APPENDIX - A

**Questionnaire for Teachers on Science Teaching**

A. Personal Information of Teachers:

(i) Name of the School: ... ... ... ... ... ... ...

(ii) Male: ... ... ... ... ... ... Female: ... ... ... ... ... ... ...

(iii) Age (in completed years): ... ... ... ... ... ... ...

(iv) Educational Qualification: ... ... ... ... ... ... ...

(v) Up to what stage have you studied science? ... ... ... ... ... ... ...

(vi) Have you offered method in general science teaching for training qualification? Yes: ... ... ... ... ... ... No: ... ... ... ... ... ... ...

(vii) Kindly mention if you have passed any other examinations related to science ... ... ... ... ... ... ...

(viii) Have you attended any of the in service courses related to science:

Yes ... ... ... ... ... ... No: ... ... ... ... ... ... ...

If yes, mention the course and duration of the course.

... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...

... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...

... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...

... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...

(ix) What is your experience of teaching science?

Total No. of years:

Teaching Science to VI Standard
B. Classroom Environment:

(a) How many students are in Standard Six?

(b) Total No. of Students ... ... Boys ... ... Girls ... ... 

(c) Whether there is sufficient day light in the classroom?

   Yes: ... ...  No: ... ... 

(d) Whether there is electricity in the classroom?

   Yes: ... ...  No: ... ... 

(e) Does the school have a Science Laboratory?

   Yes: ... ...  No: ... ... 

   If No, where are the equipment and chemical stored?

   ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... 

(f) Does the school have necessary equipment & chemicals?

   Yes: ... ...  No: ... ... 

   If No, mention the names of the articles not available in the school.

   ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... 

(g) What is the level of student’s prior achievement in science?

   1) Average  2) Below Average  3) Above Average 

(h) What is the type of seating arrangements in the classroom?

   Students sit separately: ... ... ... ... ... 

   Students sit in-groups: ... ... ... ... ... 

   Students sit in pairs: ... ... ... ... ...
(i) During the class period, whether students themselves decide about their seat in the classroom?

Yes: ... .... No: ... ....

(j) Whether seating arrangements is constant throughout the year?

Yes: ... .... No: ... ....

C. Planning And Organization of Curricular Activities

(a) Do you give freedom to students to move in the classroom at the time of curricular activities?

Yes: ... .... No: ... ....

If yes, when such permission given?

(b) Do you take students outside the classroom for curricular activities?

Regularly: ... .... Never: ... .... Casually: ... ....

(c) Do you give freedom to students to ask questions and discuss with each other at the time of curricular activities? Kindly tick off

Always: ... .... ... Sometimes: ... .... ... Never: ... .... ...

If yes, mention when such freedom is given.

(d) Which of the below mentioned material is used by you for teaching science? Kind tick off

1. Science Text Book
2. Teacher’s Hand Book
3. Reference Books
   a) Text books on different branches of science
   b) Books on Experiments and Activities in Science
4. Science Journals/Magazine/Periodicals

(e) Special instructional materials are essential for teaching science, who prepares them?

Ask students to prepare: ... ... ....
Provide to the students yourself: ... ... ....
Never use such Aids: ... ... ....

(f) Do you give homework regularly?

Yes: ... ... ... No: ... ....

What is the nature of the homework?

1. Question & Answer Type: ... ... ... 
2. Undertaking of Investigatory Projects: ... ... ... 
3. Preparation of Improvised Apparatus
4. Reading of Science Magazines, Journals & Periodicals
5. Collection of Specimens and Objects

(g) Generally, the following types of activities are used in the classroom. Out of these activities, which activities do you use to teach science? Kindly tick off.

a. Teacher demonstrates the experiments and explains to the whole class
b. Students work co-operatively in-groups on assignments given by the teacher
c. Students work in-groups according to their will
d. Students work independently on assignments given by the teachers
e. Students work independently on the work chosen by themselves
f. Teacher guides the students to discover

(h) In order to have mastery over chemical changes on which aspect do you give more stress.

a. Use of well planned and rehearsed series of experiments of demonstration

b. Provide the required resources to every student to do the planned & rehearsed experiments with the help of teacher’s guidance

c. Provide required resources and worksheets to different groups to do the planned and rehearsed series of experiments under the supervision of the teacher

d. Provide each students with the required resources to perform the experiments and give directions to perform the activities & discover the concept

D. Teaching Methods and Materials:

1. Mention below are the methods of teaching science. Which methods are you using?

Kindly specify by giving preferential numbers. 1 to 5

<table>
<thead>
<tr>
<th>Preferential Numbers</th>
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</thead>
<tbody>
<tr>
<td>Most preferred method</td>
<td>1</td>
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<tr>
<td>To a large extent</td>
<td>2</td>
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<tr>
<td>To some extent</td>
<td>3</td>
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<td>To a lesser extent</td>
<td>4</td>
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<tr>
<td>Never used</td>
<td>5</td>
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</table>
a) Lecture Method: b) Demonstration Method:
c) Laboratory Method: d) Problem-solving Method:
e) Guided Discovery: f) Co-operative Learning:
g) Project Method: h) Inductive Method:
i) Deductive Method: j) Inducto-deducto Method:

2. Out of the below mentioned Basic Science Process Skills, which skills do you give importance

(i) Observing: ... .......
(ii) Measuring: ... .......
(iii) Using space-time relationship: ... .......
(iv) Communicating: ... .......
(v) Classifying: ... .......
(vi) Predicting: ... .......
(vii) Using Numbers: ... .......
(viii) Inferring
In the table given below units from Standard Six science are listed. Against each of these units kindly mention the number of periods taken by you to teach them. What teaching learning aids do you use to teach each of these units? Kindly tick off.

<table>
<thead>
<tr>
<th>Sr No</th>
<th>Content</th>
<th>No of Periods Required to complete the unit</th>
<th>Chalk Board</th>
<th>Graph Board</th>
<th>Charts/Pictures</th>
<th>Models</th>
<th>Film/Slides</th>
<th>Experiments</th>
<th>Objects / Specimens</th>
<th>Simulation Games in Science</th>
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<tbody>
<tr>
<td>1</td>
<td>Science in Everyday Life</td>
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<td>Separation of Substance</td>
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<td>6</td>
<td>Motion, Force and Machines</td>
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<td>8</td>
<td>Structure &amp; Functions of Living World</td>
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<td>The Universe</td>
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</table>
3. Difficulty Level of the Units:

According to you

(i) Which units are difficult from the units given in the table under the question No. 1?

a)  

b)  

c)  

(ii) Which units are most easy from the units given in the table?

a)  

b)  

c)  

(iii) Which units are most suitable for students group activity from the units given in the table?

a)  

b)  

c)  

(iv) Which units are most suitable for guided discovery method from the units given in the table?

a)  

b)  

c)  

(v) Which units are most suitable for teacher demonstration from the units given in the table?

a)  

b)  

c)  

(vi) Which units are suitable for students for students group activity (co-operative learning) guided discovery and teacher demonstration methods form the units given in the table?

a)  

b)  

c)  

E. General information about Teaching and Student Achievement in Science

1. Do you undertake any special efforts to increase under achievement of the students?
   
   Yes: ... .....  
   No: ... ..... 

   If you undertake, kindly mention here
   
   ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...
   ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...
   ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...
   ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...

2. Do you provide enrichment activities to high achievers?
   
   Yes: ... .....  
   No: ... ..... 

3. If Yes, mention below
   
   ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...
   ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...
   ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...
   ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...

4. What are the factors that contribute to effective teaching of science?
   Specify.
   
   ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...
   ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...
   ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...
   ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...

5. What is your opinion about achievement of students in science?
   
   ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...
   ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...
   ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ...
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APPENDIX - B

Content Analysis

Unit: Changes Around Us

Terms: Periodic Change, Non-Periodic Change, Reversible Change, Irreversible Change, Physical Change and Chemical Change

Facts

1. When air is pumped into a rubber balloon its volume changes.
2. When a spring is pulled its length increases.
3. Milk takes 4 to 6 hours to change into curds.
4. Rice gets cooked slowly.
5. Cotton burns when ignited.
6. Sugar dissolves when it is mixed in water.
7. Flower gives rise to fruit.
8. A glass tumbler breaks when it is mixed in water.
9. Hot glass tumbler breaks when it is dropped on the floor.
10. Sugar changes into black carbon when burnt.
11. Water when heated changes into steam, when Water is cooled it becomes Ice.
12. Moon changes its shape from one full moon day to another.
13. All the changes that occur during first full moon day to second full moon day will be repeated between the second full moon day to the third and third full moon day to the fourth and so on.
14. Water when cooled becomes ice. Ice when melted becomes water.
15. By heating sugar it looses its original properties.
16. Milk looses its original properties when converted into curds.
17. When baked lime comes in contact with water energy is released in the form of heat.
18. When Ammonium Nitrate reacts with Water energy is absorbed.
19. When cracker is lighted energy is released in the form of loud sound as well as heat.

**Concepts**

1. Periodic Changes: Change that gets repeated at regular intervals.

2. Non-periodic Change: Change that does not get repeated at regular intervals.

3. Reversible Change: Change, which proceeds in two directions.

4. Irreversible Change: Change, which proceeds in one direction.

5. Physical Change: Change, which do not alter the basic composition of the substance.

6. Chemical Change: Change which alters the basic composition of a substance

**Unit: Motion, Force and Machines**

**Terms:**

Linear Motion, Circular Motion, Oscillatory Motion, Periodic Motion, Speed, Friction, Frictional Force, Steam Lining, Lubricants and Mechanical Advantage.

**Facts**

1. Bullet fired from a gun, a girl sliding down a slope and a coconut falling down from a coconut tree all moves in only one direction.

2. Bullock tied to the tread mill and blades of fan move around the central point
3. Pendulum of a clock, swing and a bell hung to a long chain move to and fro at regular intervals.

4. Motion of the minutes hand of a clock, rotation of earth around the sun rotation of earth in its own axis repeat at regular intervals.

5. Cars and buses can move faster than cycles

6. Aeroplanes move with a greater speed than buses and cars

7. Rockets move with very great speed

8. An object moving at a high speed goes a long distance in a short time

9. In a given interval of time an object at a high speed can cover greater distance

10. Sandy floor offers greater obstruction to the moving ball than the mud floor and cement floor.

11. Lubricants reduce the friction between two surface in contact when it is applied in between the surfaces.

12. Stream lining the body of the object moving in air or water will reduces the friction.

13. Friction opposes force, produces heat and causes wear and tear.

Concepts

1. Linear Motion: Movement of an object in only one direction.

2. Circular Motion: Movement of an object around the central point.

3. Oscillatory Motion: To and fro motion which repeats at regular intervals.

4. Periodic Motion: Motion, which repeats at regular interval of time.
5. Speed: The distance covered in unit time.

6. Lubricants: Substances, which reduces the friction between the two surfaces in contact when it is applied in between the surfaces.

7. Streamlining the process of making the front portion object sharp or pointed to reduce friction in the direction of motion.

8. Smoothing: Removal of the rough pieces from the surface is called smoothing.

9. Mechanical Advantage: The member of times a machine can multiply a force is called Mechanical Advantage (M.A.).

10. In first order levers, the effort put in is always less than the load.

11. In different levers of first order the direction of force exerted by the load and effort differs.

12. Mechanical advantage of first order lever is always ≥1.

13. In second order levers effort arm is always greater than load arm.

14. In third order levers, effort arm will always be smaller than weight arm.

15. In third order lever effort put in is always greater than the resistance.

16. In third order lever, the distance moved by the load is always greater than the effort.

17. The mechanical advantages of a third order lever is always less than one.
**Principles**

1. When an external force is applied on a moving body in the direction of its movement, its speed increases.

2. When a force is applied on a moving body in the opposite direction, its speed decreases.

3. When the two surfaces in contact are rough then the friction is more.

4. When the surfaces are very smooth there is very little friction.

5. Greater the weight of the body greater is the force of friction.

6. Load times load arm is equal to effort times effort arm.
   \[
   \text{Load} \times \text{Load arm} = \text{Effort} \times \text{Effort arm}.
   \]

7. In second order lovers, as the load becomes closer to the fulcrum the effort required to move the lever becomes less.

8. In first order lovers, as the effort arm increases the effort decreases

**Formula**

1. Speed = \[
\frac{\text{Distance Covered}}{\text{Time Taken}}
\]

2. Mechanical Advantage (M.A) = \[
\frac{\text{Effort Arm}}{\text{Load Arm}}
\]
   Or M.A. = \[
\frac{\text{Load}}{\text{Effort}}
\]
APPENDIX – C

Pre-Achievement Test

Std: VI  Duration : 1 hr.
Marks : 50

Note:

1. Every question should be answered.
2. Each question carries 1 mark.
3. Four alternative responses are given for each question. Choose the correct answer and put a tick (✓) mark on the letter indicating that answer in the answer sheet provided to you.

(1) The two elements present in water are
   A. Oxygen and Nitrogen
   B. Hydrogen and Oxygen
   C. Hydrogen and Nitrogen
   D. Oxygen and Carbon

(2) Which of the following statement correctly defines the term ‘volume’?
   A. Quantity of mass contained in a body
   B. Space occupied by a body
   C. Space covered by a body
   D. Amount of surface occupied by a substance

(3) Which substance is made up of elements Carbon, Hydrogen and Oxygen?
   A. Common salt
   B. Sugar
   C. Sand
   D. Milk

(4) In which process solids directly change into gaseous state?
   A. Evaporation
   B. Decantation
   C. Sublimation
   D. Distillation
(5) Which of the following is the best technique to obtain salt from seawater?
   A. Heating
   B. Filtration
   C. Evaporation
   D. distillation

(6) Levers are classified on the basis of
   A. The distance between the load, fulcrum and effort
   B. The position of load, fulcrum and effort
   C. The distance between the fulcrum and effort
   D. The distance between the fulcrum and load

(7) Which is the appropriate simple machine to be used to load a heavy drum on a truck?
   A. Pulley
   B. Inclined plane
   C. Crow bar
   D. Crane

(8) Which is an example for third order lever?
   A. Forceps
   B. Nut cracker
   C. Pair of scissors
   D. Beam balance

(9) Which of the following is an example for an element?
   A. Carbon Dioxide
   B. Ammonium Chloride
   C. Sodium Chloride
   D. Nitrogen

(10) At which temperature water changes from gaseous state to liquid state?
    A. Freezing Point
    B. Melting Point
    C. Condensing Point
    D. Boiling Point
(11) The state of water changes at different temperature due to the difference in the
A. arrangement of molecules
B. number of atoms
C. elements
D. combination of atoms

(12) Which is the standard unit for measuring length?
A. Kilometre
B. Metre
C. Centimetre
D. Millimetre

(13) Which process is the quickest to separate mixture of groundnut oil and water?
A. Decantation
B. Filteration
C. Fractional Distillation
D. Using separating funnel

(14) The ball thrown upwards falls back to the earth due to this force
A. Magnetic
B. Wind
C. Electric
D. Gravitational

(15) The fixed point at which the lever terms about is called the
A. Screw
B. Effort
C. Load
D. Fulcrum

(16) In second order levers effort arm is
A. always lesser than the weight arm
B. always greater then the weight arm
C. always equal to weight arm
D. increases as the weight arm increases
(17) The process of decantation is used to separate

A. soluble solids in liquids
B. insoluble solids in liquids
C. immiscible liquids
D. miscible liquids

(18) One kilometre is equal to

A. 100 Decametre
B. 100 Hectametre
C. 10 Decametre
D. 50 Hectametre

(19) To which of the following group coconut oil belong to?

