



# Headway Science

Teacher's Manual

Class 6

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## Lesson 1: Components of Food

- A. Multiple Choice Questions (MCQs) :
1. (b) Rice and Water
  2. (b) Herbivores
  3. (d) Leaves
  4. (c) Nectar
- B. Fill in the blanks :
1. Diet
  2. Yolk
  3. Honey
  4. Medicines
- C. State True or False :
1. False
  2. True
  3. False
  4. True
- D. Answer the following questions in short :
1. Plant eating animals are called herbivores.
  2. Omnivores eat both animals and plants.
  3. Minerals help our body grow and stay healthy.
  4. Disease caused by deficiency of proteins and carbohydrates is marasmus.
  5. Water is crucial. It lets our body use nutrients from food and removes waste through sweat and urine.
  6. A diet which contains all essential nutrients in adequate amount is called balanced diet.
- E. Matching the Columns :
1. Honey                      Beehive
  2. Spinach                    Leaves
  3. Eggs                        Poultry
  4. Nectar                      Flower
- F. Answer the following questions in detail :
1. The journey starts with the farmer. The farmer plants seeds and monitor the crop health until they are ready to be harvested. The harvested grains from the crops, vegetables, fruits are stored in a warehouse and sent to the processor. The processed food is cooked and reached our plates.

2. Different regions have different climate, different food habits. It usually depends on the food production, temperature and life style. Although with progress food habits have been adapted by all, interchanging throughout the country.
3. Herbivores animals are the ones depending on plants only. Eg. Cows, sheep etc.  
Carnivores animals depend on other animals. They are also known as predators since they kill their prey first, then consume it. Eg. Lions, wolves etc.  
Omnivores eat both animals and plants. Eg. Human Beings etc.
4. All parts of plants can be used as vegetables, such as, underground stems like onion, ginger, potatoes, underground roots like radish, carrots, turnips are used in cooking and also, some are eaten raw too. Leafy plants like bathua, methi, spinach are used as vegetables. Cauliflower, broccoli are popular vegetarian dishes. Crushed seeds or dried fruits provide oils. Coconut oil, mustard oil, olive oil etc.
5. Mustard plant - leaves of this plant are often added in salad and mustard oil is obtained by grinding the seeds.
6. The school Lunch Program, often called the "Mid - Day Meal", helps give meals to kids who might not get enough food at home. Many kids in rural places come to school hungry. This lunch helps them grow and stay healthy.
7. A disease which is caused due to lack of any of the nutrients like carbohydrates, fats, proteins, vitamins and minerals is called deficiency disease.
8. Kwashiorkar is caused by deficiency of proteins. The common symptoms are bulging of eyeballs, swelling of face, stunted growth, mental retardation, loss of appetite, bending of bones of legs, stunted growth.

9. Steps :

- Take a little bit of the food you want to test.
- Drop 2-3 drops of weak iodine solution on the food. (You can make this by mixing a few drops of iodine with some water.)
- Look at the food's colour. Did it change to blue-back? If yes, it means there's starch in it.

Lesson 2 : Sorting Materials into Groups

A. Multiple Choice Questions (MCQs) :

1. (c) Iron
2. (c) Sugar
3. (a) Soft
4. (b) Translucent
5. (c) Wood

B. Fill in the blanks :

1. Lustrous
2. Insoluble
3. Transparent
4. Carbon dioxide
5. Iron

C. State True or False :

1. False
2. False
3. False
4. True
5. False

D. Answer the following questions in short :

1. Anything that occupies space is called matter.
2. Lustrous material are those materials that have shiny surface. Eg. Gold and silver.
3. These are liquids that can mix well with water. Eg. Lemon juice with water.
4. These liquids don't mix with water. Eg. Oil in water.
5. The property of a material to float on water is called floatation. Materials like wood, leaf and feather float on water.

