask the learner: What is the greenhouse effect? Learner will give answer.</td>
<td><img src="image" alt="Diagram of Greenhouse Effect" /></td>
<td>Investigator will ask: What is the greenhouse effect?</td>
</tr>
<tr>
<td>Role of Carbon Dioxide</td>
<td>Investigator will try to involve the learners by using internet Learners will see the lesson on screen</td>
<td>Investigator will elaborate with help of websites: Carbon dioxide is one of the greenhouse gases. An increase in the carbon dioxide content in the atmosphere would cause more heat to be retained by the atmosphere.</td>
<td>Investigator will ask the learner: What is the role of carbon dioxide in the greenhouse effect?</td>
<td><img src="image" alt="Diagram of Carbon Dioxide" /></td>
<td>Investigator will ask: What is the role of carbon dioxide in the greenhouse effect?</td>
</tr>
<tr>
<td>Role of Carbon Dioxide Other Gases</td>
<td>Investigator will try to involve the learners by internet and website.</td>
<td>Investigator will elaborate with help of websites: Carbon dioxide is one of the greenhouse gases and its lead to global warming.</td>
<td>Investigator will ask the learner: What is another role of carbon dioxide in the greenhouse effect?</td>
<td><img src="image" alt="Diagram of Other Greenhouse Gases" /></td>
<td>What is another role of carbon dioxide in the greenhouse effect?</td>
</tr>
<tr>
<td>Other Gases</td>
<td>Investigator will try to involve the learners by internet and website.</td>
<td>Investigator will elaborate: The other gases of greenhouse effect with help of websites</td>
<td>Investigator will ask the learner: Name the gases related to greenhouse effect.</td>
<td><img src="image" alt="Diagram of Other Gases" /></td>
<td>Investigator will ask the learner: Name the gases related to greenhouse effect.</td>
</tr>
</tbody>
</table>
Generalization:

The learner will be able to know about the air, greenhouse effect, role of carbon dioxide and other gases.

Terminal Behaviour Testing:

The investigator will form peer groups. After that he will give them five minutes for mutual discussion. Then he will ask questions from the learners.

1. What is air?
2. What is the greenhouse effect?
3. What is the role of carbon dioxide in the greenhouse effect?
4. Name the gases related to greenhouse effect.

Creative Assignment:

What is the greenhouse effect? Do activity related to the greenhouse effect at home.

References:

SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.
SCIENCE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.
http://www.omtexclasses.com/2015/06/what-is-composition-of-air.html
https://www.britannica.com/science/greenhouse-effect
http://www.hhmi.org/biointeractive/greenhouse-effect
http://www.birdersunite.com/17/24/business/greenhouse-gases-examples

*****
Lesson Plan-18

<table>
<thead>
<tr>
<th>Subject</th>
<th>Science</th>
<th>Class</th>
<th>IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>Ozone</td>
<td>Duration</td>
<td>30 Minutes</td>
</tr>
</tbody>
</table>

Expected Cognitive Behaviour Outcomes:
Enable the learners to:

**Remember:** Explain the ozone.

**Understand:** Comprehend the ozone depletion.

**Apply:** Use the knowledge of ozone.

**Analyze:** Examine the process of ozone depletion.

**Evaluation:** Justify the reason behind the ozone depletion.

**Create/Problem Solving:** Solve the problem related to ozone.

Resource Material Required:
Computer/Laptop, Internet and LFT/ Projector

Outline/Summary of the Concept:

Essential oxygen is normally found in the form of a diatomic molecule. In the upper reaches of the atmosphere, a molecule containing three atoms of oxygen (O$_3$) is found. O$_3$ is called ozone. Unlike the normal diatomic molecule of oxygen, ozone is poisonous. It absorbs harmful radiation from the sun where they may damage many forms of life. Ozone layer was getting depleted by various man-made compounds like CFCs (carbon compounds having both fluorine and chlorine) were found to persist in the atmosphere. Once they react with the ozone molecules, this result in a reduction of the ozone layer.

Methodology to be used:
Lecture-cum-Demonstration and Discussion Methods

Entry Behaviour Testing:
The investigator will ask the following questions:

1. Name the gases on Earth.
2. Which gases are useful for life?
3. Which gases are harmful for life?
4. In which form is essential oxygen normally found?
5. What is the phenomenon called if oxygen is having three atoms?
**Presentation:**

Well, students, today we will discuss about the interesting topic the ozone and ozone depletion with help websites.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation /Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ozone</td>
<td>Investigator will try to involve the learners by asking question.</td>
<td>Investigator will the question: What is ozone?</td>
<td>Learner will be unable to give the answer.</td>
<td>Black-Board</td>
<td>Investigator will ask: What is ozone?</td>
</tr>
<tr>
<td></td>
<td>Ozone</td>
<td>Investigator will elaborate with the help of websites: Essential oxygen is normally found in the form of a diatomic molecule. In the upper reaches of the atmosphere, a molecule containing three atoms of oxygen (O$_3$) is found. O$_3$ is called ozone.</td>
<td>Investigator will ask the learner: What is the formula of ozone? Learner will give answer: O$_3$.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Role of ozone</td>
<td>Investigator will try to involve the learners by using internet. Learners will see the lesson on screen</td>
<td>Investigator will elaborate with the help of websites: Unlike the normal diatomic molecule of oxygen, ozone is poisonous. It absorbs harmful radiation from the Sun where they may damage many forms of life.</td>
<td>Investigator will ask the learner: What is the role of ozone?</td>
<td>Black-Board</td>
<td>Investigator will ask: What is the role of ozone?</td>
</tr>
<tr>
<td>Ozone Depletion</td>
<td>Investigator will try to involve the learners by internet and website.</td>
<td>Investigator will elaborate with the help of websites: Ozone layer was getting depleted by various man-made compounds like CFCs (carbon compounds having both fluorine and chlorine) were found to persist in the atmosphere. Once they react with the ozone molecules, this result in a reduction of the ozone layer.</td>
<td>Investigator will ask the learner: What is ozone depletion?</td>
<td></td>
<td>Investigator will ask: What is ozone depletion?</td>
</tr>
</tbody>
</table>
Generalization:

The learner will be able to know about the ozone, ozone layer, ozone depletion and other gases which help in the ozone depletion

Terminal Behaviour Testing:

The investigator will form the groups of five learners for collaborative learning and he will give the five minutes for the mutual discussion. After that he will ask questions from the learners.

1. What is ozone?
2. What is the role of ozone?
3. What is ozone depletion?

Creative Assignment:
What is the ozone and ozone depletion? Write how to prevent ozone depletion?

References:

SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.

SCIENCE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.

http://www.resonateintowellness.com/what-is-ozone

https://byjus.com/biology/ozone-layer-depletion

https://helpsavenature.com/ozone-layer-depletion-effects-causes

*****
Lesson Plan-19

<table>
<thead>
<tr>
<th>Subject</th>
<th>Science</th>
<th>Class</th>
<th>IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>Immunisation</td>
<td>Duration</td>
<td>30 Minutes</td>
</tr>
</tbody>
</table>

**Expected Cognitive Behaviour Outcomes:**

Enable the learners to:

**Remember:** Express immunisation.

**Understand:** Comprehend immunisation.

**Apply:** Use the knowledge of immunisation how to prevent from disease?

**Analyze:** Examine the immune system.

**Evaluation:** Justify the value of immunisation.

**Create/Problem Solving:** To solve the problems related to the topic immunisation.

**Resource Material Required:**

Computer/Laptop, Internet and LFT/ Projector

**Outline/Summary of the Concept:**

Health is a state of physical, mental and social well-being. Disease means disturbed ease. In other words, disease literally means being uncomfortable. There are two ways or principles of prevention of diseases i.e. one general and one specific to each disease. The general way of infectious diseases can be prevented by public health hygiene measures that reduce exposure to infectious agents. The specific way of infectious diseases can also be prevented by using immunization. Immune system usually fights off microbial infections. Immune system first sees an infectious microbe; it responds against it and then remembers it specifically. So the next time which particular microbe or its relatives enter the body. The immune system responds with even greater vigour. This eliminates the infection even more quickly than the first time around. This is the basis of the principle of immunization. There are vaccines against tetanus, polio etc.

**Methodology to be used:**

Face to Face Strategy, Lecture-cum-Demonstration and Discussion Methods
**Entry Behaviour Testing:**

The investigator will ask the following questions:

1. What is health?
2. What is disease?
3. What do you mean by microbes?
4. What is immunisation?

**Presentation:** Today, we will study about immunisation.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation /Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Health</strong></td>
<td>Investigator will try to involve the learners by asking a question.</td>
<td>Investigator will ask the learner: What is health?</td>
<td>Learner will give the answer: Health is a state of physical, mental and social well-being.</td>
<td><img src="image1.png" alt="Image" /></td>
<td>Investigator will ask: What is health?</td>
</tr>
<tr>
<td><strong>Disease</strong></td>
<td>Investigator will try to involve the learners by asking a question. Learners will give the answer.</td>
<td>Investigator will ask the learner: What is disease?</td>
<td>Learner will give the answer: Disease means disturbed ease. In other words, disease literally means being uncomfortable.</td>
<td><img src="image2.png" alt="Image" /></td>
<td>Investigator will ask: What is disease</td>
</tr>
<tr>
<td><strong>Principles of Prevention</strong></td>
<td>Investigator will try to involve the learners by asking a question.</td>
<td>Investigator will ask the learner: What are principles of prevention? Investigator will explain: There are two ways or principles of prevention of diseases i.e. one general and one specific to each disease. The general way of infectious diseases can be prevented by public health hygiene measures that reduce exposure to infectious agents. The specific way of infectious diseases can also be prevented by using immunization.</td>
<td>Learner will be unable to give the answer.</td>
<td><img src="image3.png" alt="Image" /></td>
<td>Investigator will ask: What are principles of prevention?</td>
</tr>
</tbody>
</table>
### Generalization:
The learner will be able to know about the immunization and basis of the principle of immunisation

### Terminal Behaviour Testing:
The investigator will form peer groups. After that he will give them five minutes for mutual discussion. Then he will ask questions from the learners.

What is immune system?
1. What is the basis of the principle of immunization??
2. Give the examples of vaccines.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation /Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Immune system</strong></td>
<td>Investigator will try to involve the learners by asking a question.</td>
<td>Investigator will ask the learner: What is immune system?</td>
<td>Learner will give the answer: Immune system usually fights off microbial infections.</td>
<td>![Image of immune system]</td>
<td>Investigator will ask: What is immune system?</td>
</tr>
<tr>
<td><strong>Basis of the principle of immunisation</strong></td>
<td>Investigator will try to involve the learners by asking a question.</td>
<td>Investigator will ask the learner: What are basis of the principle of immunization? Investigator will explain: Immune system first sees an infectious microbe, it responds against it and then remembers it specifically. So the next time which particular microbe or its relatives enter the body. The immune system responds with even greater vigour. This eliminates the infection even more quickly than the first time around.</td>
<td>Learner will be unable to give the answer.</td>
<td>![Image of immune system]</td>
<td>Investigator will ask: What are basis of the principle of immunisation?</td>
</tr>
<tr>
<td><strong>Example of vaccines</strong></td>
<td>Investigator will try to involve the learners by asking a question.</td>
<td>Investigator will ask the learner: Give the examples of vaccines.</td>
<td>Learner will give the answer: There are vaccines against tetanus, polio etc.</td>
<td>![Image of vaccine]</td>
<td>Investigator will ask: Give the examples of vaccines.</td>
</tr>
</tbody>
</table>
Creative Assignment:
Make the list of vaccines against the diseases

References:

SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.
SCIENCE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.
https://fbresearch.org/antibiotics-overuse-and-damaging-your-immune-system/
httpwww.who.inttopicsimmunizationen.
https://gurumavin.com/who-world-has-2-weeks-to-replace-problem-polio-vaccine/

*****
Lesson Plan-20

<table>
<thead>
<tr>
<th>Subject</th>
<th>Science</th>
<th>Class</th>
<th>IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>Kinetic Energy</td>
<td>Duration</td>
<td>30 Minutes</td>
</tr>
</tbody>
</table>

Expected Cognitive Behaviour Outcomes:
Enable the learners to:

**Remember:** Explain kinetic energy.

**Understand:** Comprehend kinetic energy.

**Apply:** Use the knowledge of kinetic energy.

**Analyze:** Examine the process of kinetic energy.

**Evaluation:** Justify the reason behind the kinetic energy.

**Create/Problem Solving:** To solve the problem related to kinetic energy.

**Resource Material Required:**
Computer/Laptop, Internet and LFT/ Projector

**Outline/Summary of the Concept:**
The capacity to do work is called energy. The unit of energy is joule. The various forms of energy include kinetic energy, potential energy, mechanical energy, heat energy, chemical energy, sound energy, nuclear energy, electric energy, and solar energy. Kinetic energy is the energy possessed by a body because of its motion. The kinetic energy of an object increases with its speed. A falling coconut, a flying aircraft, flowing water etc. possess kinetic energy. The equation of kinetic energy is $E_k = \frac{1}{2}mv^2$

**Methodology to be used:**
Lecture-cum-Demonstration and Discussion Methods

**Entry Behaviour Testing:**
The investigator will ask the following questions:

1. What is work?
2. Which gases are useful for life?
3. Which form of energy is possessed when a coconut falls?
4. What is energy?
5. What are the forms of energy?
6. What is kinetic energy?
**Presentation:** Well, students, today we will discuss about the interesting topic of kinetic energy with the help of websites.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement /Elaboration</th>
<th>Exploration /Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Energy</strong></td>
<td>Investigator will try to involve the learners by asking question.</td>
<td>Learner will be unable to give the answer.</td>
<td>Investigator will ask: What is energy?</td>
</tr>
<tr>
<td><strong>Unit of Energy</strong></td>
<td>Investigator will try to involve the learners by using internet. Learners will see the lesson on screen.</td>
<td>Investigator will ask the learner: What is the unit of energy? Learner will give answer Joule.</td>
<td>Investigator will ask: What is the unit of energy?</td>
</tr>
<tr>
<td><strong>Forms of Energy</strong></td>
<td>Investigator will try to involve the learners by asking question.</td>
<td>Learner will explore the forms of energy: Kinetic energy, and potential energy</td>
<td>Investigator will ask: What are the forms of energy?</td>
</tr>
<tr>
<td><strong>Kinetic Energy</strong></td>
<td>Investigator will try to involve the learners by internet and website. Learners will see the lesson on screen.</td>
<td>Investigator will ask the learner: What is kinetic energy?</td>
<td>Investigator will ask: What is kinetic energy?</td>
</tr>
</tbody>
</table>
Appendices

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation /Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relationship between kinetic energy and speed</td>
<td>Investigator will try to involve the learners by internet and website.</td>
<td>Investigator will elaborate with the help of websites: The kinetic energy of an object increases with its speed.</td>
<td>Investigator will ask the learner: What is the relationship between kinetic energy and speed?</td>
<td></td>
<td>Investigator will ask: What is the relationship between kinetic energy and speed?</td>
</tr>
<tr>
<td>Equation of Kinetic Energy</td>
<td>Investigator will try to involve the learners by internet and website.</td>
<td>Investigator will elaborate the equation of kinetic energy: ( E_k = \frac{1}{2}mv^2 ) where ( m ) is mass and ( v ) is velocity.</td>
<td>Investigator will ask the learner: What is the equation of kinetic energy?</td>
<td>( E_k = \frac{1}{2}mv^2 )</td>
<td>Investigator will ask the learner: What is the equation of kinetic energy?</td>
</tr>
</tbody>
</table>

Generalization:

The learner will be able to know about the energy, unit of energy, forms of energy, kinetic energy, relationship between kinetic energy & speed and equation of kinetic energy.

Terminal Behaviour Testing:

The investigator will give five minutes to learners for one to one interaction on the taught topic. After that he will ask questions from them.
1. What is energy?
2. What is kinetic energy?
3. What is the relationship between kinetic energy & speed?
4. What is the equation of kinetic energy?

Creative Assignment:
What is the kinetic energy? Make the list of examples related to the kinetic energy.

References:
SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.
SCIENCE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.
https://www.slideshare.net/siti1602/physics2
http://www.johnnyonenergy.com/learn-about-energy-energy-education/what-is-energy/
http://spiff.rit.edu/classes/phys200/lectures/ke_low/ke_low.html

lxxxiv
Lesson Plan-21

<table>
<thead>
<tr>
<th>Subject</th>
<th>Science</th>
<th>Class</th>
<th>IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>Potential Energy</td>
<td>Duration</td>
<td>30 Minutes</td>
</tr>
</tbody>
</table>

**Expected Cognitive Behaviour Outcomes:**
Enable the learners to:

**Remember:** explain potential energy.

**Understand:** Comprehend potential energy.

**Apply:** Use the knowledge of potential energy.

**Analyze:** Examine the process of potential energy.

**Evaluation:** Justify the reason behind potential energy.

**Create/Problem Solving:** Solve the problem related to potential energy.

**Resource Material Required:**
Computer/Laptop, Internet and LFT/ Projector

**Outline/Summary of the Concept:**
The capacity to do work is called energy. The energy possessed by a body on account of its position or configuration is called the potential energy. Gravitational potential energy of an object depends upon the weight of an object and the height of the object from the surface of earth. An object of mass m, raised to a height h, as is given by

\[ P.E. = mgh \]

**Methodology to be used:**
Lecture-cum-Demonstration and Discussion Methods.

**Entry Behaviour Testing:**
The investigator will ask the following questions:
1. What is energy?
2. What are the forms of energy?
3. Which forms of energy is stored in the stretched string on the bow?
4. What is potential energy?

**Presentation:**
Well, students, today we will discuss about the interesting topic of potential energy with the help websites.
<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation /Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy</td>
<td>Investigator will try to involve the learners by asking question.</td>
<td>Investigator will explain: The capacity to do work is called energy.</td>
<td>Learner will be unable to give the answer.</td>
<td><img src="image" alt="Energy" /></td>
<td>Investigator will ask: What is energy?</td>
</tr>
<tr>
<td>Forms of Energy</td>
<td>Investigator will try to involve the learners by asking question.</td>
<td>Investigator will explore the forms of energy: Heat energy, chemical energy, electric energy, and light energy.</td>
<td>Learner will explore the forms of energy: Kinetic energy, and potential energy</td>
<td><img src="image" alt="Forms of Energy" /></td>
<td>Investigator will ask: What are the forms of energy?</td>
</tr>
<tr>
<td>Potential Energy</td>
<td>Investigator will try to involve the learners by using internet</td>
<td>Investigator will elaborate with the help of websites: The energy possessed by a body on account of its position or configuration is called the potential energy.</td>
<td>Investigator will ask the learner: What is the potential energy?</td>
<td><img src="image" alt="Potential Energy" /></td>
<td>Investigator will ask: What is the potential energy?</td>
</tr>
<tr>
<td>Gravitational Potential Energy</td>
<td>Investigator will try to involve the learners by internet and website. Learners will see the lesson on screen.</td>
<td>Investigator will elaborate with the help of websites: Gravitational potential energy of an object depends upon the weight of an object and the height of the object from the surface of earth.</td>
<td>Investigator will ask the learner: What is gravitational potential energy?</td>
<td><img src="image" alt="Gravitational Potential Energy" /></td>
<td>Investigator will ask: What is gravitational potential energy?</td>
</tr>
<tr>
<td>Equation of Gravitational Potential Energy</td>
<td>Investigator will try to involve the learners by internet and website.</td>
<td>Investigator will elaborate with the help of websites: An object of mass m, raised to a height h, is given by P.E. = mgh</td>
<td>Investigator will ask the learner: What is the equation of gravitational potential energy?</td>
<td><img src="image" alt="Equation of Gravitational Potential Energy" /></td>
<td>Investigator will ask the learner: What is the equation of gravitational potential energy?</td>
</tr>
</tbody>
</table>
**Generalization:**

The learner will be able to know about the potential energy, gravitational potential energy and equation of gravitational potential energy.

**Terminal Behaviour Testing:**

The investigator will form the groups of five learners for collaborative learning and he will give the five minutes for the mutual discussion. After that he will ask questions from the learners.

1. What is the potential energy?
2. What is gravitational potential energy?
3. What is the equation of gravitational potential energy?

**Creative Assignment:**

What is potential energy? Make the list of examples related to the potential energy.

**References:**


https://www.slideshare.net/siti1602/physics-energy2
http://www.gcsescience.com/pen26-potential-energy.htm

****
Lesson Plan-22

<table>
<thead>
<tr>
<th>Subject</th>
<th>Science</th>
<th>Class</th>
<th>IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>Structure of Human Ear</td>
<td>Duration</td>
<td>30 Minutes</td>
</tr>
</tbody>
</table>

**Expected Cognitive Behaviour Outcomes:**

Enable the learners to:

- **Remember:** Explain the structure of human ear.
- **Understand:** Comprehend the structure of human ear.
- **Apply:** Use the knowledge of structure of human ear.
- **Analyze:** Examine the process of hearing.
- **Evaluation:** Justify the reason behind the hearing.
- **Create/Problem Solving:** Solve the problem of other related to knowledge of structure of human ear.

**Resource Material Required:**

Computer/Laptop, Internet and LFT/ Projector

**Outline/Summary of the Concept:**

We are able to hear with the help of an extremely sensitive organ called ear. Structure of ear comprises outer ear, middle ear and inner ear. Outer ear is called ‘pinna’ which collects the sound from the surroundings and passes through the auditory canal. At the end of auditory canal, there is a thin membrane called the ear drum or tympanic membrane. When a compression of the medium reaches the eardrum the pressure on the outside of the membrane increases and forces the eardrum inward. Similarly the eardrum moves outward when a reflection reaches it. In this way the eardrum vibrates. The vibrations are amplified several times by three bones i.e. hammer, anvil and stirrup in the middle ear. The middle ear transmits the amplified pressure variations received from the sound wave to the inner ear. In the inner ear, the pressure variations are turned into electrical signals which are sent to the brain via the auditory nerve and the brain interprets them as sound.

**Methodology to be used:**

Lecture-cum-Demonstration and Discussion Methods

**Entry Behaviour Testing:**

The investigator will ask the following questions:

1. Name the sense organs.
2. Which organ called equilibrium sense organ?
3. What do you mean by ear?
**Presentation:** Well, students, today we will discuss about the interesting topic of structure of ear with the help of websites.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation/Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ear</strong></td>
<td>Investigator will try to involve the learners by asking question.</td>
<td>Investigator will ask the question: What do you mean by ear? Investigator will explain about ear: We are able to hear with the help of an extremely sensitive devise called the ear. Structure of ear comprises outer ear, middle ear and inner ear. Learner will be unable to give the answer.</td>
<td>Investigator will ask: What do you mean by ear?</td>
<td>![Ear Image]</td>
<td></td>
</tr>
<tr>
<td><strong>Function of outer ear</strong></td>
<td>Investigator will try to involve the learners by using internet Learners will see the lesson on screen.</td>
<td>Investigator will elaborate with the help of websites: Outer ear is called ‘pinna’ which collects the sound from the surroundings and passes through the auditory canal. At the end of auditory canal, there is a thin membrane called the eardrum or tympanic membrane. When a compression of the medium reaches the eardrum the pressure on the outside of the membrane increases and forces the eardrum inward. Similarly the eardrum moves outward when a reflection reaches it. In this way the eardrum vibrates. Learner will explore the function of eardrum.</td>
<td>Investigator will ask: What function of outer ear?</td>
<td>![Outer Ear Image]</td>
<td></td>
</tr>
<tr>
<td><strong>Function of middle ear</strong></td>
<td>Investigator will try to involve the learners by using internet Learner will see the lesson on screen.</td>
<td>Investigator will elaborate with the help of websites: The vibrations are amplified several times by three bones i.e. hammer, anvil and stirrup in the middle ear. The middle ear transmits the amplified pressure variations received from the sound wave to the inner ear. Investigator will ask the learner: What is the Function of middle ear?</td>
<td>Investigator will ask: What is the Function of middle ear?</td>
<td>![Middle Ear Image]</td>
<td></td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation /Elaboration</th>
<th>Exploration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Function of inner ear</strong></td>
<td>Investigator will try to involve the learners by internet and website.</td>
<td>Investigator will elaborate with the help of websites: In the inner ear, the pressure variations are turned into electrical signals which are sent to the brain via the auditory nerve and the brain interprets them as sound.</td>
<td>Investigator will ask the learner: What is the Function of inner ear?</td>
</tr>
</tbody>
</table>

**Generalization:**

The learner will be able to know about the function of outer, middle and inner part of ear.