A. Kerosene, milk, water, tea
B. Sugar, Ragi, Coconut, Wheat
C. Oxygen, air, steam, carbon dioxide
D. Iron, gold, silver, aluminium

(20) Which one of the following is not a property of liquid?

A. Take the shape of the container
B. Occupy the available space completely
C. Molecules are enable to move
D. Molecules are separated by a distance

(21) List A: Oxygen, Hydrogen, Sodium, Chlorine, Carbon, and Iron. Which of the following substance does not belong to group A?

A. Carbon dioxide
B. Gold
C. Nitrogen
D. Silver

(22) Which is not a property of a molecule of an element?

A. Will posses all the properties of the substances
B. Made up of atoms of different kinds
C. An atom which exist independently
D. Made up of atoms of same kinds
(23) List A: Crowbar, pair of scissors, beam balance, plier
Which lever belongs to the above list?

A. Nut cracker  
B. Wheel barrow  
C. Spade  
D. Bottle opener

(24) In which lever load is between the effort applied and fulcrum?

A. 1  
B. 2  
C. 3  
D. 4

(25) Which one of the following machine is different in its function from all the others?

A. A screw  
B. A spiral stair case  
C. A crow bar  
D. An inclined plane

(26) The length of a rectangular field is 60 mts. and breadth is 40 mts. What is the area of the field?

A. 2400 Sq.mts.  
B. 2400 mts.  
C. 100 Sq.mts.  
D. 100 mts.

(27) The side of square field measures 200 mts. What is the area of the field?

A. 40 Hectare  
B. 4 Hectare  
C. 400 Hectare  
D. 400 Hectare
(28) How many cubic centimeters is one litre equal to?

A. 1000  
B. 100  
C. 1/100  
D. 1/1000

(29) To measure which of the following unit ‘second’ is appropriate?

A. The time taken by an athlete to run a 100 metre race  
B. Duration of a football match  
C. Time taken for the rice to cook  
D. Duration of the class period

(30) Group A  |  Group B  
---|---
Sugar, Salt, Iodine,  |  Kerosene, Groundnut oil, Chalk  
Coppersulphate, Oxygen  |  powder, Iron filings

Which of the following is the basis for the above classification?

A. Substances which float and sink in water  
B. Elements and compounds  
C. Substances soluble and insoluble in water  
D. Edible and non edible substances

(31) What is common in the properties of water, oxygen and carbon?

(i) Has weight  
(ii) occupies space  
(iii) has definite shape

A. (i) and (ii)  
B. (i) and (iii)  
C. (ii) and (iii)  
D. All the three

(32) Which of the following statement clearly explains the reason for the water mist outside a cold drink bottle which was removed from the refrigerator and kept outside for few minutes?

A. Due to the melting of ice which is deposited on the outer surface of the bottle.  
B. Due to the cooling of water vapour present around the cold soft drink bottle.  
C. Due to the air pressure exerted on the cold soft drink bottle  
D. Due to the increase in temperature of the soft drink in the bottle.
(33) Which of the following is the best reason for using powerful magnet to lift heavy machines?

A. As the machines are made up of iron they will be attracted and held firmly by the magnetic force of the powerful magnet.

B. The magnet will lift the heavy machines very easily due to its magnetic force.

C. Machines will be attracted towards the magnet easily and the magnet itself lifts the machine.

D. Machines are made up of iron. This weight will be reduced due to magnetic force.

(34) A porter wants to shift a heavy log of wood 1 metre away from its present position. Which of the following simple machine would make his work easier?

A. Inclined plane
B. Pulley
C. Crow bar
D. Wheel barrow

(35) The distance between E and F is called

![Diagram]

A. Load arm
B. Effort arm
C. Effort distance
D. Fulcrum distance

(36) How Ares 1 hectare equals to?

A. 1000
B. 100
C. 10
D. 10000
(37) The following are some of the properties of air. Which one of them supports the fact that air is a mixture?

A. Air has weight and therefore it exerts presence on the earth  
B. The composition of the air slightly different at different places  
C. Air can be compressed like other gases  
D. Air can be converted from the gaseous state to the liquid state

(38) For removing soluble impurity from a liquid the process necessary to be adopted is

A. Filtration  
B. Decantation  
C. Evaporation  
D. Fractional distillation

(39) Which is the appropriate process to recover ammonium chloride from a mixture of ammonium chloride and sodium chloride?

A. Evaporation  
B. Sublimation  
C. Crystallization  
D. Fractional distillation

(40) In which of the following electric energy is converted into heat energy?

A. Electric Fan  
B. Electric bulb  
C. Electric Iron  
D. Electric bell

(41) The Main purpose of the mixer grinder is to convert electric energy to

A. Heat energy  
B. Sound energy  
C. Mechanical energy  
D. Chemical energy

(42) In which muscle force and weight acted as a source of energy?

A. Plucking a coconut from a coconut tree  
B. Breaking a wooden log by using an axe  
C. Drawing a bucket of water from the well  
D. Riding a bicycle on a road
Which energy does a car battery contain?

A. Chemical  
B. Electrical  
C. Steam  
D. Heat

From which one of the following mixtures substances could be separated in a suitable solvent, followed by filtration and evaporation?

A. Sulphur in Carbon disulphide  
B. Common salt and iodine  
C. Chalk and iodine  
D. Chalk and common salt

How does the juice flow from the bottom of the bottle to the mouth through the straw, when one sucks the air in?

A. Air pressure inside the straw becomes lesser than the atmospheric pressure.  
B. Air pressure inside the tube becomes more than the atmospheric pressure.  
C. Air pressure inside the tube becomes equal to the atmospheric pressure.  
D. Pressure exerted by the juice is lesser than the air pressure.

How does the bucket of water comes up when the rope is pulled downwards?

A. The pulley exerts an upward force, greater than the force exerted by the pull.  
B. The pulley changes the direction of the force  
C. The bucket of water exerts upward pressure due to downward pull.  
D. Pulley reduces the weight of the bucket of water

Why does an egg floats in salt water?

A. Due to the upward pressure of salt water  
B. Density of salt water is greater than the density of egg  
C. Volume of the egg is lesser than that of the salt water  
D. Density of the egg is greater than the salt water
(48) A piece of paper is placed on a one rupee coin and a glass tumbler is inverted on it as shown in the figure given below

Which force among the following would displace the paper piece without lifting the glass tumbler?

A.  Magnetic
B.  Static Electricity
C.  Mechanical
D.  Gravitational

(49) Balloons that are to be sent high up into the air are partly filled with gas. Which of the following statement explains the reason for it?

A. If the balloon is completely filled, it will not rise
B. The larger the balloon the greater will be resistance offered to it by air
C. As it goes up, it gets hotter. So the gas in the balloon expands and the balloon is blown to pieces, if it is completely filled.
D. As it goes up, pressure increases, the gas will expand and the balloon will be blown to pieces

(50) For purifying a given substance in a laboratory, one student brought out of the necessary apparatus on the table. The main apparatus he brought out were as follows

Apparatus: spirit lamp, tripod stand, wire gauze, porcelain dish and funnel

For what process out of the following he would have selected the above apparatus.

A. Filtration
B. Crystallization
C. Distillation
D. Sublimation
APPENDIX – D

TEST OF BASIC PROCESS SKILLS
(BAPS)

Michael J. Padilla
Linda Cronin
Meghan Twiest

Department of Science Education
University of Georgia
Athens, GA - 30602
1. Last week Eric and Mike went fishing with their fathers. They each caught 2 fish. Who caught the longest fish?

   Eric  Mike  Eric’s Dad  Mike’s Dad

   A. Eric  
   B. Mike  
   C. Eric’s Dad  
   D. Mike’s Dad

2. Which statement best describes the sounds you would hear if you were in this picture?

   A. I hear the birds singing. I hear the butterfly flying. I hear the dog barking.  
   B. I hear the birds singing. I hear the sun shining. I hear the man talking  
   C. I hear the man talking. I hear the birds singing. I hear the dog barking  
   D. I hear the dog barking. I hear the sun shining. I hear the birds singing.
3. Bill and Mark went to summer camp. At night they looked at the moon and noticed these changes.

Day 2  Day 4  Day 6  Day 8

A.  
B.  
C.  
D.  

4. A Scientist found this ancient bone in a cave. Which group of bones should it be in?
5. Use the tree as measure. How many trees high is the hill?

A. 3
B. 4
C. 5
D. 6

6. Last weekend 8 of your fish died. Two are still alive. What is the best explanation for what happened?

A. The fish will get better.
B. The fish got lonely
C. The fish have a disease
D. Two fish died Sunday

7. Rick and Carol collected a basket of shells. They wanted to sort the shells into 2 groups. What would be the best way to sort these?

A. By shape
B. By age
C. By the number of lines
D. By where they were found
8. Kelley was playing in the park. She spotted an animal in the bushes. Which sentence tells you the most about what the animal looked like?

A. It was brown and scared
B. It was tired and cold
C. It was small with four legs
D. It looked like a mouse with a short tail

9. Jim found this leaf on his way to school.

What is your best guess about what happened to the leaf?

A. It has a rough edge
B. A bug was eating it
C. It has a stem
D. A boy picked it

10. Debbie is watching a nest of baby birds. The babies are very big. They do not have enough room in the nest. Use this information. What do you think will happen?

A. The birds will stay healthy
B. The birds will learn to fly and leave the nest
C. The birds are ready to fly
D. The mother bird has stopped feeding her babies
11. Bob found some eggs in the woods. This picture shows how he put them into groups.

What box would you place this egg in?

A. 1
B. 2
C. 3
D. 4

12. You have a plant in your garden. It has grown 3 centimeters in 3 days. Use this fact. Guess what will happen to the plant in the next 3 days.

A. The plant will stop growing
B. The plant will grow 3 more centimeters
C. The plant grows 1 centimeter per day
D. The plant grows because of the sunlight

13. Which island has something missing?

A. 1
B. 2
C. 3
D. 4
14. Denise wanted to build a small fort. She went into the woods looking for sticks. She found one like this.

She broke the stick into 2 equal pieces. How many stones long would each piece be?
A. 2
B. 4
C. 6
D. 8

15. Kirk was watching a squirrel in a tree. What could he tell about the squirrel just from looking at it?
A. The squirrel was brown and had a long, bushy tail.
B. The squirrel was 2 years old.
C. The squirrel was looking for food for its babies.
D. The squirrel lived in the park.

16. Mary Ellen brought a jar of pond water to class. She looked at the water under a microscope. She saw these creatures.

Which trait do all these creatures have?
A. Hairs
B. Cigar shape
C. A large dark spot
D. Tail
17. Lauren planted some seeds in a pot. This is how the plants looked.

1 Week 2 Weeks 3 Weeks

A. 

B. 

C. 

D. 

18. Rose grew corn in her garden. She wants to show what happened with pictures. Help her by choosing the correct order for these pictures.

A. 3, 5, 4, 1, 2
B. 4, 5, 3, 2, 1
C. 3, 4, 1, 5, 2
D. 4, 3, 5, 1, 2
19. Dawn found an old tree deep in the woods. She wanted to tell her friends how to get there. What would be the most important to know?

A. The direction and distance she went.
B. How many fields she passed along the way.
C. What the tree looked like.
D. What time she got there.

20. Leah found this old map in her grandmother’s attic. She wanted to add a store to the map. What symbol should she use?

Symbols

- Church
- Pond
- Store
- Tree
- House
- Road

A. 
B. 
C. 
D. 
21. What is the most common symbol on Leah’s map?
   A. House
   B. Church
   C. Store
   D. Tree

22. What is the best description of Leah’s old map?
   A. It is a town with a church, a factory, and 2 ponds.
   B. It is a city with many churches and many roads.
   C. It is a city with lots of trees, stores, and schools.
   D. It is a town with 2 ponds, many houses and a church.

23. Four streams are connected to a lake. The fish in each stream want to get to the lake. Which fish has the farthest to go?

   A. 1
   B. 2
   C. 3
   D. 4
24. A lion was hunting for his dinner. A zebra saw the lion and knew he had to hide. What would be the best hiding place for this zebra?

A. 

B. 

C. 

D. 

25. Meghan and Linda did a project in science class. They recorded the temperature of water each minute. This chart shows what they found.

<table>
<thead>
<tr>
<th>Time</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Minute</td>
<td>18°C</td>
</tr>
<tr>
<td>2. Minutes</td>
<td>22°C</td>
</tr>
<tr>
<td>3. Minutes</td>
<td>25°C</td>
</tr>
<tr>
<td>4. Minutes</td>
<td>29°C</td>
</tr>
<tr>
<td>5. Minutes</td>
<td>....°C</td>
</tr>
</tbody>
</table>

What do you think the temperature of the water will be after five minutes?

A. 26°C
B. 20°C
C. 32°C
D. 35°C
26. Use the chart from the question above. What is the best explanation for what happened?

A. The water was on a hot stove
B. The water was in a cooler
C. The water was sitting on a desk
D. The water was outside under a tree

27. What story does this set of pictures tell?

A. The man cut down a large tree. He used it for firewood.
B. Lightning killed 3 large trees. The man planted some smaller trees.
C. A man cut off some branches from a large tree. He planted some smaller trees.
D. The man cut down a large tree. He planted some smaller trees.

28. You went on a school field trip. You saw these 2 sets of animal tracks. Look at these tracks. What guess can you make about what happened?

A. The animals eat at night.
B. The tracks of one set are larger than the tracks of the other set.
C. The 2 animals had a fight.
D. The tracks were made by the same kind of animal.
29. Heather wanted to plant some sod. Her yard was 3 meters long and 4 meters wide. How many pieces of sod will she need to cover her yard? Use the picture to find out.

A. 7
B. 10
C. 12
D. 14

30. The picture below shows a caterpillar that grew into a butterfly. What can you tell about what happened just from these pictures?

A. When the caterpillar grew up, it no longer ate leaves.
B. When the caterpillar grew up, it could not fly very fast.
C. When the caterpillar grew up, it had 6 legs.
D. When the caterpillar grew up, it got wings.
31. Cathi observed these creatures in science class. She wants to put them in order by the number of legs they have. What is the correct order?

1. 

2. 

3. 

4. 

5. 

32. Tom is studying weather. This chart show how much rain fell in his town for four years.

What is the best guess about how much rainfall will fall next year?

A. 17 cm
B. 21 cm
C. 25 cm
D. 29 cm
33. Lee planted 5 pepper plants in his backyard. After 6 weeks, his pepper plants looked like this.

What does this tell you about Lee’s pepper plants?
A. All of his plants were the same size.
B. All of his pepper plants had produced peppers.
C. There were bugs on his pepper plants.
D. His pepper plants were not getting enough water.

34. Last week Russ went looking for small creatures. This chart shows where looked and what he found?

<table>
<thead>
<tr>
<th>Location</th>
<th>Spiders</th>
<th>Sowbugs</th>
<th>Worms</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Under rocks</td>
<td>8</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>2. In a pile of leaves</td>
<td>4</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>3. Under an old log</td>
<td>2</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>4. In the grass</td>
<td>7</td>
<td>9</td>
<td>5</td>
</tr>
</tbody>
</table>

Where was the best place to find worms?
A. under rocks
B. under a pile of leaves
C. under an old log
D. in the grass
35. Colleen and her father went to the pet store. They classified the animals they saw this way.