E. Match the Columns :

- |                |                                  |
|----------------|----------------------------------|
| 1. Transparent | Can be seen through              |
| 2. Soft        | Sponge                           |
| 3. Conductor   | Allow heat to pass               |
| 4. Luster      | Shiny in appearance              |
| 5. Soluble     | Disappears when mixed with water |

F. Answer the following questions in detail :

1. It is beneficial to group objects to understand them better and to make useful things from them.
2. **Transparent Objects :** Materials which can be seen through are said to be transparent objects.  
For eg. Glass, clear water and some plastics.  
**Translucent Objects :** Materials through which things can be seen but only partially are called translucent objects.  
For eg. Butter paper and frosted glass.  
**Opaque Objects :** Objects which cannot be seen through are known as opaque objects.  
For eg. Metals, wood and cardboard.
3. Materials that allow heat to flow through them are called conductors of heat whereas those that do not allow heat to flow through them are called insulators of heat.
4. Handles of some kitchen utensils are made of wood or hard plastic as they are bad conductor of heat, so would not be heated and become easy to handle.
5. **Soluble Material :** Material that mixes with water is called soluble material. For eg. Sugar or salt  
**Insoluble Material :** Material that doesn't mix with water is called insoluble material. For eg. Stones or clothes

### Lesson 3 : Separation of Substances

- A. Multiple Choice Questions (MCQs) :
1. (c) Winnowing
  2. (b) Sublimation
  3. (b) Residue
  4. (c) Evaporation
  5. (c) Sedimentation
- B. Fill in the blanks :
1. Handpicking
  2. Crystallization
  3. Water
  4. Threshing
  5. Separating funnel
- C. State True or False :
1. True
  2. False
  3. False
  4. False
  5. False
- D. Answer the following questions in short :
1. Hand picking, Threshing, Winnowing, Sieving, Sublimation, Evaporation, Crystallization, Sedimentation, Decantation, Loading, Filtration, Centrifugation.
  2. We can separate oil and water by separating funnel as oil and water are immiscible in nature.
  3. A solution which cannot dissolve anymore of substance at particular temperature is called saturated solution.
  4. Sea water is taken and kept in shallow areas. The sun shines and heats this water. Over time, the water evaporates because of this heat and goes away, but it leaves all those salts behind. From this mixture of different salts, our familiar table salt is cleaned and separated.
  5. Hand Picking : The components, of a 'solid-solid mixture, can be separated by picking them with hands. This method is used when components of the mixture are of different colours, shapes or sizes and the quantity of the mixture is small.

Threshing : This method is generally used by farmers to separate the grains from the stalks after harvesting. The dried stalks are beaten, or threshed, to separate the grains.

Evaporation : This method is used to separate solid substances dissolved in a liquid.

E. Matching the Columns :

- |    |               |  |
|----|---------------|--|
| 1. | Hand picking  | separating components by picking them with hands                   |
| 2. | Sieving       | solid particles of different sizes are separated using a wire mesh |
| 3. | Evaporation   | solid changes to gas or vapour                                     |
| 4. | Sedimentation | process where solids settle to the bottom in a liquid              |

F. Answer the following questions in detail :

- (a) Requirement of highly pure substances. For example Gold, silver are needed to make jewellery certain metals like copper is needed to make electric wires.

(b) To obtain useful substances for example crude petroleum cannot be used as such the way it is extracted in the form of thick foul smelling liquid) Whereas after separation of its components like petrol, kerosene oil, cooking gas etc. are utilized in various ways.

(c) To remove undesirable substances : In cooking, separations of unwanted stones are to be removed from pulses, rice etc. water has to be thoroughly cleaned before utilization by various methods.
- Threshing : This method is generally used by farmers to separate the grains from the stalks after harvesting. The dried stalks are beaten, or threshed, to separate the grains.

Winnowing : This method is used to separate lighter husk from heavier grains like wheat. In this method, the



mixture is allowed to fall from a height. The lighter components (the husk) get blown away to a distance while the heavier components, or the grains, fall down closer.

3. The process, in which a solid changes directly into its gaseous state, on heating, is called sublimation. The method, of sublimation, is used to separate solids, which sublime easily, from substances which do not sublime. Substances, like naphthalene, camphor, iodine and ammonium chloride, sublime on heating.
4. Filtration is like using a net or cloth to separate things from a liquid.

We use filtration:

- When you make tea, you pour the hot tea through a strainer. The tea flows into the cup, but the leaves are trapped in the strainer. That's filtration!
  - If you mix chalk with water and pour it through a paper, the chalk gets caught, but the water goes through.
  - If you don't want seeds in your fruit juice, you use a sieve to separate them.
5. A mixture of two immiscible liquids gets separated into two separate layers. A separating funnel is then used to separate out the two immiscible liquids.
    - Pour this mixture of mustard oil and water into a separating funnel.
    - Let it stand undisturbed
    - Rotate the stop-cock of the separating funnel at the bottom to let the lower layer, that is, water, move out.
    - Thus, oil is left behind in the separating funnel and water is collected in the beaker kept below.