**Terminal Behaviour Testing:**

The investigator will form peer groups. After that he will give them five minutes for mutual discussion. Then he will ask questions from the learners.

1. What is the function of eardrum?
2. What are the three bones of ear?
3. What is the equation of gravitational potential energy?
4. What is the function of inner ear?

**Creative Assignment:**

Draw the structure of ear.

**References:**

SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.
SCIENCE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.
https://www.myvmc.com/anatomy/ear/
https://generalhearing.com/ear-enables-hearing/

*****
Lesson Plan-23

<table>
<thead>
<tr>
<th>Subject</th>
<th>Science</th>
<th>Class</th>
<th>IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>The Water Cycle</td>
<td>Duration</td>
<td>30 Minutes</td>
</tr>
</tbody>
</table>

Expected Cognitive Behaviour Outcomes:
Enable the learners to:

**Remember:** Explain the water cycle.

**Understand:** Comprehend the process of the water cycle.

**Apply:** Use the knowledge of the water cycle.

**Analyze:** Examine the process of the water cycle.

**Evaluation:** Justify the reason behind the process the water cycle.

**Create/Problem Solving:** To solve the problem related to the water cycle.

**Resource Material Required:**
Computer/Laptop, Internet and LFT/ Projector

**Outline/Summary of the Concept:**
The water cycle is known as the hydrological cycle or the hydrologic cycle. The whole process in which water evaporates and falls on the land as rain and later flows back into the sea via rivers is known as water cycle. The process of evaporation involves when water evaporates from the water bodies. The process of condensation involves when water vapours leads to rain. Water seeps into the soil becomes part of the underground reservoir of fresh-water, and finds its way to the surface through springs.

**Methodology to be used:**
Lecture-cum-Demonstration and Discussion Methods

**Entry Behaviour Testing:**
The investigator will ask the following questions:
1. Name the water bodies.
2. Why seas and oceans do not dry up?
3. What do you mean by the water cycle?

**Presentation:**
Well, students, today we will discuss about the interesting topic of water cycle with the help of websites.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation / Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Water Cycle</strong></td>
<td>Investigator will try to involve the learners by asking question.</td>
<td>Investigator will the question: What do you mean by water cycle? Investigator will elaborate: The whole process in which water evaporates and falls on the land as rain and later flows back into the sea via rivers is known as water cycle.</td>
<td>Learner will be unable to give the answer.</td>
<td><img src="image" alt="Water Cycle" /></td>
<td>Investigator will ask: What do you mean by water cycle?</td>
</tr>
<tr>
<td><strong>Evaporation in water cycle</strong></td>
<td>Investigator will try to involve the learners by using internet Learners will see the lesson on screen.</td>
<td>Investigator will elaborate with the help of websites: The process of evaporation involves when water evaporates from the water bodies.</td>
<td>Learner will explore evaporation in water cycle.</td>
<td><img src="image" alt="Evaporation" /></td>
<td>Investigator will ask: What is process of evaporation in water cycle?</td>
</tr>
<tr>
<td><strong>Condensation in water cycle</strong></td>
<td>Investigator will try to involve the learners by using internet Learners will see the lesson on screen.</td>
<td>Investigator will elaborate with the help of websites: The process of condensation involves when water vapours cool down and leads rain.</td>
<td>Learner will explore condensation in water cycle.</td>
<td><img src="image" alt="Condensation" /></td>
<td>Investigator will ask: What is process of condensation in water cycle?</td>
</tr>
<tr>
<td><strong>Flow of water</strong></td>
<td>Investigator will try to involve the learners by using internet.</td>
<td>Investigator will elaborate flow of water with the help of websites: Water seeps into the soil and becomes part of the underground reservoir of fresh-water and finds the way to the surface through springs.</td>
<td>Learner will be unable to give the answer.</td>
<td><img src="image" alt="Flow of water" /></td>
<td>Investigator will ask: Explain the flow of water.</td>
</tr>
</tbody>
</table>
Generalization:

The learner will be able to know about the water cycle, process of evaporation and condensation in water cycle.

Terminal Behaviour Testing:

The investigator will form the groups of five learners for collaborative learning and he will give the five minutes for the mutual discussion. After that he will ask questions from the learners.

1. What is water cycle?
2. What is process of evaporation in water cycle?
3. What is process of condensation in water cycle?

Creative Assignment:

Draw the diagram of water cycle.

References:

SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.

SCIENCE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.

https://en.wikipedia.org/wiki/Water_cycle

http://climate.ncsu.edu/educ12/watercycle


*****
Lesson Plan-24

<table>
<thead>
<tr>
<th>Subject</th>
<th>Science</th>
<th>Class</th>
<th>IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>The Oxygen Cycle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duration</td>
<td>30 Minutes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Expected Cognitive Behaviour Outcomes:
Enable the learners to:

**Remember:** Explain the oxygen cycle.

**Understand:** Comprehend the process of the oxygen cycle.

**Apply:** Use the knowledge of the oxygen cycle.

**Analyze:** Examine the process of the oxygen cycle.

**Evaluation:** Justify the reason behind the process the oxygen cycle.

**Create/Problem Solving:** To solve the problem related to the oxygen cycle.

**Resource Material Required:**
Computer/Laptop, Internet and LFT/Projector

**Outline/Summary of the Concept:**
Oxygen is a very abundant element on our earth. It is found in the elemental form in the atmosphere to the extent of 21%. It occurs in the combined form i.e. Carbon dioxide, silicon, carbonate, carbohydrates, proteins, fats etc. The oxygen cycle is the biogeochemical cycle of oxygen. The oxygen cycle refers to the cycle that maintains the level of oxygen in the atmosphere. Oxygen from the atmosphere is used up in three processes namely combustion, respiration and in the formation of oxides of nitrogen. Plants and animals use oxygen to respire and return it to the air and water as carbon dioxide (CO₂). CO₂ is then taken up by algae and terrestrial green plants and converted into carbohydrates during the process of photosynthesis, oxygen being a by product.

**Methodology to be used:**
Lecture-cum-Demonstration and Discussion Methods

**Entry Behaviour Testing:**
The investigator will ask the following questions:

1. What is photosynthesis?
2. Name the oxygen which is found in combined state?
3. Which gas evolved during photosynthesis?
4. What do you mean by the oxygen cycle?
**Presentation:**

Well, students, today we will discuss about the interesting topic the oxygen cycle with the help of websites.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation/Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxygen</td>
<td>Investigator will try to involve the learners by asking question.</td>
<td>Investigator will ask the question: What is the percentage of oxygen in the atmosphere?</td>
<td>Learner will give the answer: 21% oxygen is present in the atmosphere.</td>
<td><img src="image" alt="Oxygen Cycle with labels" /></td>
<td>Investigator will ask: What is the percentage of oxygen in the atmosphere?</td>
</tr>
<tr>
<td>Combined form of oxygen</td>
<td>Investigator will try to involve the learners by asking question.</td>
<td>Investigator will ask the question: What are the various combined forms of oxygen?</td>
<td>Learner will give the answer: Carbon dioxides, silicon, carbonate, carbohydrates, proteins, fats, etc.</td>
<td><img src="image" alt="Combined Oxides" /></td>
<td>Investigator will ask: What is the various combined form of oxygen?</td>
</tr>
<tr>
<td>Use of oxygen</td>
<td>Investigator will try to involve the learners by using internet Learners will see the lesson on screen.</td>
<td>Investigator will elaborate with the help of websites: Oxygen from the atmosphere is used up in three processes namely combustion, respiration and in the formation of oxides of nitrogen.</td>
<td>Learner will explore the use of oxygen</td>
<td><img src="image" alt="Oxygen Use" /></td>
<td>Investigator will ask: Name the process of use of oxygen.</td>
</tr>
<tr>
<td>Role of respiration in the process of oxygen cycle</td>
<td>Investigator will try to involve the learners by using internet Learners will see the lesson on screen.</td>
<td>Investigator will elaborate with the help of websites: Plants and animals use oxygen to respire and return it to the air and water as carbon dioxide (CO₂).</td>
<td>Investigator will ask the learner: What is the role of respiration in the process of carbon cycle?</td>
<td><img src="image" alt="Respiration" /></td>
<td>Investigator will ask the learner: What is the role of respiration in the process of oxygen cycle?</td>
</tr>
<tr>
<td>Role of photosynthesis in the process of oxygen cycle</td>
<td>Investigator will try to involve the learners by using internet Learners will see the lesson on screen.</td>
<td>Investigator will elaborate with help of websites: CO₂ is taken up by algae and terrestrial green plants and converted into carbohydrates during the process of photosynthesis, oxygen being a by-product.</td>
<td>Investigator will ask the learner: What is the role of photosynthesis in the process of oxygen cycle?</td>
<td><img src="image" alt="Photosynthesis" /></td>
<td>Investigator will ask the learner: What is the role of photosynthesis in the process of oxygen cycle?</td>
</tr>
</tbody>
</table>
Generalization:

The learner will be able to know about the use of oxygen, role of respiration and photosynthesis in the process of oxygen cycle.

Terminal Behaviour Testing:

The investigator will give five minutes to learners for one to one interaction on the taught topic. After that he will ask questions from them.

1. Name the process of use of oxygen.
2. What is the role of respiration in the process of oxygen cycle?
3. What is the role of photosynthesis in the process of oxygen cycle?

Creative Assignment:

Draw the diagram of oxygen cycle.

References:

SCIENCES Textbook for Class IX, Punjab School Education Board, Mohali Punjab.

SCIENCES Textbook for Class IX, National Council of Educational Research and Training, New Delhi.


https://www.canstockphoto.com/carbohydrates-icon-43768514.html

https://www.britannica.com/science/oxygen-cycle

https://www.smore.com/6k7zg-carbon-dioxide-oxygen-cycle.
Lesson Plan-25

<table>
<thead>
<tr>
<th>Subject</th>
<th>Science</th>
<th>Class :</th>
<th>IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>The Carbon Cycle</td>
<td>Duration :</td>
<td>30 Minutes</td>
</tr>
</tbody>
</table>

Expected Cognitive Behaviour Outcomes:
Enable the learners to:

**Remember**: Explain the carbon cycle.

**Understand**: Comprehend the process the carbon cycle.

**Apply**: Use the knowledge of the carbon cycle.

**Analyze**: Examine the process of the carbon cycle.

**Evaluation**: Justify the reason behind the carbon cycle.

**Create/Problem Solving**: To solve the problem related to the carbon cycle.

**Resource Material Required:**
Computer/Laptop, Internet and LFT/ Projector

**Outline/Summary of the Concept:**
Carbon is found in diamonds and graphite forms on the earth. Carbon dioxide in the atmosphere is found in the combined state. Process of photosynthesis converts carbon dioxide from the atmosphere or dissolved in the water into glucose molecules. The utilization of glucose to provide energy to living things involves the process of respiration in which oxygen may or may not be used to convert glucose back into carbon dioxide. This carbon dioxide then goes back into the atmosphere. Another process that adds to carbon dioxide in the atmosphere is the process of combustion where fuels are burnt to provide energy.

**Methodology to be used:**
Lecture-cum-Demonstration and Discussion Methods

**Entry Behaviour Testing:**
The investigator will ask the following questions:
1. What is photosynthesis?
2. Name the carbon which is found in combined state?
3. Which gas evolves during respiration?
4. What do you mean by the carbon cycle?
**Presentation:** Well, students, today we will discuss about the interesting topic the carbon cycle with the help of websites.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation /Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combined form of carbon</td>
<td>Investigator will try to involve the learners by asking question.</td>
<td>Investigator will ask the question: What is the various combined form of carbon?</td>
<td>Learner will give the answer: Carbon dioxide, carbonate, minerals, carbohydrates etc.</td>
<td><img src="image" alt="CO2" /></td>
<td>Investigator will ask: What is the various combined form of carbon?</td>
</tr>
<tr>
<td>Role of photosynthesis in the process of carbon cycle</td>
<td>Investigator will try to involve the learners by using internet Learners will see the lesson on screen.</td>
<td>Investigator will elaborate with the help of websites: Process of converts carbon dioxide from the atmosphere or dissolved in the water into glucose molecules.</td>
<td>Learner will explore the role of photosynthesis in the process of carbon cycle.</td>
<td><img src="image" alt="Photosynthesis" /></td>
<td>Investigator will ask: What is the role of photosynthesis in the process of carbon cycle?</td>
</tr>
<tr>
<td>Role of respiration in the process of carbon cycle</td>
<td>Investigator will try to involve the learners by using internet Learners will see the lesson on screen.</td>
<td>Investigator will elaborate with the help of websites: The utilization of glucose to provide energy to living things involves the process of respiration in which oxygen may or may not be used to convert glucose back into carbon. This carbon dioxide then goes back into the atmosphere.</td>
<td>Investigator will ask the learner: What is the role of respiration in the process of carbon cycle?</td>
<td><img src="image" alt="Respiration" /></td>
<td>Investigator will ask: What is the role of respiration in the process of carbon cycle?</td>
</tr>
<tr>
<td>Role of combustion in the process of carbon cycle</td>
<td>Investigator will try to involve the learners by using internet Learners will see the lesson on screen.</td>
<td>Investigator will elaborate with the help of websites: Another process that adds to carbon dioxide in the atmosphere is the process of combustion where fuels are burnt to provide energy.</td>
<td>Investigator will ask the learner: What is the role of combustion in the process of carbon cycle?</td>
<td><img src="image" alt="Combustion" /></td>
<td>Investigator will ask: What is the role of combustion in the process of carbon cycle?</td>
</tr>
</tbody>
</table>
Generalization:
The learner will be able to know about the role of photosynthesis and respiration in the process of carbon cycle.

Terminal Behaviour Testing:
The investigator will form peer groups. After that he will give them five minutes for mutual discussion. Then he will ask questions from the learners.

1. What is the role of photosynthesis in the process of carbon cycle?
2. What is the role of respiration in the process of carbon cycle?
3. What is the role of combustion in the process of carbon cycle?

Creative Assignment:
Draw the diagram of carbon cycle.

References:
SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.
SCIENCE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.
http://www.gettingthepicture.info/2/
https://studyadda24.blogspot.in/2017/04/what-is-oxygen-cycle-oxygen-cycle.html

*****
Lesson Plan-26

<table>
<thead>
<tr>
<th>Subject</th>
<th>Science</th>
<th>Class</th>
<th>IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>The Nitrogen Cycle</td>
<td>Duration</td>
<td>30 Minutes</td>
</tr>
</tbody>
</table>

Expected Cognitive Behaviour Outcomes:
Enable the learners to:

Remember: Explain the nitrogen cycle.
Understand: Comprehend the nitrogen cycle.
Apply: Use the knowledge of the nitrogen cycle.
Analyze: Examine the process the nitrogen cycle.
Evaluation: Justify the reason behind the nitrification, ammonification and denitrification.
Create/Problem Solving: To solve the problem related the nitrogen cycle.

Resource Material Required:
Computer/Laptop, Internet and LFT/ Projector

Outline/Summary of the Concept:
Nitrogen gas makes up 78% of our atmosphere and also a part of many molecules essential to life like protein, nucleic acid and some vitamins. In nitrification process which nitrogen molecules convert into nitrates and nitrites by atmospheric and industrial fixation. In ammonification process nitrogen molecules convert into ammonia by green plants and animals and ammonia convert into nitrates and nitrites. In denitrification process, nitrates and nitrites convert into nitrogen molecules.

Methodology to be used:
Lecture-cum-Demonstration and Discussion Methods

Entry Behaviour Testing:
The investigator will ask the following questions:
1. Name the molecules contained in the protein and vitamins.
2. Name the molecules contained in the DNA and RNA.
3. How much percent nitrogen is present in atmosphere?
4. What do you mean by the nitrogen cycle?
**Presentation:** Well, students, today we will discuss about the interesting topic the nitrogen cycle with the help of websites.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation /Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen</td>
<td>Investigator will try to involve the learners by asking question.</td>
<td>Investigator will give the question: What percentage of nitrogen is present in the atmosphere?</td>
<td>Learner will explore the nitrification process.</td>
<td>![Diagram of Atmospheric Nitrogen Composition]</td>
<td>Investigator will ask: What percentage of nitrogen is present in the atmosphere?</td>
</tr>
<tr>
<td>Nitrification Process</td>
<td>Investigator will try to involve the learners by using internet. Learners will see the lesson on screen.</td>
<td>Investigator will elaborate with the help of websites: In nitrification process, nitrogen molecules convert into nitrates and nitrites by atmospheric and industrial fixation.</td>
<td>Learner will explore the nitrification process.</td>
<td>![Diagram of Nitrification Process]</td>
<td>Investigator will ask: What is the nitrification process?</td>
</tr>
<tr>
<td>Ammonification Process</td>
<td>Investigator will try to involve the learners by using internet. Learners will see the lesson on screen.</td>
<td>Investigator will elaborate with the help of websites: In ammonification process, nitrogen molecules convert into ammonia by green plants and animals and ammonia converts into nitrates and nitrites.</td>
<td>Learner will explore the ammonification process.</td>
<td>![Diagram of Ammonification Process]</td>
<td>Investigator will ask: What is the ammonification process?</td>
</tr>
<tr>
<td>Denitrification Process</td>
<td>Investigator will try to involve the learners by internet and website.</td>
<td>Investigator will elaborate with the help of websites: In denitrification process, nitrates and nitrites convert into nitrogen molecules.</td>
<td>Learner will explore the denitrification process.</td>
<td>![Diagram of Denitrification Process]</td>
<td>Investigator will ask the learner: What is the denitrification process.</td>
</tr>
</tbody>
</table>

**Generalization:**

The learner will be able to know about the nitrification process, ammonification process and denitrification process.
Terminal Behaviour Testing:

The investigator will give five minutes to learners for one to one interaction on the taught topic. After that he will ask questions from them.

1. What percentage of nitrogen is present in the atmosphere?
2. What is the nitrification process?
3. What is the ammonification process?
4. What is the denitrification process?

Creative Assignment:

Draw the diagram of the Nitrogen Cycle.

References:

SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.

SCIENCE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.

https://www.bbc.co.uk/education/guides/zysbgk7/revision/2

https://en.wikipedia.org/wiki/Nitrogen_cycle

http://www.aquariumfiltersetup.com/nitrate-removal/

*****
Blended Learning

Module - 3

on

Outdoor Experience Strategy

in

Science

Topics:

1. Uniform Circulation of Motion
2. Tyndall Effect
3. Force
4. First Law of Motion
5. Second Law of Motion
6. Third Law of Motion
7. Buoyancy
8. Archimedes’ Principle
9. Work
10. Sound
11. Air Pollution
12. Plant Nutrients
13. Cropping Patterns
Introduction:
Outdoor education usually refers to organized learning that takes place outside the classroom. The term 'outdoor education', however, is used broadly to refer to a range of organized activities that take place in a variety of ways in predominantly outdoor environments.

Objectives:

i. To increased learner engagement.

ii. To improved learning effectiveness.

iii. Individual differences results into different learning styles.

Methodology to be used:
The topics were developed with the lecture-cum-demonstration and discussion methods at outdoor activities.
THIS MODULE PRESENTS AN OVERVIEW OF THE FOUR MODULES ON DIFFERENT TOPICS FROM YOUR SYLLABUS IN THE SUBJECT OF SCIENCE WITH OUTDOOR ACTIVITIES:

PAY ATTENTION AS IT WILL HELP YOU TO UNDERSTAND THE SUBJECT MATTER EASILY
Lesson Plan-27

<table>
<thead>
<tr>
<th>Subject :</th>
<th>Science</th>
<th>Class :</th>
<th>IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic :</td>
<td>Uniform Circular Motion</td>
<td>Duration :</td>
<td>30 Minutes</td>
</tr>
</tbody>
</table>

Expected Cognitive Behaviour Outcomes:
Enable the learners to:

**Remember:** Define uniform circular motion.

**Understand:** Comprehend velocity, magnitude or direction of motion.

**Apply:** Use the concept of uniform circular motion.

**Analyze:** Examine the relationship between time, speed and circular path.

**Evaluation:** Justify the functions of circular motion.

**Create/Problem Solving:** Solve numerical related topics.

**Resource Material Required:**
Small piece of thread and ball.

**Outline/Summary of the Concept:**
An object changes its position or covers distance with a time is called motion. If an object covers the equal distance in equal interval of time, it is said to be uniform motion. When an object moves in a circular path with uniform speed, its motion is called uniform circular motion. If an object takes \( t \) seconds to go once around the circular path of radius \( r \) the velocity will be
\[
v = \frac{2\pi r}{t}
\]
When an object released suddenly, it moves in the direction in which it was moving at the time it was released, it show the effect on an object after releasing suddenly.

**Methodology to be used:**
Outdoor Activities, Lecture-cum-Demonstration and Discussion Methods

**Entry Behaviour Testing:**
The investigator will ask the following questions:

1. What is the meaning of motion?
2. What is uniform motion?
3. What is the relation between time and speed in motion?
4. What is uniform circular motion?
**Presentation:** Today, we will study about the uniform circular motion.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation /Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Meaning of motion</strong></td>
<td>Investigator will try to involve the learners by showing them pictures and by performing activities with ball. Learners will perform the activities.</td>
<td>Investigator will explain: An object changes its position or covers distance within a certain and this time is called motion.</td>
<td>Investigator will ask the learner: Give an example of motion.</td>
<td>Ball</td>
<td>Investigator will ask the learners: What is motion?</td>
</tr>
<tr>
<td><strong>Meaning of uniform motion</strong></td>
<td>Investigator will try to involve the learners by showing them pictures and by performing activities with ball. Learners will perform the activities.</td>
<td>Investigator will elaborate: If an object covers the equal distance in equal interval of time, it is said to be uniform motion.</td>
<td>Investigator will ask the learner: Give an example of uniform motion.</td>
<td>Ball</td>
<td>Investigator will ask the learners: What is uniform motion?</td>
</tr>
<tr>
<td><strong>Meaning of uniform circular motion</strong></td>
<td>Investigator will try to involve the learners by performing activities with ball. Learners will perform the activities.</td>
<td>Investigator will explain: When an object moves in a circular path with uniform speed, its motion is called uniform circular motion.</td>
<td>Investigator will ask the learner: Give an example of uniform circular motion.</td>
<td>Ball</td>
<td>Investigator will ask the learners: What is uniform circular motion?</td>
</tr>
<tr>
<td><strong>Relationship between time and circular path</strong></td>
<td>Investigator will try to involve the learners by discussion</td>
<td>Investigator will elaborate: If an object takes ( t ) seconds to go once around the circular path of radius ( r ) the velocity will be [ v = \frac{2\pi r}{t} ]</td>
<td>Investigator will ask the learner: What is ( 2\pi r ) in equation?</td>
<td>Ball</td>
<td>Investigator will ask the learners: What is the value of ( 2\pi r )?</td>
</tr>
<tr>
<td><strong>Effect on an object after releasing suddenly</strong></td>
<td>Investigator will try to involve the learners by performing activities with ball. Learners will perform the activities.</td>
<td>Investigator will explain: When an object released suddenly, it moves in the direction in which it was moving at the time it was released.</td>
<td>Investigator will ask the learner: Give an example of to show the Effect on an object after releasing suddenly</td>
<td>Ball</td>
<td>Investigator will ask the learners: What will happen when an object is released?</td>
</tr>
</tbody>
</table>
Generalization:

The learner will be able to know about the motion, uniform motion, uniform circular motion and Effect on an object after releasing suddenly.

