

# Science for class 6<sup>th</sup>

## Chapter No: 1 Cellular Organization of Plants and Animals.

Q:1 Describe parts and functioning of a light micro scope.

### Parts of a light microscope.

A light micro scope has a base, an arm 'a tube' a stage two adjustment screws and two lenses.

### Functioning of light Microscope.

The object to be seen is placed on glass slide on the stage. Adjustment screws are used to focus the object clearly. By using lens we can view 1500times bigger image of an object.

Q:2 Describe the structure of a plant cell also draw its babbled diagram.

### Structure of a plant cell

#### (i)Cell Wall:-

The outer most covering of a plant cell is called cell wall. It gives shape and support to the cell.

#### (ii)Cell Membrane:-

Next to the cell wall cell membrane is present It controls the movement of material in and out of the cell.

#### (iii)Cytoplasm:-

Jelly like material inside the cell membrane is called cytoplasm. Most of the cell functions take place in it. Such as "mitochondria" provides energy to the cell. Chloroplast traps sunlight to make food. Vacules store waste material, water, air and food particles.

#### (iv)Nucleus:-

Nucleus is the most important part of the cell. It controls all the activities of the cell. That's why it is called the "Brain" of the cell.

Q: 3 Write a note on the nucleus of the cell?

Nucleus is the most important part of the cell. It is called the brain of the cell. It controls all the activities of the cell. Many thread like structure called chromosomes are present in it which pass on the characteristics of the cell to new cell.

Q: 4 Write about shoot system of a plant.

The part of the plant outside the ground forms the shoot system of the plant It consists of main stem leaves branches and flowers.

### Function of different parts of a shoot system:-

#### (i)Main stem:-

It provides support to the plant. It holds the plant firmly in the soil.

#### (ii) Leaves:-

Leaves are called food factories The prepare food for the plant.

#### (iii) Branches:-

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Branches conduct water and minerals from root to all parts of plant.

(iv) Flowers:-

Flowers are the reproductive part of the plants.

**Q:5 Define Cell**

A Cell:-

A cell is the basic unit of structure and function of all the living organisms. All the living things are made up of cells.

A Tissue:-

A group of cells performing same function is called tissue.

Example:-

Xylem tissue, Muscle tissue, Bone tissue etc.

An Organ:-

A Group of tissues performing the same function is called an organ.

Example:-

Leaf, Heart, Lungs etc.

Organ Systems:-

A group of organs which work together is called an organ system.

Example:-

Root system Digestive system

An Organism:-

A combination of different organs and organ systems which work is coordination is called an organism.

Example:-

Animals, Plants, Humane beings etc.

**Expand Your Thinking:-**

Q (I) A brain cell contains thousands of mitochondria. What conclude about the brains need for energy?

Brain controls all the activities so it needs more energy. That's why it contains thousands of mitochondria because it provides energy to the cell.

Q (ii) which cell part is being described.

Helps keep cytoplasm inside:-

**Cell membrane.**

Controls all cell activities:-

**Nucleus**

Liquid filled space for storage:-

**Cytoplasm.**

Green plans which trap energy:-

**Chloroplast**

Clearly Jelly like material:-

**Cytoplasm.**

Q (III) Suppose you saw a small organism move across you look is it a unicellular or multicellular.

Ans:- It is a multicellular organism because unicellular organism cannot be seen with naked eye without microscope.

Q (iv) How is a tissue like a team?

Ans:- A tissue is a group of cells which work together.

Q (v) Complete the Venn diagram.

**Venn diagram**

**Chapter No: 2 Sense Organs**

**Q:1 Describe the structure of human Eye.**

Ans:- Main parts of a human eye are Cornea, iris, pupil, lens, retina and optic nerve

Cornea:-

The transparent part of the eye is called cornea, Light rays enter the eye through cornea.

Iris:-

The coloured portion of eye is called iris. Different colours of eye are due to iris.

Pupil:-

The hole in the middle of iris is known as pupil. It expands in dim light and contracts in bright light.

Lens:-

A flexible lens is present behind the pupil. It helps the eye to focus light.

Retina:-

Eye lens from the image on retina.

Optic nerve:-

When the light hits the retina it sends signals to brain <sup>through</sup> the optic nerve and thus we become able to see the object.

**Q:2 Describe structure and function of the inner ear.**

Ans: The last part of the ear is inner ear. It is filled with a liquid. It has a coiled structure called cochlea. It sends signals to the brain through auditory nerves and thus we become able to hear a sound.