## Lesson 4 : Getting to Know Plants

- A. Multiple Choice Questions (MCOs) :
1. (b) Herb
  2. (a) Reticulate Venation
  3. (c) Roots
  4. (b) leaves
  5. (c) Stomata
- B. Fill in the blanks :
1. Transpiration
  2. Lamina
  3. Trees
  4. Petals
  5. Sepals
- C. True or False :
1. False
  2. True
  3. False
  4. False
  5. True
- D. Answer the following questions in short :
1. Herb : These are plants with soft, green stems. They're typically not very tall and might not have many branches.  
Shrubs : These plants are a bit bigger. They start branching out near the ground and their stems are tougher than herbs.
  2. (i) The part above the ground is called the shoot system bearing the stem, leaves, buds, flowers, fruits (when grown) and seeds.  
(ii) The part which is below the soil (underground) is called as the root system bearing roots.
  3. If the veins run side-by-side, straight and not branching out, it's parallel venation.
  4. Leaves make food for plants.
  5. Loss of water from leaves in the form of water vapour is called transpiration.
- E. Answer the following questions in detail :
1. There are two types of root systems :

- (i) Tap root:
    - (a) In this, main root grows vertically downwards.
    - (b) From the main root secondary, tertiary root arise spreading in all directions in the soil
    - (c) Root hair arise from the tertiary roots.
    - (d) Carrot, radish, neem, mango etc. show the presence of tap root system.
  - (ii) Fibrous root :
    - (a) A number of fibrous hair like roots spread around and hold the soil together.
    - (b) There is no main root.
    - (c) The fibrous roots hold the soil so strongly that it is not easy to pull out the plant from the ground.
    - (d) Some of the plants having fibrous roots are maize, grass, wheat, millets etc.
2. Main functions of stems :
- a. Stem bears branches, leaves, flowers, buds, fruits.
  - b. Some connects the roots system to all parts of plants.
  - c. It acts as transporting system to carry water, food etc to all other parts of plants.
3. Functions of roots :
- (a) The most important function of the roots is anchoring and fixation of the plant to the ground.
  - (b) Roots help to absorb water and mineral salt from the soil.
  - (c) Roots also help in prevention of soil erosion.
4. Network of veins and veinlets in leaf is called venation.  
There are two common types :
- (a) Reticulate Venation: If the pattern looks like a

network on both sides of the midrib, it's reticulate. Imagine a tree's branching pattern.

- b) Parallel Venation: If the veins run side-by-side, straight and not branching out, it's parallel. Grass leaves often have this pattern.
5. Flowers are the colourful part of the plant. They are the reproductive part of the plant. Petals of flowers are bright coloured part that attract insects. Sepals are the green colored part beneath the petals. Stamen is the male reproductive organ of the flower. Pistil is the innermost part and female reproductive part of the flower.

### Lesson 5 : Body Movements

#### A. Multiple Choice Questions (MCQs) :

- |                      |                              |
|----------------------|------------------------------|
| 1. (d) Pivotal Joint | 2. (c) Earthworm             |
| 3. (c) Move          | 4. (d) Ball and Socket joint |

#### B. Fill in the blanks :

- |                  |           |
|------------------|-----------|
| 1. Pivotal       | 2. Ribs   |
| 3. Bones         | 4. Hollow |
| 5. Long backbone |           |

#### C. True or False :

- |          |         |
|----------|---------|
| 1. False | 2. True |
| 3. False | 4. True |
| 5. True  |         |

#### D. Answer the following questions in short :

1. The movements which are within our control are called voluntary movements. For example movement of hands, fingers etc.
2. There are many movements which are not within our control and are called as involuntary movements. For

example, movements of muscles of our body organs like beating of heart, movement of blood in blood vessels, breathing movements, etc.

3. Skeletal system is a framework of bones and cartilages which gives support to the body of animals and human beings.
4. This is the joint that connects your head to your neck. It let's you nod your head up and down or turn it side to side.
5. The different patterns of movement of animals due to the differences in their skeletal structure are called gaits of animals.