Which animal belongs in Box 1?

A. Fish  
B. Lizard 
C. Rabbit 
D. House

36. Vicky drew a map of a pond in her yard. The objects in the pond are lily pads. About how many lily pads would it take to cover the whole pond?

A. 10  
B. 18  
C. 24  
D. 36
APPENDIX - E

SCIENTIFIC ATTITUDE SCALE

Instructions: The following statements are concerned with Scientific Attitude. Read each statement carefully and then mark your answer in the space provided in the given sheet.

If your attitude is always similar to the statement given then put a '✓' mark under the columns ‘Always’. Put a '✓' mark under ‘Rarely’ if your attitude is rarely similar to the statement. Put '✓' mark under ‘Very rarely’ if your attitude is very rarely like that of the given statement. Put ‘✓’ mark under ‘Never’ if your attitude is never be like that of the given statement. Answer all the statements.

<table>
<thead>
<tr>
<th></th>
<th>Always</th>
<th>Rarely</th>
<th>Very rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. When I see thunder and lightening I would like to find out the causes for it</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2. I would not accept an idea if it is proved to be wrong</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>3. When someone says that broken mirror should not be kept at home, I would not question them why</td>
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<tr>
<td>4. I will critically analyze my answers when it is given to me after the evaluation and correct my mistakes</td>
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<td>-----------------------------------------------------------------</td>
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</tr>
<tr>
<td>5</td>
<td>When religious festivals are being celebrated, I will ask questions with my parents about the rituals of that celebration</td>
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<tr>
<td>6</td>
<td>When I observe unexpected rainfall I will not try to find out the cause for it</td>
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<tr>
<td>7</td>
<td>If someone finds some drawbacks and errors in my drawing I cannot tolerate</td>
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<td></td>
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<tr>
<td>8</td>
<td>I will accept each and every words of elders without questioning</td>
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<tr>
<td>9</td>
<td>After observing the magic show I am eager to find out the secret of it</td>
<td></td>
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<tr>
<td>10</td>
<td>When I observe a beautiful nest of a bird I am eager to know about the bird</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>When a science experiment demonstrated by the teacher fails I will not think about the reasons for the failure</td>
<td></td>
<td></td>
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<tr>
<td>12</td>
<td>When my toys are spoilt I am not worried about it</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>When I find a beautiful insect a number of questions arise in my mind</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>When I get little information about any event I will try to find out the complete information</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>15</td>
<td>I will not ask questions to my teachers, if a concept is not clear to me</td>
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</tr>
<tr>
<td>16</td>
<td>When I visit a tourist place for the first time, I don’t get any questions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>I will learn new games with interest</td>
<td></td>
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<tr>
<td>18</td>
<td>I am very happy to perform new experiments in science</td>
<td></td>
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<tr>
<td>19</td>
<td>When my words are proved to be wrong, I will find it very difficult to change them</td>
<td></td>
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<tr>
<td>20</td>
<td>I would like to learn new knowledge from others</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>21</td>
<td>When my classmate proves that my solution to a mathematics problem is wrong, I will not change it</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>If my junior suggest a new method to perform an experiment I will not accept it</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>When new toys are brought home. I would like to know about them</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>I cannot adjust with the guest who are not familiar to me</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>25</td>
<td>I get worried if I see a cat as soon as I get up from my bed</td>
<td></td>
<td></td>
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<tr>
<td>26</td>
<td>I don’t believe cooked stories of magicians</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>To prevent epidemic diseases I <em>take vaccination</em></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>28</td>
<td>In spite of the objections from others, I would like to observe eclipses as suggested by the scientist</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>I believe that by praying more one will score more marks in the exams</td>
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<td>---------------------------------------------------------------------</td>
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</tr>
<tr>
<td>30</td>
<td>I will not accept the fact that by making offerings to divine spirit epidemic diseases could be cured</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>I will accept the fact that when the shadow of the earth falls on the moon lunar eclipse takes place</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>32</td>
<td>Immediately after I leave home for an important work, If someone asks me where I am going, I am very much annoyed with them</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>I will accept the facts only after I observe them directly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>I will report the facts only on the basis of my observation of the experiment demonstrated by the teacher</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>When I find out the secret of the magic, I will not tell others about it</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>According to me if one could not study due to ill health he/she can copy in the examination</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>I will not reveal the truth if my friend is going to get punishment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38</td>
<td>When I solve mathematics problem, if my answers is different from others, I will change my answers by copying theirs</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
39 When I get more marks by mistake immediately, I will inform the teacher about that

40 I don't like the students who give false reasons for their absence

41 When the bus does not come on time, I will not say that the bus had met with an accident.

42 Observing holes on the leaves of a plant, I will not accept the fact that caterpillar had ate them.

43 When the measurement of the straight line is wrong, immediately I will conclude that the scale used by me is not correct

44 Looking at the ants I will accept the fact that they have come for the sweets fallen on the ground

45 Looking at well bloomed flowers in a plant I will say that the plant is manured with chemical fertilizers

46 I will not accept the reason that seeds sown on the soil did not germinate due to the poor quality of the soil

47 As soon as I see a black bird I will not say that it is a crow

48 If the electric bulb does not light then I conclude that there is no power supply
APPENDIX - F

Post-achievement Test

Std: VI  Duration: 1 Hr.  Marks: 50

Note:

1. Every question should be answered
2. Each question carries one mark
3. Four alternative responses are given for each question. Choose the correct answer and put a ‘✓’ mark on the letter indicating that answer in the answer sheet provided to you.

1. Which aspect of change is observed while blowing a balloon?
   A. Volume
   B. Length
   C. Temperature
   D. Position

2. Which of the following statements correctly defines the term ‘periodic changes’?
   A. Changes that repeat regularly
   B. Changes that repeat at regular intervals
   C. Changes that do not occur regularly
   D. Changes that occur at a definite time

3. In which changes the basic composition of a substance does not alter?
   A. Chemical
   B. Physical
   C. Irreversible
   D. Permanent changes

4. Which is an example for periodic change?
   A. Movement of a bicycle wheel
   B. Motion of the pendulum of a clock
   C. Rotation of the blades of a wind wheel
   D. Evaporation of water as clouds
5. An example for a reversible change is
   A. Heating of
   B. Sugar Sulphur
   C. Iron and Sulphur
   D. Iron rod

6. To and fro motion is called ... ... ... ...... motion
   A. Periodic
   B. Linear
   C. Oscillating
   D. Circular

7. An example for oscillating motion is the movement of
   A. Cradle
   B. Seconds hand of a clock
   C. Wheel of a bus
   D. Earth around the sun

8. Which of the following relationships is correct
   A. Speed = \( \frac{Time \ taken}{Distance \ covered} \)
   B. Speed = \( \frac{Distance \ covered}{Time \ taken} \)
   C. Speed = \( \frac{Distance \ covered \times Time \ taken}{60} \)
   D. Speed = \( \frac{Distance \ covered \times 60}{Time \ taken} \)

9. The mechanical advantage of a machine is the
   A. advantage you obtain by using the machine
   B. difference between the force exerted and the lead lifted
   C. ratio of the distance the load moves to the distance the effort moves
   D. ratio of the load to the effort
10. Which of the following statement is the best definition of friction?
   A. the force exerted on a moving object in the same direction
   B. the pressure exerted on a moving object in the opposite direction
   C. the force exerted on a moving object or some force in the opposite direction
   D. the pressure exerted on a moving object in the same direction

11. Ball bearings are used in wheels and axles is to
   A. increase the rotation of the wheel
   B. decrease the rotation of the wheel
   C. decrease the friction
   D. increase the friction

12. The force which opposes motion is
   A. Gravitational
   B. Electric
   C. Magnetic
   D. Frictional

13. Which of the following change evolves heat, sound and light energy
   A. Rusting of iron
   B. Burning of a candle
   C. Bursting of cracker
   D. Bursting of a balloon

14. Linear motion is defined as the motion taking place only in
   A. Upward direction
   B. A straight line
   C. Download direction
   D. One direction

15. The motion observed while a train is moving
   A. Linear
   B. Oscillating
   C. Periodic
   D. Circular
16. In third order levers the distance moved by the lever is always
   A. equal to the effort
   B. lesser than the effort
   C. greater than the effort
   D. decrease as the effort increases

17. The lever will be balanced when
   A. Load \times load\ arm = effort \times effort\ arm
   B. Load \times effort = load\ arm \times effort\ arm
   C. \frac{Load}{Effort} = \frac{load\ arm}{effort\ arm}
   D. \frac{Load}{Load\ arm} = \frac{effort}{effort\ arm}

18. An example for a chemical change
   A. Burning of a firewood
   B. Heating of wax
   C. Melting of ice
   D. Bursting of balloon

19. List of changes: stretching of rubber band, melting of ice, dissolution of salt in water, melting of wax
   Which of the following changes belong to the above list?
   A. Changes in the size of the eyes pupil
   B. Burning of candle
   C. Growth of a plant
   D. Growth of nail on the finger

20. Which of the following is a chemical change?
   A. Movement of a wheel
   B. Opening of coiled spring
   C. Digestion of food
   D. Rotation of earth around the sun
21. Which is not the characteristic of a physical change?
   A. Change in the physical properties
   B. Temporary change
   C. Reversible change
   D. Original properties of the substance are lost

22. Rusting of iron does not belong to this group of change
   A. Fast changes
   B. Slow changes
   C. Chemical changes
   D. Permanent changes

23. How is energy involved while a candle is burning?
   A. heat and light is given out
   B. heat is absorbed
   C. heat, light and sound is released
   D. only heat is given out

24. Which of the following is an example for linear motion?
   A. movement of an arrow shot using a bow
   B. motion of the blades of a wind mill
   C. rotation of earth around the sun
   D. movement of a fruit hanging on a tree

25. With the help of a lever a load of 750gms was moved with an effort of 150 gms. What is the mechanical advantages of that lever
   A. 5
   B. 3
   C. $\frac{1}{5}$
   D. $\frac{1}{3}$
26. In which of the following levers the load moves a greater distance than the effort?

A. 1.
B. 2.
C. 3.
D. 4.

27. This is an example for a physical change

A. Preparing ‘Puries’ from flour by frying
B. Chewing cooked rice while eating
C. Converting coal into powder
D. Taking photograph of person

28. Which among the following figure correctly shows the direction of force exerted by the effort and load

A. 4
B. 3
C. 2
D. 1
29. Which of the following is not the characteristics of a third order lever

A. Load moves a greater distance than the effort
B. Mechanical advantages is always less than one
C. Effort applied is in between Load and fulcrum
D. Effort arm is always longer than load

30.

<table>
<thead>
<tr>
<th>Group ‘A’</th>
<th>Group ‘B’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth of a plant, rusting of iron,</td>
<td>Dissolution of salt in water,</td>
</tr>
<tr>
<td>changes of day and night, change of</td>
<td>burning of petroleum, breaking of a</td>
</tr>
<tr>
<td>seasons</td>
<td>stick, busting of a cracker</td>
</tr>
</tbody>
</table>

Which is the basis of above classification

A. Physical changes and chemical changes
B. Slow and fast changes
C. Reversible and irreversible change
D. Periodic and non-periodic changes

31. A list of changes are given below, which is the best method of classifying them

List of changes: heating of sugar, heating of iron rod,
Bursting of crackers, burning of kerosene oil,
Filling a balloon with air, moving a wheel,
Lighting an electric bulb

A. Changes which absorb heat energy and changes which give out heat energy
B. Periodic and non-periodic
C. Physical and chemical
D. Slow and fast changes

32. Three changes are listed below

(i) Changes in he shape of moon from one full moon day and another
(ii) Rotation of earth around the sun
(iii) Heart beat

What are the common characteristics of all these three changes?

A. The time interval in all the three changes is same
B. The time of change can not be predicted
C. Position of the object does not change
D. Change occurs after a fixed interval of time
33. Changes: 1. Heating of Iodine crystals
2. Heating of Ice Cubes

What is common in the characteristics of these two changes?

(i) Reversible changes (ii) physical change (iii) change of state place
(iv) State of change is solid to liquid (v) State of change is solid to vapours

A. (i), (ii) and (iv)
B. (i), (ii) and (iii)
C. (i), (ii) and (v)
D. (ii), (iii) and (iv)

34. Which slab with experience the greatest friction when they are moved on sandpaper?

A. glass
B. iron
C. wooden
D. plastic

35. A train moving at a constant speed covers a distance of 240 km in 4 hours. What is the speed of the train?

A. 80 Km/hour
B. 50 Km/hour
C. 60 Km/hour
D. 70 Km/hour

36. A bus moves with a constant speed of 45 Km/hour. It takes 3 hours to cover a distance. What is the distance traveled by the bus?

A. 140 Km
B. 135 Km
C. 145 Km
D. 125 Km

37. The speed of a car is 60 Km/hour. How much time does it take to cover a distance of 240 Km?

A. 4 hours
B. 3½ hours
C. 5 hours
D. 3 hours

38. The effort arm of a lever is 15 cm and load arm is 2.5 cm. The mechanical advantage of the lever is
39. Using a first order lever a load of 200gms was lifted by applying an effort of 100gms at a distance 20cm away from the fulcrum. How far is the load from the fulcrum?

A. 15 cm  
B. 20 cm  
C. 10 cm  
D. 25 cm

40. In which of the following changes heat energy is absorbed?

A. Evaporation of water from the pond  
B. Burning of firewood  
C. Burning of Agarbathi  
D. Breaking of a stick

41. Figures given below shows the position of fulcrum (F), effort (E) and load (L) in a 1st order lever. In which lever maximum effort should be put in?

A (1)  
B (2)  
C (3)  
D (4)

42. If in a machine the effort put in is less than the load, then the distance the effort has to move
A. is less than the distance the load is moved
B. is the same as the distance the load is moved
C. is greater than the distance the load is moved
D. can be greater or less than the distance the load is moved

43. Why is the tip of the arrow pointed?
   A. to increase the speed by reducing the friction
   B. to increase the speed by increasing the friction
   C. to decrease the speed by increasing the friction
   D. to decrease the speed by reducing the friction

44. Why do people slip easily on a finely polished floor?
   A. As the surface of the floor is very smooth there is very less friction between the foot and the floor
   B. The friction between the floor and the foot is very high
   C. There is no friction between the two surfaces in contact as both the surfaces are very smooth
   D. As one of the surface in contact is rough the friction between the surfaces in contact is very high

45. When we strike a match enough heat energy is set free to light the match due to this force
   A. Mechanical
   B. Frictional
   C. Electric
   D. Magnetic

46. The water in the river flows more quickly in the middle and more slowly near the riverbed. Which of the following gives the correct reason for this
   A. The friction is less in the middle and more near the river bed
   B. The friction is more in the middle and less near river side
   C. The river is more deep in the centre and less deep near the river bed
   D. In the middle the water is more and near the river bed water is less
47. The picture given below shows the 3 different ways a student held the umbrella during his three runs. Which run was the easiest to him?