**Q:3 Write a note on sense of smell.**

Ans: The sense organ for smelling is nose. Our nose is a hollow air passage. It has two openings called nostrils. In each side of the nose there is an air chamber.

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The roof of the nose has lining of nerve cells to sense smell. When some odour present in the air enters our nose, nerve cells pass message to the brain through olfactory nerve and we become able to differentiate sweet or bad smell.

**Q:4 What is the importance of our tongue?**

Ans: Tongue is the sense organ for taste. Tongue has taste buds due to which we are able to detect sweet, salty sour and bitter tastes.

**Q:5 Write a note on our sense of touch.**

Ans: Skin is the organ of touch. The skin contains many kinds of cell that detect pain, pressure, touch, heat and cold. Our skin has outer and inner layer. Outer layer protects the skin from harmful rays of the sun. The inner layer is sensitive part of the skin. It has blood vessels nerves sweat glands and roots of hair. When we touch something sensitive cell of the skin send message to the brain and the brain give instruction to other part of the body according to the message.

### Explain Your Thinking

**Q:1 what happens to the pupil when we switch the lamp on?**

Ans: The pupil of our eye contracts due to the bright light of the lamp.

**Q:2 Sometimes as a result of cold the middle ear becomes filled with fluid why do you think this can cause a temporary loss of hearing.**

Ans:- We hear the sound when sound waves strike the eardrum and it causes vibration. If it is *filled* called with fluid sound wave will not strike the eardrum and we can't hear the sound.

**Q:3 what is the advantage of having a lens in the eye that can change its shape?**

Ans: Due to the flexible lens we can focus the light and we become able to see even in the dim light.

**Q:5 Have you ever faced an injury of breaking of your nail? Why is it so painful?**

Ans: Because tip of the finger is the most sensitive part of our skin.

### **Concept Map**

#### **Sense Organs**

Nose	Tongue	EAR	EYE	Skin
Olfactory nerve	Taste Buds	Cochlea	Retina	the largest <i>organ</i>
<i>Organ</i>				

## Chapter No: 3 Photosynthesis and Respiration in Plants

**Q:1 Describe the internal structure of leaf?**

Ans: Internal structure of leaf:-

There are three main internal parts of a leaf.

- (i) Epidermis
- (ii) Mesophyll
- (iii) Vascular Bundle

### Epidermis:-

The upper layer of leaf is called upper epidermis .The lower layer of leaf is called lower epidermis .Lower epidermis has many stomata's .Exchange of gases and vapors between the leaf cells and air takes place through these stomata's.

### Mesophyll:-

Between the upper and lower epidermis mesophyll tissues are present. Mesophyll contains chloroplasts and chlorophyll is present in chloroplasts. Chlorophyll traps sunlight for photosynthesis.

### Vascular Bundle:-

The central part of mesophyll tissue is made of vascular bundle. It has xylem and Phloem tissues.

### Xylem tissues:-

Xylem tissues carry water from root to leaves.

### Phloem tissues:-

Phloem tissues carry prepared food to other parts of plant.

### **Q:2 Which factors are necessary for photo synthesis?**

Ans: Necessary factors for photosynthesis:-

Light temperature carbon dioxide water and chlorophyll are the necessary factor for photosynthesis.

### **Q:3 Prove the structure of leaf facilitates the process of photosynthesis?**

Ans: The structure of leaf is suitable for photosynthesis.

### **Flat Blade:-**

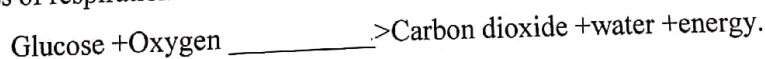
- (i) Flat blade of leaf traps sunlight for photosynthesis.
- (ii) Leaves are thin so that the carbon dioxide and light can reach to the inner cells easily.
- (iii) Exchange of gases, water and air takes place through stomatas.
- (iv) Thick layer of mesophyll cells make enough food for plants.
- (v) Vascular Bundle:-

It carries water from root to leave and prepared food to all parts of plant. All the above given characteristics prove that the structure of leaf is fit for the process of photosynthesis.

### **Q:4 How does the respiration accours in plants?**

Ans: Plants take in oxygen from the air and give out carbon dioxide is used in photosynthesis.

Process of respiration can be shown by this equation



### **Expand your Thinking:-**

### **Q:1 Which part of the leaf can best be compared to your skin.**

Ans: Epidermis can be best compared to our skin.