E. Matching the Columns :

- |                          |                     |
|--------------------------|---------------------|
| 1. Ball and socket joint | hips                |
| 2. Hinge joint           | swing               |
| 3. Pivotal joint         | nod head            |
| 4. Earthworm             | bristles on skin    |
| 5. Snail                 | muscular foot       |
| 6. Cockroach             | hard outer skeleton |
| 7. Birds                 | hollow bones        |

F. Answer the following questions in detail :

1. Joints are important for human body as at these joints, our bones come together.  
Bones are hard and they can't bend. But we can still bend our elbow or knee because of the way bones come together at the joints. Different joints help us do different things. So, joints are important for moving and doing all kinds of activities
2. The skin of earthworm also has a large number of tiny bristles that help it get a good grip on the ground. Repeated extension and contraction of the body

muscles, enable the earthworm to move through the soil.

3. Some additional parts of the skeleton that are not as hard as bones and that which can be bent. These are called cartilages. They are semi rigid yet flexible. They form parts of the body where more flexibility is required. Cartilage is also found in the joints of the body. Few examples of other parts it can be found are - the nose, elbow, knee, and ankle.
4.
  - (i) Snails move with the help of their muscular, flat foot.
  - (ii) They glide along a solid surface which is lubricated with mucus.
  - (iii) This motion is powered by succeeding waves of muscular contractions of the foot.
5.
  - (i) The bones of the hind limbs are used for perching and walking.
  - (ii) The shoulder bones and breastbones are strong and support muscles of flight, which move the wings up and down.

#### Lesson 6 : Living Organism and their Surroundings

##### A. Multiple Choice Questions (MCQs) :

1. (a) Humps                      2. (b) Habitat
3. (d) Cultivated land with grazing cattle
4. (c) Webbed                      5. (b) Water
6. (d) Mountains                      7. (b) Fresh water plant
8. (c) Photosynthesis                      9. (a) Aquatic animals
10. (a) Plants

##### B. Fill in the blanks :

1. food                                      2. Dependent

3. Desert
4. Mountains
5. Grassland

C. True or False :

1. False
2. True
3. True
4. False
5. True

D. Answer the following questions in short :

1. Everything that surrounds living organism and affect their growth and development is called environment.
2. Aquatic habitat comprises of all water bodies on the planet. Habitat includes ponds, vamps, oceans etc. They are mainly of three kinds: fresh water, Marine and coastal habitats. These are the homes for the aquatic animals.
3. Reproduction is essential for living organisms because it is that biological process through which they produce offsprings of their own kind.
4. The natural living place of an organism is called habitat. For example aquatic habitat, terrestrial habitat etc.
5. A modification of an organism or its parts that makes it fit for existence is called adaptation.

E. Answer the following questions in detail :

1. Adaptations adopted by camel called as the ship of desert are :-
  1. They have homes on their back to store fat. This provides food to the camel in shortage.
  2. They have long legs to keep their body from heat.
  3. They loose very little water to conserve it.
  4. They have padded feet so that they do not sink in the sand while walking.
2. Consumers include all the animals that cannot make their own food and have to depend on others directly

or indirectly for their food. They can be herbivores (plant eaters), carnivores (flesh eaters) and omnivores (both plant and animal eaters). Some examples are:-

1. Herbivores : cow, deer etc.
  2. Carnivores : lion, wolf etc.
  3. Omnivores : man, crows etc.
3. Terrestrial habitats can be forest, desert, grassland, mountain, rain forest and tundra or polar habitats. Some examples of terrestrial habitat are horse, cow, lion, camel, cacti, grasses, penguin etc.
4. Aquatic plants are called as Hydrophytes. Adaptations adopted by plants :
1. The floating leaves are broad and flat. They have waxy upper surface having stomata on the upper surface to expose to air.
  2. The plants which are rooted at the bottom are partly submerged eg. Lotus.
  3. Their stems are long and narrow to with stand water currents eg. Water lily.
  4. Stems and leaves have air spaces to keep them floating.
5. Desert plants are called xerophytes.  
Rat live in burrows as they overcome the extreme heat of the day. They only come out during night.