Terminal Behaviour Testing:

The investigator will form the groups of five learners for collaborative learning and he will give the five minutes for the mutual discussion. After that he will ask questions from the learners.
1. What is motion?
2. What is uniform motion?
3. What is uniform circular motion?
4. What will happen when an object is released?

Creative Assignment:

Solve the numerical related with velocity with the help of the following equation.

\[ v = \frac{2\pi r}{t} \]

References:

SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.
SCIENCE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.
https://www.wethementors.com/notes/physics/uniform-circular-motion

*****
Lesson Plan-28

<table>
<thead>
<tr>
<th>Subject</th>
<th>Science</th>
<th>Class</th>
<th>IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>Tyndall Effect</td>
<td>Duration</td>
<td>30 Minutes</td>
</tr>
</tbody>
</table>

Expected Cognitive Behaviour Outcomes:
Enable the learners to:

Remember: Define Tyndall effect.
Understand: Comprehend Tyndall effect.
Apply: Use the knowledge of Tyndall effect.
Analyze: Examine the causes of Tyndall effect.
Evaluation: Justify the causes of Tyndall effect.
Create/Problem Solving: Develop the scientific attitude behind Tyndall effect.

Resource Material Required:
Field Visit

Outline/Summary of the Concept:
The Solution is a homogeneous mixture of two or more substances. The Colloidal solution is a heterogeneous mixture. Colloids have particles larger than the particles of the true solution but smaller than those of a suspension. Colloidal particles scatter light i.e. they show Tyndall effect. Tyndall effect may be defined as the scattering of light by colloidal particles present in a colloidal solution. The dimensions of colloidal particles are comparable to the wavelengths of ultraviolet and visible radiations, they scatter these radiations and get illuminated. The zone of scattered light is much larger than the particles itself. This is why colloidal particles look like a bright beam. Tyndall effect can be used to distinguish a colloidal solution from a true solution.
A fine beam of light enters a room through a small hole and sunlight passes through the canopy of a dense forest are the examples of Tyndall effect.

Methodology to be used:
Outdoor Activities, Lecture-cum-Demonstration and Discussion Methods

Entry Behaviour Testing:
The investigator will ask the following questions:
1. What is solution?
2. What is the colloidal solution?
3. What is the meaning of scattering?
4. Why a beam of light is observered in a dark room?
**Presentation:** Today, we will study about the Tyndall effect.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation/Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Meaning of Solution</strong></td>
<td>Investigator will try to involve the learners by performing activities. Learners will perform the activities.</td>
<td>Investigator will explain: The solution is a homogeneous mixture of two or more substances.</td>
<td>Investigator will ask the learners: Give an example of a solution.</td>
<td><img src="image1.png" alt="Image" /></td>
<td>Investigator will ask: What is solution?</td>
</tr>
<tr>
<td><strong>Meaning of Colloidal Solution</strong></td>
<td>Investigator will try to involve the learners by asking question.</td>
<td>Investigator will ask the learner: What is colloidal solution?</td>
<td>Learner will explore the answer: Colloidal solution is a heterogeneous mixture.</td>
<td><img src="image2.png" alt="Image" /></td>
<td>Investigator will ask: What is colloidal solution?</td>
</tr>
<tr>
<td><strong>Meaning of Tyndall Effect</strong></td>
<td>Investigator will try to involve the learners in field by performing activities.</td>
<td>Investigator will elaborate: The colloidal particles scatter light i.e. they show Tyndall effect. Tyndall effect may be defined as the scattering of light by colloidal particles present in a colloidal solution.</td>
<td>Learner will explore the Tyndall effect.</td>
<td><img src="image3.png" alt="Image" /></td>
<td>Investigator will ask: What is Tyndall effect?</td>
</tr>
<tr>
<td><strong>Cause behind Tyndall Effect</strong></td>
<td>Investigator will try to involve the learners in field by performing activities.</td>
<td>Investigator will explain the causes behind Tyndall effect: The dimensions of colloidal particles are comparable to the wavelengths of ultraviolet and visible radiations; they scatter these radiations and get illuminated. The zone of scattered light is much larger than the particles itself. This is why colloidal particles look like a bright beam.</td>
<td>Learner will be unable to answer the question. Investigator will explore answer of the question</td>
<td><img src="image4.png" alt="Image" /></td>
<td>Investigator will ask: What is the cause behind Tyndall effect?</td>
</tr>
<tr>
<td><strong>Use of Tyndall Effect</strong></td>
<td>Investigator will try to involve the learners by asking question.</td>
<td>Investigator will try to involve the learners by asking question. What is use of Tyndall effect? Investigator will explore answer of</td>
<td>Learner will be unable to answer the question. Investigator will explore answer of the</td>
<td><img src="image5.png" alt="Image" /></td>
<td>Investigator will ask: What is the use of Tyndall effect?</td>
</tr>
<tr>
<td>Content Highlights</td>
<td>Engagement</td>
<td>Explanation/Elaboration</td>
<td>Exploration</td>
<td>Resource Material</td>
<td>Evaluation</td>
</tr>
<tr>
<td>-------------------</td>
<td>------------</td>
<td>-------------------------</td>
<td>-------------</td>
<td>-------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Tyndall effect can be used to distinguish a colloidal solution from a true solution.</td>
<td>Investigator will try to involve the learners by asking question.</td>
<td>Investigator will try to involve the learners by asking question. Give the example of Tyndall effect. Investigator will explore answer of the question: A fine beam of light enters a room through a small hole and sunlight passes through the canopy of a dense forest are the examples of Tyndall effect.</td>
<td>Learner will be unable to answer the question. Investigator will explore answer of the question.</td>
<td>Investigator will ask: Give the examples of Tyndall effect.</td>
<td></td>
</tr>
</tbody>
</table>

**Generalization:**
The learner will be able to know about the Tyndall effect, causes, use and examples of Tyndall effect.

**Terminal Behaviour Testing:**
The investigator will form peer groups. After that he will give them five minutes for mutual discussion. Then he will ask questions from the learners.

1. What is Tyndall effect?
2. What is the cause behind Tyndall effect?
3. What is the use of Tyndall effect?
4. Give the examples of Tyndall effect.

**Creative Assignment:**
What is Tyndall effect? Performe activities at home related to Tyndall effect.
References:
SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.
SCIENCE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.
https://maryhally.wordpress.com/tag/colloid-science-blog-mixture/
https://chemistryonline.guru/tyndall-effect-brownian-movement/
http://www.chemistryworks.net/2013/12/properties-of-colloids.html
https://www.slideshare.net/renzbisquera/colloid-14304331
Lesson Plan-29

<table>
<thead>
<tr>
<th>Subject : Science</th>
<th>Class : IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic : Force</td>
<td>Duration : 30 Minutes</td>
</tr>
</tbody>
</table>

**Expected Cognitive Behaviour Outcomes:**

Enable the learners to:

**Remember:** Define force.

**Understand:** Comprehend different functions of force.

**Apply:** Use the concept of force in daily life

**Analyze:** Examine the push and pull process.

**Evaluation:** Justify the functions of Balanced and unbalanced forces.

**Create/Problem Solving:** Develop the problem solving ability in the concept of force.

**Resource Material Required:**

Football, Small piece of thread, brick, bicycle and pictures

**Outline/Summary of the Concept:**

Pull or Push acting on an object to change its state of motion is called force. Opening and shutting the door and drawer are the example of push, pull and force. A force can be used to change the magnitude of velocity or to change its direction of motion or change the shape of the objects. If the resultant of all the forces acting on a body is zero, the forces are called balanced force. If the resultant of all the forces acting on a body is not zero, the forces are called unbalanced force.

**Methodology to be used:**

Outdoor Activities, Lecture-cum-Demonstration and Discussion Methods.

**Entry Behaviour Testing:**

The investigator will ask the following questions:

1. What is the meaning of pull?
2. What is the meaning of push?
3. What is the relation between push and pull?
4. What is force?
**Presentation:** Today, we will study about the force.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation /Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Meaning of Force</strong></td>
<td>Investigator will try to involve the learners by showing pictures and by performing activities with bicycle. Learners will perform the activities.</td>
<td>Investigator will explain: Pull or Push acting on an object to change its state of motion is called force.</td>
<td>Investigator will ask the learner: Give an example of force.</td>
<td>Bicycle</td>
<td>Investigator will ask: What is force?</td>
</tr>
<tr>
<td><strong>Examples of pull and push</strong></td>
<td>Investigator will try to involve the learners by showing pictures and by performing activities with bicycle. Learners will see the picture and perform the activities.</td>
<td>Investigator will elaborate: The examples of push or pull i.e. Opening and shutting the door and drawer are the example of push, pull and force.</td>
<td>Investigator will ask the learner: Give an example of pull force.</td>
<td>Bicycles</td>
<td>Investigator will ask: What is pull force?</td>
</tr>
<tr>
<td><strong>Effect of force on objects</strong></td>
<td>Investigator will try to involve the learners by showing pictures and by performing activities with bicycle. Learners will see the picture and perform the activities.</td>
<td>Investigator will explain: A force can be used to change the magnitude of velocity or to change its direction of motion or change the shape of the objects.</td>
<td>Investigator will ask the learner: What will happen when be apply a force on an object?</td>
<td>Football</td>
<td>Investigator will ask: Explain the effect of force on shape of an object.</td>
</tr>
<tr>
<td><strong>Balanced Force</strong></td>
<td>Investigator will try to involve the learners by performing activities with bicycle. Learners will perform the activities.</td>
<td>Investigator will explain: If the resultant of all the forces acting on a body is zero, the forces are called balanced force.</td>
<td>Investigator will ask the learner: Give an example of balanced force.</td>
<td>Rope and Brick</td>
<td>Investigator will ask: What is balanced force?</td>
</tr>
<tr>
<td><strong>Unbalanced Force</strong></td>
<td>Investigator will try to involve the learners by performing activities with bicycle. Learners will perform the activities.</td>
<td>Investigator will explain: If the resultant of all the forces acting on a body is not zero, the forces are called unbalanced force.</td>
<td>Investigator will ask the learner: Give an example of unbalanced force.</td>
<td>Rope and Brick</td>
<td>Investigator will ask: What is unbalanced force?</td>
</tr>
</tbody>
</table>
Generalization:

The learner will be able to know about the force, pull and push forces and balanced and unbalanced forces.

Terminal Behaviour Testing:

The investigator will give five minutes to learners for one to one interaction on the taught topic. After that he will ask questions from them.

1. What is the meaning of force?
2. What is the meaning of pull?
3. What is the meaning of push?
4. What is the relation between push and pull?
5. What is the difference between balanced and unbalanced forces?

Creative Assignment:

What is the meaning of force? Explain with special reference to examples from daily life.

References:

SCIENECE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.
SCIENECE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.
http://easyscienceforkids.com/all-about-force-push-and-pull/
https://www.slideshare.net/teachertanoto/forces-and-their-effects-8707801
https://byjus.com/physics/balanced-force/

*****
Lesson Plan-30

<table>
<thead>
<tr>
<th>Subject</th>
<th>Science</th>
<th>Class</th>
<th>IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>First Law of Motion</td>
<td>Duration</td>
<td>30 Minutes</td>
</tr>
</tbody>
</table>

Expected Cognitive Behaviour Outcomes:

Enable the learners to:

**Remember:** Define motion.

**Understand:** Comprehend different functions of the first law of motion.

**Apply:** Use the concept of first law of motion in daily life

**Analyze:** Examine the inertia and mass.

**Evaluation:** Justify the functions of rest and motion position.

**Create/Problem Solving:** Develop the first law of motion in the concept of motion.

Resource Material Required:

Football, Small piece of card, coin, glass, ball and bicycle

Outline/Summary of the Concept:

When a body does not change its position with respect to its surroundings the body is said to be at rest. When a body changes its position with respect to its surroundings the body is said to be in motion position. There is a resistance offered by an object to change its position. If it is at rest it tends to remain at rest; if it is moving it tends to keep moving. This property of an object is called its inertia. The inertia of an object is measured by its mass. The first law of motion is also known as the law of inertia. Every object in this universe will continue its state of rest or uniform motion in a straight line unless acted upon by some external force is the first law of motion.

Methodology to be used:

Outdoor Activities, Lecture-cum-Demonstration and Discussion Methods

Entry Behaviour Testing:

The investigator will ask the following questions:

1. What is the meaning of rest position?
2. What is the meaning of motion position?
3. What is inertia?
4. What is the first law of motion?
**Presentation:** Today, we will study about the first law of motion.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation /Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meaning of rest position</td>
<td>Investigator will try to involve the learners by performing activities with football. Learners will perform the activities.</td>
<td>Investigator will explain: When a body does not change its position with respect to its surroundings the body is said to be at rest.</td>
<td>Investigator will ask the learner: Give an example of rest position of an object.</td>
<td>Football</td>
<td>Investigator will ask: What is the meaning of rest position?</td>
</tr>
<tr>
<td>Meaning of motion position</td>
<td>Investigator will try to involve the learners by performing activities with ball. Learners will see the picture and perform the activities.</td>
<td>Investigator will explain: When a body changes its position with respect to its surroundings the body is said to be in motion.</td>
<td>Investigator will ask the learner: Give an example motion position of an object.</td>
<td>Football</td>
<td>Investigator will ask: What is the meaning of motion position?</td>
</tr>
<tr>
<td>Meaning inertia.</td>
<td>Investigator will try to involve the learners by performing activities with coin, card and glass. Learners will perform the activities.</td>
<td>Investigator will elaborate: If it is at rest it tends to remain at rest; if it is moving it tends to keep moving. This property of an object is called its inertia.</td>
<td>Investigator will ask the learner: What is inertia?</td>
<td>Coin, Card and Glass</td>
<td>Investigator will ask: What is inertia?</td>
</tr>
<tr>
<td>Relation between inertia and mass</td>
<td>Investigator will try to involve the learners by performing activities. Learners will perform the activities.</td>
<td>Investigator will explain: The inertia of an object is measured by its mass.</td>
<td>Investigator will ask the learner: What is inertia?</td>
<td>Football</td>
<td>Investigator will ask: What is mass?</td>
</tr>
<tr>
<td>First law of motion</td>
<td>Investigator will try to involve the learners by performing activities football. Learners will perform the activities.</td>
<td>Investigator will explain: Every object in this universe will continue its state of rest or uniform motion in a straight line unless acted upon by some external force is the first law of motion.</td>
<td>Investigator will ask the learner: Give an example of the first law of motion.</td>
<td>Football</td>
<td>Investigator will ask: What is the first law of motion?</td>
</tr>
</tbody>
</table>
Generalization:

The learner will be able to know about the position of an object, inertia and mass forces and the law of inertia or the first law of motion.

Terminal Behaviour Testing:

The investigator will form the groups of five learners for collaborative learning and he will give the five minutes for the mutual discussion. After that he will ask questions from the learners.

1. What is inertia?
2. What is the meaning of rest position?
3. What is the meaning of motion position?
4. What is the first law of motion?

Creative Assignment:

What is the first law of motion? Explain with special reference to examples from daily life.

References:

SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.

SCIENCE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.


*****
Lesson Plan-31

<table>
<thead>
<tr>
<th>Subject</th>
<th>Science</th>
<th>Class</th>
<th>IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>Second Law of Motion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duration</td>
<td>30 Minutes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Expected Cognitive Behaviour Outcomes:**

Enable the learners to:

**Remember:** Define second law of motion.

**Understand:** Comprehend different functions of second law of motion.

**Apply:** Use the concept of second law of motion in daily life.

**Analyze:** Examine mass and velocity.

**Evaluation:** Justify the functions of momentum and mass.

**Create/Problem Solving:** Develop the concept of the second law of motion.

**Resource Material Required:**

Ball and Pictures.

**Outline/Summary of the Concept:**

The first law of motion indicates that when an unbalanced external force acts on an object, its velocity changes, that is, the object gets acceleration. If an object is to accelerate, we know that a greater force is required to give a greater velocity. In other words, there appears to exist some quantity of importance that combines the object’s mass and its velocity. One such property called momentum. The momentum of an object is defined as the product of its mass and velocity. The second law of motion states that the rate of change of momentum of an object is proportional to the applied unbalanced force in the direction of the force. While catching a fast moving cricket ball, a fielder in the ground gradually pulls his hands backward with moving the ball because fielder increases the time during which the velocity of the moving ball decreases to zero. The acceleration of the ball is also reduced and prevents the palm of fielder from the injury.

**Methodology to be used:**

Outdoor activities, Lecture-cum-demonstration and Discussion methods

**Entry Behaviour Testing:**

The investigator will ask the following questions:

What is the meaning of velocity?

1. What is momentum?

2. What is second law of motion?

**Presentation:** Today, we will study about the second law of motion.
<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement /Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Meaning unbalanced external force</strong></td>
<td>Investigator will try to involve the learners by asking question. What is unbalance force?</td>
<td>Investigator will explain: If double force is applied than the friction force on an object is called unbalance force.</td>
<td>Investigator will ask the learner: Give an example of unbalance force.</td>
<td>Investigator will ask: What is unbalance force?</td>
</tr>
<tr>
<td><strong>Meaning acceleration</strong></td>
<td>Investigator will try to involve the learners by asking question. What is acceleration?</td>
<td>Investigator will elaborate: When an unbalanced external force acts on an object, its velocity changes, that is, the object gets acceleration.</td>
<td>Investigator will the learner: Give an example of acceleration?</td>
<td>Investigator will ask: What is acceleration?</td>
</tr>
<tr>
<td><strong>Meaning momentum</strong></td>
<td>Investigator will try to involve the learners by asking question. What is momentum?</td>
<td>Investigator will elaborate: Momentum with equation. The momentum of an object is defined as the product of its mass and its velocity.</td>
<td>Investigator will the learner: Give an example of momentum.</td>
<td>Investigator will ask: What is momentum?</td>
</tr>
<tr>
<td><strong>Second law of motion</strong></td>
<td>Investigator will try to involve the learners by performing activities with ball. Learners will and perform the activities.</td>
<td>Investigator will explain: The second law of motion states that the rate of change of momentum of an object is proportional to the applied unbalanced force in the direction of the force.</td>
<td>Investigator will the learner: What is second law of motion?</td>
<td>Investigator will ask: Explain the second law of motion.</td>
</tr>
<tr>
<td><strong>Example of second law of motion</strong></td>
<td>Investigator will try to involve the learners by performing activities with ball. Learners will perform the activities.</td>
<td>Investigator will explain: While catching a fast moving cricket ball, a fielder in the ground gradually pulls his hands backward with moving the ball because fielder increases the time during which the velocity of the moving ball decreases to zero. The acceleration of the ball is also reduced and prevents the palm of fielder from the injury.</td>
<td>Investigator will the learner: Give an example of second law of motion.</td>
<td>Investigator will ask: Give an example of the second law of motion.</td>
</tr>
</tbody>
</table>
Generalization:
The learner will be able to know about the momentum and second law of motion.

Terminal Behaviour Testing:
The investigator will form peer groups. After that he will give them five minutes for mutual discussion. Then he will ask questions from the learners.

1. What is acceleration?
2. Explain the second law of motion.
3. Give an example of the second law of motion.

Creative Assignment:
What is the meaning of the second law of motion? Explain with special reference to examples from daily life.

References:
SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.
SCIENCE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.
http://slideplayer.com/slide/9038210/
https://brainly.in/question/1159880

*****
Lesson Plan-32

<table>
<thead>
<tr>
<th>Subject</th>
<th>Science</th>
<th>Class</th>
<th>IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>Third Law of Motion</td>
<td>Duration</td>
<td>30 Minutes</td>
</tr>
</tbody>
</table>

**Expected Cognitive Behaviour Outcomes:**

Enable the learners to:

**Remember:** Define motion.

**Understand:** Comprehend third law of motion.

**Apply:** Use the concept of third law of motion in daily life

**Analyze:** Examine the action and reaction process.

**Evaluation:** Justify the functions of action and reaction.

**Create/Problem Solving:** Develop the problem solving ability in the concept of action and reaction.

**Resource Material Required:**

Balloon and Ball

**Outline/Summary of the Concept:**

The third law of motion states that when one object exerts a force on another object, the second object instantaneously exerts a force back on the first. These two forces are always equal in magnitude but opposite in direction. The two opposing forces are also known as action and reaction forces. To every action, there is an equal and opposite reaction. Examples of the third law of motion are when we push the road below backward. The road exerts an equal and opposite reaction force and when we release the air filled balloon, the air blow downward. The air pushes balloon upward.

**Methodology to be used:**

Outdoor Activities, Lecture-cum-Demonstration and Discussion Methods.

**Entry Behaviour Testing:**

The investigator will ask the following questions:

1. What is the meaning of force?
2. What is the meaning of motion?
3. What are the action and reaction?
4. When a gun is fired, why does it recoil?
5. **What is the third law of motion?**

**Presentation:** Today, we will study about the third law of motion

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation /Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The third law of motion</strong></td>
<td>Investigator will try to involve the learners by performing activities with ball. Learners will perform the activities.</td>
<td>Investigator will explain: To every action, there is an equal and opposite reaction is known as third law of motion.</td>
<td>Investigator will ask the learner: Give an example of third law of motion.</td>
<td>Ball</td>
<td>Investigator will ask: What is the third law of motion?</td>
</tr>
<tr>
<td><strong>Meaning of action and reaction</strong></td>
<td>Investigator will try to involve the learners by performing activities with ball. Learners will perform the activities.</td>
<td>Investigator will elaborate: The two opposing forces are also known as action and reaction forces.</td>
<td>Investigator will ask the learner: Give an example action and reaction forces.</td>
<td>Ball</td>
<td>Investigator will ask: What are action and reaction force?</td>
</tr>
<tr>
<td><strong>The examples of third law of motion</strong></td>
<td>Investigator will try to involve the learners by performing activities himself. Learners will perform the activities.</td>
<td>Investigator will elaborate: The example of third law of motion by performing an activity of walking and elaborate the concept of third law of motion that when we push the road below backward. The road exerts an equal and opposite reaction force.</td>
<td>Investigator will ask the learner: Give an example third law of motion.</td>
<td>Walking</td>
<td>Investigator will ask: What is the third law of motion?</td>
</tr>
<tr>
<td><strong>The examples of third law of motion</strong></td>
<td>Investigator will try to involve the learners by performing activities with balloon. Learners will see the picture and perform the activities.</td>
<td>Investigator will elaborate: The example of the third law of motion by performing an activity with balloon to elaborate the concept of third law of motion that when we release the air filled balloon, the air blow downward. The air pushes balloon upward.</td>
<td>Investigator will ask the learner: Why balloon has gone upward?</td>
<td>Balloon</td>
<td>Investigator will ask: Explain, Why does balloon go upward instead of downward?</td>
</tr>
</tbody>
</table>
Generalization:
The learner will be able to know about the third law of motion, action and reaction forces

Terminal Behaviour Testing:
The investigator will give five minutes to learners for one to one interaction on the taught topic. After that he will ask questions from them.

1. What are the action and reaction?
2. What is the third law of motion?

Creative Assignment:
What is the third law of motion? Make the list of example based on the third law of motion from daily life.