A. first and second run
B. second run
C. third run
D. first run

48. Figures given below shows the stages which a man goes through in raising a long ladder against the wall of his house

(a)  (b)  (c)  (d)
(e)  (f)  (g)  (h)  (i)

In which positions the effort acts nearer to the fulcrum than the load

A. (e), (i) and (f)
B. (d), (e) and (i)
C. (f), (e) and (d)
D. (g), (h) and (j)

49. In which position the effort put in is the least?

A. (d)
B. (e)
C. (f)
50. In which of the following levers mechanical advantage is equal to 1?

A. 1.
B. 2.
C. 3
D. 4.
APPENDIX - G

Lesson Plan on Cooperative Learning Method

Name of the Teacher: 
Standard: VI 
Section: B 
Subject: Science 
Unit: Changes Around Us 
Lesson: Chemical Changes 
Date: 4.8.01 
Duration: 40 Min.

1.0 Previous Knowledge Expected:
- States of matter – solid, liquid, gas and their properties;
- Concept of volume, mass and area;
- Units of measuring length, mass time, temperature, volume and area;
- Aspects of change, types of changes – slow changes, fast changes, reversible changes, irreversible changes, physical changes

2.0. Instructional Objectives

2.1. Knowledge: The pupils will:
- Recall and explain the process of change observed during the demonstration;
- Recall and define the term chemical change;
- Recognize the aspects of change in different chemical changes observed;
- Recognize the chemical change among the changes observed.

2.2. Understanding: The pupils will:
- Illustrate chemical changes with examples;
- Compare the properties of the substances before undergoing change and after the change;
- Give the difference between the different chemical changes being performed;
- Classify the given changes into chemical and physical changes;
- Explain the process involved in the chemical change being observed.

2.3. **Application** : The pupils will
- Identify chemical change in a new situation
- Give new examples for chemical changes
- Predict chemical changes on the basis of knowledge of chemical changes
- Analyze the given situations related to chemical changes
- Give reasons for identifying a change as chemical change
- Apply the concept of chemical change in identifying the changes observed in their daily life situations as chemical changes

2.4. **Skill** : The pupils will acquire the skill of manipulation, observation and experimentation

(i) **Manipulation skill** - The pupils will
- Handle the apparatus and chemicals carefully
- Keep the apparatus and chemicals in order
- Prepare sequential plan for observation

(ii) **Observation Skill** : The pupils will
- Notice the relevant changes in chemical using senses;
- Discriminates between the closely related substances and reactions.
(iii) **Reporting Skill**: The pupils will

- Infer correct results of the experiment on the basis of observations;
- Report the results in a systematic manner.

**2.5. Attitude**: The pupil will

- Report the observed facts, procedures and results with intellectual honesty;
- Draw inference only on the basis of observed facts.

**3.0. Learning Points**

1. **Chemical Change**
   
   The change in which the original properties of the substances are lost and new substances with new set of properties are formed

2. **Properties of Chemical Changes**
   
   i. Most of the chemical changes are irreversible
   
   ii. Changes are permanent
   
   iii. New substance is formed

**5.0. Materials and Equipment**

Sugar, Sulpher, Iron Powder, Carbon disulfide, Magnesium ribbon, Iron powder, test tubes, zinc, Dil. Hydrochloric Acid, test tube holders, iron nails rusted, iron nails without rust, paper piece, tong, spirit lamp, magnet, matches
### 6. Instructional Sequence

<table>
<thead>
<tr>
<th>Instructional Sequence</th>
<th>Teacher Activity</th>
<th>Pupil Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>6.1. Previous Knowledge Testing and Motivation</strong></td>
<td>Teacher asks the following questions</td>
<td>Pupil Activity</td>
</tr>
<tr>
<td>1. Define physical change.</td>
<td></td>
<td>Physical Defines Change</td>
</tr>
<tr>
<td>2. Identify the physical changes in the given list and write in your notebook (Teacher displays the chart)</td>
<td></td>
<td>Defines Physical Change</td>
</tr>
<tr>
<td><strong>List of Changes:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. Rusting of iron;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ii. Milk changes into curd;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>iii. Burning of cooking gas;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>iv. Blowing of a balloon;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>v. Folding of a paper;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>vi. Freezing of water;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>vii. Melting of ice;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>viii. Bursting of a balloon.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Read out the physical changes</td>
<td></td>
<td>Identifies the physical changes and writes</td>
</tr>
<tr>
<td>4. How do you say that they are physical changes?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Read out the changes which are not physical changes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Are these changes reversible?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[Teacher distributes rusted and new nails to the students to observe]</td>
<td>Observe the nails given and records the observations</td>
<td></td>
</tr>
<tr>
<td>Tr: All of you observe the nails given to you, note down your observation</td>
<td>P_u: One is shining and has a smooth surface and the other one has lost its luster and it is brown in colour and has rough surface</td>
<td></td>
</tr>
<tr>
<td>Tr: Give your observations</td>
<td>Shows keen interest to learn</td>
<td></td>
</tr>
<tr>
<td>Tr: Yes, your observation is correct</td>
<td></td>
<td></td>
</tr>
<tr>
<td>What is the reason for this? Can we get back the original iron nail from the rusted?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>What type of change in this? Would you like to know? (silence)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tr: You will find answers for all your questions in today’s lesson on ‘Chemical Changes’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blackboard work</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemical Changes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 6.2. Presentation and Development of the Learning Points

#### (i) Communication of the Group Goal

- **Tr**: In today’s lesson, the objectives of your group work are,
  - i. To acquire an understanding of the concept ‘Chemical Change’
  - ii. To list the properties of chemical change
  - iii. To identify the chemical change in the given list of changes
  - iv. To list examples for chemical changes
  - v. To acquire the skill of manipulation, observation and reporting through practical work

#### (ii) Communication of the Task Structure

- **Tr**: To attain these objectives you have to do the activities given in the task sheet in your respective groups. At first, one of the members from the each group has to read the experiment/activity given in the task sheet. Every member of the group must listen carefully and discuss in your respective group about the activity / experiment to be performed. Every member of the group must actively participate in the group work and record your observations in the work sheet provided to you. Each member has to take turns in performing the experiment. Clarify your doubts with your group members. If your doubts/problems cannot be solved by any of your group members then approach the teacher. Each member should attain the group goal at the end of your group task. It is the responsibility of the group to make each and every member to attain the group goal.
### (iii) Pupil-Pupil Interaction

The task to be performed by your group are

(i) Heating of 10 gms of sugar in a hard test tube
(ii) Heating 8 gms of sulphur and 14 gms of iron in a hard test tube
(iii) Burning of magnesium ribbon

Tr: The procedure to be followed while performing these experiments are given step by step in your task sheet. (Teacher distributes the task sheets to each group)

Tr: Now you start working in your respective groups. Each one has to record your observations in the work sheet provided to you

Pupil discuss in their respective groups and performs the activities following the task sheet

<table>
<thead>
<tr>
<th>TASK SHEET</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Experiment No.1</strong></td>
</tr>
<tr>
<td>Procedure:</td>
</tr>
<tr>
<td>Step 1</td>
</tr>
<tr>
<td>Step 2</td>
</tr>
<tr>
<td>Step 3</td>
</tr>
<tr>
<td>i.</td>
</tr>
<tr>
<td>ii.</td>
</tr>
<tr>
<td>Expt No.2: Heating of Sulphur and Iron powder</td>
</tr>
<tr>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>Procedure</td>
</tr>
<tr>
<td>Step 1</td>
</tr>
<tr>
<td>Observe the physical properties of Iron and Sulphur and record its colour and state (Bring a magnet near the iron fittings and record your observations)</td>
</tr>
<tr>
<td>i. Take 2 gms of Sulphur and put it in a test tube containing 10 ml of Carbon Disulphide</td>
</tr>
<tr>
<td>ii. Take 8 gms of sulphur and 14 gms of iron fittings in a hard test tube and heat with the help of a spirit lamp till it forms a single mass</td>
</tr>
<tr>
<td>iii. Stop heating and allow it for cooling. Then put the content of the test tube in a watch glass and examine whether the original properties of Iron and Sulphur are present by performing the following tests</td>
</tr>
<tr>
<td>(a) Observe the substance through a magnifying lens</td>
</tr>
<tr>
<td>(b) Put a piece of the substance in a small quantity of carbon disulphide</td>
</tr>
<tr>
<td>(c) Take the magnet near the substance and test the magnetic properties of iron</td>
</tr>
</tbody>
</table>
### (iii) Pupil-Pupil Interaction

Based on the observations discuss the correctness of the statements given below:

i. In the substance formed iron and sulphur atoms could separately be identified

ii. The substances has the property of sulphur

iii. As a result of heating 8 gms of sulphur and 14 gms of iron a new substance Ferrous Sulphide which is a compound of Iron and Sulphur is formed.

Based the results of your discussion write the results.

<table>
<thead>
<tr>
<th>Experiment No 3</th>
<th>Burning of Magnesium Ribbon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procedure</td>
<td></td>
</tr>
<tr>
<td>Step 1</td>
<td>Observe the physical properties colour and state and note down</td>
</tr>
<tr>
<td>Step 2</td>
<td>Take 3 cms of Magnesium ribbon and hold it in a tong and heat with the help of a spirit lamp. Collect the residue in a watch glass</td>
</tr>
<tr>
<td>Step 3</td>
<td>Observe the properties colour and state of the substance formed. Write the result of the experiment based on your observation</td>
</tr>
<tr>
<td>Note:</td>
<td>All these experiments performed by you are chemical changes. Based on the results of each experiments answer the following questions in your work sheet</td>
</tr>
<tr>
<td></td>
<td>i. Define Chemical Change</td>
</tr>
<tr>
<td></td>
<td>ii. List the properties of chemical change</td>
</tr>
<tr>
<td></td>
<td>iii. (Write 2 more examples for chemical change</td>
</tr>
<tr>
<td></td>
<td>iv. What type of change is curdling of milk? Give reasons</td>
</tr>
<tr>
<td>Expt No.4</td>
<td>Take a piece of zinc and put it in 5 ml of Dil.HCL acid and find out what type of change is it? Justify your answer</td>
</tr>
<tr>
<td>(iv) Teacher Intervention and Monitoring</td>
<td>Tr: Monitors the group performance and individual behaviour. Provides assistance on request. Intervenes to teach the cooperative skills necessary for group performance</td>
</tr>
</tbody>
</table>
| (v) Testing of Individual Learning | Tr: Asks the following questions for different members of different groups and verifies the answer with the other groups
1. Define chemical change?
2. Compare physical change and chemical change
3. Classify the following changes into physical and chemical change
   i. a. Decay of plants
   ii. b. Bursting of cracker
   iii. c. Melting of work
   iv. d. Rotting of egg
   v. e. Blowing air into a balloon
1. List five physical changes you observe in your home
2. Classify the following into physical and chemical changes
   i. Growing of hair in your head
   ii. Heating of iodine crystals
   iii. Freezing of water
   iv. Change in the pulse rate of a person with fever | Answers the questions |

7. Home Work

Answers the questions
APPENDIX - H

Lesson Plan on Guided Discovery Method

Name of the Teacher
Standard : VI
Section: B
Subject : Science
Unit : Changes Around Us
Lesson : Chemical Changes
Date: 10.9.01     Duration : 40 Min.

1.0. Previous Knowledge Expected:

states of matter – solid, liquid, gas and their properties;
Concept of volume, mass and area;
units of measuring length, mass, time, temperature, volume and area;
Aspects of change, types of changes – slow changes, fast changes, reversible changes, irreversible changes, physical changes.

2.0. Instructional Objectives

2.1. Knowledge – The pupils will:

- recall and explain the process of change observed during the demonstration;
- recall and define the term chemical change;
- Recognize the aspects of change in different chemical changed observed;
- Recognize the chemical change among the changes observed.
2.2. **Understanding:** The pupils will

- Illustrate chemical changes with examples;
- Compare the properties of the substances before undergoing change and after the change;
- give the difference between the different chemical changes being performed;
- Classify the given changes into chemical and physical changes;
- explain the process involved in the chemical change being observed.

2.3. **Application:** The pupils will

- Identify chemical change in a new situation;
- give new examples for chemical changes;
- Predicts chemical changes on the basis of knowledge of chemical changes;
- Analyze the given situations related to chemical changes;
- give reasons for identifying a change as chemical change;
- applies the concept of chemical change in identifying the changes observed in their daily life situations as chemical changes.

2.4. **Skill:** The pupils will acquire the skill of manipulation, observation and experimentation

(i) **Manipulation skill:** The pupil’s will;

- handle the apparatus and chemicals carefully;
- keeps the apparatus and chemicals in order;
- Prepares sequential plan for observation.
<table>
<thead>
<tr>
<th>(ii) <strong>Observation Skill</strong>: The pupil’s will</th>
</tr>
</thead>
<tbody>
<tr>
<td>notices the relevant changes in chemical using senses</td>
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<tr>
<td>discriminates between the closely related substances and reactions</td>
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</table>

<table>
<thead>
<tr>
<th>(iii) <strong>Reporting Skill</strong>: The pupil’s will</th>
</tr>
</thead>
<tbody>
<tr>
<td>infer correct results on the basis of observations;</td>
</tr>
<tr>
<td>reports the results in a systematic manner.</td>
</tr>
</tbody>
</table>

2.5. **Attitude**: The pupil’s will

reports the observed facts, procedures and results with intellectual honesty;

draw inference only on the basis of observed facts.

3.0. **Learning Points**

**Chemical Change**  
The change in which the original properties of the substances are lost and new substances with new set of properties are formed

**Properties of Chemical Changes**

i. Most of the chemical changes are irreversible;

ii. Changes are permanent;

iii. New substance is formed.