### **Q:2 What is one cause of oxygen being found in the atmosphere?**

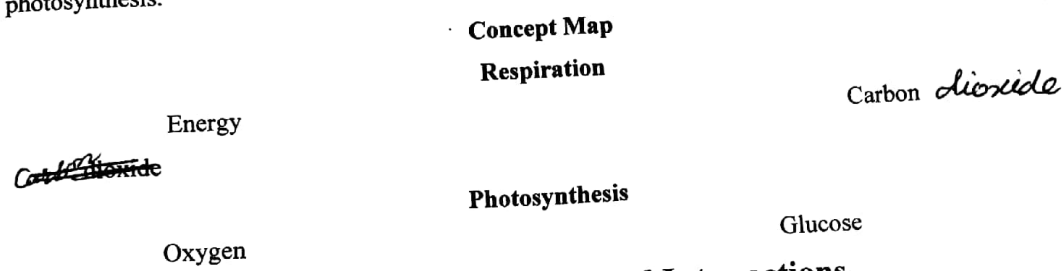
Ans: Because plants release oxygen in the atmosphere during photosynthesis.

### **Q:3 What would happen if there were not carbon dioxide in the air?**

Ans: If there is no carbon  <sup>dioxide in</sup> the air, plants would not be able to prepare food and other living organism (animal, human being) would not get  <sup>to</sup> food eat.

**Q:4 Why is it important that the leaves on a stem are arranged so they do not overlap too much?**

Ans: It is important for leaves not to overlap each other to absorb maximum sunlight for photosynthesis.



**Chapter No :4 Environment and Inter actions**

**Q:1 How do plants depend upon animals for their needs?**

Ans: Plants are the producers. They make their own food by photosynthesis. Carbon dioxide is necessary for photosynthesis (food making process) the plants get carbon dioxide from animals, because animals release carbon dioxide during respiration.

**Q:2 Explain the abiotic factors of the environment.**

Ans: ~~Alone~~ <sup>All the</sup> living things are the abiotic components of environment Light, air, temperature soil and water are the abiotic components of the environment.

**Light:-**

Light is a very important abiotic component of the environment. Plants need sunlight for photosynthesis. All the living organisms use the food prepared by plants. Human beings and animals need sunlight for their activities.

**Temperature:-**

~~The heat of the sun affects the temperature mostly days are~~ hot due to the sun. <sup>(2)</sup> Most of the organisms are active at the temperatures between 0°C to 45°C <sup>(1)</sup> Temperature affects the activities of plants and animals.

**Air:-**

Air is a mixture of different gases. <sup>and Carbon dioxide</sup> Oxygen is necessary for photosynthesis. All the living organism cannot survive without air. <sup>oxygen is necessary for respiration</sup>

**Soil:-**

Soil is very important for plants growth. Plants get water and minerals from soil. Plant cannot exist without soil.

**Water:-**

Water is essential for life living organisms cannot live without water.

**Q:3 Explain the following with example.**

(i) **Parasitism:-**

A relationship between two living organisms in which one is harmed and other is helped is called a parasitism.

(ii) **A parasite:-**

The organism which depends on the other organism for its food is called a parasite.

Example:-

Mosquito, Cucuta, Leech asearis etc.

**A Host:-**

The organism on which a parasite depends for food or by which parasite gets its food is called its host.

**Example:-**

Animals and human beings are the host for mosquito and leech.

**Mutualism:-**

Mutualism is a friendly relationship between two living organism which live together and depend on each other. *for their needs*. Both are helpful and beneficial to each other.

**Example:-**

**Plants and animals**

Plants provide food to animals and animals provide carbon dioxide to plants.

**Algae and fungi**

Green algae make food for itself and for fungi. Fungi protect it from dying and provide carbon dioxide to algae to make food.

**Types of consumers**

There are three main types of consumers.

- (i) **Herbivores**
- (ii) **Carnivores**
- (iii) **Omnivores**

**Herbivores:-**

The animals that eat only plants are called "Herbivores"

**Example:-**

Horse, Cow, Sheep, Donkey.

**Carnivores:-**

The animals that eat the meat of other animals are called "Carnivores"

**Example:-**

Human beings, Crow, Bear etc.

**Expand Your Thinking**

**Q:1 What would be the effect of destroying most or all of the plants on the other biotic factors in an environment.**

Ans: Plants are the producers,

Animals use food prepared by the plants if there were no plants animals and human being cannot survive. They would not get food and oxygen which is necessary for their life.