References:
SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.
SCIENCE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.
Lesson Plan-33

<table>
<thead>
<tr>
<th>Subject</th>
<th>Science</th>
<th>Class</th>
<th>IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>Buoyancy</td>
<td>Duration</td>
<td>30 Minutes</td>
</tr>
</tbody>
</table>

**Expected Cognitive Behaviour Outcomes:**

Enable the learners to:

- **Remember:** Define buoyancy.
- **Understand:** Comprehend buoyancy.
- **Apply:** Use the concept of buoyancy in daily life
- **Analyze:** Examine the buoyant force.
- **Evaluation:** Justify the functions of buoyant force.
- **Create/Problem Solving:** Develop the scientific attitude in the concept of buoyancy.

**Resource Material Required:**

Water, Orange, Thread and Bottle

**Outline/Summary of the Concept:**

The net force in a particular direction is called thrust. The net upward force in a particular direction is called upthrust or buoyant force. When an object is immersed in a fluid, the upward force on the object exerts that force is called buoyancy. All objects experience a force of buoyancy when they are immersed in the fluid. The magnitude of this buoyant force depends on the density of the fluid. The density of an object less than that of a liquid, it floats on the liquid. The density of an object greater than that of a liquid, it sinks in the liquid.

**Methodology to be used:**

Outdoor Activities, Lecture-cum-Demonstration and Discussion Methods

**Entry Behaviour Testing:**

The investigator will ask the following questions:

1. Why is a bucket of water heavier when it is out of water?
2. Why does iron and steel ship not sink in sea water?
3. Why does nail sink in the water?
4. What is upthrust?
5. What is buoyancy?
Presentation: Today, we will study about the buoyancy.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation /Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meaning of thrust</td>
<td>Investigator will try to involve the learners by performing activities with bottle Learners will perform the activities.</td>
<td>Investigator will explain: The net force in a particular direction is called thrust. Investigator will ask the learner: Give an example of thrust.</td>
<td>Investigator will ask the learner: Give an example of thrust.</td>
<td>Bottle</td>
<td>Investigator will ask: What is thrust?</td>
</tr>
<tr>
<td>Meaning of upthrust</td>
<td>Investigator will try to involve the learners by performing activities with bottle Learners will perform the activities.</td>
<td>Investigator will elaborate: The net upward force in a particular direction is called upthrust or buoyant force. Investigator will ask the learner: Give an example of upthrust.</td>
<td>Investigator will ask the learner: Give an example of upthrust.</td>
<td>Bottle</td>
<td>Investigator will ask: What is buoyant force?</td>
</tr>
<tr>
<td>Meaning of buoyancy</td>
<td>Investigator will try to involve the learners by performing activities himself Learners will perform the activities.</td>
<td>Investigator will elaborate: When an object is immersed in a fluid, the upward force on the object exerts that force is called buoyancy. Investigator will ask the learner: Give an example of buoyancy.</td>
<td>Investigator will ask the learner: Give an example of buoyancy.</td>
<td></td>
<td>Investigator will ask: What is buoyancy?</td>
</tr>
<tr>
<td>The examples of buoyancy</td>
<td>Investigator will try to involve the learners by performing activities with an orange. Learners will see and perform the activities.</td>
<td>Investigator will elaborate the example of buoyancy: First, he will put the orange in water and it will not sink in water due pores and less density of the orange and upthrust force on orange. After that he will put the peel free orange it will sink in the water due more density of orange than water density. Investigator will ask the learner: Explain, Why does not orange sink in water?</td>
<td>Investigator will ask the learner: Why orange does not sink in water?</td>
<td></td>
<td>Investigator will ask: Explain, Why does not orange sink in water?</td>
</tr>
</tbody>
</table>
Generalization:
The learner will be able to know about the thrust, buoyant force and concept of buoyancy.

Terminal Behaviour Testing:
The investigator will form the groups of five learners for collaborative learning and he will give the five minutes for the mutual discussion. After that he will ask questions from the learners.
1. What is upthrust?
2. What is buoyancy?
3. Why does not orange sink in the water?

Creative Assignment:
What is buoyancy? Perform activity at home to understand the concept of buoyancy.

References:
SCIENCe Textbook for Class IX, Punjab School Education Board, Mohali Punjab.
SCIENCe Textbook for Class IX, National Council of Educational Research and Training, New Delhi.
https://byjus.com/physics/thrust-pressure/

*****
Subject: Science
Class: IX
Topic: Archimedes’ Principle
Duration: 30 Minutes

Expected Cognitive Behaviour Outcomes:

Enable the learners to:

Remember: Define Archimedes’ Principle.
Understand: Comprehend Archimedes’ Principle.
Apply: Use the concept of Archimedes’ Principle in daily life
Analyze: Examine the upward force and displacement.
Evaluation: Justify the functions of Archimedes’ Principle.
Create/Problem Solving: Develop the scientific attitude in the concept of Archimedes’ Principle.

Resource Material Required:
Water, Thread and Bottle

Outline/Summary of the Concept:
Archimedes was a Greek scientist. He has discovered the Archimedes’ Principle. Upward force exerted by water is known as the force of buoyancy. When a body is immersed fully or partially in a fluid, it experiences an upward force that is equal to the weight of the fluid displaced by it is known as Archimedes’ Principle.

Methodology to be used:
Outdoor Activities, Lecture-cum-Demonstration and Discussion Methods

Entry Behaviour Testing:
The investigator will ask the following questions:

1. On which principle is lactometer based?
2. On which principle are ships designed?
3. Why is water displaced when we put heavy stone in it?
4. What is Archimedes’ Principle?
**Presentation:** Today, we will study about the Archimedes’ Principle.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement/Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Meaning buoyant force</strong></td>
<td>Investigator will try to involve the learners by performing activities with bottle. Learners will perform the activities.</td>
<td>Investigator will explain: Upward force exerted by water is known as the force of buoyancy.</td>
<td></td>
<td>Bottle</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Investigator will ask the learner: Give an example of thrust</td>
<td></td>
<td>Investigator will ask: What is force of buoyancy?</td>
</tr>
<tr>
<td><strong>Meaning of buoyancy</strong></td>
<td>Investigator will try to involve the learners by performing activities himself. Learners will perform the activities.</td>
<td>Investigator will elaborate: When an object is immersed in a fluid, the upward force on the object exerts that force is called buoyancy.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Investigator will ask the learner: Give an example of buoyancy</td>
<td></td>
<td>Investigator will ask: What is buoyancy?</td>
</tr>
<tr>
<td><strong>Archimedes’ Principle</strong></td>
<td>Investigator will try to involve the learners by performing activities with bottle and stone. Learners will see and perform the activities.</td>
<td>Investigator will elaborate: When a body is immersed fully or partially in a fluid, it experiences an upward force that is equal to the weight of the fluid displaced by it is known as Archimedes’ Principle.</td>
<td></td>
<td>Investigator will ask: Explain, Why water is displaced?</td>
</tr>
<tr>
<td><strong>Example of Archimedes’ Principle</strong></td>
<td>Investigator will try to involve the learners by performing activities with bottle and stone. Learners will see and perform the activities.</td>
<td>Investigator will elaborate the example of buoyancy: First he will put the bottle filled with soil in the water and size of thread decreased. After fully immersed of bottle in the water, the level of water raised.</td>
<td></td>
<td>Investigator will ask: Explain, why water is displaced?</td>
</tr>
</tbody>
</table>
Generalization:
The learner will be able to know about the buoyant force, concept of buoyancy and Archimedes’ Principle.

Terminal Behaviour Testing:
The investigator will give five minutes to learners for one to one interaction on the taught topic. After that he will ask questions from them.
1. What is buoyant force?
2. What is buoyancy?
3. What is Archimedes’ Principle?
4. Why is water displaced?

Creative Assignment:
What is Archimedes’ Principle? Perform activity and note down the result to know the Archimedes’ Principle at home.

References:
SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.

SCIENCE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.

https://byjus.com/physics/thrust-pressure/
https://ainikamarudin.wordpress.com/notes/note/
https://dustinyouthbusters321.wordpress.com/2012/06/14/archimedes-principle/

*****
Subject: Science
Class: IX
Topic: Work
Duration: 30 Minutes

Expected Cognitive Behaviour Outcomes:
Enable the learners to:

Remember: Define the work.
Understand: Comprehend the concept of work.
Apply: Use the concept of work in daily life
Analyze: Examine the concept of work.
Evaluation: Justify the positive and negative concept of work.
Create/Problem Solving: Develops the scientific attitude in the concept of work.

Resource Material Required:
Water, Thread and Bottle

Outline/Summary of the Concept:
Work is said to be done by a force on a body or an object if the force applied causes a displacement in the body or the object. The magnitude of the applied force and the distance traveled by the body on the application of force are the factors on which work done depends. Work done by a force can be either positive or negative. Work done is positive when the force is in the direction of displacement e.g. work done by a winning team of tug of war game is positive. Work done is negative when the force acts opposite to the direction of displacement e.g. in a tug of war game the work was done by the losing team is negative. In SI, the unit of work is joule (J).

Methodology to be used:
Outdoor Activities, Lecture-cum-Demonstration and Discussion Methods

Entry Behaviour Testing:
The investigator will ask the following questions:
1. What do we mean when we hit a football?
2. What is it called when a box is lifted from the ground?
3. What we said when a box is dragged on the floor?
4. What do you mean by work?
**Presentation:** Today, we will study about the work.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation /Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meaning of work</td>
<td>Investigator will try to involve the learners by performing activities with bicycle.</td>
<td>Investigator will explain: Work is said to be done by a force on a body or an object if the force applied causes a displacement in the body or the object.</td>
<td>Investigator will ask the learner: What is work? Learner will give the answer.</td>
<td></td>
<td>Investigator will ask the learner: What is work?</td>
</tr>
<tr>
<td>Factors of work</td>
<td>Investigator will try to involve the learners by asking question.</td>
<td>Investigator will elaborate the answer of question. What are the factors of work? The magnitude of the applied force and the distance traveled by the body on the application of force are the factors on which work done depends.</td>
<td>Investigator will ask the learner: What are the factors of work? Learner will give the answer.</td>
<td></td>
<td>Investigator will ask the learner: What are the factors of work?</td>
</tr>
<tr>
<td>Positive work done</td>
<td>Investigator will try to involve the learners by performing tug of war game. Learners will see and perform the activities.</td>
<td>Investigator will elaborate: The positive work done is said when the force is in the direction of displacement e.g. work done by a winning team of tug of war game is positive.</td>
<td>Investigator will ask the learner: What is the positive work done?</td>
<td></td>
<td>Investigator will ask the learner: What is the positive work done?</td>
</tr>
<tr>
<td>Negative work done</td>
<td>Investigator will try to involve the learners by performing tug of war game. Learner will see and perform the activities.</td>
<td>Investigator will elaborate: The negative work done is said when the force acts opposite to the direction of displacement e.g.in a tug of war game the work was done by the losing team is negative.</td>
<td>Investigator will ask the learner: What is the negative work done?</td>
<td></td>
<td>Investigator will ask the learner: What is the negative work done?</td>
</tr>
<tr>
<td>SI unit of work</td>
<td>Investigator will try to involve the learners by asking question.</td>
<td>Investigator will elaborate the answer of question. What is the SI he unit of work? In SI, the unit of work is joule (J).</td>
<td>Investigator will ask the learner: What is the SI unit of work?</td>
<td>joule (J)</td>
<td>Investigator will ask the learner: What is the SI unit of work?</td>
</tr>
</tbody>
</table>
Generalization:
The learner will be able to know about the meaning, factors, positive and negative work done and SI unit of work

Terminal Behaviour Testing:
The investigator will form peer groups. After that he will give them five minutes for mutual discussion. Then he will ask questions from the learners.
1. What is work?
2. What are the factors of work?
3. What is the positive work done?
4. What is the negative work done?
5. What is the SI unit of work?

Creative Assignment:
What do you mean by positive and negative work done? Perform activity to understand the concept of positive and negative work done.

References:

SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.

SCIENCE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.


http://tutor4physics.com/casenowork.htm

https://brilliant.org/problems/classical-mechanics-problem-91102/


*****

cxxxi
Lesson Plan-36

<table>
<thead>
<tr>
<th>Subject</th>
<th>Science</th>
<th>Class</th>
<th>IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>Sound</td>
<td>Duration</td>
<td>30 Minutes</td>
</tr>
</tbody>
</table>

**Expected Cognitive Behaviour Outcomes:**

Enable the learners to:

- **Remember:** Define sound.
- **Understand:** Comprehend sound.
- **Apply:** Use the concept of sound in daily life
- **Analyze:** Examine role of vibration and medium in sound.
- **Evaluation:** Justify the functions of vibration and medium in sound.
- **Create/Problem Solving:** Develop the intellectual power in the production of sound.

**Resource Material Required:**

Fork and Bell

**Outline/Summary of the Concept:**

A sound is a form of energy that produces a sensation of hearing in our ears. The sound is produced due to the vibration of different objects. Vibration means a kind of rapid to and fro motion of an object. The matter or substance through which sound is transmitted is called a medium like solid liquid or gas. Sound moves through a medium from the point of generation to the listener.

**Methodology to be used:**

Outdoor Activities, Lecture-cum-Demonstration and Discussion Methods

**Entry Behaviour Testing:**

The investigator will ask the following questions:

1. What is the function of our ears?
2. What is vibration?
3. What do you mean by sound?
**Presentation:** Today, we will study about the sound.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation /Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Meaning of sound</strong></td>
<td>Investigator will try to involve the learners by performing activities with clapping. Learners will perform the activities.</td>
<td>Investigator will explain sound with the clapping activity: A sound is a form of energy that produces a sensation of hearing in our ears.</td>
<td>Investigator will ask the learner: Give an example of sound.</td>
<td></td>
<td>Investigator will ask: What is sound?</td>
</tr>
<tr>
<td><strong>Meaning of vibration and its relation with sound</strong></td>
<td>Investigator will try to involve the learners by performing activities with fork and school bell. Learners will perform the activities.</td>
<td>Investigator will elaborate: Vibration that vibration means a kind of rapid to and fro motion of an object. The sound is produced due to the vibration of different objects.</td>
<td>Investigator will ask the learner: Give an example of vibration.</td>
<td></td>
<td>Investigator will ask: What is vibration?</td>
</tr>
<tr>
<td><strong>How sound produced?</strong></td>
<td>Investigator will try to involve the learners by performing activities with fork and bell. Learners will see and perform the activities.</td>
<td>Investigator will elaborate: The sound is produced by striking objects which causes sound. When we clap, a sound is produced.</td>
<td>Investigator will ask the learner: How sound produced?</td>
<td></td>
<td>Investigator will ask: Explain, How sound produced?</td>
</tr>
<tr>
<td><strong>Meaning of medium and its relation with sound</strong></td>
<td>Investigator will try to involve the learners by performing activities. Learners will see and perform the activities.</td>
<td>Investigator will elaborate the medium and its relation to the sound: The matter or substance through which sound is transmitted, is called a medium like solid liquid or gas. Sound moves through a medium from one point of generation to the listener.</td>
<td>Investigator will ask the learner: Give an example of medium which sound is transmitted.</td>
<td></td>
<td>Investigator will ask: Explain, Role of medium.</td>
</tr>
</tbody>
</table>
Generalization:
The learner will be able to know about the sound, vibration and medium.

Terminal Behaviour Testing:
The investigator will form the groups of five learners for collaborative learning and he will give the five minutes for the mutual discussion. After that he will ask questions from the learners.
1. What is vibration?
2. How is sound produced?
3. What is the role of medium in sound?
4. What is sound?

Creative Assignment:
What is sound? Perform activity at home to know, how is sound produced?

References:
SCIENCES Textbook for Class IX, Punjab School Education Board, Mohali Punjab.
SCIENCES Textbook for Class IX, National Council of Educational Research and Training, New Delhi.
http://www.orangefreesounds.com/category/sound-effects/bell-sound/
http://electriciantraining.tpub.com/14182/css/Longitudinal-Wave-54.htm

*****
Subject: Science
Topic: Air Pollution
Class: IX
Duration: 30 Minutes

Expected Cognitive Behaviour Outcomes:

Enable the learners to:

Remember: Define air pollution.

Understand: Comprehend air pollution.

Apply: Use the ways to reduce air pollution.

Analyze: Examine the causes of air pollution.

Evaluation: Justify the harmful effect by air pollution.

Create/Problem Solving: Think up various ways to reduce air pollution.

Resource Material Required:

Vehicles and Kitchen

Outline/Summary of the Concept:

An increase in the content of the harmful substances in air is called air pollution. When fossil fuels like coal and petroleum are burnt, nitrogen and sulphur too are burnt and this produces different oxides of nitrogen and sulphur. It causes inhalation and acid rain problems. Carbon monoxide (CO), nitrous oxides (NOx), and unburnt gas (HC's) have bad human health impacts.

Methodology to be used:

Outdoor Activities, Lecture-cum-Demonstration and Discussion Methods.

Entry Behaviour Testing:

The investigator will ask the following questions:

1. What is pollution?
2. What are the different types of pollution?
3. What is air pollution?
4. What are the causes of air pollution?
**Presentation:** Today, we will study about the air pollution.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation /Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Meaning pollution</strong></td>
<td>Investigator will try to involve the learners by showing picture</td>
<td>Investigator will explain: An increase in the content of the harmful substances is called pollution.</td>
<td>Investigator will ask the learner: How many types of pollution?</td>
<td><img src="image" alt="Air Pollution" /></td>
<td>Investigator will ask: What is pollution?</td>
</tr>
<tr>
<td><strong>Meaning of air pollution</strong></td>
<td>Investigator will try to involve the learners by showing picture</td>
<td>Investigator will elaborate: An increase in the content of the harmful substances in air is called air pollution.</td>
<td>Investigator will ask the learner: Name the different harmful chemical of air pollution.</td>
<td><img src="image" alt="Air Pollution" /></td>
<td>Investigator will ask: What is air pollution?</td>
</tr>
<tr>
<td><strong>Pollution by fossil fuels</strong></td>
<td>Investigator will try to involve the learners by visiting in the kitchen,</td>
<td>Investigator will elaborate: When fossil fuel like coal and petroleum are burnt, nitrogen and sulphur too are burnt and these different oxides of nitrogen and sulphur. It causes inhalation and acid rain problems.</td>
<td>Investigator will ask the learner: Name the gases, when fossil fuel like coal and petroleum are burnt,</td>
<td><img src="image" alt="Fossil Fuels" /></td>
<td>Investigator will ask: Explain, How fossil fuels polluted air?</td>
</tr>
<tr>
<td><strong>Pollution by vehicles</strong></td>
<td>Investigator will try to involve the learners by visiting in the scooter/cycle stand of school. Learners will visit at scooter/cycle stand</td>
<td>Investigator will elaborate the pollution by vehicles: Carbon monoxide (CO), nitrous oxides (NOx), and unburnt gas (HC's) have bad human health impacts.</td>
<td>Investigator will ask the learner: Give harmful gases from vehicles.</td>
<td><img src="image" alt="Pollution by Vehicles" /></td>
<td>Investigator will ask: Give harmful gases from vehicles.</td>
</tr>
</tbody>
</table>
Generalization:

The learner will be able to know air pollution, causes and effect of air pollution.

Terminal Behaviour Testing:

The investigator will form peer groups. After that he will give them five minutes for mutual discussion. Then he will ask questions from the learners.

1. What is pollution?
2. How do fossil fuels pollute air?
3. What is air pollution?
4. Name the harmful gases released from vehicles?

Creative Assignment:

What is air pollution? Make the list of harmful gases released from vehicles.

References:

SCIENE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.

SCIENE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.

http://2016.igem.org/Team:Ionis_Paris/Air_pollution
http://newafghanpress.com/?p=18449
http://slideplayer.com/slide/9900990/
http://josiah.berkeley.edu/MiniProjects/MotorcyclePollution.html

*****

cxxxix
Expected Cognitive Behaviour Outcomes:

Enable the learners to:

**Remember**: Define fertilizers.

**Understand**: Comprehend fertilizers.

**Apply**: Use fertilizers for agriculture.

**Analyze**: Examine production of the fertilizers.

**Evaluation**: Justify difference between manure and fertilizers.

**Create/Problem Solving**: Develop the scientific attitude behind the manure and fertilizers.

**Resource Material Required**: Fertilizer Plastic Bag and Field Visit

**Outline/Summary of the Concept**:

Nutrients are supplied to plants by air, water and soil for growth. Nutrients are of two types i.e. macro-nutrients and micro-nutrients. To increase the yield, the soil can be enriched by supplying these nutrients in the form of manure and fertilizers. Fertilizers supply nitrogen, phosphorous and potassium. Fertilizers are a factor in the higher yields of high-cost farming. Manure is prepared by the decomposition of animal excreta and plant waste which helps in enriching soil with nutrients. Manure can be classified as compost and vermicompost: the process in which farm waste material is decomposed in pits. Green manure: prior to the sowing of the crop seeds, some plants like sun hemp or guar are grown and then mulched by ploughing them into the soil.

**Methodology to be used**:

Outdoor Activities, Lecture-cum-Demonstration and Discussion Methods

**Entry Behaviour Testing**:

The investigator will ask the following questions:

1. What are nutrients of plant?
2. What is a fertilizer?
3. What is manure?
**Presentation:** Today, we will study about the plant nutrients.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation /Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Meaning Nutrients and its types</strong></td>
<td>Investigator will try to involve the learners by visiting in the field. Learners will see the nutrients.</td>
<td>Investigator will explain: Nutrients are supplied to plants by air, water and soil for growth. Nutrients are two of types i.e. macro-nutrients and micro-nutrients.</td>
<td>Investigator will ask the learner: How many types of nutrients?</td>
<td></td>
<td>Investigator will ask: What are nutrients?</td>
</tr>
<tr>
<td><strong>Fertilizers and its role</strong></td>
<td>Investigator will try to involve the learners by showing fertilizer plastic bags. Learners will see the bags.</td>
<td>Investigator will elaborate: Fertilizers supply nitrogen, phosphorous and potassium. Fertilizers are a factor in the higher yields of high-cost farming.</td>
<td>Investigator will ask the learner: Name the different fertilizers.</td>
<td></td>
<td>Investigator will ask: What is a fertilizer?</td>
</tr>
<tr>
<td><strong>Manure and its role</strong></td>
<td>Investigator will try to involve the learners by visiting in the field. Learners will visit at manure.</td>
<td>Investigator will elaborate: Manure is prepared by the decomposition of animal excreta and plant waste which helps in enriching soil with nutrients.</td>
<td>Investigator will ask the learner: Explain the role of manure.</td>
<td></td>
<td>Investigator will ask: Explain the role of manure.</td>
</tr>
<tr>
<td><strong>Compost and Vermi-compost</strong></td>
<td>Investigator will try to involve the learners by visiting in field. Learners will visit at picture</td>
<td>Investigator will elaborate: The compost and vermicompost: the process in which farm waste material is decomposed in pits. Compost is also prepared by using earthworms to hasten the process of decomposing of plants and animal refuse.</td>
<td>Investigator will ask the learner: Give an example animal which used for vermicompost.</td>
<td></td>
<td>Investigator will ask: Explain Compost and Vermi-compost</td>
</tr>
<tr>
<td><strong>Green Manure</strong></td>
<td>Investigator will try to involve the learners by visiting in field. Learners will visit at field.</td>
<td>Investigator will elaborate green manure: Prior to the sowing of the crop seeds, some plants like sun hemp or guar are grown and then mulched by ploughing them into the soil.</td>
<td>Investigator will ask the learner: Give name of plants sowing for green manure.</td>
<td></td>
<td>Investigator will ask: What is green manure?</td>
</tr>
</tbody>
</table>
Generalization:

The learner will be able to know nutrients, types of nutrients, fertilizers and manure.