### Lesson 7 : Motion and Measurement

#### A. Multiple Choice Questions (MCQs) :

- |                      |               |
|----------------------|---------------|
| 1. (b) Time interval | 2. (c) Length |
| 3. (c) Oscillatory   | 4. (b) Metre  |

#### B. Fill in the blanks :

- |                |                |
|----------------|----------------|
| 1. Standard    | 2. Rectilinear |
| 3. Oscillatory | 4. Length      |



C. True or False :

- |         |          |
|---------|----------|
| 1. True | 2. False |
| 3. True | 4. False |
| 5. True |          |

D. Matching the Columns :

- |                                |                 |
|--------------------------------|-----------------|
| 1. Units for smaller length    | Decimeter       |
| 2. State of moving objects     | Motion          |
| 3. State of stationary objects | Rest            |
| 4. Moving fan                  | Circular motion |

E. Answer the following questions in short :

1. A unit of measurement that has a fixed value which does not change from person to person or place to place is called the standard unit.
2.  $1\text{m} = 100\text{cm}$   
 $1.83\text{m} = 1.83 \times 100\text{ cm}$   
 $= 183\text{cm}$
3. When a body moves to and fro about a fixed point (called the mean position), it is said to be in oscillatory motion, example motion of a pendulum of a clock, swing etc.
4. (i) Place the scale in contact with the object along its length.  
(ii) In some scales, the ends may be broken. You may not be able to see the zero mark clearly. In such cases, you should avoid taking measurements from the zero mark of the scale. You can use any other full mark of the scale, say, 1.0cm.

F. Answer the following questions in detail :

1. An object moves from its position when a force is applied on it. In general, force (push or pull) results in motion of an object.) The objects which do not change

their position with respect to time is at the state of rest.  
Motion is defined as the change in position of an object.

2. Measurement is the scientific method to know the exact length, mass, time and temperature of various places and objects. But there can be inconsistencies, therefore, a standard unit of measurement is adapted called as the standard unit of measurement which is internationally accepted.

Measurement means the comparison of an unknown quantity. This known fixed quantity is called a unit. The result of a measurement is expressed in two parts. One part is a number. The other part is the unit of the measurement.

3. Circular motion : When an object is following a circular path of motion it is called circular motion. In circular motion the object remains at the same distance from a fixed point.

Example : motion of stone tied in thread and whirled.

Periodic motion : When an object repeats its motion after fixed interval of time it is said to be undergoing periodic motion.

Example : Oscillations of pendulum, motion of a swing.

4. Motion in which a whole body moves about an axis is called a rotational motion. This motion can be easily understood by imagining earth's rotation. When the earth spins on its own axis it is said to be undergoing rotational motion. For Example: Pendulum, Motion of a top.

### Lesson 8 : Light, Shadow and Reflection

#### A. Multiple Choice Questions (MCQs) :

1. (b) PVC sheet
2. (c) In the night



2. Sources of Light : An object which emits light is known as source of light. There are man made and natural sources of light.

Natural Sources of Light : Sun is the main natural source of light. We, on earth receive light from the sun which enables us to see all the things.

Artificial Sources of Light : In darkness we are unable to see things therefore we depend on artificial light like electric bulb, tube - light, burning, candle, torch etc.

3. Transparent objects : An object which allows most of the light passing through it is a Transparent object. For example, glass, air, clean water diamond etc.

Translucent objects : It is one which partially allows light to pass through it, for example ground mist fog, smoke, butter paper etc.

Opaque objects : The objects which do not allow light to pass through them at all are opaque objects. For example, stones, metals, woods etc. are opaque bodies.

4. Solar Eclipse : When the sun, moon, earth come in a straight line with a moon in the middle, the shadow of the moon may fall on some portion of the earth. In such a situation solar eclipse can be seen from these areas on the earth.

Lunar Eclipse : When shadow of the earth falls on the moon, lunar eclipse occurs. It happens when the sun, earth and the moon come in a straight line, shadow of the earth falls on the moon. There can be total or partial lunar eclipse as the moon moves round the earth. During a lunar eclipse its bright side faces the earth. That is lunar eclipse occurring on a full moon day.

5. When a ray of light falls on the surface of a plane mirror, it bounces back in the same medium . This is called reflection of light.

Incident ray: The ray falling on a plane mirror is called as incident ray.

Reflected ray: The ray which bounces back after reflection from the mirror is called as reflected ray.