**Q:2 There were many deer in a forest Hunters killed the mountain lions wolves and other enemies of the deer. What changes do you think took place because of what hunters did?**

Ans: Deer will be more in number. They will eat the plants. Plants will be decreased and we would not get enough food and oxygen for life.

**Q:3 Think of three things you like to eat? What type of consumers are you?**

Ans: I like to eat fruits vegetables chicken meat and cereals so I am an omnivore.

**Q:4 Why are animals said to be consumers instead of producers?**

Ans: Animals said to be consumers instead of producers because they cannot prepare their own food. They use <sup>the</sup> food prepared by the plants, Plants are the producers

**Q:5 Why is it better for a parasites to leave its host alive?**

Ans: It is better for a parasite to leave its host alive so that they can get food from it, again after sometime.

**Q:6 Where does the main source of energy come from in an environment?**

Ans: Sun is the main source of energy in an environment.

**Q:7 What are two ways a mosquito may harm its host?**

Ans: (i) It sucks the blood of its host

It injects the germs of Malaria to its host's body.

**Concept Map**

Relationship among Organism

**Chapter No. 5 Atoms, Molecules, Mixtures and Compounds**

**Q:1 Relate physical properties of metal elements with their uses.**

Ans: Properties of Metals and their uses:-

Metals are widely used in our daily life due to their physical properties.

**State:-**

Mercury is found in liquid state. It is used in thermometer to measure temperature.

**Hardness:-**

Most metals are hard solid. Iron is used to make steel. Steel is used to make vehicles bridges, ships girders surgical instruments and utensils.

**Luster:-**

<sup>sh</sup>Bridge shine of metal is called its luster. Aluminum is used to make utensils. Gold and silver are used to make ornaments due to their luster.

**Melting and Boiling points:-**

Metals have high melting and boiling points. Due to this property iron copper and aluminum are used to make kitchen utensils.

**Strength and Malleability:-**

Metals are used to make sheets, wires and springs due to their strength and malleability.

**Conductivity:-**

Metals like copper and aluminum are used in electrical wiring due to their conductivity.

**Q:2 Define and explain compounds.**

**Compound:-**



Chemical combination of two or more elements in a fixed ratio is called a compound.

**Example:-**

Water  $H_2O$  is the combination of oxygen and hydrogen in a fixed ratio.

**Explanation:-**

Elements of compound cannot be separated easily. Physical properties of element change when they are combined as compounds. In case of water, hydrogen and oxygen are colorless gases. They have no taste and smell. But when both of these gases form water we can see and taste it. Their physical properties change and they cannot be separated easily.

**Q:3 What do you know about sublimation and distillation.**

**Sublimation:-**

The process in which a solid on heating directly changes into gas or vapors is called "Sublimation" But on cooling vapors again change into solid. This method is used to separate the two components of a mixture if one of these has the property of sublime. Iodine camphor and naphthalene have the properties of sublime.

**Distillation:-**

Distillation is a method <sup>to</sup> of separate the component of a mixture having different boiling point. This method is used to separate the mixture of two or more liquids.

**Example:-**

Crude oil is a mixture of different chemicals such as petrol, tar, oil, gases and kerosene. Distillation method is used in oil refinery to separate the component of crude oil.

**Q:4 Define paper chromatography and explain it with the help of an activity.**

Ans: Paper chromatography

The method used to separate the colored (chemical) components in a mixture is called "paper chromatography"

**Activity:-**

Place a filter paper on the beaker. Put a drop of ink in the middle of the filter paper. The drop will be spread over the paper and different band of colours can be seen on the paper. It means that ink is the mixture of yellow and green colour.

**Q:5 write symbols of the following elements.**

Ans: Potassium	K
Nitrogen	N
Sodium	Na
Gold	Au
Mercury	Hg
Silver	Ag

**Expand your Thinking**

**Q:1 Why water is said to be a compound instead of an element?**

Ans:- Water is said to be a compound instead of an element because it is formed by the chemical combination of hydrogen and oxygen in a fixed ratio.

**Q:2 Explain why salt cannot be removed from a salt water mixture by pouring a mixture through a filter paper?**

(10)

Ans: salt cannot be removed from a salt water mixture through filter paper because salt is completely dissolved in water and passes through the pores of filter paper.