Terminal Behaviour Testing:

The investigator will give five minutes to learners for one to one interaction on the taught topic. After that he will ask questions from them.

1. What are nutrients of plant?
2. What are fertilizers?
3. What is manure?

Creative Assignment:

What are nutrients of plant? Make the list of the nutrients of plant.

References:

SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.

SCIENCE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.

http://www.bombaytesthouse.com/agri_commodities.html
http://www.agrifarming.in/organic-manure-production-guide/
http://www.agricultivation.com/green-manure-crops/

*****

cxlii
Lesson Plan-39

<table>
<thead>
<tr>
<th>Subject</th>
<th>Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>Cropping Patterns</td>
</tr>
<tr>
<td>Class</td>
<td>IX</td>
</tr>
<tr>
<td>Duration</td>
<td>30 Minutes</td>
</tr>
</tbody>
</table>

**Expected Cognitive Behaviour Outcomes:**

Enable the learners to:

**Remember:** Define cropping patterns.

**Understand:** Comprehend ways of growing crops.

**Apply:** Use cropping in different patterns.

**Analyze:** Examine mixed cropping, inter-cropping and crop rotation.

**Evaluation:** Justify difference ways of growing crops.

**Create/Problem Solving:** Develop the scientific attitude behind the cropping patterns.

**Resource Material Required:**

Field Visit

**Outline/Summary of the Concept:**

Different ways of growing crops can be used to give maximum benefit called cropping patterns. Mixed cropping is growing two or more crops simultaneously on the same piece of land. Inter-cropping is growing two or more crops simultaneously on the same field in a definite pattern. A few rows of one crop alternate with a few rows of the second crop. The growing of different crops on a piece of land in a pre-planned succession is known as crop rotation.

**Methodology to be used:**

Outdoor Activities, Lecture-cum-Demonstration and Discussion Methods

**Entry Behaviour Testing:**

The investigator will ask the following questions:

1. From where we get food?
2. What we grow in the land?
3. What we call when different ways of growing crop be used?
4. What is crop pattern?
Presentation: Today, we will study about the cropping patterns.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation /Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meaning of cropping patterns</td>
<td>Investigator will try to involve the learners by field visit. Learners will see the nutrients.</td>
<td>Investigator will explain cropping patterns: Different ways of growing crops can be used to give maximum benefits called cropping patterns.</td>
<td>Investigator will ask the learner: What is a cropping pattern?</td>
<td></td>
<td>Investigator will ask: What is a cropping pattern?</td>
</tr>
<tr>
<td>Mixed Cropping</td>
<td>Investigator will try to involve the learners by asking the questions. Learners will give the answer.</td>
<td>Investigator will elaborate mixed cropping: Mixed cropping is growing two or more crops simultaneously on the same piece of land.</td>
<td>Investigator will ask the learner: Name the example of mixed cropping.</td>
<td></td>
<td>Investigator will ask: What is a mixed cropping?</td>
</tr>
<tr>
<td>Inter-cropping</td>
<td>Investigator will try to involve the learners by field visit. Learners will visit at field.</td>
<td>Investigator will elaborate inter-cropping: Inter-cropping is growing two or more crops simultaneously on the same field of different pattern. A few rows of one crop alternate with a few rows of the second crop.</td>
<td>Investigator will ask the learner: Name the example of inter-cropping.</td>
<td></td>
<td>Investigator will ask: What is an inter-cropping?</td>
</tr>
<tr>
<td>Crop Rotation</td>
<td>Investigator will try to involve the learners by visiting in Learners will visit at</td>
<td>Investigator will elaborate crop rotation: The growing of different crops on a piece of land in a pre-planned succession is known as crop rotation.</td>
<td>Investigator will ask the question to the learners: What is a crop rotation?</td>
<td></td>
<td>Investigator will ask: What is a crop rotation?</td>
</tr>
<tr>
<td>Examples</td>
<td>Investigator will try to involve the learners by asking the examples Learners will give example.</td>
<td>Investigator will elaborate examples of mixed cropping: Wheat + gram inter-cropping: soyabean + maize</td>
<td>Investigator will ask the learner: Give examples of mixed cropping and inter-cropping</td>
<td></td>
<td>Investigator will ask: Name the examples of mixed and inter-cropping.</td>
</tr>
</tbody>
</table>
Generalization:

The learner will be able to know cropping patterns, mixed cropping, inter-cropping and crop rotation.

Terminal Behaviour Testing:

The investigator will form the groups of five learners for collaborative learning and he will give the five minutes for the mutual discussion. After that he will ask questions from the learners.

1. What is mixed cropping?
2. What is inter-cropping?
3. What is crop rotation?

Creative Assignment:

What are cropping patterns? Make a list of the example of cropping patterns.

References:

SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.

SCIENCE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.

http://www.observerbd.com/2015/01/16/66740.php

http://curvedflatlands.co.uk/crop/mixed-cropping-in-burma/


https://wilkes.ces.ncsu.edu/2014/12/advantages-of-crop-rotation/

http://slideplayer.com/slide/9003227/

****
Blende Learning
Module-4
on
EduSat Teaching
in
Science

Topics:

1. Bohars Model of Atom
2. Thomson’s Model of Atom
3. Rutherford’s Model of Atom
4. Diversity in Living Organism-1
5. Diversity in Living Organism-2
6. Gravitation
7. Thrust and Pressure
8. Animal Husbandry (Cattle and Poultry Farming)
9. Animal Husbandry (Fish Production and Bee-Keeping)
10. Wave Motion-1
11. Wave Motion-2
Introduction:

Educational Satellite is a communications satellite launched by the Indian Space Research Organisation. EDUSAT is the first dedicated “Educational Satellite” that provide the country with satellite based two-way communication to class room for delivering educational material.

Objectives:

i. To increase learner engagement.
ii. To improve learning effectiveness.
iii. To use high motivation facilities (fast learning) with A-V Resources.
iv. Individual differences result into different learning styles.
THIS MODULE PRESENTS AN OVERVIEW OF DIFFERENT TOPICS FROM YOUR SYLLABUS IN THE SUBJECT OF SCIENCE WITH EDUSAT TEACHING STRATEGY.

PAY ATTENTION AS IT WILL HELP YOU TO UNDERSTAND THE SUBJECT MATTER EASILY
Lesson Plan-40

<table>
<thead>
<tr>
<th>Subject</th>
<th>Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>Bohr’s Model of Atom</td>
</tr>
<tr>
<td>Class</td>
<td>IX</td>
</tr>
<tr>
<td>Duration</td>
<td>30 Minutes</td>
</tr>
</tbody>
</table>

**Expected Cognitive Behaviour Outcomes:**
Enable the learners to:

**Remember:** Define Bohr’s Model of Atom.

**Understand:** Comprehend Bohr’s Model of Atom.

**Apply:** Use the knowledge of Bohr’s Model of Atom.

**Analyze:** Examine the process of Bohr’s Model of Atom.

**Evaluation:** Justify the reason behind Bohr’s Model of Atom.

**Create/Problem Solving:** Develop scientific attitude in the concept of Bohr’s Model of Atom.

**Resource Material Required:**
EduSat, Computer/Laptop, Internet and LFT/ Projector

**Outline/Summary of the Concept:**
Bohr’s Model of Atom was given by Neils Bohr. Bohr put forward the postulates about the model of an atom: (i) only certain special orbits known as discrete orbits of electrons, are allowed inside the atom. (ii) while revolving the discrete orbits the electrons do not radiate energy. These orbits or shells are called energy levels. These orbits or shells are represented by the letter K, L, M, N,…… or the numbers, n=1,2,3,4,……. Bohr’s Model of Atom suffered from limitations i.e. it gave no idea about the shapes of molecules formed by the combination of atoms and the path of the electron cannot be followed exactly as stated by Bohr.

**Methodology to be used:**
At the end of the lesson delivered through EduSat, investigator will use lecture-cum-questions and question-answer methodology.

**Entry Behaviour Testing:**
The investigator will ask the following questions:
1. What is electron?
2. What is orbit?
3. What do you mean by Bohr’s Model of Atom?
**Presentation:** Today, we will study about the Bohr’s Model of Atom.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation /Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bohr’s Model of Atom</td>
<td>Investigator will try to involve the learners by using EduSat. Learners will see the lesson on screen.</td>
<td>Investigator will elaborate the lesson in brief. After that he will ask the question. Who gave Bohr’s Model of Atom?</td>
<td>Learner will explain: Bohr’s Model of Atom was given by Neils Bohr.</td>
<td><img src="image" alt="Bohr's Model" /></td>
<td>Investigator will ask: Who gave Bohr’s Model of Atom?</td>
</tr>
<tr>
<td>Postulates of Bohr’s Model of Atom</td>
<td>Investigator will ask a question. Learners will see the lesson on screen.</td>
<td>Investigator will ask a question: What are the postulates of Bohr’s Model of Atom?</td>
<td>Learner will give answer: Only certain special orbits known as discrete orbits of electrons are allowed inside the atom.</td>
<td><img src="image" alt="Bohr's Model" /></td>
<td>Investigator will ask: What are the postulates of Bohr’s Model of Atom?</td>
</tr>
<tr>
<td>Postulates of Bohr’s Model of Atom</td>
<td>Investigator will ask a question. Learners will see the lesson on screen.</td>
<td>Investigator will ask a question: What are the postulates of Bohr’s Model of Atom?</td>
<td>Learner will give answer: While revolving the discrete orbits the electrons do not radiate energy.</td>
<td><img src="image" alt="Bohr's Model" /></td>
<td>Investigator will ask: What are the postulates of Bohr’s Model of Atom?</td>
</tr>
<tr>
<td>Energy levels</td>
<td>Investigator will ask a question. Learners will see the lesson on screen.</td>
<td>Investigator will ask a question: What do you mean by energy levels in Bohr’s Model of Atom?</td>
<td>Learner will give answer: Orbits or shells are called energy levels</td>
<td><img src="image" alt="Energy Levels" /></td>
<td>Investigator will ask: What do you mean by energy levels in Bohr’s Model of Atom?</td>
</tr>
<tr>
<td>Representation of orbits or shells</td>
<td>Investigator will ask a question. Learners will see the lesson on screen.</td>
<td>Investigator will ask a question: How shells or orbits are represented?</td>
<td>Learner will give answer: These orbits or shells are represented by the letter K, L, M, N,…… or the numbers, n=1,2,3,4,……</td>
<td><img src="image" alt="Orbit Representation" /></td>
<td>Investigator will ask: How shells or orbits are represented?</td>
</tr>
<tr>
<td>Limitations of Bohr’s Model of Atom</td>
<td>Investigator will ask a question. Learners will see the lesson on screen.</td>
<td>Investigator will ask a question: What are the limitations of Bohr’s Model of Atom?</td>
<td>Learner will give answer. Bohr’s Model of Atom suffered from limitations i.e. it gave no idea about the shapes of molecules formed by the combination of atoms and the path of the electron cannot be followed exactly as stated by Bohar.</td>
<td><img src="image" alt="Bohr's Model" /></td>
<td>Investigator will ask: What are the limitation of Bohr’s Model of Atom?</td>
</tr>
</tbody>
</table>
Generalization:

The learner will be able to know about Bohr’s Model of Atom, postulates, energy levels, representation of orbits or shells and limitations of Bohr’s Model of Atom

Terminal Behaviour Testing:

The investigator will form peer groups. After that he will give them five minutes for mutual discussion. Then he will ask questions from the learners.

1. Who gave Bohr’s Model of Atom?
2. What are the postulates of Bohr’s Model of Atom?
3. What do you mean by Energy levels in Bohr’s Model of Atom?
4. How shells or orbits are represented?
5. What are the limitations of Bohr’s Model of Atom?

Creative Assignment:
What is Bohr’s Model of Atom? Draw the diagram of Bohr’s Model of Atom?

References:
EduSat Lesson ‘Bohr’s Model of Atom’ Delivered on 16th November 2016
SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.
SCIENCE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.
https://byjus.com/chemistry/bohr_model/

*****
Lesson Plan-41

<table>
<thead>
<tr>
<th>Subject : Science</th>
<th>Class : IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic : Thomson’s Model of Atom</td>
<td>Duration : 30 Minutes</td>
</tr>
</tbody>
</table>

**Expected Cognitive Behaviour Outcomes:**

Enable the learners to:

**Remember:** Define Thomson’s Model of Atom.

**Understand:** Comprehend Thomson’s Model of Atom.

**Apply:** Use the knowledge of Thomson’s Model of Atom.

**Analyze:** Examine process of Thomson’s Model of Atom.

**Evaluation:** Justify reason behind Thomson’s Model of Atom.

**Create/Problem Solving:** Use the examples of Thomson’s Model of Atom.

**Resource Material Required:**

EduSat, Computer/Laptop, Internet and LFT/Projector

**Outline/Summary of the Concept:**

Thomson’s Model of Atom was given by J.J. Thomson. Thomson proposed that (i) an atom consist of a positively charged sphere in which protons are present. (ii) the electrons are embedded in it. (iii) the negative and positive charges are equal in magnitude. So the atom as a whole is electrically neutral. Thomson’s Model of Atom suffered from limitations i.e. but it was noticed that his model explained the characteristics of the atoms without any experimental support.

**Methodology to be used:**

At the end of the lesson delivered through EduSat, investigator will use lecture-cum-questions and question-answer methodology.

**Entry Behaviour Testing:**

The investigator will ask the following questions:

1. What is an atom?
2. What is proton?
3. What is an electron?
4. What do you mean by Thomson’s Model of Atom?
**Presentation:** Today, we will study about the Thomson’s Model of Atom.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement/Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thomson’s Model of Atom</td>
<td>Investigator will try to involve the learners by using EduSat and by asking question.</td>
<td>Learner will give the answer: Thomson’s Model of Atom was given by J.J. Thomson.</td>
<td><img src="image1.png" alt="Diagram" /></td>
<td>Investigator will ask: Who gave Thomson’s Model of Atom?</td>
</tr>
<tr>
<td>Postulates of Thomson’s Model of Atom</td>
<td>Investigator will ask a question.</td>
<td>Learner will give answer. (i) An atom consists of a positively charged sphere in which proton are present.</td>
<td><img src="image2.png" alt="Diagram" /></td>
<td>Investigator will ask: Give one the postulate of Thomson’s Model of Atom.</td>
</tr>
<tr>
<td>Postulates of Thomson’s Model of Atom</td>
<td>Investigator will ask a question.</td>
<td>Learner will give answer. (ii) The electrons are embedded in it.</td>
<td><img src="image3.png" alt="Diagram" /></td>
<td>Investigator will ask: Give one the postulate of Thomson’s Model of Atom.</td>
</tr>
<tr>
<td>Postulates of Thomson’s Model of Atom</td>
<td>Investigator will ask a question.</td>
<td>Learner will give answer. (iii) The negative and positive charges are equal in magnitude. So the atom as a whole is electrically neutral.</td>
<td><img src="image4.png" alt="Diagram" /></td>
<td>Investigator will ask: Give one the postulate of Thomson’s Model of Atom.</td>
</tr>
<tr>
<td>Limitations of Thomson’s Model of Atom</td>
<td>Investigator will ask a question. Learners will see the lesson on screen.</td>
<td>Learner will give answer. Thomson’s Model of Atom suffered from limitations i.e. Thomson’s Model of Atom suffered from limitations i.e. but it was noticed that his model explained the characteristics of the atoms without any experimental support.</td>
<td><img src="image5.png" alt="Diagram" /></td>
<td>Investigator will ask: What are the limitations of Thomson’s Model of Atom?</td>
</tr>
</tbody>
</table>
Generalization:
The learner will be able to know about Thomson’s Model of Atom, postulates and limitations of Thomson’s Model of Atom.

Terminal Behaviour Testing:
The investigator will give five minutes to learners for one to one interaction on the taught topic. After that he will ask questions from them.

1. Who gave Thomson’s Model of Atom?
2. Give one of the postulates of Thomson’s Model of Atom.
3. What are the limitations of Thomson’s Model of Atom?

Creative Assignment:
What is Thomson’s Model of Atom? Draw the diagram of Thomson’s Model of Atom.

References:
SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.
SCIENCE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.
https://sites.google.com/site/modernatomicehs/dalton-and-thomson-s-atomic-models-1
https://byjus.com/chemistry/thomsons-model/

*****
Lesson Plan-42

<table>
<thead>
<tr>
<th>Subject :</th>
<th>Science</th>
<th>Class :</th>
<th>IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic :</td>
<td>Rutherford's Model of Atom</td>
<td>Duration :</td>
<td>30 Minutes</td>
</tr>
</tbody>
</table>

**Expected Cognitive Behaviour Outcomes:**

Enable the learners to:

**Remember:** Define Rutherford's Model of Atom.

**Understand:** Comprehend Rutherford's Model of Atom.

**Apply:** Use the examples of Rutherford's Model of Atom.

**Analyze:** Use the examples of Rutherford's Model of Atom.

**Evaluation:** Justify the reason behind Rutherford's Model of Atom.

**Create/Problem Solving:** Use the examples of Rutherford's Model of Atom.

**Resource Material Required:**

EduSat, Computer/Laptop, Internet and LFT/Projector

**Outline/Summary of the Concept:**

Rutherford's Model of Atom was given by Ernest. Rutherford was interested in knowing how the electrons are arranged within an atom. He performed the famous alpha particle scattering experiment. He selected a thin foil of a heavy gold metal. Alpha particles were first passed through a fine slit and then made to strike against the gold foil. To his surprise, these particles got scattered and produced bright flashes on a circular screen coated with a substance Zinc Sulphide. Rutherford made the observations (i) most of the fast moving alpha particles passed straight through the gold foil. (ii) Some alpha particles were deflected by the foil small and large angles. (iii) Surprisingly one out of every 12000 particles appeared to rebound. The main features are (i) there is a positively charged center an atom called the nucleolus. Nearly the mass of an atom resides in the nucleolus. (ii) the electrons revolve around the nucleolus in well-defined orbits. (iii) the size of the nucleolus is very small as compared to the size of the atom. (iv) Most of the space inside the atom is empty. There are in fact, two main drawbacks of model i.e. the stability of the atom could not be explained by this model and how the electrons are distributed in the extranuclear portion in an atom.
Methodology to be used:
At the end of the lesson delivered through EduSat, investigator will use lecture-cum-questions and question-answer methodology.

Entry Behaviour Testing:
The investigator will ask the following questions:
1. What is an atom?
2. What is proton?
3. What is an electron?
4. What do you mean by Rutherford's Model of Atom?

Presentation: Today, we will study about the Rutherford's Model of Atom.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation /Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rutherford's Model of Atom</td>
<td>Investigator will try to involve the learners by using EduSat and by asking question. Learners will give answer.</td>
<td>Investigator will elaborate the lesson in brief after that he will ask question: Who gave Rutherford's Model of Atom?</td>
<td>Investigator will ask the learner: Rutherford's Model of Atom was given by Ernest.</td>
<td></td>
<td>Investigator will ask: Who gave Rutherford's Model of Atom?</td>
</tr>
<tr>
<td>Experiment of Rutherford's Model of Atom</td>
<td>Investigator will ask a question. Learners will give answer.</td>
<td>Investigator will ask a question: Explain the Experiment of Rutherford's Model of Atom. Investigator will explain: He performed the famous alpha particle scattering experiment. He selected a thin foil of a heavy gold metal. Alpha particles were first passed through a fine slit and then made to strike against the gold foil. To his surprise, these particles got scattered and produced bright flashes on a circular screen coated with a substance Zinc Sulphide. Learner will not give answer.</td>
<td></td>
<td></td>
<td>Investigator will ask: Explain the Experiment of Rutherford's Model of Atom.</td>
</tr>
<tr>
<td>Content Highlights</td>
<td>Engagement</td>
<td>Explanation/Elaboration</td>
<td>Exploration</td>
<td>Resource Material</td>
<td>Evaluation</td>
</tr>
<tr>
<td>-------------------</td>
<td>------------</td>
<td>-------------------------</td>
<td>-------------</td>
<td>-------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Observations of Rutherford's Model of Atom</td>
<td>Investigator will ask a question. Learners will give answer.</td>
<td>Investigator will ask a question: What are the observations of Rutherford's Model of Atom? Investigator will explain: Rutherford made the observation (i) most of the fast moving alpha particles passed straight through the gold foil. (ii) Some alpha particles were deflected by the foil small angles. (iii) Surprisingly one out of every 12000 particles appeared to rebound.</td>
<td>Learner will not give answer.</td>
<td>Investigator will ask: What are the observations of Rutherford's Model of Atom?</td>
<td></td>
</tr>
<tr>
<td>Features of Rutherford's Model of Atom</td>
<td>Investigator will ask a question. Learners will give answer.</td>
<td>Investigator will ask a question: Explain the features of Rutherford's Model of Atom. Investigator will explain: The main features are (i) there is a positively charged centre an atom called the nucleolus. Nearly the mass of an atom resides in the nucleolus. (ii) the electrons revolve around the nucleolus in well-defined orbits. (iii) the size of the nucleolus is very small as compared to the size of the atom.</td>
<td>Learner will not give answer.</td>
<td>Investigator will ask: What are the features of Rutherford's Model of Atom?</td>
<td></td>
</tr>
<tr>
<td>Drawbacks of Rutherford's Model of Atom</td>
<td>Investigator will ask a question. Learners will give answer.</td>
<td>Investigator will ask a question: What are the drawbacks of Rutherford's Model of Atom? Investigator will explain: There are in fact, two main drawbacks of model i.e. the stability of the atom could not be explained by this model and how the electrons are distributed in the extranuclear portion in an atom.</td>
<td>Learner will not give answer.</td>
<td>Investigator will ask: What are the drawbacks of Rutherford's Model of Atom?</td>
<td></td>
</tr>
</tbody>
</table>
Generalization:

The learner will be able to know about experiment, observation, features and drawbacks of Rutherford's Model of Atom.

Terminal Behaviour Testing:

The investigator will form the groups of five learners for collaborative learning and he will give the five minutes for the mutual discussion. After that he will ask questions from the learners.

1. Who gave Rutherford's Model of Atom?
2. What are the observations of Rutherford's Model of Atom?
3. What are the drawbacks of Rutherford's Model of Atom?

Creative Assignment:


References:

SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.
https://www.slideshare.net/SGalindoZ/atomic-model-original-16983673
https://byjus.com/chemistry/rutherford-atomic-model-drawbacks/
http://www.thestargarden.co.uk/Rutherfords-atom.html

*****
Expected Cognitive Behaviour Outcomes:
Enable the learners to:

**Remember:** Define diversity in living organisms.

**Understand:** Comprehend diversity in living organisms.

**Apply:** Use the examples of diversity in living organisms.

**Analyze:** Examine the diversity in living organisms.

**Evaluation:** Justify reason behind diversity in living organisms.

**Create/Problem Solving:** Use the examples of diversity in living organisms.

**Resource Material Required:**
EduSat, Computer/Laptop, Internet and LFT/ Projector

**Outline/Summary of the Concept:**
All living organisms classified into broad categories called kingdoms. Kingdom further classified into Phylum/Division, Class, Order, family, Genus and Species. Whittaker has proposed five kingdoms: Monera, Protista, Fungi, Plantae and Animalia. Monera (e.g. Bacteria) organisms do not have a defined nucleus or organelles, nor do any of them show multi-cellular body designs. All living organisms are divided into Prokaryote and Eukaryotes. Prokaryote cell has no membrane-bound organelles and Eukaryotes cell has membrane-bound organelles. They are unicellular i.e. Protista (e.g. Algae) or multicellular. Multicellular eukaryotes having with cell-wall i.e. Fungi (e.g. Mushroom) and Plantae has also cell-wall. Multicellular having without cell-wall i.e. Animalia. Plantae depends upon whether the plant body has well-differentiated and distinct components. Plantae having do not differentiated plant body i.e. Thallophyta (e.g. Ulothrix) and differentiated plant body without specialized vascular tissue i.e. Bryophytes (e.g. Moss) or with vascular tissue. Plantae with vascular tissue having do not produce seed i.e. Petridophyta (e.g. Ferns) or produce seed i.e. Phanerogames which bear naked seed i.e. Gymnosperms (e.g. Pinus) and Angiosperms bear seed inside fruits i.e. Angiosperms. Angiosperms divided into two groups’ monocots having seeds with a single cotyledon (e.g. Paphiopedilum) or dicots having seeds with two cotyledons (e.g. Ipomoea).
Methodology to be used:
At the end of the lesson delivered through EduSat, investigator will use lecture-cum-
questions and question-answer methodology.