5.0. **Material and Equipment**

Sugar, Sulpher, Iron Powder, Carbon disulfide, Magnesium ribbon, Iron powder, test tubes, zinc, Dil. Hydrochloric Acid, test tube holders, iron nails rusted, iron nails without rust, paper piece, tong spirit lamp, magnet, matches
### 6.0. Instructional Sequence

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<th>Instructional Sequence</th>
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<td></td>
<td>1. Define physical change</td>
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<td></td>
<td>2. Identify the physical changes in the given list and write in your note book (Teacher displays the chart)</td>
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<td>List of Changes</td>
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<tr>
<td>i. Rusting of iron</td>
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<td>iii. Burning of cooking gas</td>
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<td>iv. Blowing of a balloon</td>
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<td>3. Read out the physical changes</td>
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<tr>
<td>4. How do you say that they are physical changes?</td>
<td></td>
<td>Identifies the physical changes and writes</td>
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<tr>
<td>5. Read out the changes which are not physical changes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 5.2. Presentation and Development of the Learning Points | 6. Are these changes reversible?  
[Teacher distributes rusted and new nails to the students to observe] |
|---|---|
| **Tr:** All of you observe the nails given to you, note down your observation.  
**Tr:** Give your observations.  
**Tr:** Yes, your observation is correct  
What is the reason for this? Can we get back the original iron nail from the rusted?  
What type of change is this? Would you like to know? (silence)  
**Tr:** You will find answers for all your questions in today’s lesson on ‘Chemical Changes’  
**Blackboard work**  
**Chemical Changes**  
**Tr:** The first experiment you have to perform is heating of sugar in a hard test tube by holding the test tube with a test tube holder. To enter your observations and result make use of the work sheet provided to you.  
**Tr:** Before you start heating the sugar observe the physical characteristics of sugar carefully and record it in your work sheet | **Observe the nails given and records the observations**  
**Pu:** One is shining and has a smooth surface and the other one has lost its luster and it is brown in colour and has rough surface  
**Shows keen interest to learn**  
**Pu:** Observes the sugar crystals and records their observation |
<table>
<thead>
<tr>
<th>Tr.</th>
<th>Takes sugar in a hard test tube lights the spirit lamp and heats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pu.</td>
<td>Continues heating and observation of the process</td>
</tr>
<tr>
<td>Pu.</td>
<td>A black man is formed</td>
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</tbody>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tr.</th>
<th>What changes do you observe in the test tube?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tr.</td>
<td>What does the black mass indicate?</td>
</tr>
<tr>
<td>Tr.</td>
<td>What else do you find on the sides of the test tube?</td>
</tr>
<tr>
<td>Tr.</td>
<td>What aspects of change you observe in this experiment?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tr.</th>
<th>Now observe the products obtained as a result of heating sugar and record the changes in your worksheet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tr.</td>
<td>Compare the properties of carbon and water with that of sugar</td>
</tr>
<tr>
<td>Tr.</td>
<td>Are the properties of carbon, water and sugar same?</td>
</tr>
<tr>
<td>Tr.</td>
<td>What do you infer from this?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tr.</th>
<th>What is the result of heating sugar?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tr.</td>
<td>This is an example for chemical</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pu.</th>
<th>Carbon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pu.</td>
<td>Drops of water</td>
</tr>
<tr>
<td>Pu.</td>
<td>Change in state, colour and taste</td>
</tr>
<tr>
<td>Pu.</td>
<td>Observes carbon and water and records the observation in the worksheets provided</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pu.</th>
<th>Compares the properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pu.</td>
<td>No</td>
</tr>
<tr>
<td>Pu.</td>
<td>By heating sugar it has lost its original properties and new substances carbon and water are formed</td>
</tr>
</tbody>
</table>

<p>| Pu. | By heating sugar carbon and water are formed |</p>
<table>
<thead>
<tr>
<th><strong>Tr:</strong> As a second example for chemical change you have to perform an experiment of heating 8 gms of sulphur with 14 gms of iron powder</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Before doing the experiment you have to observe and record the physical properties (state &amp; colour) of each and learn one property of each of sulphur and iron</strong></td>
</tr>
<tr>
<td>i. Take 2 ml of carbon disulphide in a test-tube and put a small quantity of sulphur into it and stir it with the help of a glass rod and record your observation</td>
</tr>
<tr>
<td>ii. Take some iron powder in a watch glass and take a magnet near it and record your observation</td>
</tr>
<tr>
<td><strong>Tr:</strong> Take 8 gms of sulphur and 14 gms of iron in a hard test tube and heat till your get a brownish black single mass</td>
</tr>
<tr>
<td><strong>Tr:</strong> Allow the substance to cool and you record the changes observed</td>
</tr>
<tr>
<td><strong>Tr:</strong> Take out the substance from the test-tube and examine its properties and find out whether the original properties of iron and sulphur is present or changed in the substance formed</td>
</tr>
<tr>
<td>i. Observe the substances through a magnifying lens and find out whether iron and sulphur particles are present</td>
</tr>
<tr>
<td><strong>Performs the experiment and records the observation as</strong></td>
</tr>
<tr>
<td>(i) sulphur dissolves in carbon disulphide</td>
</tr>
<tr>
<td>(ii) iron powder is attracted towards the magnet and clings to it</td>
</tr>
<tr>
<td><strong>Perform the experiment. Observes the changes taking place</strong></td>
</tr>
<tr>
<td><strong>Keeps the substance to cool and writes the observations</strong></td>
</tr>
<tr>
<td><strong>Observes the substances through magnifying lens</strong></td>
</tr>
<tr>
<td><strong>Puts a piece of the substance in 2 ml of carbon disulphide stirs it, filters the mixture and evaporates the filtrate</strong></td>
</tr>
</tbody>
</table>
| ii. Take a price of substance and put it in a test-tube containing 2 ml of carbon disulphide and stir it, then filter the mixture and evaporate the filtrate | (ii) Tests the substance with the magnet  
Records the observation |
| --- | --- |
| iii. Take a magnet near the substance  
Tr: What are your observations? | Pu: (i) The particles of iron and sulphur cannot be distinguished  
(ii) The substance was not attracted by the magnet  
(iii) The substance did not dissolve in carbon disulphide  
Pu: Change of state, colour and size of the sulphur and iron stability of sulphur in carbon disulphide and magnetic property of iron  
Pu: No, It is not a reversible change  
Pu: By heating sulphur and iron a single new substance is formed. The properties of this substance are different from that of iron and sulphur. IT is not easily reversible |
| Tr: What are the aspects of change observed in this experiment? | Pu: |
| Tr: Is the change observed easily reversible? | Pu: |
| Tr: Based on your observations what do you conclude about change took place as a result of heating 8 gms of sulphur and 14 gms of iron? | Pu: |
| Tr: The new substance formed is a compound of iron and sulphur and it is known as Iron Sulphide. This is also an example for chemical change |
| Tr: Now perform the third experiment with Magnesium ribbon. All of you take a piece of Magnesium ribbon and observe it carefully and record your observation in your work sheet |
| Tr: Take a tong and heat the Magnesium ribbon with the help of a spirit lamp and collect the substance formed in a watch glass |
| Tr: Now observe the substance formed as a result of burning Magnesium ribbon |
| The teacher asks the following cue questions to clarify the process of burning of Magnesium ribbon with oxygen |
| (i) What is essential for burning to take place |
| (ii) With what did Magnesium ribbon combine while burning |
| Tr: The substance formed as result of burning Magnesium ribbon with oxygen is Magnesium oxide |
| Tr: Compare the properties of Magnesium, Oxygen and Magnesium Oxide |
| Tr: Based on your observations what do you conclude about the change took place when Magnesium was burnt with oxygen |

| Takes a piece of Magnesium ribbon and observes it and records the observations |
| Burns the Magnesium ribbon and collects the product |
| Observes the physical properties of the substance formed |
| Pu: Heat and oxygen |
| Pu: Magnesium had combined with oxygen |
| Compare the properties |
| Pu: When Magnesium Metal in burnt in oxygen a new substance Magnesium Oxide with a new set of properties is formed |
| Generalization of the Concept by the Pupil | Tr: This is also an example for Chemical Change. Now study the observations recorded in your work sheet and find the similarities (common features) in all the three experiments and generalize and define Chemical Change  
Tr: Writes the concept on the board  
What are the properties of Chemical Change?  
Tr: Writes on the black board | List the similarities as  
- new substance is formed  
- properties of the substance formed are different than the original properties  
- change is not easily reversible. Permanent change Pupil generalize and define Chemical Change as follows.  
Change in which the original properties of the substances are lost and new substances with new set of properties are formed  
Pu: In Chemical Change new substances is formed  
- change is not easily reversible  
- Change is permanent  

| Black board work | Chemical Change: Change in which the original properties of the substances are lost and new substances set of properties are formed  
Properties of chemical changes  
i. Most of chemical changes are not easily reversible i.e. they are irreversible  
ii. Permanent changes  
iii. New substances are formed |
### (iii) Examples from the Pupil

#### (iv) Application of the Concept

<table>
<thead>
<tr>
<th>Teacher asks the following questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Define Chemical Change</td>
</tr>
<tr>
<td>2. Compare physical and changes</td>
</tr>
<tr>
<td>3. Classify the following into physical Change and Chemical Change</td>
</tr>
<tr>
<td>iii. Decay of plant</td>
</tr>
<tr>
<td>iv. Bursting of cracker</td>
</tr>
<tr>
<td>v. Burning of candle</td>
</tr>
<tr>
<td>vi. Preparing wine from grapes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(iii) Examples from the Pupil</th>
<th>(iv) Application of the Concept</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tr: Give two examples for chemical change.</td>
<td>Pu: Gives examples</td>
</tr>
<tr>
<td>Tr: Take a piece of zinc and add 5 ml of Dil. Hydrochloric Acid Find out whether it is a chemical change. Give reasons for your answer</td>
<td>Pu: Performs the experiment and finds out as chemical change and gives reasons</td>
</tr>
<tr>
<td>Tr: What type of change is curdling of milk? Justify your answer</td>
<td>Pu: Chemical Change</td>
</tr>
<tr>
<td>Pu: Justifies as</td>
<td></td>
</tr>
<tr>
<td>- new substance curds is formed</td>
<td></td>
</tr>
<tr>
<td>- properties of curds different than milk</td>
<td></td>
</tr>
<tr>
<td>- milk cannot be obtained back from curds</td>
<td></td>
</tr>
</tbody>
</table>
### 6. Home Work

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.</strong></td>
<td>List five physical changes and chemical changes you observe in your home</td>
</tr>
<tr>
<td><strong>2.</strong></td>
<td>Classify the following changes into physical and chemical changes</td>
</tr>
<tr>
<td>(i)</td>
<td>growing of hair in your head</td>
</tr>
<tr>
<td>(ii)</td>
<td>heating of iodine crystals</td>
</tr>
<tr>
<td>(iii)</td>
<td>freezing of milk</td>
</tr>
<tr>
<td>(iv)</td>
<td>change in the pulse rate of a person with fever</td>
</tr>
</tbody>
</table>
## APPENDIX - 1

Lesson Plan on Teacher Demonstration Method

<table>
<thead>
<tr>
<th>Name of the Teacher</th>
<th>Subject</th>
<th>Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard : VI</td>
<td>Unit</td>
<td>Changes Around Us</td>
</tr>
<tr>
<td>Section: A</td>
<td>Lesson</td>
<td>Chemical Changes</td>
</tr>
<tr>
<td></td>
<td>Date</td>
<td>21.8.02</td>
</tr>
<tr>
<td></td>
<td>Duration</td>
<td>40 Min.</td>
</tr>
</tbody>
</table>

### 1.0 Previous Knowledge Expected:

- states of matter – solid, liquid, gas and their properties;
- concept of volume, mass and area;
- units of measuring length, mass, time, temperature, volume and area;
- aspects of change, types of changes – slow changes, fast changes, reversible changes, irreversible changes, physical changes.

### 2.0. Instructional Objectives

#### 2.1. Knowledge: The pupils will:

- recall and explain the process of change observed during the demonstration;
- recall and define the term chemical change;
- recognize the aspects of change in different chemical changes observed;
- recognize the chemical change among the changes observed.
2.2. Understanding: The pupils will:
- illustrate chemical changes with examples;
- compare the properties of the substances before undergoing change and after the change;
- give the difference between the different chemical changes being performed;
- classify the given changes into chemical and physical changes;
- explain the process involved in the chemical change being observed.

2.3. Application: The pupils will:
- identify chemical change in a new situation;
- give new examples for chemical changes;
- predict chemical changes on the basis of knowledge of chemical changes;
- analyze the given situations related to chemical changes;
- give reasons for identifying a change as chemical change;
- apply the concept of chemical change in identifying the changes observed in their daily life situations as chemical changes.
2.4. Skill: The pupils will acquire the skill of manipulation, observation and experimentation

(i) Manipulation skill: The pupils will:
- handle the apparatus and chemicals carefully;
- keep the apparatus and chemicals in order;
- prepare sequential plan for observation.

(ii) Observation Skill: The pupils will:
- notice the relevant changes in chemicals using senses;
- discriminates between the closely related substances and reactions.

(iii) Reporting Skill: The pupils will
- infer correct results on the basis of observations;
- report the results in a systematic manner.

2.5. Attitude: The pupil will
- report the observed facts, procedures and results with intellectual honesty;
- draw inference only on the basis of observed facts.
3.0. Learning Points

**Chemical Change:** The change in which the original properties of the substances are lost and new substances with new set of properties are formed

**Properties of Chemical Changes**

i. Most of the chemical changes are irreversible

ii. Changes are permanent

iii. New substance is formed

4.0. List of Demonstrations

i. Heating of Sugar

ii. Heating Sulphur with Iron Powder

iii. Burning Magnesium ribbon with oxygen

5.0. Materials and Equipment

Sugar, Sulphur, Iron Powder, Carbon disulfide, Magnesium ribbon, Iron powder, test tubes, zinc, Dil. Hydrochloric Acid, test tube holders, iron nails rusted, iron nails without rust, paper piece, tong, spirit lamp, magnet, matches
### 6.0. Instructional Sequence

<table>
<thead>
<tr>
<th>Instructional Sequence</th>
<th>Teacher Activity</th>
<th>Pupil Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>6.1. Previous Knowledge Testing and Motivation</strong></td>
<td>Teacher asks the following questions</td>
<td>Physical Defines Change</td>
</tr>
<tr>
<td></td>
<td>1. Define physical change</td>
<td>Defines Physical Change</td>
</tr>
<tr>
<td></td>
<td>2. Identify the physical changes in the given list and write in your note book (Teacher displays the chart)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>List of Changes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>i. Rusting of iron</td>
<td>Identifies the physical changes and writes</td>
</tr>
<tr>
<td></td>
<td>ii. Milk changes into curd</td>
<td></td>
</tr>
<tr>
<td></td>
<td>iii. Burning of cooking gas</td>
<td></td>
</tr>
<tr>
<td></td>
<td>iv. Blowing of a balloon</td>
<td></td>
</tr>
<tr>
<td></td>
<td>v. Folding of a paper</td>
<td></td>
</tr>
<tr>
<td></td>
<td>vi. Freezing of water</td>
<td></td>
</tr>
<tr>
<td></td>
<td>vii. Melting of ice</td>
<td></td>
</tr>
<tr>
<td></td>
<td>viii. Bursting of a balloon</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Read out the physical changes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. How do you say that they are physical changes?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Read out the changes which are not physical changes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. Are these changes reversible?</td>
<td></td>
</tr>
</tbody>
</table>
Teacher distributes rusted and new nails to the students to observe

Tr: All of you observe the nails given to you, note down your observation

Tr: Give your observations

Observe the nails given and records the observations

P: One is shining and has a smooth surface and the other one has lost its luster and it is brown in colour and has rough surface

Tr: Yes, your observation is correct

What is the reason for this? Can we get back the original iron nail from the rusted?

What type of change is this? Would you like to know?

(silence)

Tr: You will find answers for all your questions in today’s lesson on ‘Chemical Changes’

Shows keen interest to learn
### 6.2. Presentation and Development of the Learning Points

**(i) Statement of the concept by the Teacher**

Tr: Changes in which the original properties of the substances are lost and new substances with new set of properties are formed called as chemical changes. Most of the chemical changes are not easily reversible they are irreversible. Almost all are permanent changes.

Tr: To clarify what is chemical change I will demonstrate three experiments. To begin with I will demonstrate the experiment of heating of sugar.

Tr: Before I begin the experiment let us list the properties of sugar. All of you observe the physical properties of sugar.

[Teacher elicits the properties through the following questions]

What is the state of sugar?
What is its colour?
What is its taste?

Tr: Shows the material and equipment needed for the demonstration and starts the demonstration.

Tr: All of you must carefully observe the changes taking place while heating sugar.