**Q:3 Describe a procedure to separate a mixture of salt finely ground pepper and pebbles.**

Ans: Salt finely ground pepper and pebbles can be separated by filtration method.

**Q:4 If we try to separate the parts of a material and cannot does this mean that the material is an element ? Explain why?**

Ans: It is an element because an element is made up of the same kind of atoms and cannot be further divided into smaller particles.

### Concept Map

Substance		
Element	Compound	Mixture
One kind of atoms	two or more elements combined	two or more substance mix not combined

## Chapter No: 6 Air

**Q:1 What is atmosphere? How air is important for us?**

Ans: Atmosphere:-

Air covers the Earth like a thick blanket. This blanket of air is called "atmosphere"

### Importance of air:-

- (i) We cannot live without air. We breathe in the air.
- (ii) Plants use air (carbon dioxide) for making food. Animals and humane being use this food.
- (iii) Fishes and other water animal use air (oxygen) for respiration.
- (iv) Air is filled in the tyres of vehicles.
- (v) Air is needed for burning.

**Q:2 Write some uses of oxygen in our daily life.**

Ans: Uses of oxygen in our daily life:-

All the living organisms use oxygen for respiration. It is used in welding and cutting of materials. It is necessary for burning wood coal and natural gas. Mountain climbers sea divers and astronauts carry oxygen cylinders for breathing. It is used in hospitals for artificial breathing.

**Q:3 Write some properties of carbon dioxide.**

Ans: Properties of "carbon dioxide"

- (i) It is a colorless gas.
- (ii) It has no smell.
- (iii) It has sour taste.
- (iv) It does not burn.
- (v) It is heavier than air.
- (vi) It turns the lime water milky.

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### Expand Your Thinking

**Q:1 How would air composition change if there were no plants?**

Ans: Plants use carbon dioxide for making food. If there were no plants ratio of carbon dioxide will be increased in air and its composition will be changed.

**Q:2 When an empty glass is inverted vertically into a tub of water the water does not enter the inverted glass. Why do you think this is so?**

Ans: Water does not enter the inverted empty glass *because* and the glass which is seems to be empty is not actually empty. *Air is present in that glass and there is no space for water.*

**Q:3 Why carbon dioxide important for survival of life on Earth? Name one other gas and explain its importance to living things.**

Ans: Carbon dioxide is important for the survival of living organisms because plants use carbon dioxide for making food and living organisms use the food prepared by the plants. The other important gas in the atmosphere is Oxygen. All the living organisms use this gas for respiration and cannot live without it.

**Q:4 Give three ways in which oxygen and nitrogen are the same and ways in which they are different.**

Ans: Similarities between Oxygen and Nitrogen:-

- (i) Both gases are colourless.
- (ii) Both have no smell. *soluble*
- (iii) Both are slightly ~~sol~~ *sol*uble in water

Difference between Oxygen and Nitrogen:-

Oxygen is a very active gas whereas nitrogen is not an active gas.

Oxygen helps in burning process whereas Nitrogen does not help in burning process.

#### Concept Map

	Air	
Nitrogen	Oxygen	Carbon dioxide
Reduce rusting	helping burning	dry ice

## Chapter No: 7 Solutions and Suspensions

**Q:1 Describe the particle model of solution.**

Ans: According to particle model

- (i) Particle of matter are in constant motion.
- (ii) There are forces of attraction between particles.
- (iii) There are spaces between particles of matter.

### **“Particle Model of a Solution”**

In a solution of water and salt when we dissolve salt in water forces of attraction between salt particle become weak and they spread among the spaces between water molecules and due to the constant motion of particles of water every part of the solution becomes the same.

**Q:2 Prove that water is a universal solvent.**

Ans: Most of the things dissolve in water easily. Solid such as sugar rock salt sodium bicarbonate dissolve in water easily. Liquid such as milk, vinegar, lemon juice etc dissolve in water easily. Some gases such as oxygen carbon dioxide are also soluble in water. That's why water is called a universal solvent because all the three kinds of matter can be dissolved in the water.

**Q:3 What is solubility ? How does temperature affect the solubility?**

Ans: The amount of solute in grams dissolved in 100 grams of the solvent at a given temperature is called its solubility at that temperature.

Example:-

24g of copper sulphate dissolve in 100 g at room temperature 25°C it is its solubility.

Effect of temperature on solubility:-

Usually temperature increases the solubility of a solute, but the solubility of gases in liquid solvents decreases at high temperature.