Entry Behaviour Testing:
The investigator will ask the following questions:
1. What are living organisms?
2. What do we call if living organisms are found in different shapes, sizes and
colours?
3. What is diversity?
4. What is diversity in living organisms?

Presentation: Today, we will study about the diversity in living organisms.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement /Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kingdom</td>
<td>Investigator will try to involve the learners by using EduSat and by asking questions. Learners will see the lesson on screen.</td>
<td>At the end of the lesson delivered through EduSat, investigator will elaborate the lesson in brief and ask the question: What is kingdom?</td>
<td>Learner will give answer: All living organisms classified into broad categories called kingdoms.</td>
<td>Investigator will ask: What is kingdom?</td>
</tr>
<tr>
<td>Classification of kingdom</td>
<td>Investigator will try to involve the learners by ask a question.</td>
<td>Investigator will ask a question: What is classification of kingdom?</td>
<td>Learner will give answer: Kingdom further classified into Phylum/Division, Class, Order, family, Genus and Species.</td>
<td></td>
</tr>
<tr>
<td>Division of kingdoms</td>
<td>Investigator will try to involve the learners by ask a question.</td>
<td>Investigator will ask a question: What is the division of kingdom?</td>
<td>Learner will give answer: Five kingdoms: Monera, Protista, Fungi, Plantae and Animalia.</td>
<td>Investigator will ask: What is the division of kingdom?</td>
</tr>
<tr>
<td>Prokaryote and Eukaryotes</td>
<td>Investigator will try to involve the learners by ask a question.</td>
<td>Investigator will ask a question: What is</td>
<td>Learner will give answer: Prokaryote cell has no membrane-bound</td>
<td>Investigator will ask: What is difference</td>
</tr>
<tr>
<td>Content Highlights</td>
<td>Engagement</td>
<td>Explanation /Elaboration</td>
<td>Exploration</td>
<td>Resource Material</td>
</tr>
<tr>
<td>--------------------</td>
<td>------------</td>
<td>--------------------------</td>
<td>-------------</td>
<td>-------------------</td>
</tr>
<tr>
<td><em>Monera</em></td>
<td>Investigator will try to involve the learners by ask a question.</td>
<td>Investigator will ask a question: What is the difference between Prokaryote and Eukaryotes?</td>
<td>Learner will give answer:</td>
<td>Investigator will ask: What is the difference between Prokaryote and Eukaryotes?</td>
</tr>
<tr>
<td><em>Protista</em></td>
<td>Investigator will try to involve the learners by ask a question.</td>
<td>Investigator will ask a question: What is the difference between Prokaryote and Eukaryotes?</td>
<td>Learner will give answer:</td>
<td>Investigator will ask: What is the difference between Prokaryote and Eukaryotes?</td>
</tr>
<tr>
<td><em>Fungi</em></td>
<td>Investigator will try to involve the learners by ask a question.</td>
<td>Investigator will ask a question: What is the difference between Prokaryote and Eukaryotes?</td>
<td>Learner will give answer:</td>
<td>Investigator will ask: What is the difference between Prokaryote and Eukaryotes?</td>
</tr>
<tr>
<td><em>Plantae</em></td>
<td>Investigator will try to involve the learners by ask a question.</td>
<td>Investigator will ask a question: What is the difference between Prokaryote and Eukaryotes?</td>
<td>Learner will give answer:</td>
<td>Investigator will ask: What is the difference between Prokaryote and Eukaryotes?</td>
</tr>
<tr>
<td><em>Thallophyta</em></td>
<td>Investigator will try to involve the learners by ask a question.</td>
<td>Investigator will ask a question: What is the difference between Prokaryote and Eukaryotes?</td>
<td>Learner will give answer:</td>
<td>Investigator will ask: What is the difference between Prokaryote and Eukaryotes?</td>
</tr>
<tr>
<td>Content Highlights</td>
<td>Engagement</td>
<td>Explanation /Elaboration</td>
<td>Exploration</td>
<td>Resource Material</td>
</tr>
<tr>
<td>-------------------</td>
<td>------------</td>
<td>--------------------------</td>
<td>-------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Bryophyta</td>
<td>Investigator will try to involve the learners by ask a question.</td>
<td>Investigator will ask a question: Give an example of Bryophytes plant.</td>
<td>Learner will give answer: Moss</td>
<td><img src="image" alt="Bryophyta" /></td>
</tr>
<tr>
<td>Pteridophyta</td>
<td>Investigator will try to involve the learners by ask a question. Learners will give answer</td>
<td>Investigator will ask a question: Give an example of plant which do not produces seeds.</td>
<td>Learner will give answer: Ferns</td>
<td><img src="image" alt="Pteridophyta" /></td>
</tr>
<tr>
<td>Gymnosperms</td>
<td>Investigator will try to involve the learners by ask a question. Learners will give answer</td>
<td>Investigator will ask a question: Give an example of plant which bears naked seeds.</td>
<td>Learner will give answer: Pinus</td>
<td><img src="image" alt="Gymnosperms" /></td>
</tr>
<tr>
<td>Angiosperms</td>
<td>Investigator will try to involve the learners by ask a question. Learners will give answer</td>
<td>Investigator will ask a question: Name the kingdom which bears seeds inside fruits.</td>
<td>Learner will give answer: Angiosperms</td>
<td><img src="image" alt="Angiosperms" /></td>
</tr>
</tbody>
</table>

**Generalization:**

The learner will be able to know about Kingdom, Prokaryote and Eukaryotes, Monera Protista, Fungi, Plantae, Thallophyta, Bryophytes, Pteridophyta, Gymnosperms and Angiosperms.
Terminal Behaviour Testing:
The investigator will form peer groups. After that he will give them five minutes for mutual discussion. Then he will ask questions from the learners.

1. Give an example of Monera.
2. Give an example of Protista
3. Give an example of Fungi.
4. Give an example of Gymnosperms.
5. How does Prokaryote cell differ from Eukaryotes?
6. How do Gymnosperms differ from Angiosperms?

Creative Assignment:
Make the list of plants which show the diversity in living organisms.

References:
EduSat Lesson ‘Diversity in Living Organism’ Delivered on 30th November 2016
SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.
SCIENCE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.
https://www.slideshare.net/sumanneerukonda/2-classification-79188607
http://guidancecorner.com/five-kingdom-classification-system/
https://www.thinglink.com/scene/507561114326794241
http://clipartbarn.com/bacteria-clipart_9244/
https://cleananddelicious.com/2015/12/01/mushroom-101-the-basics/
http://slideplayer.com/slide/8036402/
https://www.slideshare.net/vilegavekailash/kingdom-plantae-by-sayali-diwan
https://www.colourbox.com/image/moss-on-a-white-background-image-2760615
https://training.tutorvista.com/content/biology/biology-iii/kingdoms-living-world/angiosperms.php

*****
Lesson Plan-44

<table>
<thead>
<tr>
<th>Subject</th>
<th>Science</th>
<th>Class</th>
<th>IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>Diversity in Living Organisms-2</td>
<td>Duration</td>
<td>30 Minutes</td>
</tr>
</tbody>
</table>

**Expected Cognitive Behaviour Outcomes:**

Enable the learners to:

**Remember:** Define diversity in living organism.

**Understand:** Comprehend diversity in living organism.

**Apply:** Use the examples of diversity in living organism.

**Analyze:** Examine diversity in living organism.

**Evaluation:** Justify reason behind diversity in living organism.

**Create/Problem Solving:** Use the examples of diversity in living organism.

**Resource Material Required:**

EduSat, Computer/Laptop, Internet and LFT/ Projector

**Outline/Summary of the Concept:**

Animalia divided into two groups: cellular level of the organization i.e. Porifera (e.g. Sycon) having holes or pores all over body or tissue level organization. Tissue level organization or animals having nobody cavity i.e. Coelenterata (e.g. Hydra) and Platyhelminthes (e.g. Liverflukes), a sort of body cavity or a pseudocoelom i.e. Nematoda (e.g. Ascaris) and coelomate. Coelomate animals which mesodermal cells from a single cell during growth of the embryo and having true body cavity and segmented i.e. Annelida (e.g. Earthworm), having blood-filled cavity and jointed legs i.e. Arthropoda (e.g. Spiders) and coelomic cavity reduces, open circulatory system and a foot i.e. Mollusca (e.g. Octopus). Coelomate animals which coelom formed from pouches pinched off from the endoderm and it’s divided into two groups no notochord i.e. Echinodermata (e.g. Starfish) with spiny skinned and notochord present in Chordata. In Protochordata (e.g. Herdemania), notochord present in at least larval form, but rudimentary. In Vertebrate (e.g. Starfish), notochord replaced by the vertebral column in adults. In Pisces (e.g. Dog Fish), Skin is covered with scales, cold-blooded and two-chambered heart is present. In Amphibia (e.g. Frog), lack of scales, and three-chambered heart and respiration is through either gills or lungs. In Reptilia (e.g. Snake), cold-blooded, have scales, breath through lungs and three-chambered heart mostly but four-chambered heart present in crocodiles. In Aves (e.g. Sparrow), warm-blooded, four-chambered heart, covered with feathers, forelimbs and
breathe through lungs. In Mammalia (e.g. Human), warm-blooded, four-chambered heart, mammary glands, the skin has hairs, produce live young ones and few of them lay eggs.

**Methodology to be used:**
At the end of the lesson delivered through EduSat, investigator will use lecture-cum-questions and question-answer methodology.

**Entry Behaviour Testing:**
The investigator will ask the following questions:
1. What are living organisms?
2. What we call if living organisms found in different shapes, sizes and colours?
3. What is diversity?
4. What is diversity in living organisms?

**Presentation:** Today, we will study about the diversity in living organisms.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation /Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Porifera</td>
<td>Investigator will try to involve the learners by ask a question.</td>
<td>Investigator will ask a question: Give an example of Porifera.</td>
<td>Learner will give answer: ‘Sycon’</td>
<td><img src="image1.png" alt="Image" /></td>
<td>Investigator will ask: Give an example of Porifera.</td>
</tr>
<tr>
<td>Coelenterata and Platyhelminthes</td>
<td>Investigator will try to involve the learners by ask a question.</td>
<td>Investigator will ask a question: Give an example of animal having nobody cavity.</td>
<td>Learner will give answer: ‘Hydra and Liverflukes’</td>
<td><img src="image2.png" alt="Image" /></td>
<td>Investigator will ask: Give an example of animal having nobody cavity.</td>
</tr>
<tr>
<td>Nematoda</td>
<td>Investigator will try to involve the learners by ask a question.</td>
<td>Investigator will ask a question: Give an example of animal having pseudocoelom.</td>
<td>Learner will give answer: ‘Ascaris’</td>
<td><img src="image3.png" alt="Image" /></td>
<td>Investigator will ask: Give an example of animal having pseudocoelom.</td>
</tr>
<tr>
<td>Annelida</td>
<td>Investigator will try to involve the learners by ask a question.</td>
<td>Investigator will ask a question: Give an example of animal having segmented body.</td>
<td>Learner will give answer ‘Earthworm’</td>
<td><img src="image4.png" alt="Image" /></td>
<td>Investigator will ask: Give an example of animal having segmented body.</td>
</tr>
<tr>
<td>Mollusca</td>
<td>Investigator will try to involve the learners by ask a question.</td>
<td>Investigator will ask a question: Give an example of Mollusca.</td>
<td>Learner will give answer: ‘Octopus’</td>
<td><img src="image5.png" alt="Image" /></td>
<td>Investigator will ask: Give an example of Mollusca.</td>
</tr>
<tr>
<td>Content Highlights</td>
<td>Engagement</td>
<td>Explanation /Elaboration</td>
<td>Exploration</td>
<td>Resource Material</td>
<td>Evaluation</td>
</tr>
<tr>
<td>-------------------</td>
<td>------------</td>
<td>--------------------------</td>
<td>-------------</td>
<td>-------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Echinodermata</td>
<td>Investigator will try to involve the learners by ask a question.</td>
<td>Investigator will ask a question: Give an example of animal having spiny skin.</td>
<td>Learner will give answer: ‘Starfish’</td>
<td></td>
<td>Investigator will ask: Give an example of animal having spiny skin.</td>
</tr>
<tr>
<td>Protochordata</td>
<td>Investigator will try to involve the learners by ask a question.</td>
<td>Investigator will ask a question: Give an example of Protochordata.</td>
<td>Learner will give answer: ‘Herdemania’</td>
<td></td>
<td>Investigator will ask: Give an example of Protochordata.</td>
</tr>
<tr>
<td>Pisces</td>
<td>Investigator will try to involve the learners by ask a question. Learners will give answer.</td>
<td>Investigator will ask a question: Give an example of animal having skin is covered with scales.</td>
<td>Learner will give answer: ‘Dog Fish’</td>
<td></td>
<td>Investigator will ask: Give an example of animal having skin covered with scales.</td>
</tr>
<tr>
<td>Amphibia</td>
<td>Investigator will try to involve the learners by ask a question.</td>
<td>Investigator will ask a question: Give an example of animal having three-chambered heart.</td>
<td>Learner will give answer: ‘Frog’</td>
<td></td>
<td>Investigator will ask: Give an example of animal having three-chambered heart.</td>
</tr>
<tr>
<td>Reptilia</td>
<td>Investigator will try to involve the learners by ask a question. Learners will give answer.</td>
<td>Investigator will ask a question: Give an example of animal having four-chambered heart.</td>
<td>Learner will give answer ‘Crocodiles’</td>
<td></td>
<td>Investigator will ask: Give an example of animal having four-chambered heart.</td>
</tr>
<tr>
<td>Aves</td>
<td>Investigator will try to involve the learners by ask a question. Learners will give answer.</td>
<td>Investigator will ask a question: Give an example of animal having warm-blooded.</td>
<td>Learner will give answer ‘Sparrow’</td>
<td></td>
<td>Investigator will ask: Give an example of animal having warm-blooded.</td>
</tr>
<tr>
<td>Mammalia</td>
<td>Investigator will try to involve the learners by ask a question.</td>
<td>Investigator will ask a question: Give an example of Mammalia having mammary glands.</td>
<td>Learner will give answer ‘Human’</td>
<td></td>
<td>Investigator will ask: Give an example of Mammalia having mammary glands.</td>
</tr>
</tbody>
</table>
**Generalization:**

The learner will be able to know about Porifera, Coelenterata and Platyhelminthes, Nematoda, Annelida, Mollusca, Echinodermata, Protochordata, Pisces, Amphibia, Reptilia, Aves and Mammalia.

**Terminal Behaviour Testing:**

The investigator will give five minutes to learners for one to one interaction on the taught topic. After that he will ask questions from them.

1. Give an example of Porifera.
2. Give an example of animal having no body cavity.
3. Give an example of animal having segmented body.
4. Give an example of animal having spiny skin.
5. Give an example of animal having skin covered with scales.
6. Give an example of animal having three chambered heart.
7. Give an example of animal having four chambered heart.
8. Give an example of warm-blooded animal.
9. Give an example of Mammalia having mammary glands.

**Creative Assignment:**

Make the list of animals which shows the diversity in living organisms.

**References:**

EduSat Lesson ‘Diversity in Living Organism’ Delivered on 30th November 2016
SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.
SCIENCE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.
https://arayalacy.wordpress.com/2011/11/16/hydra/
Appendices

https://clipartxtras.com/categories/view/35bfbebdfadb09e3b20ac6ebcfe132f544e3c091/octopus-clipart-outline.html
https://www.google.co.in/search?hl=en&biw=1024&bih=634&tbm=isch&sa=1&ei=XB-NWpCqCoeC8gXx2bL4BQ&q=‘Star
http://wikiclipart.com/shark-black-and-white/
http://wikiclipart.com/frog-clipart-black-and-white_7146/
http://cliparts.co/alligator-pictures-for-kids
http://www.supercoloring.com/coloring-pages/white-throated-sparrow
https://drawinglics.com/s/human-body-black-and-white.py

*****
Lesson Plan-45

<table>
<thead>
<tr>
<th>Subject</th>
<th>Science</th>
<th>Class</th>
<th>IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>Gravitation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duration</td>
<td>30 Minutes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Expected Cognitive Behaviour Outcomes:**

Enable the learners to:

**Remember:** Define gravitation.

**Understand:** Comprehend gravitation force.

**Apply:** Use the examples of gravitation.

**Analyze:** Examine the process of gravitation and Universal law of gravitation.

**Evaluation:** Justify universal law of gravitation.

**Create/Problem Solving:** Use the examples of gravitation force.

**Resource Material Required:**

EduSat, Computer/Laptop, Internet and LFT/ Projector

**Outline/Summary of the Concept:**

The force of attraction between objects is called gravitation or gravitational force. Every object in the universe attract every other object with a force which is proportional to the product of their masses and inversely proportional to the square of the distance between them is called the universal law of gravitation or Newton's law of gravitation. The equation of universal law of gravitation is

\[ F = \frac{G M m}{d^2} \]

Examples of the universal law of gravitation are the existence of the solar system, tide in ocean, artificial and natural satellites revolve around the earth, the atmosphere on earth, rainfall and snowfall and we stay on the earth.

**Methodology to be used:**

At the end of the lesson delivered through EduSat, investigator will use lecture-cum-questions and question-answer methodology.

**Entry Behaviour Testing:**

The investigator will ask the following questions:

1. What is force?
2. Why does tide occur in ocean?
3. Why every object does falls on earth?
4. What is gravitation force?

**Presentation:** Today, we will study about the gravitation force.
<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation/Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Force</td>
<td>Investigator will try to involve the learners by using EduSat and asking question.</td>
<td>Investigator will ask a question: What is force?</td>
<td>Learner will give the answer: Push or pull upon on an object is called force.</td>
<td><img src="image1.png" alt="Image" /></td>
<td>Investigator will ask: What is force?</td>
</tr>
<tr>
<td>Gravitation force</td>
<td>Investigator will ask a question. Learners will give answer.</td>
<td>Investigator will ask a question: What is gravitation force?</td>
<td>Learner will give the answer: The force of attraction between objects is called gravitation or gravitational force.</td>
<td><img src="image2.png" alt="Image" /></td>
<td>Investigator will ask: What is gravitation force?</td>
</tr>
<tr>
<td>Universal law of gravitation</td>
<td>Investigator will ask a question. Learners will give answer.</td>
<td>Investigator will ask a question: What is the universal law of gravitation?</td>
<td>Learner will give the answer: The force of attraction between two particles or bodies is (i) directly proportional to the product of their mass and (ii) inversely proportional to the square of the distance between these particles or bodies is called the universal law of gravitation.</td>
<td><img src="image3.png" alt="Image" /></td>
<td>Investigator will ask: What is universal law of gravitation?</td>
</tr>
<tr>
<td>Equation of universal law of gravitation</td>
<td>Investigator will ask a question. Learners will give answer.</td>
<td>Investigator will ask a question: What is other name of the universal law of gravitation?</td>
<td>Learner will give the answer: Newton's law of gravitation.</td>
<td><img src="image4.png" alt="Image" /></td>
<td>Investigator will ask: What is other name of the universal law of gravitation?</td>
</tr>
</tbody>
</table>

Equation: $F = G \frac{m_1 m_2}{r^2}$
### Generalization:

The learner will be able to know about gravitation force, universal law of gravitation, equation of the universal law of gravitation and examples of the universal law of gravitation.

### Terminal Behaviour Testing:

The investigator will form the groups of five learners for collaborative learning and he will give the five minutes for the mutual discussion. After that he will ask questions from the learners.
1. What is gravitation force?
2. What is the universal law of gravitation?
3. What is the other name of universal law of gravitation?
4. What is the equation of universal law of gravitation?
5. Give an example of the universal law of gravitation.

### Creative Assignment:

What is the meaning of the universal law of gravitation? Perform activities related to the gravitation force.

### References:

EduSat Lesson ‘Gravitation’ Delivered on 7th December 2016
SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.
SCIENCE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.
https://alchetron.com/Force
http://idahoptv.org/sciencetrek/topics/gravity/facts.cfm
https://www.pinterest.co.uk/danipage96/newtons-law-of-universal-gravitation/
http://www.mcasco.com/Physics-1/p1grav.html
Appendices

Lesson Plan-46

<table>
<thead>
<tr>
<th>Subject</th>
<th>Science</th>
<th>Class</th>
<th>IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>Thrust and Pressure</td>
<td>Duration</td>
<td>30 Minutes</td>
</tr>
</tbody>
</table>

Expected Cognitive Behaviour Outcomes:

Enable the learners to:

**Remember:** Define thrust and pressure.

**Understand:** Comprehend thrust and pressure.

**Apply:** Use the examples of thrust and pressure.

**Analyze:** Examine the process of thrust and pressure.

**Evaluation:** Justify reason behind thrust and pressure.

**Create/Problem Solving:** Solve the problems of other regarding thrust and pressure.

Resource Material Required:

- EduSat, Computer/Laptop, Internet and LFT/ Projector

Outline/Summary of the Concept:

Force acting normally on a surface is called thrust. The force (thrust) acting normally on the unit surface area of is called pressure. Pressure = Thrust/Area. The unit of pressure is *pascal* (Pa). The examples of pressure are railway tracks are laid on large sized wooden or iron sleepers, a camel can run in a desert easily; a sharp knife is more effective in cutting than a blunt knife etc.

Methodology to be used:

At the end of the lesson delivered through EduSat, investigator will use lecture-cum-questions and question-answer methodology.