### (ii) Clarification of the concept through demonstration

Pu: Observes sugar crystals and answers as
Sugar is in solid crystalline state
White in colour
Sweet to taste

Pu: Observes the experiments
<table>
<thead>
<tr>
<th>Teacher explains the process as follows</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tr: The sugar started melting</td>
</tr>
<tr>
<td>The colour has changed to brown</td>
</tr>
<tr>
<td>On the inner side of the test tube water drops are observed</td>
</tr>
<tr>
<td>The colour of the sugar has changed to black mass</td>
</tr>
<tr>
<td>Tr: The black mass obtained in this experiment is carbon. Sugar in made up of atoms of carbon, hydrogen and oxygen. While heating sugar, hydrogen and oxygen of sugar liberate as water molecule and carbon remains as a black mass in the test tube. Properties of sugar indifferent from water and carbon. Thus it is evident that sugar has lost its original properties from carbon and water sugar cannot be obtained easily. Thus it is an irreversible change and permanent change. Thus it is confirmed that heating of sugar is a chemical change.</td>
</tr>
<tr>
<td>Pu: Listens to the clarification and explanation</td>
</tr>
</tbody>
</table>
| iii) Summary of the Demonstration by the Pupil | **Tr:** Now you give the summary of the experiment being demonstrated (Teacher writes the summary on the black board) | **Pu:** Gives the summary of the demonstration  
**Pu:** Writes the summary in their note book  
**Pu:** Sulphur in yellow coloured powder  
Iron is dark brown coloured powder  
Pupils observe the activity  
**Pu:** Magnetic property |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Tr:</strong> Now I will demonstrate to you the second experiment, that is, heating of 8 gms of sulphur with 14 gms of iron powder</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Tr:</strong> Before I begin the experiment let me explain the properties of sulphur and iron powder (teacher elicits the physical properties by asking the following questions)</td>
<td></td>
</tr>
<tr>
<td>i.</td>
<td>What is the colour of sulphur?</td>
<td></td>
</tr>
<tr>
<td>ii.</td>
<td>What is the colour of iron?</td>
<td></td>
</tr>
<tr>
<td>iii.</td>
<td>What is the state of sulphur?</td>
<td></td>
</tr>
<tr>
<td>iv.</td>
<td>What is the state of iron?</td>
<td></td>
</tr>
<tr>
<td><strong>Tr:</strong> Now I will demonstrate one property each of sulphur and iron</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Tr:</strong> You have already studied the property of iron that it is attracted by magnet. Now I will take this magnet near the iron powder, you have to observe reaction. The magnet attracts iron filings. What property of iron did you observe here?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Tr: Now, I will demonstrate the solubility of sulphur in Carbon disulphide. I will take a small quantity of sulphur in a test tube containing 5 ml of Carbon disulphide and stir it with a glass rod. It is dissolved completely in carbon disulphide.

Which property did you observe in this experiment?

Tr: All of you have to observe carefully the experiment which I will demonstrate now.

Teacher takes 8 gms of sulphur and 14 gms of Iron in a hard test tube and heats till it starts glowing.

Tr: The mixture in the test tube started to glow. Now I will stop heating and allow it to cool. You have to recall the stages of this experiment and note down in your book.

Tr: Now observe the substance formed in the test tube as a result of heating sulphur and Iron. It is a brownish black single mass (teacher puts it on a watch glass and shows the substance to the whole glass)

Tr: We have already listed the properties of sulphur and Iron before undergoing this change. Let me examine the properties of the substance formed (teacher does the following tests taking a small sample)

i. Test for the presence of sulphur and iron particles in the substance using a magnifying lens;

ii. Test for magnetic property of iron;

iii. Test for solubility of sulphur in carbon disulphide.
### iii) Summary of the Demonstration by the Pupil

| 
| --- |
| **Tr:** From the results of these tests it is proved that both Iron and sulphur have lost their original properties and a new substance made up of Sulphur and Iron with new set of properties are formed. It is not easily reversible, hence it is a irreversible change and permanent. Thus the change took place as a result of heating of Iron and Sulphur is a chemical change. The new substance formed is Ferrous Sulphide [Iron Sulphide] |

| **Tr:** Now one of you give the summary of the experiment being demonstrated. |
| **Tr:** One of you repeat the summary (Teacher writes the summary on the black board). |

**Pu:** Writes in their book

| 
| --- |
| **Tr:** All of you write the summary in your notebook. |
| **Tr:** The third experiment is burning of Magnesium ribbon with oxygen. This is Magnesium ribbon. It has a shining surface, strong and silver colour. Let me demonstrate the experiment, you have to observe the reaction (Teacher performs the experiment). |
| **Tr:** Now the magnesium ribbon is burning with atmospheric oxygen. I will collect the substance formed in this watch glass (Teacher shows the substance formed to the whole class and asks them to observe the physical properties like colour and state. |
| **Tr:** What is the colour and state of the substance formed? |
| **Tr:** The substance formed is a compound of Magnesium and oxygen called Magnesium Oxide. It has entirely different properties than that of Magnesium and Oxygen. It cannot be easily reversed. The change is irreversible. It is permanent. Hence, burning of Magnesium with Oxygen is also a chemical change. |

**Pu:** observes the experiment
<table>
<thead>
<tr>
<th>(iii) Summary of the Demonstration by the Pupil</th>
<th>Tr: One of you give the summary of the experiment being demonstrated (teacher writes the summary on the black board).</th>
<th>Pu: Gives the summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>(iv) Application of the Concept</td>
<td>Tr: Give two examples for chemical change. Tr: Take a price of zinc and add 5 ml of Dil. Hydrochloric acid. Find out whether it is a Chemical Change? Give reasons for your answer. Tr: What type of change is curdling of milk? Justify your answer.</td>
<td>Gives examples Pu: Performs the experiment and find out as chemical change and gives reasons for then answer Pu: Chemical change justifies as New substance is formed Properties of curds is different than milk Milk cannot be obtained back from curds</td>
</tr>
</tbody>
</table>
## CHEMICAL CHANGE

**Chemical Change:** Changes in which the original properties of the substances are lost and new substances with new set of properties are formed

<table>
<thead>
<tr>
<th>Properties of chemical changes</th>
<th>i. Most of chemical changes are not easily reversible i.e. they are irreversible</th>
<th>ii. Permanent changes</th>
<th>iii. New substances are formed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experiment 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Heating of sugar</td>
<td>Sugar is a white crystalline substance – sweet to taste</td>
<td>Water drops on the inner side of the test tube – blackman in the test tube</td>
<td>Water colourless – tasteless liquid</td>
</tr>
<tr>
<td></td>
<td>Iron: Brownish black coloured solid</td>
<td>Dark brown coloured hard mass is formed</td>
<td>Carbon-black solidman</td>
</tr>
<tr>
<td></td>
<td>Sulphur: yellow powder</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) Heating 8 gms of sulphur and 14 gms of Iron powder</td>
<td>Magnesium -solid metal -silver colour -shining surface</td>
<td>Burnt brightly and white powder is formed</td>
<td>Solid (powder) White in colour</td>
</tr>
<tr>
<td>3) Burning of Magnesium Ribbon</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>New substance water and carbon are formed</td>
<td>Sugar has lost its original properties</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Change is permanent</td>
<td>A compound of sulphur and Iron is formed Sulphur has lost its original properties</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Iron also has lost its original properties</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Change is irreversible</td>
<td>Permanent</td>
</tr>
<tr>
<td></td>
<td></td>
<td>New compound Magnesium Oxide has formed</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Magnesium has lost, its original properties</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Change is not easily reversible, Permanent change</td>
<td></td>
</tr>
<tr>
<td>7. Evaluation</td>
<td>Tr: Teacher asks the following questions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>-------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Define chemical change</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. compare physical change and chemical change</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. classify the following into physical and chemical change:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. Decay of plants;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ii. Bursting of cracker;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>iii. Burning of candle;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>iv. Preparing wine from grapes;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>v. Rotting of egg.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>8. Homework</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. List five physical changes you observe in your home</td>
<td></td>
</tr>
<tr>
<td>2. Classify the following into physical and chemical changes:</td>
<td></td>
</tr>
<tr>
<td>i. Growing of hair in your head;</td>
<td></td>
</tr>
<tr>
<td>ii. Heating of iodine crystals;</td>
<td></td>
</tr>
<tr>
<td>iii. Freezing of milk;</td>
<td></td>
</tr>
<tr>
<td>iv. Change in the pulse rate of a person with fever.</td>
<td></td>
</tr>
</tbody>
</table>
## APPENDIX – J

### Worksheet

<table>
<thead>
<tr>
<th>Experiment No</th>
<th>Original Properties of the substances</th>
<th>Observation at the end of the reaction</th>
<th>Properties of the substances formed after the change</th>
<th>Result of the Experiment</th>
</tr>
</thead>
</table>
| 1. Heating of Sugar | Sugar is a white crystalline substance sweet to taste | - Water drops on the inner side of the test tube  
- Black single mass in the test tube | Water – colours liquid Carbon – black solid | - New substances water and carbon are formed  
- Sugar has lost its original properties  
- Change is irreversible  
- Permanent change |
| 2. Heating 8 gms of Sulphur and 14 gms of Iron powder | Iron: Brownish black coloured solid Sulphur: Yellow powder | - Dark brown coloured hard mass in formed | - Solid  
- Brown in colour | - A compound of Iron and Sulphur is formed.  
- Sulphur has lost its original properties  
- Iron also has lost its original properties  
- Change is irreversible  
- Permanent |
3. Burning of Magnesium ribbon

<table>
<thead>
<tr>
<th>Magnesium</th>
<th>Burn brightly and white powder is formed</th>
<th>Solid (powder)</th>
<th>Now compound of Magnesium oxide has formed</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Solid metal</td>
<td>- White is colour</td>
<td>- Magnesium has lost its original properties</td>
<td></td>
</tr>
<tr>
<td>- Silver colour</td>
<td>-</td>
<td>- Change is not irreversible</td>
<td></td>
</tr>
<tr>
<td>- Shining surface</td>
<td></td>
<td>- Permanent change</td>
<td></td>
</tr>
</tbody>
</table>

List the common features

- Formation of new substance
- Original properties of the substance are lost
- Change cannot be reversed easily
- Permanent change

Definition of Chemical Change

- Change in which the original properties of the substances are lost and new substances are found.

(ii) Properties of Chemical Change:
- New substances are formed
- Most of the changes are not easily reversible
- Permanent changes

(iii) Two Examples of Chemical Change
1. Burning a firewood
2. Burning a paper

A. Curdling of milk is a chemical change
Reasons – New substance curds is formed, Milk has lost its original property
Milk cannot be obtained from curds
# APPENDIX – K

## Transcript No. 1

**Method:** Cooperative Learning

<table>
<thead>
<tr>
<th>Lesson No</th>
<th>Subject</th>
<th>Standard</th>
<th>Unit</th>
<th>Section</th>
<th>Lesson</th>
<th>Group</th>
<th>Date</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Science</td>
<td>V1</td>
<td>Changes Around Us</td>
<td>B</td>
<td></td>
<td>High Achievers</td>
<td>4.8.01</td>
<td>35 Min.</td>
</tr>
</tbody>
</table>

## Communication of the Group Goal

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1:</td>
<td>—which changes have been observed and how?</td>
</tr>
<tr>
<td>2:</td>
<td>—how does it affect the environment?</td>
</tr>
<tr>
<td>3:</td>
<td>—how do we know that it is happening?</td>
</tr>
<tr>
<td>4:</td>
<td>—how is it related to other changes?</td>
</tr>
</tbody>
</table>

## Communication of the task structure

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1:</td>
</tr>
<tr>
<td>2:</td>
</tr>
<tr>
<td>3:</td>
</tr>
<tr>
<td>4:</td>
</tr>
</tbody>
</table>
Pupil-pupil Interaction

1: ಐದೆಂಬರು ವರ್ಷಗಳಿಗೂ ಇದೆ ಅವಧಿಯಲ್ಲಿ ಫ್ರಾಯ ಐದೆಂಬದಿಗೆ ಮುಂದುವರೆದ ಹಾಗು ವಿವಿಧ ಸಂದರ್ಶನಗಳು ಸಾರಿದ್ದು.
2: ಎಂದರೆ ಇದೆ ನಿಮ್ಮ ಹಾಗು ಬಾಹ್ಯ ವಿನಿಮಯದ ಪ್ರದರ್ಶನದೊಂದಿಗೆ, ಐದೆಂಬರು ವರ್ಷಗಳಿಗೂ ಎಂದರೆ ಅವಧಿಯಲ್ಲಿ ವಿವಿಧ ಸಂದರ್ಶನಗಳು ಸಾರಿದ್ದು.
3: ಇದೆ ವಿವಿಧ ಸಂದರ್ಶನಗಳು ಸಾರಿದ್ದು.

21: ಐದೆಂಬರು ನಿಮ್ಮ, ಕೋಟೆ, ಕೇಂದ್ರಧಾರಿಗಳು ಎಂದರೆ ಸಮಯದ ಪ್ರದರ್ಶನಗಳು.
   ಎಂದರೆ, ಎಂದರೆ ಪ್ರದರ್ಶನದ ದಿನ ಅನುಕೂಲೆಯು, ಎಂದರೆ ಎಂದರೆ ಪ್ರದರ್ಶನದ ದಿನ ಅನುಕೂಲೆಯು, ಎಂದರೆ ಎಂದರೆ ಪ್ರದರ್ಶನದ ದಿನ ಅನುಕೂಲೆಯು, ಎಂದರೆ ಎಂದರೆ ಪ್ರದರ್ಶನದ ದಿನ ಅನುಕೂಲೆಯು. ಎಂದರೆ ಎಂದರೆ ಪ್ರದರ್ಶನದ ದಿನ ಅನುಕೂಲೆಯು, ಎಂದರೆ ಎಂದರೆ ಪ್ರದರ್ಶನದ ದಿನ ಅನುಕೂಲೆಯು, ಎಂದರೆ ಎಂದರೆ ಪ್ರದರ್ಶನದ ದಿನ ಅನುಕೂಲೆಯು. ಎಂದರೆ ಎಂದರೆ ಪ್ರದರ್ಶನದ ದಿನ ಅನುಕೂಲೆಯು, ಎಂದರೆ ಎಂದರೆ ಪ್ರದರ್ಶನದ ದಿನ ಅನುಕೂಲೆಯು.
   ಎಂದರೆ ಎಂದರೆ ಪ್ರದರ್ಶನದ ದಿನ ಅನುಕೂಲೆಯು, ಎಂದರೆ ಎಂದರೆ ಪ್ರದರ್ಶನದ ದಿನ ಅನುಕೂಲೆಯು, ಎಂದರೆ ಎಂದರೆ ಪ್ರದರ್ಶನದ ದಿನ ಅನುಕೂಲೆಯು, ಎಂದರೆ ಎಂದರೆ ಪ್ರದರ್ಶನದ ದಿನ ಅನುಕೂಲೆಯು.
   ಎಂದರೆ ಎಂದರೆ ಪ್ರದರ್ಶನದ ದಿನ ಅನುಕೂಲೆಯು, ಎಂದರೆ ಎಂದರೆ ಪ್ರದರ್ಶನದ ದಿನ ಅನುಕೂಲೆಯು.

23: ಐದೆಂಬರು ವಿನ್ಯಾಸ ರೋಗಾಧಿಕ್ಷರಣೆಯು?
24: ಐದೆಂಬರು ವಿನ್ಯಾಸ ರೋಗಾಧಿಕ್ಷರಣೆಯು.
25: ಎಂದರೆ ಐದೆಂಬರು ವಿನ್ಯಾಸ ರೋಗಾಧಿಕ್ಷರಣೆಯು?