**Q:4 Compare the properties of “solution” and “suspension”**

Solution	Suspension
(i) Particles of solute do not settle down.	(i) Particles of <del>solute</del> <sup>suspension</sup> settle down on standing.
(ii) Particles pass through ordinary filter paper but cannot be separated through it.	(ii) Particles can be separated by easily an ordinary filter paper.
(iii) Light rays do not scatter on passing through the solution.	(iii) Light rays scatter on passing through the suspension.

**Q:5 Define the solvent, solute and saturated solution.**

Ans: **Solvent**

The substance in which solute is dissolve is called “solvent”

**Example:-**

In solution of water and salt, “water” is a “solvent”

**Solute:-**

The substance which is to be dissolved in solvent is called solute. Solute is always less in quantity amount.

**Example:-**

In solution of salt and water "salt" is a "solute"

**Saturated Solution:-**

The solution in which solute cannot be dissolved any more at a particular temperature is called a saturated solution.

**Example:-**

We can dissolve a specific quantity of sugar in a glass of water the stage at which no more sugar will be dissolved in water but settle down a saturated solution is ready.

**Expand Your Thinking**

**Q:1 What makes ocean water a solution.**

Ans: The salt makes the ocean water a solution .In ocean water salt is a solute and water is solvent.

**Q:2 How can you cause more solid solute to be dissolved in a liquid?**

Ans: Because of more space between the molecules of a liquid.

**Q:3 Why do the words "shake well before use" on a bottle of medicine indicate that the medicine is a suspension.**

Ans: The particles of medicine settle down at the bottom of the bottle after sometimes shows that medicine is a suspension.

**Q:4 identify the solute and solvent in a solution made from 15g of oxygen and 5g of helium.**

Ans: In this solution of oxygen and helium oxygen is a solvent and helium is a solute because solute is always less in amount.

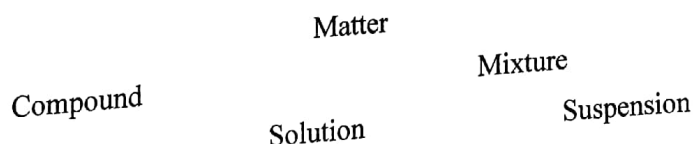
**Q:5 Even after a glass is filled to the brim with water, you can add a considerable amount of salt without making the water run over. How is this possible?**

Ans: It is possible due to the spaces between the molecules of water and forces between the particles of salt become weak in water and they spread in those spaces and water does not run over the glass.

**Q:6 Suppose you were given a bottle that had a solid and liquid mixed in it. How could you tell whether the mixture was solution or suspension?**

Ans: We will leave the bottle for some time after some time we will check the bottle if the particle of solid are settled down it would be a suspension otherwise it is a solution.

**Concept Map**



**Chapter No: 8 Energy and its Forms**

**Q:1 what is the difference between "potential" and "kinetic" energy ? Give two examples.**

**Ans: Potential energy**

The energy that is stored in an object due to its position is called "potential energy" It is written as P.E

**Example:-**

Chemical energy, Nuclear energy.

**Kinetic Energy:-**

Energy in a body due to its motion is called kinetic energy It is written as K.E

**Example:-**

A moving bus running tap water

**Q:2 Define and explain the law of "conservation of energy"**

**Ans: Law of conservation of energy:-**

Energy cannot be made or destroyed. It can be changed from one form to another. This fact is known as "law of conservation" of energy.

Explanation:- In our daily life we use many appliances which convert one form of energy to other such as a lamp. It changes the electrical energy to light energy. Radio changes the electrical energy to sound energy. Washing machine changes the electrical energy to mechanical energy etc.

**Q:3 Describe at least three renewable source of energy.**

**Ans:** Renewable source of energy include wood, water, wind, animal waste sunlight and tides of sea.

- (i) **Hydroelectric Energy:-** The kinetic energy of flowing water <sup>can</sup> ~~iron~~ be changed into electrical energy. This energy is called hydroelectric energy. Dams are built to get this energy.

**Advantages of Hydroelectric energy:-**

The water for producing hydroelectricity is available free of cost.  
Hydal power stations do not add pollution to the atmosphere.

**Solar Energy:-**

The energy coming from the sun is called solar energy. It can be changed into electricity with the help of solar cells.

**Advantages of solar energy:-**

- (i) It is totally free of cost.
- (ii) It is pollution free.
- (iii) A lot of solar energy is coming on the earth at daily basis.