Entry Behaviour Testing:

The investigator will ask the following questions:

1. What is force?
2. Why do cutting tools have sharp edges?
3. What is pressure?
4. What is thrust?
**Presentation:** Today, we will study about the thrust and pressure.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation/Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Force</strong></td>
<td>Investigator will try to involve the learners by using EduSat lesson and ask the question. Learners will give the answer.</td>
<td>Investigator will elaborate the lesson in brief. After that he will ask the question. What is force?</td>
<td>Investigator will explain: Pull or Push acting on an object to change its state of motion is called force.</td>
<td><img src="image" alt="Push and Pull" /></td>
<td>Investigator will ask: What is force?</td>
</tr>
<tr>
<td><strong>Thrust</strong></td>
<td>Investigator will ask a question. Learners will give the answer.</td>
<td>Investigator will ask a question: What is thrust?</td>
<td>Learner will give answer: Force acting normally on a surface is called thrust.</td>
<td><img src="image" alt="Thrust" /></td>
<td>Investigator will ask: What is thrust?</td>
</tr>
<tr>
<td><strong>Pressure</strong></td>
<td>Investigator will ask a question. Learner will give the answer.</td>
<td>Investigator will ask a question: What is pressure?</td>
<td>Learner will give answer: The force (thrust) acting normally on the unit surface area of is called pressure.</td>
<td><img src="image" alt="Pressure" /></td>
<td>Investigator will ask: What is pressure?</td>
</tr>
<tr>
<td><strong>Equation of pressure</strong></td>
<td>Investigator will ask a question. Learners will give the answer.</td>
<td>Investigator will ask a question: What is the equation of pressure?</td>
<td>Learner will give answer: Pressure = Thrust/Area.</td>
<td><img src="image" alt="Pressure Equation" /></td>
<td>Investigator will ask: What is the equation of pressure?</td>
</tr>
<tr>
<td><strong>Unit of pressure</strong></td>
<td>Investigator will ask a question. Learners will give the answer.</td>
<td>Investigator will ask a question: What is the unit of pressure?</td>
<td>Learner will give answer: The unit of pressure is pascal (Pa).</td>
<td><img src="image" alt="Unit of Pressure" /></td>
<td>Investigator will ask: What is the unit of pressure?</td>
</tr>
<tr>
<td><strong>Example of pressure</strong></td>
<td>Investigator will ask a question. Learners will give the answer.</td>
<td>Investigator will ask a question: Give the example of thrust and pressure.</td>
<td>Learner will give answer: Cutting tools have sharp edges.</td>
<td><img src="image" alt="Example" /></td>
<td>Investigator will ask: Give the example of thrust and pressure.</td>
</tr>
<tr>
<td>Content Highlights</td>
<td>Engagement/Explanation</td>
<td>Exploration</td>
<td>Resource Material</td>
<td>Evaluation</td>
<td></td>
</tr>
<tr>
<td>-------------------</td>
<td>------------------------</td>
<td>-------------</td>
<td>-------------------</td>
<td>------------</td>
<td></td>
</tr>
<tr>
<td><strong>Example of pressure</strong></td>
<td>Investigator will ask a question. Learners will give the answer.</td>
<td>Investigator will ask a question: Give other examples of thrust and pressure. Investigator will give the example of thrust and pressure. The examples of pressure are railway tracks are laid on large sized wooden or iron sleepers; a camel can run in a desert easily etc.</td>
<td>Learner will be unable to give answer.</td>
<td>Investigator will ask: Give the example of thrust and pressure.</td>
<td></td>
</tr>
</tbody>
</table>

**Generalization:**

The learner will be able to know about thrust, pressure, equation, unit and example of pressure.

**Terminal Behaviour Testing:**

The investigator will give five minutes to learners for one to one interaction on the taught topic. After that he will ask questions from them.

1. What is thrust?
2. What is pressure?
3. What is the equation of pressure?
4. What is the unit of pressure?
5. Give examples of thrust and pressure.

**Creative Assignment:**

What is the meaning of thrust and pressure? Make the list of examples related to the thrust and pressure concept.
References:

EduSat Lesson ‘Thrust and Pressure’ Delivered on 14th December 2016

SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.

SCIENCE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.


http://easyscienceforkids.com/all-about-force-push-and-pull/
https://www.pinterest.com/pin/444871269415554212/
http://harsablk.wixsite.com/kidshelp/force--pressure


*****
Lesson Plan-47

<table>
<thead>
<tr>
<th>Subject</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science</td>
<td>IX</td>
</tr>
<tr>
<td>Topic</td>
<td></td>
</tr>
<tr>
<td>Animal Husbandry (Cattle and Poultry Farming)</td>
<td></td>
</tr>
<tr>
<td>Duration</td>
<td></td>
</tr>
<tr>
<td>:30 Minutes</td>
<td></td>
</tr>
</tbody>
</table>

**Expected Cognitive Behaviour Outcomes:**

Enable the learners to:

**Remember:** Define cattle and poultry farming.

**Understand:** Comprehend cattle and poultry farming.

**Apply:** Use the examples of poultry farming.

**Analyze:** Examine process of cattle farming.

**Evaluation:** Justify the reason behind cattle and poultry farming.

**Create/Problem Solving:** Use the examples of cattle and poultry farming.

**Resource Material Required:**

EduSat, Computer/Laptop, Internet and LFT/ Projector

**Outline/Summary of the Concept:**

Animal husbandry is the scientific management of animal livestock. It includes various aspects such as feeding, breeding and disease control. A cattle farming is done for two purposes- milk and draught labour for agriculture work such as tilling, irrigation and carting. Indian cattle belong to two different species, *Bos indicus*, cow and *Bos bubalis*, buffaloes. The period of milk production after the birth of a calf. Exotic or foreign breeds (Jersy, brown Swiss) are selected for long lactation periods and local breeds (Red Sindhi, Sahiwal) show excellent resistance to diseases. Proper cleaning and shelter facilities are required for health and for production of clean milk. Cattle need balance feed including roughage, protein and other nutrients. Cattle suffer from a number of diseases and vaccination should be given against many bacterial and viral diseases.

Poultry farming is undertaken to raise egg production and chicken meat. The cross-breeding programme between Indian (*Assel*) and foreign (*Leghorn*) breeds are used for improvement and to develop new varieties. Broiler chickens are fed with vitamin and protein-rich with adequate fat feed. Good management practices including temperature, housing and prevention from diseases and pests. Cleaning, spraying and vaccination can prevent from the various diseases.
Methodology to be used:
At the end of the lesson delivered through EduSat, investigator will use lecture-cum-questions and question-answer methodology.

Entry Behaviour Testing:
The investigator will ask the following questions:
1. From where do we get milk to drink?
2. From where do we get eggs to eat?
3. From where do we get meat to eat?
4. What are the names of these cultures?

Presentation: Today, we will study about the Cattle and Poultry Farming.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation /Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Animal Husbandry</strong></td>
<td>Investigator will try to involve the learners by using EduSat and by asking questions.</td>
<td>At the end of the lesson delivered through EduSat, Investigator will elaborate the lesson in brief and ask the question: What is animal husbandry?</td>
<td>Learner will give answer: Animal husbandry is the scientific management of animal livestock. It includes various aspects such as feeding, breeding and disease control.</td>
<td>![Image]</td>
<td>Investigator will ask: What is animal husbandry?</td>
</tr>
<tr>
<td><strong>Cattle Farming</strong></td>
<td>Investigator will involve the learners by asking a question.</td>
<td>Investigator will ask a question: What are the purposes of cattle farming?</td>
<td>Learner will give answer: A cattle farming is done for two purposes- milk and draught labour for agriculture work such as tilling, irrigation and carting.</td>
<td>![Image]</td>
<td>Investigator will ask: What are the purposes of cattle farming?</td>
</tr>
<tr>
<td><strong>Species of Cattle</strong></td>
<td>Investigator will involve the learners by asking a question.</td>
<td>Investigator will ask question: What are the species used for cattle farming?</td>
<td>Learner will give answer: ‘Bos indicus, cow and Bos bubalis, buffaloes’</td>
<td>![Image]</td>
<td>Investigator will ask: What are the species used for cattle farming?</td>
</tr>
<tr>
<td><strong>Milk Production</strong></td>
<td>Investigator will involve the learners by asking a question.</td>
<td>Investigator will ask question: Name the period of milk production</td>
<td>Learner will give answer: ‘Lactation period’</td>
<td>![Image]</td>
<td>Investigator will ask: Name the period of milk production.</td>
</tr>
<tr>
<td>Content Highlights</td>
<td>Engagement</td>
<td>Explanation /Elaboration</td>
<td>Exploration</td>
<td>Resource Material</td>
<td>Evaluation</td>
</tr>
<tr>
<td>-------------------</td>
<td>------------</td>
<td>--------------------------</td>
<td>-------------</td>
<td>------------------</td>
<td>------------</td>
</tr>
<tr>
<td><strong>Feed for cattle</strong></td>
<td>Investigator will involve the learners by ask a question.</td>
<td>Investigator will ask question: Which feed used for cattle farming?</td>
<td>Learner will give answer: Balance feed including roughage, protein and other nutrients.</td>
<td><img src="image1" alt="Feed for cattle" /></td>
<td>Investigator will ask question: Which feed used for cattle farming?</td>
</tr>
<tr>
<td><strong>Remedies for cattle disease</strong></td>
<td>Investigator will involve the learners by ask a question.</td>
<td>Investigator will ask question: What remedies are used for cattle diseases?</td>
<td>Learner will give answer: ‘Vaccination’</td>
<td><img src="image2" alt="Remedies for cattle disease" /></td>
<td>Investigator will ask question: What remedies are used for cattle diseases?</td>
</tr>
<tr>
<td><strong>Poultry Farming</strong></td>
<td>Investigator will involve the learners by ask a question.</td>
<td>Investigator will ask question: What is Poultry Farming?</td>
<td>Learner will give answer: Poultry farming is undertaken to raise egg production and chicken meat.</td>
<td><img src="image3" alt="Poultry Farming" /></td>
<td>Investigator will ask question: What is Poultry Farming?</td>
</tr>
<tr>
<td><strong>Species used for poultry farming</strong></td>
<td>Investigator will involve the learners by ask a question.</td>
<td>Investigator will ask question: What are the species used for poultry farming?</td>
<td>Learner will give answer: ‘Assel and Leghorn’</td>
<td><img src="image4" alt="Species used for poultry farming" /></td>
<td>Investigator will ask question: What are the species used for poultry farming?</td>
</tr>
<tr>
<td><strong>Feed used in poultry farming</strong></td>
<td>Investigator will involve the learners by ask a question.</td>
<td>Investigator will ask question: Which feed used in poultry farming?</td>
<td>Learner will give answer: Vitamin and protein-rich with adequate fat feed.</td>
<td><img src="image5" alt="Feed used in poultry farming" /></td>
<td>Investigator will ask question: Which feed used in poultry farming?</td>
</tr>
<tr>
<td><strong>Remedies for poultry farming</strong></td>
<td>Investigator will involve the learners by ask a question.</td>
<td>Investigator will ask question: What remedies are used for poultry farming?</td>
<td>Learner will give answer: Cleaning, spraying and vaccination</td>
<td><img src="image6" alt="Remedies for poultry farming" /></td>
<td>Investigator will ask question: What remedies are used for poultry farming?</td>
</tr>
</tbody>
</table>
Generalization:
The learner will be able to know about cattle farming and poultry farming.

Terminal Behaviour Testing:
The investigator will give five minutes to learners for one to one interaction on the taught topic. After that he will ask questions from them.

1. What are the species used for cattle farming?
2. What remedies are used for cattle diseases?
3. What are the species used for poultry farming?
4. Which feed is used in poultry farming?

Creative Assignment:
Make the list of animals which are used in cattle farming and poultry farming.

References:
SCIENE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.
SCIENE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.
http://www.vashishthacademy.com/yojnakurukshetra/animal-husbandry.html
https://dir.indiamart.com/impcat/cattle-feed.htm
http://www.anbvet.co.za/vaccinessheep.html

*****
Lesson Plan-48

Subject: Science  
Class: IX  
Topic: Animal Husbandry (Fish Production and Bee Keeping)  
Duration: 30 Minutes

Expected Cognitive Behaviour Outcomes:

Enable the learners to:

Remember: Define fish production and bee keeping.
Understand: Comprehend fish production and bee keeping.
Apply: Use the examples of fish production and bee keeping.
Analyze: Examine the process of fish production and bee keeping.
Evaluation: Justify the reason behind fish production and bee keeping.
Create/Problem Solving: Use the examples of fish production and bee keeping.

Resource Material Required:

EduSat, Computer/Laptop, Internet and LFT/ Projector

Outline/Summary of the Concept:

Fish is a cheap source of animal protein for our food. Capture fishing and culture fishery are the two ways of obtaining fish. Marine Fisheries: fish are caught using fishing nets and fishing boats. Popular varieties of fish include Tuna, Bombay duck and economic value fish are mullets, *bhetki*, prawns and oysters. As marine fish stocks can only be met by such a culture, a practice called mariculture. Inland Fisheries: Capture fishing is done in such inland water bodies. A combination of five or six fish species is used in a single fishpond. A major problem in fish farming is the lack of availability of good quality seed. Hormonal stimulation is using to overcome the problem.

Bee Keeping is done in open areas. Bees are keeping in special boxes. Bee Keeping is widely used for honey and wax as an additional income generating activity and also used in various medicinal preparations. For commercial honey and wax production, bee farms or apiaries are established. The varieties of bees are used as *Apis cerana indica*, *A. mellifera* etc, to increase the yield of honey. The value or quality of honey depends upon the pasturage or the flowers available to the bees for nectar and pollen collection.
Methodology to be used:
At the end of the lesson delivered through EduSat, investigator will use lecture-cum-questions and question-answer methodology.

Entry Behaviour Testing:
The investigator will ask the following questions:
1. From where we get vitamin-A?
2. From where we get honey?
3. From where we get wax?
4. What are the names of these cultures?

Presentation: Today, we will study about the fish production and bee keeping.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation/Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fish Farming</td>
<td>Investigator will try to involve the learners by using EduSat and by asking questions.</td>
<td>At the end of the lesson delivered through EduSat, Investigator will elaborate the lesson in brief and ask the question: What is fish farming?</td>
<td>Learner will give answer: A combination of five or six fish species is used in a single fishpond.</td>
<td><img src="image" alt="Fish Pond" /></td>
<td>Investigator will ask: What is fish farming?</td>
</tr>
<tr>
<td>Ways of obtaining fish</td>
<td>Investigator will try to involve the learners by asking questions.</td>
<td>Investigator will ask question: What are the ways of obtaining fish?</td>
<td>Learner will give answer: Capture fishing and Culture fishery</td>
<td><img src="image" alt="Capture Fishing" /></td>
<td>Investigator will ask question: What are the ways of obtaining fish?</td>
</tr>
<tr>
<td>Marine Fisheries</td>
<td>Investigator will try to involve the learners by showing pictures.</td>
<td>Investigator will ask question: What is a marine fisheries?</td>
<td>Learner will give answer: Fish are caught using fishing nets and fishing boats.</td>
<td><img src="image" alt="Fishing Boats" /></td>
<td>Investigator will ask question: What is a marine fisheries?</td>
</tr>
<tr>
<td>Inland Fisheries</td>
<td>Investigator will try to involve the learners by asking questions.</td>
<td>Investigator will ask question: What is an inland fishery?</td>
<td>Learner will give answer: Capture fishing is done in such inland water bodies.</td>
<td><img src="image" alt="Cultivation" /></td>
<td>Investigator will ask question: What is an inland fisheries?</td>
</tr>
<tr>
<td>Content Highlights</td>
<td>Engagement</td>
<td>Explanation /Elaboration</td>
<td>Exploration</td>
<td>Resource Material</td>
<td>Evaluation</td>
</tr>
<tr>
<td>-------------------</td>
<td>------------</td>
<td>--------------------------</td>
<td>-------------</td>
<td>------------------</td>
<td>------------</td>
</tr>
<tr>
<td><strong>Species of fish</strong></td>
<td>Investigator will try to involve the learners by asking questions.</td>
<td>Investigator will ask question: Name the one popular species of fish.</td>
<td>Learner will give answer: ‘bhetki’</td>
<td><img src="%22bhetki%22" alt="Blackboard" /></td>
<td>Investigator will ask question: Name the popular species of fish.</td>
</tr>
<tr>
<td><strong>Major problem in fish farming</strong></td>
<td>Investigator will try to involve the learners by asking questions.</td>
<td>Investigator will ask question: What is the major problem in fish farming?</td>
<td>Learner will give answer: A major problem in fish farming is lack of availability of good quality seed.</td>
<td>![Blackboard](&quot;Lack of good quality seed&quot;)</td>
<td>Investigator will ask question: What are the ways of obtaining fish?</td>
</tr>
<tr>
<td><strong>Bee Keeping</strong></td>
<td>Investigator will try to involve the learners by showing pictures.</td>
<td>Investigator will ask question: What do you mean by Bee Keeping?</td>
<td>Learner will give answer: Bee Keeping is done in open areas. Bees are keeping in special boxes.</td>
<td>![Blackboard](&quot;Apis cerana indica, and A. mellifera&quot;)</td>
<td>Investigator will ask question: What do you mean by Bee Keeping?</td>
</tr>
<tr>
<td><strong>Varieties of bees</strong></td>
<td>Investigator will try to involve the learners by asking questions.</td>
<td>Investigator will ask question: Name the varieties of bees which are used in bee farming.</td>
<td>Learner will give answer: ‘Apis cerana indica, and A. mellifera’</td>
<td>![Blackboard](&quot;Apis cerana indica, and A. mellifera&quot;)</td>
<td>Investigator will ask question: Name the varieties of bees which are used in bee farming.</td>
</tr>
<tr>
<td><strong>Production of honey</strong></td>
<td>Investigator will try to involve the learners by showing pictures.</td>
<td>Investigator will ask question: From where do we get honey?</td>
<td>Learner will give answer: The value or quality of honey depends upon the pasturage or flowers to the bees for nectar and pollen collection.</td>
<td><img src="%22honey%22" alt="Blackboard" /></td>
<td>Investigator will ask question: From where do we get honey?</td>
</tr>
<tr>
<td><strong>Use of bee farming</strong></td>
<td>Investigator will try to involve the learners by asking questions.</td>
<td>Investigator will ask question: What are the uses of bee farming?</td>
<td>Learner will give answer: Bee keeping is widely used for honey and wax as an additional income generating activity and also used in various medicinal preparations.</td>
<td><img src="%22honey%22" alt="Blackboard" /></td>
<td>Investigator will ask question: What are the uses of bee farming?</td>
</tr>
</tbody>
</table>
Generalization:
The learner will be able to know about fish farming and bee keeping.

Terminal Behaviour Testing:
The investigator will form peer groups. After that he will give them five minutes for mutual discussion. Then he will ask questions from the learners.

1. What is fish farming?
2. Name the popular species of fish.
3. What do you mean by Bee Keeping?
4. Name the varieties of bees which are used in bee farming.
5. From where do we get honey?

Creative Assignment:
Make the list of use of fish, honey and wax.

References:
SCIENECE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.
SCIENECE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.
https://modernfarmer.com/2015/03/dear-modern-farmer-is-fish-farming-sustainable/
http://agritex.co.in/the-core-programs/aquaculture/
https://www.bananivista.com/2017/04/beekeeping/
https://www.thebalance.com/making-money-with-bees-125660
http://www.indianetzone.com/79/use_honey_wax_treatment.htm

*****
Lesson Plan-49

<table>
<thead>
<tr>
<th>Subject</th>
<th>Science</th>
<th>Class</th>
<th>IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>Wave Motion-1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duration</td>
<td>30 Minutes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Expected Cognitive Behaviour Outcomes:
Enable the learners to:

**Remember:** Define wave motion.

**Understand:** Comprehend wave motion.

**Apply:** Use the examples of wave motion.

**Analyze:** Examine process of types of wave motion.

**Evaluation:** Justify reason behind wave motion.

**Create/Problem Solving:** Develop problem solving ability in the concept of wave motion.

**Resource Material Required:**
EduSat, Computer/Laptop, Internet and LFT/ Projector

**Outline/Summary of the Concept:**

A sound is a form of energy that produces a sensation of hearing. Vibration objects produce the sound. The matter or substance through which sound transmitted is called a medium like solid, liquid or gas, air, water, steel etc. Sound cannot travel through the vacuum. A disturbance produced in a medium by the to and fro motion of its particles about their mean position is called the wave. The transference of energy, when the particles of a medium, move about their mean position is called wave motion. Electromagnetic waves, Mechanical waves and matter waves are the examples of wave motion.

**Methodology to be used:**

At the end of the lesson delivered through EduSat, investigator will use lecture-cum-questions and question-answer methodology.

**Entry Behaviour Testing:**

The investigator will ask the following questions:

1. What is Sound?
2. What is motion?
3. What do you mean by wave?
4. What is wave motion?
**Presentation:** Today, we will study about the wave motion.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation /Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sound</strong></td>
<td>Investigator will try to involve the learners by using EduSat lesson and ask the question</td>
<td>Investigator will elaborate the lesson in brief: After that he will ask the question. What is sound?</td>
<td>Learner will explain: A sound is a form of energy that produces a sensation of hearing.</td>
<td><img src="image1.png" alt="Image" /></td>
<td>Investigator will ask question: What is sound?</td>
</tr>
<tr>
<td><strong>Sound</strong></td>
<td>Investigator will ask the question</td>
<td>Investigator will ask question: What do you mean by medium through which sound transmitted?</td>
<td>Learner will explain: The matter or substance through which sound transmitted is called a medium.</td>
<td><img src="image2.png" alt="Image" /></td>
<td>Investigator will ask question: What do you mean by medium through which sound transmitted?</td>
</tr>
<tr>
<td><strong>Sound</strong></td>
<td>Investigator will ask the question</td>
<td>Investigator will ask question: Name the examples of medium through which sound transmitted?</td>
<td>Learner will explain: Solid, liquid or gas, air, water, steel etc.</td>
<td><img src="image3.png" alt="Image" /></td>
<td>Investigator will ask question: Name the examples of medium through which sound transmitted?</td>
</tr>
<tr>
<td><strong>Sound</strong></td>
<td>Investigator will ask the question</td>
<td>Investigator will ask question: Does Sound travel in vacuum?</td>
<td>Learner will explain: Sound cannot travel through vacuum.</td>
<td><img src="image4.png" alt="Image" /></td>
<td>Investigator will ask question: Does Sound travel in vacuum?</td>
</tr>
<tr>
<td><strong>Wave</strong></td>
<td>Investigator will ask a question.</td>
<td>Investigator will ask a question: What is wave?</td>
<td>Learner will give answer: A disturbance produced in a medium by the to and fro motion of its particles about their mean position is called wave.</td>
<td><img src="image5.png" alt="Image" /></td>
<td>Investigator will ask: What is wave?</td>
</tr>
<tr>
<td><strong>Wave Motion</strong></td>
<td>Investigator will ask a question.</td>
<td>Investigator will ask a question: What is wave motion?</td>
<td>Learner will give answer: The transference of energy, when the particles of a medium, move about their mean position is called wave motion.</td>
<td><img src="image6.png" alt="Image" /></td>
<td>Investigator will ask: What is wave motion?</td>
</tr>
</tbody>
</table>
### Generalization:

The learner will be able to know about sound, wave, wave motion, examples of wave motion.

### Terminal Behaviour Testing:

The investigator will form the groups of five learners for collaborative learning and he will give the five minutes for the mutual discussion. After that he will ask questions from the learners.

1. What is wave?
2. What is wave motion?
3. Give examples of wave motion.

### Creative Assignment:

What is the meaning of wave motion? Make the list related to the Mechanical waves.

### References:

EduSat Lesson ‘Wave Motion’ Delivered on 4\textsuperscript{th} January 2017

SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.

SCIENCE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.


Lesson Plan-50

<table>
<thead>
<tr>
<th>Subject : Science</th>
<th>Class : IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic : Wave Motion -2</td>
<td>Duration : 30 Minutes</td>
</tr>
</tbody>
</table>

Expected Cognitive Behaviour Outcomes:
Enable the learners to:

**Remember:** Define wave motion.

**Understand:** Comprehend wave motion.

**Apply:** Use the examples of wave motion.

**Analyze:** Examine the process of types of wave motion.

**Evaluation:** Justify the reason behind wave motion.

**Create/Problem Solving:** Develop problem solving ability in the concept of wave motion.

**Resource Material Required:**
EduSat, Computer/Laptop, Internet and LFT/Projector

**Outline/Summary of the Concept:**

The transference of energy, when the particles of a medium, move about their mean position is called wave motion. Electromagnetic waves, Mechanical waves and matter waves are the examples of wave motion. Transverse and Longitudinal are the examples of mechanical waves. In a transverse wave, particles do not oscillate along the line of wave propagation but oscillate along up and down about their mean position as the wave travels. In a longitudinal wave, the individual particles of the medium move in a direction parallel to the direction to the propagation of the disturbance. The particles do not move from one place to another but they simply oscillate back and forth about their position of rest. Medium, amplitude, frequency, time period, wavelength, wave velocity and speed are the characteristics of wave motion. \( v=1/T \) or \( T=1/v \) equation shows the relationship between frequency and time period and \( v=\lambda/T \) equation shows the relationship between frequency, wavelength and time period.
Methodology to be used:
At the end of the lesson delivered through EduSat, investigator will use lecture-cum-questions and question-answer methodology.