### Lesson 9 : Electricity

#### A. Multiple Choice Questions (MCQs) :

1. (b) Key
2. (b) Gas burner
3. (c) Circuit diagram
4. (b) Fuse

#### B. Fill in the blanks :

1. Alessandro Volta
2. Fuse
3. Ammonium chloride
4. Closed
5. Electric

#### C. True or False :

1. True
2. False
3. True
4. False
5. False

#### D. Answer the following questions in short :

1. The outer covering of electric wire is made of plastic because plastic is an insulator. The plastic cover prevent shock.
2. A bulb is said to be fused when the filament inside it breaks. The filament burn due to excessive amount of current flow. In such case, the circuit will be incomplete to make the bulb glow when electricity is applied.
3. An electric cell is a device which converts chemical energy into electrical energy. It has two terminals i.e. positive terminal and negative terminal.
4. Conductors- Copper, silver  
Insulator- wood, plastic
5. Electrician use rubber gloves repairing an electrically

damage appliance as rubber is bad conductor of electricity, so it prevent current to flow through hand and prevent electric shock.

E. Answer the following questions in detail :

1. Electricity is generated on large scale :
  1. Hydro electric power plants - from water
  2. Thermal power plants - from coal, diesel or natural gas
  3. Atomic power plants - from uranium 2.35
2. Construction of dry cell :

A dry cell consists of a container made up of metal zinc. The container also serves as the negative terminal In the centre is a carbon rod with a metal cap. This acts as the positive terminal of the cell The carbon rod is surrounded by a mixture of manganese dioxide ( $MnO_2$ ) and powdered charcoal. Thick paste of substance ammonium chloride is filled in the remaining space. The cell is sealed at the top. The whole of the cell is covered by a card-board cover.

When the electric circuit is closed, the current starts flowing starts from the carbon rod electrode to the zinc electrode. If a bulb is connected in the circuit, it will glow.

3. The complete path from one terminal of an electric cell through the bulb and back to the other terminal of the electric cell is called as electric circuit.

Electricity can only flow through a closed circuit and not flow through an open circuit. In an electric circuit the electric current flows from the positive to negative terminal of the electric cell.

4. Conductors: The materials which allow electric current to pass through them are known as conductors eg.

copper, aluminum.

Examples :

1. All metals are conductors of electricity.
2. Non-metals like graphite and carbon are also conductors of electricity.
3. All solutions of alkali in water are conductors of electricity.

Insulators : The materials which do not allow electricity to pass through them are called as Insulators eg. cloth, paper, air, plastic, thermacol etc.

5. Switches are devices that break or complete the circuit. Different kinds of switches are made.

To make an electric switch. Take a thermocol sheet, two thumb pins, two wires, a cell, a safety pin or a paper clip. Fix one thumb pin on the thermocol holding one end of the safety pin. Fix the other thumb pin on the thermocol a little away from the first one so that the safety pin attach wires with both the pins while connecting the other ends of wire with the two terminals of the cells.

### Lesson 10 : Fun with Magnets

#### A. Multiple Choice Questions (MCQs) :

1. (b) Tesla
2. (a) Aluminium
3. (a) North-south
4. (d) Magnet
5. (b) Magnetism

#### B. Fill in the blanks :

1. Magnes
2. Iron
3. Needle
4. Iron
5. Magnetic compass

C. True or False :

- |          |          |
|----------|----------|
| 1. True  | 2. True  |
| 3. True  | 4. False |
| 5. False |          |

D. Answer the following questions in short :

1. Natural magnet is found naturally on the earth. It has regular or irregular shapes. Artificial magnets are man made. It can be found in different regular shapes.
2. Properties of magnets
  1. Magnet attract magnetic material.
  2. The magnet's similar poles repel each other whereas opposite pole attract each other.
  3. A freely suspended magnet always rest in north south direction.
3. The poles of a bar magnet are located at their two ends.
4. Magnetic materials : The material which attract iron are called magnetic materials. Example : Nickel.  
Non magnetic materials : The material which do not attract iron are called as non magnetic materials. Example : Aluminum.
5. The space around a magnet in which the magnetism is in the form of attraction or repulsion can be experienced on a magnetic material.

E. Answer the following questions in detail :

1. There was a shephard named Magnes, in early 800 B.C. in ancient Greece. He took his herd of goats and sheep for grazing holding a stick having an iron piece at one end. One day while walking over a hill, he was surprised that the iron end of his stick got stuck in a rock and it was hard to pull hard to free his stick. This rock was a kind of iron ore which was a natural magnet.
2. To keep the magnets safely, they should be stored in



pairs with their unlike poles on the same side. Soft magnets are to be placed across their ends and the magnets be separated by a piece of wood. The horse-shoe magnet have a piece of soft-iron placed across the poles. The soft pieces are called the 'keepers'.