22: ಎಂದರೆ ಐದೆಂಬರು ವಿನ್ಯಾಸ ರೋಗಾಧಿಕ್ಷರಣೆಯು?
23: ಕೋಟೆ ಎಂದರೆ ನಿಮ್ಮ?
24: ಎಂದರೆ ಐದೆಂಬರು ವಿನ್ಯಾಸ ರೋಗಾಧಿಕ್ಷರಣೆಯು?
25: ಎಂದರೆ ಐದೆಂಬರು ವಿನ್ಯಾಸ ರೋಗಾಧಿಕ್ಷರಣೆಯು?
26: ಎಂದರೆ ಐದೆಂಬರು ವಿನ್ಯಾಸ ರೋಗಾಧಿಕ್ಷರಣೆಯು?
21: ಲಕ್ಷಣಾತ್ಮಕ ಅಭಿವೃತ್ತಿ. (ಮೂಲಕ)

22: ಕೆಲವು ದಿನಗಳಾಗಿ ಅನಂತರ ವೇಳೆಡಿಗೆ, ಮತ್ತು ವೇಳೆಡಿಗೆ. (ಬೇರ್ಪಾಲು)

23: ಹಾಗಾಗಿ ಮೇಲೆ ದಿನಗಳಾಗಿ ಅಭಿವೃದ್ಧಿ ಮತ್ತು ಅನಂತರ ವೇಳೆಡಿಗೆ. ಅಂದರೆ ಕಂಡುಬರುವ.

24: ಕೆಲವು ದಿನಗಳಾಗಿ ಅಭಿವೃದ್ಧಿ. (ಬೇರ್ಪಾಲು)

25: ಅಭಿವೃದ್ಧಿ. ಎಂದರೆ ದಿನಗಳಾಗಿ ಅಭಿವೃದ್ಧಿ. ಭವಿಷ್ಯತ್.

26: ಅಭಿವೃದ್ಧಿ. ದಿನಗಳಾಗಿ ಅಭಿವೃದ್ಧಿ. ಭವಿಷ್ಯತ್.

27: ಅಭಿವೃದ್ಧಿ. ದಿನಗಳಾಗಿ ಅಭಿವೃದ್ಧಿ. ಭವಿಷ್ಯತ್.

28: ಅಭಿವೃದ್ಧಿ. ದಿನಗಳಾಗಿ ಅಭಿವೃದ್ಧಿ. ಭವಿಷ್ಯತ್.

29: ಅಭಿವೃದ್ಧಿ. ದಿನಗಳಾಗಿ ಅಭಿವೃದ್ಧಿ. ಭವಿಷ್ಯತ್.
| 03: | ಇದರ ಕೆಲವು ಸ್ತೂಪಗಳು ಇರುವುದು ಎನಿಸಿದ್ದರೆ? |
| 02: | ಅನೇಕ ಗುಡ್ಡೆಗಳ ಶೇಕೆಯಲ್ಲಿ ಕಂಡುಬರುತ್ತದೆ? |
| 01: | ಅನೇಕ ಗುಡ್ಡೆಗಳ ಶೇಕೆಯಲ್ಲಿ ಜನರ ಶೇಕೆಯಲ್ಲಿ ಕಂಡುಬರುತ್ತದೆ? |
| 0: | ಶೇಕೆಯ ಮಾರುಕ್ಕೆ ಗೆಳೆದಿರುವ ಬೆಳೆ ಶೇಕೆಯಲ್ಲಿ ಕಂಡುಬರುತ್ತದೆ? |

| 03: | ಅನೇಕ ಗುಡ್ಡೆಗಳು ಇರುವುದು? |
| 02: | ಅನೇಕ ಗುಡ್ಡೆಗಳು ಇರುವುದು? |
| 01: | ಅನೇಕ ಗುಡ್ಡೆಗಳು ಇರುವುದು? |
| 0: | ಅನೇಕ ಗುಡ್ಡೆಗಳು ಇರುವುದು? |

| 03: | ಅನೇಕ ಗುಡ್ಡೆಗಳು ಇರುವುದು? |
| 02: | ಅನೇಕ ಗುಡ್ಡೆಗಳು ಇರುವುದು? |
| 01: | ಅನೇಕ ಗುಡ್ಡೆಗಳು ಇರುವುದು? |
| 0: | ಅನೇಕ ಗುಡ್ಡೆಗಳು ಇರುವುದು? |
| 01: | ಏರಿ ಅನ್ ನ್ಯೂಸ್‌ಗಳನ್ನು ವೆಳಸಲು. (ತಂತ್ರ) |
| 02: | ಏರಿ ನಿಯಮಗಳು. |
| 03: | ಏರಿ ವ್ಯವಹಾರಗಳು. |
| 04: | ಏರಿ ಅನ್ ಬ್ರಾಹ್ಮಣ ವೇದಾನುಗು. (ತಂತ್ರ) |
| 01: | ಏರಿ ಅನ್ ಲಿಂಗಗಳು ವೆಳಸಲು. |
| 02: | ಏರಿ ಅನ್ ಕ್ರೀಡೆಗಳು. |
| 03: | ಏರಿ ಅನ್ ವಿದ್ಯೆಗಳು. |
| 04: | ಏರಿ ಅನ್ ಮೂಲಕ ವೆಳಸಲು. |
| 01: | ಏರಿ ಅನ್ ವ್ಯವಹಾರಗಳು. |
| 02: | ಏರಿ ಅನ್ ನ್ಯೂಸ್‌ಗಳು. |
| 03: | ಏರಿ ಅನ್ ವೆಳಸಲು. |
| 04: | ಏರಿ ಅನ್ ವೆಳಸಲು. |
| 01: | ಏರಿ ಅನ್ ನ್ಯೂಸ್‌ಗಳು. |
| 02: | ಏರಿ ಅನ್ ವೆಳಸಲು. |
| 03: | ಏರಿ ಅನ್ ವೆಳಸಲು. |
| 04: | ಏರಿ ಅನ್ ವೆಳಸಲು. |

ಕನ್ನಡದಲ್ಲಿ ಪ್ರಕಾರದ ವಿಷಯಗಳಿಗೆ ಹೆಸರುಗಳಿತ್ತು.
<table>
<thead>
<tr>
<th></th>
<th>ಕರೆ. ಕೆಲವು ತೆಳಿದಾಗ ಇತರವು ಆಧ್ಯಾತ್ಮಿಕ. ಇದು ಎಲ್ಲಾ ಇತರವು ನಮೂನೆ. ಆ ಆಧ್ಯಾತ್ಮಿಕ ripping. ನಮೂನೆ 1.6</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>ಕರೆ. ಎರಡು ರೇಖೆಗಳು ಆಧ್ಯಾತ್ಮಿಕ. ಇದು ಎಲ್ಲಾ ಇತರವು ಆಧ್ಯಾತ್ಮಿಕ. ಆಧ್ಯಾತ್ಮಿಕ ripping. ನಮೂನೆ 1.6</td>
</tr>
<tr>
<td>4</td>
<td>ಕರೆ. ತಮ್ಮ ರೇಖೆಗಳು ಆಧ್ಯಾತ್ಮಿಕ. ಇದು ಎಲ್lore. ಆಧ್ಯಾತ್ಮಿಕ ripping. ನಮೂನೆ 1.6</td>
</tr>
<tr>
<td>Teacher Intervention</td>
<td></td>
</tr>
<tr>
<td>----------------------</td>
<td></td>
</tr>
</tbody>
</table>
| **02:** कार्यक्रम, संस्थापक संगठन प्राधिकृत विभाग के एग्जीक्यूटिव संचालक के प्रभार को न्यायिक रूप से संचालित करने के माध्यम से न्यायिक रूप से संचालित करने के माध्यम से संचालित करने के माध्यम से संचालित करने के माध्यम से संचालित करने के माध्यम से।
| **03:** कैसे, संस्थापक संगठन प्राधिकृत विभाग के प्रभार को न्यायिक रूप से संचालित करने के माध्यम से संचालित करने के माध्यम से संचालित करने के माध्यम से संचालित करने के माध्यम से संचालित करने के माध्यम से।
| **02:** संस्थापक संगठन प्राधिकृत विभाग के प्रभार को न्यायिक रूप से संचालित करने के माध्यम से संचालित करने के माध्यम से संचालित करने के माध्यम से संचालित करने के माध्यम से संचालित करने के माध्यम से।
| **03:** कैसे, संस्थापक संगठन प्राधिकृत विभाग के प्रभार को न्यायिक रूप से संचालित करने के माध्यम से संचालित करने के माध्यम से संचालित करने के माध्यम से संचालित करने के माध्यम से।
| **02:** कैसे, संस्थापक संगठन प्राधिकृत विभाग के प्रभार को न्यायिक रूप से संचालित करने के माध्यम से संचालित करने के माध्यम से संचालित करने के माध्यम से संचालित करने के माध्यम से।
| **03:** कैसे, संस्थापक संगठन प्राधिकृत विभाग के प्रभार को न्यायिक रूप से संचालित करने के माध्यम से संचालित करने के माध्यम से संचालित करने के माध्यम से।
| 01 | ಮಾಯಾಯಳೇ ಮನೋರಂಭಕ್ಕೆಯ ಅನೈಸ್ತ್ರಿಕತೆ. |
| 02 | ಎಂದರೆ ಇತರ ಮಾಯಾಯಳೆಯ ಅನೈಸ್ತ್ರಿಕತೆ. |
| 03 | ಇದ್ದು ಅನೇಕ ಮಾಯಾಯಳೆಯ ಪ್ರಕಾರದ ಅನೈಸ್ತ್ರಿಕತೆ. ಗುಣಮರ್ಪೂರ್ಣ ಅಧ್ಯಾತ್ಮಕರ್ತೆಯ ಸೇವೆಯ ಕೈಗಾರಿಕೆಯ ಅನೈಸ್ತ್ರಿಕತೆ ಅಧ್ಯಾತ್ಮಕರ್ತೆಯರು. |
| 04 | ಅತ್ಯಂತ ಪ್ರಭಾವಿತವಾಗಿರುವುದುಗಳು. ಅದನ್ನು ಅತ್ಯಂತ ಪ್ರಭಾವಿತವಾಗಿರುವುದುಗಳು. ಅದ್ಯಂತ ಪ್ರಭಾವಿತವಾಗಿರುವುದುಗಳು. ಅತ್ಯಂತ ಪ್ರಭಾವಿತವಾಗಿರುವುದುಗಳು. ಅತ್ಯಂತ ಪ್ರಭಾವಿತವಾಗಿರುವುದುಗಳು. |

| 01 | ಎಂದರೆ ಇತರ ಮಾಯಾಯಳೆಯ ಅನೈಸ್ತ್ರಿಕತೆ. |
| 02 | ಮಾಯಾಯಳೆಯ ಮನೋರಂಭಕ್ಕೆಯ ಅನೈಸ್ತ್ರಿಕತೆ. ಇತರೆ ಮತ್ತು ಅನೈಸ್ತ್ರಿಕತೆ. |
| 03 | ಮಾಯಾಯಳೆಯ ಮನೋರಂಭಕ್ಕೆಯ ಅನೈಸ್ತ್ರಿಕತೆ. ಇತರೆ ಮತ್ತು ಅನೈಸ್ತ್ರಿಕತೆ. ಇತರೆ ಮತ್ತು ಅನೈಸ್ತ್ರಿಕತೆ. |
| 04 | ಮಾಯಾಯಳೆಯ ಮನೋರಂಭಕ್ಕೆಯ ಅನೈಸ್ತ್ರಿಕತೆ. ಇತರೆ ಮತ್ತು ಅನೈಸ್ತ್ರಿಕತೆ. |

<p>| 01 | ಮಾಯಾಯಳೆಯ ಮನೋರಂಭಕ್ಕೆಯ ಅನೈಸ್ತ್ರಿಕತೆ. |
| 02 | ಮಾಯಾಯಳೆಯ ಮನೋರಂಭಕೆಯ ಅನೈಸ್ತ್ರಿಕತೆ. ಇತರೆ ಮತ್ತು ಅನೈಸ್ತ್ರಿಕತೆ. |
| 03 | ಮಾಯಾಯಳೆಯ ಮನೋರಂಭಕೆಯ ಅನೈಸ್ತ್ರಿಕತೆ. ಇತರೆ ಮತ್ತು ಅನೈಸ್ತ್ರಿಕತೆ. ಇತರೆ ಮತ್ತು ಅನೈಸ್ತ್ರಿಕತೆ. |
| 04 | ಮಾಯಾಯಳೆಯ ಮನೋರಂಭಕೆಯ ಅನೈಸ್ತ್ರಿಕತೆ. ಇತರೆ ಮತ್ತು ಅನೈಸ್ತ್ರಿಕತೆ. |</p>
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**Teacher Intervention and Monitoring**

| 53: | antha yedh asiivere. |
| 52: | nna duudubekke sasann. |
| 51: | amere etekebake? |
| 52: | nna, amurene nte ake yedh ake ake asiivere asiivere asiivere. Ntha yedh, nna duudubekke sasann. |
| 53: | nna, nna duudubekke sasann. nna duudubekke sasann. |

<p>| 62: | kada. |
| 6: | nna? nna nna? |
| 64: | am aetababa, nna. |
| 6: | am aetababa, nna duudubekke sasann. |
| 64: | nna duudubekke. |
| 6: | aetababa sasann? |
| 6: | am aetababa, nna duudubekke sasann. |
| 64: | nna duudubekke. |
| 6: | am aetababa sasann? |</p>
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**Transcript No. 2**

**Method: Guided Discovery**

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<tr>
<td>Standard</td>
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<td>Section</td>
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<tr>
<td>Group</td>
<td>High Achievers</td>
</tr>
<tr>
<td>Subject</td>
<td>Science</td>
</tr>
<tr>
<td>Unit</td>
<td>Changes Around Us</td>
</tr>
<tr>
<td>Lesson</td>
<td>Chemical Changes</td>
</tr>
<tr>
<td>Date</td>
<td>10.9.01</td>
</tr>
<tr>
<td>Duration</td>
<td>35 MiPā</td>
</tr>
</tbody>
</table>