Entry Behaviour Testing:
The investigator will ask the following questions:
1. What do you mean by wave?
2. What is wave motion?
3. What are the examples of wave motion?
4. Give examples of mechanical waves.

Presentation: Today, we will study about the Transverse and Longitudinal waves.

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation/Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examples of wave motion</td>
<td>Investigator will ask a question. Learners will give the answer.</td>
<td>Investigator will ask a question: Give the examples of wave motion.</td>
<td>Learner will give the answer: Electromagnetic waves, Mechanical waves and matter waves are the examples of wave motion.</td>
<td>Investigator will ask: Give the examples of wave motion.</td>
<td></td>
</tr>
<tr>
<td>Examples of mechanical waves</td>
<td>Investigator will ask a question. Learners will give the answer.</td>
<td>Investigator will ask a question: Give the examples of mechanical waves.</td>
<td>Learner will give the answer: Transverse and Longitudinal are the examples of mechanical waves.</td>
<td>Investigator will ask: Give the examples of mechanical waves.</td>
<td></td>
</tr>
<tr>
<td>Transverse waves</td>
<td>Investigator will ask a question. Learners will give the answer.</td>
<td>Investigator will ask a question: What is transverse wave?</td>
<td>Learner will give the answer: In a transverse wave particles do not oscillate along the line of wave propagation but oscillate along up and down about their mean position as the wave travels.</td>
<td>Investigator will ask: What is transverse wave?</td>
<td></td>
</tr>
<tr>
<td>Longitudinal waves</td>
<td>Investigator will ask a question. Learners will give the answer.</td>
<td>Investigator will ask a question: What is longitudinal wave?</td>
<td>Learner will give the answer: In a longitudinal wave, the individual particles of the medium move in a direction parallel</td>
<td>Investigator will ask: What is longitudinal wave?</td>
<td></td>
</tr>
</tbody>
</table>
### Characteristics of Wave Motion

<table>
<thead>
<tr>
<th>Content Highlights</th>
<th>Engagement</th>
<th>Explanation/Elaboration</th>
<th>Exploration</th>
<th>Resource Material</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Investigator will ask a question. Learners will give the answer.</td>
<td>Investigator will ask a question: What are characteristics of wave motion?</td>
<td>Learner will give the answer: Medium, Amplitude, frequency, Time period, wavelength, wave velocity and speed are the characteristics of wave motion.</td>
<td><img src="Image" alt="Black-Board" /></td>
<td>Investigator will ask: What are characteristics of wave motion?</td>
</tr>
</tbody>
</table>

#### Equation of frequency and time period.

| Investigator will ask a question. Learners will give the answer. | Investigator will ask a question: What is the equation which shows the relationship between frequency and time period? | Learner will give the answer: \( v = \frac{1}{T} \) or \( T = \frac{1}{v} \) | Investigator will ask: What is the equation which shows the relationship between frequency and time period? |

#### Equation of frequency, wavelength and time period.

| Investigator will ask a question. Learners will give the answer. | Investigator will ask a question: What is the equation which shows the relationship between frequency, wavelength and time period? | Learner will give the answer: \( v = \frac{\lambda}{T} \) | Investigator will ask the question: What is the equation which shows the relationship between frequency, wavelength and time period? |

### Generalization:

The learner will be able to know about transverse waves, longitudinal waves, characteristics of wave motion, equation of frequency and time period and equation of frequency, wave length and time period.
Terminal Behaviour Testing:
The investigator will give five minutes to learners for one to one interaction on the taught topic. After that he will ask questions from them.

1. What are transverse and longitudinal waves?
2. What is the equation which shows the relationship between frequency and time period?
3. What is the equation which shows the relationship between frequency, wavelength and time period?

Creative Assignment:
What are transverse and longitudinal waves? Make the list of examples related to the transverse and longitudinal wave.

References:
EduSat Lesson ‘Wave Motion’ Delivered on 4th January 2017
SCIENCE Textbook for Class IX, Punjab School Education Board, Mohali Punjab.
SCIENCE Textbook for Class IX, National Council of Educational Research and Training, New Delhi.

*****
APPENDIX – III

Manual for DIVERGENT Production Abilities DPA-s

Dr. K. N. Sharma (Retd.)
Reader
Department of Psychology
University of Rajasthan
JAIPUR (Raj.)
APPENDIX-III

Consumable Booklet
of
DPA-s
(English Version)

Dr. K. N. Sharma (Jaipur)

Please fill in the following informations:

Name
Age
Sex: Male [ ] Female [ ]
Caste
Religion
Class

Date

INSTRUCTIONS

In the following pages, different types of problems are given. Please try to solve them according to the given instructions.

Time is short so please be quick.

Estd. 1971
www.npcindia.com ☎:(0562) 2601080
NATIONAL PSYCHOLOGICAL CORPORATION
UG-1, Nirmal Heights, Near Mental Hospital, Agra-282 007
**Instructions**

Time is short so write the answers quickly. Do not stop on any one question. Start immediately solving next question after solving the previous question.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.</strong> Write as many as possible words starting with 'S'–</td>
<td></td>
</tr>
<tr>
<td><strong>2.</strong> Write as many as possible words starting and ending with 'T'–</td>
<td></td>
</tr>
<tr>
<td><strong>3.</strong> Write as many as possible words ending with 'R'–</td>
<td></td>
</tr>
<tr>
<td><strong>4.</strong> Write as many as possible words starting with 'Q'–</td>
<td></td>
</tr>
<tr>
<td><strong>5.</strong> Write as many as possible words in with 'G'–</td>
<td></td>
</tr>
</tbody>
</table>
PART - 2

Instructions
Following names of some things are given. You have to write maximum possible and different uses of these things against that thing in short. Any use howsoever looks strange to you, write immediately the moment it strucks in your mind.

For example—Wood: to burn, to beat, for making table and chair.

Time is short so write as quickly as possible.

1. BRICK

2. PENCIL

3. BRUSH

4. WATER

5. BOOK
**PART - 3**

Instructions

Following some words are written which can be used in different meanings. Blank space is left against each word. Write as many as possible meanings or relations for the given word in short in the blank space provided against that word. Write meaning in words only. There is no necessity to write complete sentence. It will be clear from the following example what you have to do.

For example—**Black**: darkness, night, blanket, coat, colour, hair.

*Start the work and write quickly.*

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. WATER</strong></td>
<td></td>
</tr>
<tr>
<td><strong>2. HAND</strong></td>
<td></td>
</tr>
<tr>
<td><strong>3. SHARP</strong></td>
<td></td>
</tr>
<tr>
<td><strong>4. LATTER</strong></td>
<td></td>
</tr>
<tr>
<td><strong>5. GROUND</strong></td>
<td></td>
</tr>
<tr>
<td><strong>6. CLEVERNESS</strong></td>
<td></td>
</tr>
</tbody>
</table>
PART - 4

Instructions

Following first letter of some words are given, with which many sentences can be made:

e.g., R______  G______  T______  H______

Answer—Ram goes to home; Radha goes to house.

Similarly form as many as possible sentences with the given following words.  

*Time is less, be quick.*

1. H____  R____  A____  B____

2. R____  I____  P____

3. I____  A____  G____  T____  T____

4. T____  D____  A____  B____

5. P____  G____  T____  M____
**PART - 5**

**Instructions**
Following three short stories are written. Write best, strange and interesting headings to them. There may be more than one heading to a story. Write all of them quickly.

### 1. Story
A wicked dog used to bite every passerby reaching him quietly on tips of toes. So his master tied a bell around his neck so that everybody may know that the dog is coming. The dog enjoyed this and began to wander in whole of the locality ringing the bell.

<table>
<thead>
<tr>
<th>Heading</th>
</tr>
</thead>
</table>

### 2. Story
Peacock spreading his tail feathers began to run up and down like a kite and started ridiculing the feathers of kite as being simple. He said, "my feathers are golden, like kings robes, yellow and decorated with rainbow colours whereas your are simple"

<table>
<thead>
<tr>
<th>Heading</th>
</tr>
</thead>
</table>

### 3. Story
A fool dog stole a piece of bread and ran away. In the way he crossed a river. He saw his shadow in the water of the river. He thought it to be a second dog and tried to take away from him the bread. The dog opened his mouth. The result was, his piece of bread dropped in the water and sinked.

<table>
<thead>
<tr>
<th>Heading</th>
</tr>
</thead>
</table>
Instructions

Following are given some problems. After reading each problem try to give solutions in short, best and as many as possible ways for each of them.

1. What person should do if robbery takes place in his house?

2. What should be done to celebrate a festival of joy?

3. In the following an incomplete story is given. Try to complete it, as much as possible.

Once there was less rain so in jungle less grass was grown and trees and plants were also less greeny.
STUDENT ENGAGEMENT TEST

Please fill up the following information:

Name ____________________________________
Class ____________________________________
Section ___________________________________
Roll No. ___________________________________
School _____________________________________
Session ____________________________________

Instructions:

Please read each statement given in the next pages carefully, think and then answer it. There are five options against each statement including Almost Always, Often, Sometimes, Seldom and Never. As per your answer you have to tick (√) one of the options from each statement. There is no right or wrong answers.

Date: ____________________________________
Signature ____________________________________
<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Statements</th>
<th>Response</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Almost Always</td>
<td>Often</td>
</tr>
<tr>
<td>1</td>
<td>I am particular about the rules and regulations of the class.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>I am curious about every new topic being taught.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.*</td>
<td>I do shirk-work in the classroom.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Before going to the class, I prepare my lesson.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.*</td>
<td>I am incapable to help the needy students.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>I try to learn during the class as much as I can</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>I become more curious during EduSat class.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.*</td>
<td>I boycott the class without any reason.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>I prefer face to face teaching learning to EduSat learning.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>I am equally curious during outdoor learning and classroom learning.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.*</td>
<td>I am unhappy to represent my class in academic activities.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>I am willing to participate in the project work.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>I am curious for web-based learning.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>I prefer to get outdoor experiences.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>I am in a pleasant mood in the classroom.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16.*</td>
<td>Class -based activities are boring for me.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>I remain excited with new topic in the class.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sr. No.</td>
<td>Statements</td>
<td>Response</td>
<td>Score</td>
</tr>
<tr>
<td>--------</td>
<td>---------------------------------------------------------------------------</td>
<td>----------</td>
<td>-------</td>
</tr>
<tr>
<td>18.</td>
<td>I enjoy the interesting topics in the classroom.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19.*</td>
<td>I feel uncomfortable in every new learning situation.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20.</td>
<td>I enjoy participation in the class work.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21.*</td>
<td>I am uninterested in the class work.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22.</td>
<td>I am very fond of learning new things.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23.</td>
<td>Class activities fill me with excitement.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24.*</td>
<td>I feel boredom in routine work.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25.</td>
<td>I am keenly interested in new concept-learning.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26.*</td>
<td>I feel the need of extra time from teacher for learning new concepts.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27.</td>
<td>I am highly interested in the topics to be taught in the Science subject.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28.</td>
<td>I am excited about EduSat teaching.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>29.*</td>
<td>On difficult topics, I feel discouraged.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30.</td>
<td>I enjoy the web-based teaching.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31.</td>
<td>I enjoy outdoor teaching.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32.</td>
<td>I do my home work.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>33.*</td>
<td>I do not check my home-work for mistakes before submitting it to the teacher.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>34.</td>
<td>I consult dictionary whenever needed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35.*</td>
<td>I cannot apply practice method to understand my topic clearly.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sr. No.</td>
<td>Statements</td>
<td>Response</td>
<td>Score</td>
</tr>
<tr>
<td>--------</td>
<td>---------------------------------------------------------------------------</td>
<td>----------</td>
<td>-------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Almost Always</td>
<td>Often</td>
</tr>
<tr>
<td>36.</td>
<td>I correlate daily life examples which are helpful in understanding the topic of <em>Laws of Motion</em>.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>37.*</td>
<td>I cannot link my classroom learning to my self-study.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>38.</td>
<td>Outdoor learning is important for me to understand reality.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>39.*</td>
<td>I do not rethink about the topic not well understood.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40.</td>
<td>While classroom teaching is on, I give some more examples in the topic of <em>Chronic Diseases</em>.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>41.*</td>
<td>My doubts remain the same even after the class is over.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>42.</td>
<td>While classroom teaching is on, I give outlet to my examples on the topic of <em>States of Matter</em>.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>43.</td>
<td>I try to think beyond and around the topic of <em>Types of Pollution</em>.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>44.</td>
<td>I express my feelings related to the topic of <em>Green House Effect</em>.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>45.</td>
<td>I let my teacher know about my past experiences regarding the subject.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>46.</td>
<td>While EduSat teaching is on, I express my suggestions.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>47.*</td>
<td>I am inactive during the classroom discussion.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>48.</td>
<td>During the web-based teaching, I raise the questions on the confusing topic.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>49.</td>
<td>When outdoor teaching is on, I share my feelings with my teacher.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX-V

LEARNING EFFECTIVENESS TEST

Please fill up the following information:-

Name __________________________

Class __________________________

Section __________________________

Roll No. __________________________

Session __________________________

School __________________________

Instructions:

Please read each statement given in the next pages carefully, think and then answer it. There are five options against each statement including Almost Always, Often, Sometimes, Seldom and Never. As per your answer you have to tick (√) one of the options from each statement. There is no right or wrong answers.

Date: __________________________

Signature __________________________
<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Statements</th>
<th>Responses</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I am able to recall what I have learnt during the examination.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.*</td>
<td>I am incapable to solve numerical problems on the basis of my past learning.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>My learning of the topic of <strong>Why do we Fall Ill</strong> helps me to do well in the relevant situation.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.*</td>
<td>I am unable to answer the questions put in the classroom with confidence.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>I am able to make the link between my past and present learning in the topic of <strong>Animal Husbandry</strong>.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.*</td>
<td>My learning does not enable me to clarify thoughts about new concepts of <strong>Models of an Atom</strong>.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>My learning deepens understanding in the topic of <strong>Gravitation</strong>.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.*</td>
<td>I feel uncomfortable to face any test.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>I feel confident about my achievement with learning <strong>Graphical Representation</strong>.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.*</td>
<td>I am unhappy when the teacher does not appreciate my knowledge about the topic of <strong>Pollution</strong>.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>I prepare myself in a planned manner for class test.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.*</td>
<td>I am inactive in every test.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>I share my knowledge with my friends about <strong>Colloidal Solution</strong> I have learnt.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.*</td>
<td>I am unable to assess my classmates from their numerical work.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>My knowledge of the targeted syllabus is up to date.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16.*</td>
<td>I am very lazy about syllabus while preparing for my exams.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sr. No.</td>
<td>Statements</td>
<td>Responses</td>
<td>Score</td>
</tr>
<tr>
<td>--------</td>
<td>--------------------------------------------------------------------------</td>
<td>-----------</td>
<td>-------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Almost Always</td>
<td>Often</td>
</tr>
<tr>
<td>21.</td>
<td>I organize the subject matter of learning according to syllabus requirements.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17.*</td>
<td>I am unable to plan my preparation on the basis of classroom learning.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18.*</td>
<td>I quote suitable examples relevant to the topic of <strong>Mixture</strong> in my class.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20.*</td>
<td>I pretend to be normal in the tests.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21.</td>
<td>I apply learning about <strong>Natural Resources</strong> to my life.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22.*</td>
<td>I feel confused about the lesson <strong>Diversity in Living Organisms</strong> I have learnt.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23.</td>
<td>Whenever necessary, I help my parents in decision-making about <strong>my nutrition</strong>.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24.*</td>
<td>I am not ready to take test in any situation.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25.</td>
<td>I love to understand the taught material about <strong>Ozone</strong> logically.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26.*</td>
<td>I get lost in the past with the topic being taught in the classroom.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27.</td>
<td>My classroom learning about <strong>Green House Effect</strong> develops ability to analyse global warming.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28.*</td>
<td>I am incapable of acquire more and more knowledge about topics for my examination.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>29.</td>
<td>My performance in <strong>writing chemical formulae</strong> is getting better day by day.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30.*</td>
<td>My learning does not enable me to build good relationships with the past learning in the exams.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31.</td>
<td>My learning helps me to elaborate the topic of <strong>Cell</strong>.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32.*</td>
<td>I get bore in topics I have read in the previous class.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>33.</td>
<td>My achievement in the lesson <strong>Tissue</strong> increases with my learning.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sr. No.</td>
<td>Statements</td>
<td>Responses</td>
<td>Score</td>
</tr>
<tr>
<td>--------</td>
<td>---------------------------------------------------------------------------</td>
<td>-----------</td>
<td>-------</td>
</tr>
<tr>
<td>34.*</td>
<td>My learning makes me confused to face any problem.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35.</td>
<td>I feel empowered due to classroom learning about Immunisation.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>36.*</td>
<td>I cannot demonstrate my knowledge about topic of Separation of Compounds in laboratory work.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>37.</td>
<td>My behaviour improves day by day due to learning chemical formulae.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>38.*</td>
<td>I argue with my teacher on difficult points during the classroom session.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>39.</td>
<td>My interest in the subject of Science improves day by day.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40.*</td>
<td>I feel uncomfortable to acquire knowledge of scientific facts in the topic of Force and Gravitation.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>41.</td>
<td>My learning develops my critical thinking skills in the topic of Kinetic and Potential Energy.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>42.*</td>
<td>I take time to solve complex problems related to the learnt topic.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>43.</td>
<td>My learning in Sublimation Process has enhanced my ability to handle and process new concepts.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>44.*</td>
<td>I cannot apply my learning in situations for which there is no obvious solution.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>45.</td>
<td>My learning helps my fellows clarify their thoughts.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>46.*</td>
<td>Classroom teaching does not enable me in the self management of learning at home.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>47.</td>
<td>EduSat learning helps me understand the lesson logically.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>48.</td>
<td>Web-based learning helps me in supplementing learning.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>49.</td>
<td>Outdoor experience helps me explain the reality to my classmates.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX-VI

MANUAL FOR

Self Efficacy Scale

SES-MGBR

Dr. (Mrs.) G. P. Mathur
M.A., Ph.D. (Psy.), D. Uitt.
Reader, Department of Psychology
I.G. Govt. Girls Degree College
RAEBARELI

Dr. (Mrs.) Raj Kumari Bhatnagar
M.A., Ph.D. (Ed.)
Reader
ACME Institute of Management and Technology
Sikandara, AGRA

MANASVI
UG-I, Nirmal Heights, Agra Mathura Road, AGRA

ccvii
<table>
<thead>
<tr>
<th>क्र. सं.</th>
<th>कथन</th>
<th>प्रतिक्रिया</th>
<th>पूर्णता: सहमत</th>
<th>अनियमित</th>
<th>असहमत</th>
<th>पूर्णता: असहमत</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. मैं अपने लक्ष्यों का एवं मानदण्डों को जितना संभव हो उतना ऊंचा स्तर पर करता/करती हूँ।</td>
<td>☐ ☐ ☐ ☐ ☐ ☐</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. मैं और भी उच्चतर लक्ष्यों के लिए प्रयास करने के बदले तालाब लोजनाओं एवं लक्ष्यों से संतुष्ट रहता/रहती हूँ।</td>
<td>☐ ☐ ☐ ☐ ☐ ☐</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. मैं अपने करीबी लोगों से कभी ईच्छा नहीं करता/करती हूँ।</td>
<td>☐ ☐ ☐ ☐ ☐ ☐</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. मुझे लगता है कि मैं सदैव अपनी पूरी क्षमताओं का पूरा हो से उपयोग करता/करती हूँ।</td>
<td>☐ ☐ ☐ ☐ ☐ ☐</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. मानव सम्बन्धों में स्थायित्व का अभाव मुझे कभी भी परेशान नहीं करता।</td>
<td>☐ ☐ ☐ ☐ ☐ ☐</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. मुझे दूसरों से कहीं समस्या में आनद आता है।</td>
<td>☐ ☐ ☐ ☐ ☐ ☐</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. मैं अपने ऊपर बहुत-सी जिम्मेदारियों को महसूस करता/करती हूँ जिनको मुझे निभाना है।</td>
<td>☐ ☐ ☐ ☐ ☐ ☐</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. मेरे पास जितना कुछ है मैं उससे संतुष्ट रहता/रहती हूँ।</td>
<td>☐ ☐ ☐ ☐ ☐ ☐</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

कुल प्राप्तांक ☐ ☐ ☐ ☐ ☐ ☐
3 | Consumable Booklet of SES-MGBR

<table>
<thead>
<tr>
<th>क्र. सं.</th>
<th>कथन</th>
<th>पूर्णता:सहमत</th>
<th>सहमत</th>
<th>अनिश्चित</th>
<th>असहमत</th>
<th>पूर्णता:असहमत</th>
<th>प्राप्तांक</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.</td>
<td>दूसरे लोग सुझाव बड़ी आपेक्षाओं रखते हैं।</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
</tr>
<tr>
<td>10.</td>
<td>मेरे परिवार के लिये यह महत्वपूर्ण होता है कि मैं अपने काम में सफल रहू।</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
</tr>
<tr>
<td>11.</td>
<td>मेरे पास बहुत-सी आत्मनिर्भर रचनाएँ हैं।</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
</tr>
<tr>
<td>12.</td>
<td>अपने वचनों और कमी का दूसरे लोगों पर क्या प्रभाव पड़ता है, इसके बारे में मैं बहुत सजीवता रहता/रहती हू।</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
</tr>
<tr>
<td>13.</td>
<td>मैं अपने निकट व्यक्ति को बुरा-भला कहने और उसकी भावनाओं को चोट पहुँचाने पर चिंतित हो जाता/जाती हू।</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
</tr>
<tr>
<td>14.</td>
<td>यह अधिक महत्वपूर्ण नहीं है कि &quot;तुम क्या हो&quot; वाला &quot;तुम्हारी क्या उपुलप्पिक्ष है&quot;।</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
</tr>
<tr>
<td>15.</td>
<td>मैं सफलता मिले या नहीं मिले परन्तु मैं अपने आपको सदैव सनुक्त करता/करती हू।</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
</tr>
<tr>
<td>16.</td>
<td>मेरे कार्य को स्वीकार किया जाये या न किया जाय परन्तु मैं अपने कार्य करने में आनंद आता है और यही मेरे लिए सबसे अधिक महत्वपूर्ण है।</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
</tr>
</tbody>
</table>

कुल प्राप्तांक ☐ ☐ ☐ ☐
17. मैं अपने परिवार के लोगों के बारे में कभी-कभी
ही सोचता हूँ।

18. मैं क्या कहता हूँ और क्या करता हूँ इसका मेरे
आस-पास रहने वाले लोगों पर बहुत तीव्र प्रभाव
पड़ता है।

19. मैं कभी-कभी महसूस करता/करती हूँ कि मैं
एक “विशिष्ट व्यक्ति हूँ”。

20. मैं बहुत आपसे और अपनी उपलब्धियों से बहुत
संनुग्ध हूँ।

21. अकेले रहने से ज्यों बिल्कुल परेशानी नहीं होती।

22. बहुधा मैं अपने आपको तुलना अपने निर्धारित
नानदण्डों या लक्ष्यों से करता/करती हूँ।

कुल प्राप्तांक

© 2012. All rights reserved. Reproduction in any form is a violation of Copyright Act.