**Tidal Energy:-**

Sea tides can also be used to make electricity.

**Advantages of Tidal Energy:-**

It is a free of cost source of energy.

It is pollution free.

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**Q:4 Write a note on energy transfer in an environment.**

Green plants use sunlight to grow and make food. This solar energy ~~change~~<sup>changes</sup> into the chemical energy of food. Animal and human beings use the food prepared by the plants and change the chemical ~~energy~~<sup>changes into</sup> of food to kinds of energy they need such as heat and kinetic energy. Solar energy ~~causes~~<sup>changes into</sup> wind energy, sea tides energy and many other forms of energies. At the end all the energies are consumed in the atmosphere at different level in different ways.

#### Expand Your Thinking

**Q:1 How can the kinetic energy of truck can be increased without increasing its speed?**

Ans: Kinetic energy of the truck can be increased by increasing its "mass" as  $K.E = \frac{1}{2}mv^2$

**Q:2 What energy does a skier has at the top of hill and coming down a hill?**

Ans: A skier has the potential energy at the top of the hill and kinetic energy while coming down.

**Q:3 How can solar energy be helpful to Pakistan in overcoming electricity shortage.**

Ans: Solar energy can be an effective renewable source of ~~in our~~<sup>energy</sup> country because a lot of solar energy comes on the earth free of cost which can be changed into electricity with the help of solar cells.

**Q:4 What energy changes takes place as a tube light is turned on?**

Ans: When the tube light is turned on electrical energy changes into light energy.

**Q:5 You turn on electrical fan to cool off. Describe the energy conversion involved.**

Ans: When we turn on the fan electrical energy change into kinetic energy.

**Q:6 You drop a ball it bounces a few times but then it stops. Your friend says that the ball has lost all of its energy. Using what you know about the "law of conservation of energy" respond your friends statement.**

Ans: According to the law of conservation of energy, energy does never end. The ball does not lose energy but it stop due to friction.

#### Concept Map

##### Sunlight

Which can be stored in

Food

fuel

Animals

Heat

Light

Use energy to do work

### Chapter No: 9 Forces and Machines

**Q:1 Write some uses of wheel and axel in our daily life.**

Ans: Wheel and axle is vastly used in our daily life such as it is used in mincing machine, a tap handle, a hand drill, crank on the well and in vehicles. It is used to lift heavy load and to increase the speed.

**Q:2 Describe two kinds of pulley and their working.**

- (i) Fixed pully
- (ii) Moveable pully

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### Working of a fixed pulley:-

The axle of this pulley is fixed with some support. The load is tied on one end of the rope and force is applied on the other end of the rope to lift the load. A fixed pulley is used to change the direction of applied force.

### Working of movable pulley:-

This kind of pulley has a hook to tie the load. The moveable pulley moves together with the load. A moveable pulley does not change the direction of a force. The applied force and the load move in the same direction.

**Q:3 Define a gear and write its characteristics.**

Ans: A Gear

A gear is a toothed wheel.

### Characteristic of gear:-

- (i) A gear wheel has teeth around it
- (ii) A gear transfer force from one wheel to the other
- (iii) Gear can increase or reduce the speed.

**Q:4 Write <sup>briefly</sup> ~~friendly~~ about the working of a hand drill and a bicycle.**

Working of a hand drill:-

A hand drill consists of two mutually perpendicular gears. When its larger gear is rotated in a vertical plane the smaller gear linked with it rotates very fast in the horizontal plane. A hand drill is used to make holes in the wood.

### Working of a "Bicycle"

A bicycle moves with the help of two gears. Both the gears are linked with each other by a chain. The pedal of the bicycle is fitted with large gear. The small gear is attached with the back wheel of the bicycle. When we pedal the bicycle the big gear turns the chain which turns the small gear. <sup>and</sup> ~~when~~ the small gears turns the bicycle moves forward.

### **Expand Your Thinking**

**Q:1 A door knob is a wheel and axle. How does it work?**

Ans: A door knob is a wheel and axle. The long part of the door knob (the handle) works as a wheel and short part works an axle. A small force on the wheel provides a bigger force to axle to open the lock of the door.

**Q:2 what type of a simple machine would be used to lower the empty bucket into a well and then lift the bucket full of water?**

Ans: Wheel and axle.

**Q:3 When you let water into a bathtub, What kind of machine help you open the tap?**

Ans: Wheel and axle.