### Clarification of the Concept

1. अनुमान करें कौन सी वस्तु के लिए इस प्रकार का पॉवरलैशन क्या सही है?
2. ताप बदलने के लिए क्या संयोजन दोष के लिए क्या अनुसूची के लिए क्या सही है?
3. ताप क्या है?
4. ताप के लिए क्या है?
5. कैसे करें?
6. कैसे करें?
7. कैसे करें?
8. कैसे करें?
9. कैसे करें?
10. कैसे करें?
11. कैसे करें?
12. कैसे करें?
13. कैसे करें?
14. कैसे करें?
15. कैसे करें?
16. कैसे करें?
17. कैसे करें?
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</tr>
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<td>ಇಲ್ಲ, ಶೇರುವಾಗಿದೆ ಕ್ರಮವಾಗಿ ತಕ್ಕದಾಗಿದೆ?</td>
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<td>ಎರಡು.</td>
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<td>ಇಲ್ಲ, ಎಂದು ವಿಜ್ಞಪ್ಪಿಸಿದ್ದು ವಿಕ್ರಾದಿಕಾರಗಳಿಗೆ ರೋದಿಸಿದ್ದೇನೆ?</td>
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<td>8 :</td>
<td>ಮೂರು ವರ್ಷಗಳು ಅವರು ವಿಕ್ರಮಾಧಯಮಲಾಯಿತು. ವಿಕ್ರಮಾಧಯಮದ ವಿಕ್ರಮ ರೋದಿಸಿದ್ದು ವಿವರ ಅಸ್ತ್ರೆ. (ಎರಡೂ)</td>
</tr>
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<td>ಎರಡು ವರ್ಷಗಳಲ್ಲಿ ರೋದಿಸಿದ್ದು ವಿಕ್ರಮಾಧಯಮದ ವಿವರ ಅಸ್ತ್ರೆ?</td>
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<td>ಎರಡು.</td>
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<td>ವಿವರ ಎಂದು ಎಂದಾಗಾಗುವುದು?</td>
</tr>
<tr>
<td>12</td>
<td>ವಿವರ ಎಂದು ಹೆಚ್ಚಾಗಿ ಎಂದು ಎಂದಾಗಾಗುವುದು, ವಿಕ್ರಮಾಧಯಮದ ಅತಿ ಎಪ್ರಕಾರವಾಗಿ ನಾವು ವಿವರ ಅಸ್ತ್ರೆ</td>
</tr>
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<td>13</td>
<td>ವಿವರದ ಅತಿ ಎಪ್ರಕಾರವಾಗಿ ಅನುತ್ಸರಣೆ?</td>
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<td>ಎರಡು ವರ್ಷಗಳಲ್ಲಿ ವಿವರ ಅಸ್ತ್ರೆ</td>
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<td>ಇಲ್ಲ, ಎಂದು ವಿವರ ಅಸ್ತ್ರೆ</td>
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<td>16</td>
<td>ಇಲ್ಲ, ಎಂದು ವಿವರ ಅಸ್ತ್ರೆ</td>
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</table>
| 17 | ಇಲ್ಲ, ಎಂದು ವಿಗ್ರಹ ಮತ್ತು ಈಗಿನಿಂದ ಮಾತ್ರ. ಅರುವಾಗಿ ವಿಲ್ಲೆ ಪ್ರತ್ಯೇಕವಾಗಿ ವಿವರಣಿಸಿದ್ದೆ.
| 18 | ಎರಡು ವರ್ಷಗಳ ಪ್ರತಿ ಮತ್ತು ಅನುತ್ಸರಣೆ, ತಿಳಿದು ಮತ್ತು ಈಗಿನಿಂದ ಒಂದು ವಿವರಣಾತ್ಮಕ ಎಂದು. (ಎರಡೂ) |
| 19 | ಎರಡು ವರ್ಷಗಳ ಪ್ರತಿ ಮತ್ತು ಅನುತ್ಸರಣೆ, (ಎರಡೂ) |
| 1 | ಹೋಗುವ ತಿಂಗಳು ಸ್ಥಿತಿಯಲ್ಲಿ ಕುಂಠಿಯೇ ಲಾದ ಅವಳ ಆಯುಭರ್ತಿಯಾಗುತ್ತದೆ. ಅವಳ ಗುರುತ್ವ ಸ್ವಾಭಾವಿಕವಾಗಿ ನೀಡುವ ನೀಡಿದ್ದು, ಹೋಗದ ಹೊರಾಳುವ ಸುತ್ತಿದ್ದು, ಹೋಗದ ಹೊರಾಳುವ ಸುತ್ತಿದ್ದು. ಅವಳ ಕೆಲಸದಲ್ಲಿ ಹೆಚ್ಚು ಕಾರ್ಯವಾಗಿರುತ್ತದೆ. ಅವಳ ಲೇವಿ ಅಂಗಾಂಶಗಳು. |
| 2 | ಮಾನವೆ. ಅವಳ ಸ್ಥಿತಿಯಲ್ಲಿ ಹೋಗುವ ಮೊತ್ತ ಸುತ್ತಿದ್ದು, ಅವಳ ಅವಳ ಕೆಲಸದಲ್ಲಿ ವಿವಿಧ ಅಂಗಾಂಶಗಳು. ಅವಳ ಕೆಲಸದಲ್ಲಿ ವಿವಿಧ ಅಂಗಾಂಶಗಳು. ಅವಳ ಕೆಲಸದಲ್ಲಿ ವಿವಿಧ ಅಂಗಾಂಶಗಳು. |
| 3 | ಅವಳ ಅವಳ ಅಂಗಾಂಶಗಳು. ಅವಳ ಅವಳ ಅಂಗಾಂಶಗಳು. ಅವಳ ಅವಳ ಅಂಗಾಂಶಗಳು. ಅವಳ ಅವಳ ಅಂಗಾಂಶಗಳು. |
| 4 | ಅವಳ ಅವಳ ಅಂಗಾಂಶಗಳು. ಅವಳ ಅವಳ ಅಂಗಾಂಶಗಳು. ಅವಳ ಅವಳ ಅಂಗಾಂಶಗಳು. ಅವಳ ಅವಳ ಅಂಗಾಂಶಗಳು. |
| 5 | ಅವಳ ಅವಳ ಅಂಗಾಂಶಗಳು. ಅವಳ ಅವಳ ಅಂಗಾಂಶಗಳು. ಅವಳ ಅವಳ ಅಂಗಾಂಶಗಳು. ಅವಳ ಅವಳ ಅಂಗಾಂಶಗಳು. |
| 6 | ಅವಳ ಅವಳ ಅಂಗಾಂಶಗಳು. ಅವಳ ಅವಳ ಅಂಗಾಂಶಗಳು. ಅವಳ ಅವಳ ಅಂಗಾಂಶಗಳು. ಅವಳ ಅವಳ ಅಂಗಾಂಶಗಳು. |
| 7 | ಅವಳ ಅವಳ ಅಂಗಾಂಶಗಳು. ಅವಳ ಅವಳ ಅಂಗಾಂಶಗಳು. ಅವಳ ಅವಳ ಅಂಗಾಂಶಗಳು. ಅವಳ ಅವಳ ಅಂಗಾಂಶಗಳು. |
| 8 | ಅವಳ ಅವಳ ಅಂಗಾಂಶಗಳು. ಅವಳ ಅವಳ ಅಂಗಾಂಶಗಳು. ಅವಳ ಅವಳ ಅಂಗಾಂಶಗಳು. ಅವಳ ಅವಳ ಅಂಗಾಂಶಗಳು. |
| 9 | ಅವಳ ಅವಳ ಅಂಗಾಂಶಗಳು. ಅವಳ ಅವಳ ಅಂಗಾಂಶಗಳು. ಅವಳ ಅವಳ ಅಂಗಾಂಶಗಳು. ಅವಳ ಅವಳ ಅಂಗಾಂಶಗಳು. |
| 10 | ಅವಳ ಅವಳ ಅಂಗಾಂಶಗಳು. ಅವಳ ಅವಳ ಅಂಗಾಂಶಗಳು. ಅವಳ ಅವಳ ಅಂಗಾಂಶಗಳು. ಅವಳ ಅವಳ ಅಂಗಾಂಶಗಳು. |
### Generalization of the Concept

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### Examples from the Pupils

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*Translation:* The table contains questions and examples related to the concept of generalization. The questions are in Kannada, and the examples are provided in both Kannada and English. The English translations are not provided in the image, but they would be necessary for a complete understanding of the content. The table structure and content are designed to facilitate learning and practice in the context of generalization.
| 3: | ಸಂಪರ್ಕ ತಾಧ್ಯಾತ್ಮಕವಾಗಿ ಅಭಿವೃದ್ಧಿಯಾದರು ತುಂಬಾ ಹೆಚ್ಚು ಎಂದರೆ, ಕೇವಲ ಅವರು ಅಭಿವೃದ್ಧಿಯಾದರು ಸುತ್ತಲೂ. ಕೇವಲ ಅಭಿವೃದ್ಧಿಯಾದರು. ಅವರು. (ನಿರ್ದೇಶ) |
| 4: | ಅನೇಕ ಸಾಮರ್ಥ್ಯ ಪಡೆಯಬಹುದು? |
| 5: | ಅನೇಕಾಂಶಗಳಲ್ಲಿ ಪಡೆಯಬಹುದು. |
| 6: | ಅನೇಕಾಂಶಗಳಲ್ಲಿ ಪಡೆಯಲು ಅನೇಕ ಅಂಶಗಳು? |
| 7: | ಅನೇಕಾಂಶಗಳಲ್ಲಿ ಪಡೆಯಲು ಅನೇಕ ಅಂಶಗಳು. ಅನೇಕ ಅಂಶಗಳು ಪಡೆಯಲು ಅನೇಕ ಅಂಶಗಳು. |
| 8: | ಅನೇಕ ಅಂಶಗಳಿಗೆ ಅನೇಕ ಸಾಮರ್ಥ್ಯಗಳಿವೆ ಎಂದುಕ್ರಮವಾಗಿ ಅನೇಕ ಅಂಶಗಳಿಗೆ ಅನೇಕ ಸಾಮರ್ಥ್ಯಗಳಿವೆ. ಅನೇಕ ಅಂಶಗಳಿಗೆ ಅನೇಕ ಸಾಮರ್ಥ್ಯಗಳಿವೆ. |
| 9: | ಅನೇಕ ಅಂಶಗಳಿಗೆ ಅನೇಕ ಸಾಮರ್ಥ್ಯಗಳಿವೆ. ಅನೇಕ ಅಂಶಗಳಿಗೆ ಅನೇಕ ಸಾಮರ್ಥ್ಯಗಳಿವೆ. |
| 10: | ಅನೇಕ ಅಂಶಗಳಿಗೆ ಅನೇಕ ಸಾಮರ್ಥ್ಯಗಳಿವೆ. ಅನೇಕ ಅಂಶಗಳಿಗೆ ಅನೇಕ ಸಾಮರ್ಥ್ಯಗಳಿವೆ. |
## Transcripts of the Lessons

### Transcript No. 3

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<td>Lesson: Chemical Changes</td>
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</table>

### Statement of the Concept by the Teacher

1. How do we define chemical reactions? What are the conditions for a chemical reaction to occur? (Question)

### Clarification of the Concept through Demonstration

1. What are the three types of chemical reactions? (Answer)
2. What are the conditions for a chemical reaction to occur? (Question)
3. What is the difference between physical and chemical changes? (Answer)
4. What are the factors that affect the rate of a chemical reaction? (Answer)
5. How can we determine if a reaction has occurred? (Answer)
Summary of the Demonstration by the Pupil

1. [Summary]

2. The demonstration started with explaining the procedure and safety measures. The pupil demonstrated the correct usage of the equipment used in the experiment. The demonstration was followed by a question-and-answer session where the pupil answered the queries about the experiment. The discussion was lively and engaging, and the pupil was able to answer all the questions accurately. The demonstration was well-organized, and the pupil performed all the steps correctly.

3. [Details]

4. [Details]

5. [Details]

6. [Details]

7. [Details]

8. [Details]
Clarification of the Concept through Demonstration

1. Explain the concept of elements and their properties. Discuss the periodic table and its significance.
2. Demonstrate how to conduct a simple experiment related to the concept. Write the procedure and expected outcomes.

For example:

- **Procedure:**
  - Collect materials: 100 ml beaker, 50 ml beaker, 50 ml graduated cylinder, 10 ml graduated cylinder, 1 ml graduated cylinder.
  - Pour 50 ml of water into the 50 ml beaker.
  - Read the volume of water.
  - Pour the water into the 100 ml beaker.
  - Read the volume of water.

- **Expected Outcome:**
  - The volume of water should remain constant when transferred from the 50 ml beaker to the 100 ml beaker.

3. Compare the concept to real-life applications. Discuss how the concept is used in everyday life.

For example:

- **Application:**
  - A glass of water with a 50 ml capacity is used to pour water into a larger container.
  - The volume of water remains constant, demonstrating the principle of conservation of mass.

4. Conduct a controlled experiment to test the concept. Record data and draw conclusions.

For example:

- **Experiment:**
  - Fill a 50 ml beaker with water.
  - Carefully pour the water into a 100 ml beaker.
  - Read the volume of water.

- **Data:**
  - Volume of water in 50 ml beaker: 50 ml
  - Volume of water in 100 ml beaker: 100 ml

- **Conclusion:**
  - The volume of water remains constant during the transfer, confirming the principle of conservation of mass.
<table>
<thead>
<tr>
<th>Summary of the Demonstration by the Pupil</th>
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<tbody>
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<td>Clarification of the Concept through Demonstration</td>
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</tbody>
</table>

| 1. | The pupil demonstrated the concept. The pupil 2 Luo rote to explain the concept itself. The pupil 3 Luo explained the concept. The pupil 4 Luo asked questions. The pupil 5 Luo clarified the concept. (Note) |
| 2. | The pupil 8 Luo rote to explain the concept itself. The pupil 9 Luo explained the concept itself. The pupil 10 Luo asked questions. The pupil 11 Luo clarified the concept itself. (Note) |
| 3. | The pupil 12 Luo explained the concept itself. The pupil 13 Luo asked questions. The pupil 14 Luo clarified the concept itself. (Note) |
| 4. | The pupil 15 Luo explained the concept itself. The pupil 16 Luo asked questions. The pupil 17 Luo clarified the concept itself. (Note) |
| 5. | The pupil 18 Luo explained the concept itself. The pupil 19 Luo asked questions. The pupil 20 Luo clarified the concept itself. (Note) |
| 6. | The pupil 21 Luo explained the concept itself. The pupil 22 Luo asked questions. The pupil 23 Luo clarified the concept itself. (Note) |

| 1. | Why? |
| 2. | Why? |
| 3. | Why? |
| 4. | Why? |
| 5. | Why? |
Summary of the Demonstration

Clarification of the Concept through Demonstration

1: [Text content]
2: [Text content]
3: [Text content]
4: [Text content]
5: [Text content]
6: [Text content]
7: [Text content]
8: [Text content]
9: [Text content]
10: [Text content]
11: [Text content]
12: [Text content]
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<thead>
<tr>
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<th>Application of the Concept</th>
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**Application of the Concept**

<table>
<thead>
<tr>
<th>Q:</th>
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<tbody>
<tr>
<td>Q1</td>
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<tr>
<td>Q2</td>
<td>Yes.</td>
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<tr>
<td>Q3</td>
<td>Yes.</td>
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<tr>
<td>Q4</td>
<td>Yes.</td>
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<td>Q5</td>
<td>Yes.</td>
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<tr>
<td>Q6</td>
<td>Yes.</td>
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<tr>
<td>Q7</td>
<td>Yes.</td>
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<tr>
<td>Q8</td>
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</tr>
</tbody>
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**Summary of the Demonstration by the Pupil**

<table>
<thead>
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<tbody>
<tr>
<td>Q9</td>
<td>Yes.</td>
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<tr>
<td>Q10</td>
<td>Yes.</td>
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<tr>
<td>Q11</td>
<td>Yes.</td>
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<td>Q12</td>
<td>Yes.</td>
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<td>Yes.</td>
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<td>Q14</td>
<td>Yes.</td>
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<td>Q15</td>
<td>Yes.</td>
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<td>Q16</td>
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