It is not advisable to keep magnets or magnetic objects near television, CDs, mobiles, music system etc.

3. Take a bar magnet A and suspend it with a string. It will come to rest in the north- south direction. Hold another magnet B, bring its north pole, near the north pole of the suspended magnet A. It will be observed that the two poles repel each other. Now bring the south pole of the magnet B near the south pole of the magnet A, it will be observed that the two poles repel each other again. Next, bring the north pole of the magnet B near the south pole of the suspended magnet. The two poles attract each other.
4. A magnetic compass is a device which is used by the pilots and navigators in the aeroplane or ship. It is based on the direction property of the magnet. It consists of a flat circular aluminium box at the base of which directions north, south, east, west, north-east, north-west are marked. It also consists of a magnetised needle pivoted at a point where it is free to move and rotate.
5. The magnet can lose its magnetic properties if it is not carefully kept and stored by following the safety measures. This is referred to as demagnetisation of magnets.

Following are the ways by which magnets may lose their magnetic powers:-

1. Striking the magnet on hard surface repeatedly.
2. Hammering and heating of magnets.
3. If the magnet falls from a height.

4. Not being stored in a proper manner.

To keep the magnets safely, they should be stored in pairs with their unlike poles on the same side.

### Lesson 11 : Air Around Us

#### A. Multiple Choice Questions (MCQs) :

1. (a) Humidity
2. (d) 21%
3. (c) Carbon dioxide
4. (b) Nitrogen
5. (c) Carbon dioxide

#### B. Fill in the blanks :

1. Atmosphere
2. Atmosphere
3. Mixture of gases
4. 0.9%
5. Photosynthesis

#### C. True or False :

1. False
2. False
3. True
4. False
5. True

#### D. Answer the following questions in short :

1. 1. Plant needs nitrogen for their growth.  
2. It is utilised in metallurgical processes.
2. The thick blanket of air that envelopes the earth completely is called the atmosphere.
3. 1. Take a glass and invert it over a burning candle. It will be observed the candle will keep burning for as long as there is sufficient air in the glass. The candle will stop burning when the whole of the oxygen or air is totally consumed in burning. This shows that oxygen is necessary for things to burn.  
2. In another activity, take a plastic jar with holes in it. Place it over a burning candle. The candle will keep burning till the end The reason is that it gets oxygen

supply till the end.

4. Nitrogen is needed by plants for growth.
  5. The substances which are capable of burning are called combustible substances.
  6. The air from the water bodies containing water vapour rises up in the atmosphere since it is warm. As it rises it cool down and forms clouds which condenses to form rain.
- E. Answer the following questions in detail :
1. Plants and animals help each other in the circulation of gases in the atmosphere. For all the burning and respiratory processes, large amount of oxygen is being used. But the carbon dioxide produced during these processes is taken up by plants for photosynthesis. Cycle is maintained as animals used up the oxygen released by the plants.
  2. The activities that result in excessive production of carbon dioxide are burning of fossil fuels:-
    - a. Industrialisation
    - b. Burning of fossil fuels
    - c. Deforestation
  3. Take an empty glass, hold this in inverted position (with its mouth facing downwards) now, dip the open mouth of the inverted glass into vessel filled with water. It is observed that the water is not entering into the glass. The reason is that the glass is not empty; it is totally filled with air. The air is not able to escape as the glass was upside down. The air in the glass prevents it from entering inside. Now on titting the glass so that the mouth opens to air above water and the water starts entering into it. Bubbles are seen coming out of the mouth of the glass. This shows that the glass was not empty, but filled with air.

4. Air is a mixture of gases. The most important components of air are oxygen, carbon dioxide, nitrogen and water vapours.

Nitrogen is 78.1% by volume

Oxygen is 21%

0.9% is carbon dioxide

Rest is water vapour and other gases in traces.

Some pollutants, dust particles and soil may also be present.

- 5.
1. Air keeps the earth warm enough for the living beings to survive.
  2. All living organisms breathe in air to survive.
  3. Clothes get dried in air.
  4. Air helps in pollination of flowers and in dispersal of seeds.
  5. Birds, insects, aeroplanes are helped in their flights by the air.