**Q:4 If the driving wheel and the driven wheel of a gear system are of the same size, which gear will <sup>more</sup> faster?**

Ans: If the driving wheel and the driven wheel of a gear system are of the same size they will move with the same speed.



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**Q:5 How are compound machines are different from simple machines?**

Ans: Compound machines are combination of different simple machines which work together, Compound machines have complex parts they are not easy to handle or maintain.

**Q:6 How are wheel and axle pulley and gear are alike?**

Ans: They are all the kinds of simple machines, they are used to lift heavy load to increase the force and speed, they make our work easier.

#### Concept Map

Simple Machines

Pully

Wheel and axle

Gear

Wheel and rope

Wheel with rope *had*

toothed wheel

## Chapter No: 10 Properties of Light

**Q:1 Define the transmission absorption and reflection of light.**

Ans: **Transmission of light**

When the light falls on a transparent object, it is transmitted to the other side of the object, this is called "Transmission of light" we can see across the transparent objects due to the transmission of light.

**Absorption of light:-**

When the light falls on rough opaque object most of the light is absorb in object This is called absorption of light we cannot see through the opaque objects due to the absorption of light.

**Reflection of light:-**

Bouncing of light particles after striking a shiny surface is called "reflection of light"

**Q:2 Prove the laws of reflection with the help of an activity.**

Ans: Laws of reflection:-

- (i) The angle of incidence is equal to the angle of reflection.
- (ii) The incident ray the reflected ray and the normal ray on the point of incidence lie on the same plane.

Activity:-

- Fix a white paper on a drawing board.
- Place a mirror strip AB on the paper
- Fix two common pins Q and R slant in front of the mirror in a line.
- See the image of the pins in the mirror and fix two more common pins S and T lie on the same straight line at the image of pins Q and R
- Join the points Q R S T with the AB (strip) on point P
- Draw a perpendicular line on P It is the normal ray.
- Now we will observe that the angle of incidence is equal to angle of reflection and the incident ray reflected ray and normal ray all line on the same plane.

Q:3 Draw a ray diagram for light reflected from a plane mirror.

**Q:4 How does multiple reflection occur in a kaleidoscope?**

Ans: A kaleidoscope is a hollow tube containing two or more rectangular plane mirror. The mirrors are fixed at angle of  $60^{\circ}$  or  $45^{\circ}$  with each other. At the end of the kaleidoscope one plate of clear glass and one plate of ground glass have been placed. Small pieces of coloured object are placed between the plates and are reflected in the mirrors. The plate of ground glass throws the reflections in different directions which make beautiful designs. ~~The constantly changing designs~~ are formed by the multiple reflections of the loose coloured pieces through mirrors.

**Q:5 Describe in detail the image formation in a concave mirror.**

Ans: A concave mirror can form real as well as virtual image. If the object is beyond the principal focus F the image formed is real and upside down. If the object is very near to the concave mirror image forms <sup>ed</sup> behind the mirror is virtual upright and bigger in size.

**Expand Your Thinking**

**Q: 1 is a shine metal plate also said to be a mirror?**

Ans: Yes a shine metal plate can also said to be a mirror because according to the definition of a mirror a shiny surface is called a mirror.

**Q:2 How does a surface of still pond or puddle behave when light falls on it.**

Ans: When light falls on the surface of a still pond or puddle it acts like a plane mirror.

**Q:3 How can a scientist see the details of the moon?**

Ans: A scientist sees the details of moon with the help of a reflecting telescope because it produces the images of distant object.

**Q:4 white surface reflect most of the light that strikes on them. Why are people used to wear dark coloured dresses in winter?**

Ans: People used to wear dark coloured dress in winter because dark colour absorbs sunlight and they can get warmth from it.

**Q:6 Can a plane mirror ever produce a real image? Explain**

Ans: A plane mirror can <sup>not</sup> produce a real image because it cannot coverage light at a fixed point where image would be formed.

**Q:5 Can you obtain a virtual and upright image from a concave mirror ? Draw a ray diagram.**

Ans: Yes we can get a virtual and upright image if the object is very near to the concave mirror.

**Q:7 If you look directly at a highway it looks black. If however you look it at an angle it looks shiny. Why does it look so?**

Ans: It looks shiny due to the reflection of light.

## Chapter No: 11 Investigating sound

**Q: 1 Prove that sound is a form of energy.**

Ans: Energy can do work and work is done when something is moved. When the sound of speaker is high more vibration can be seen by putting pieces of paper or empty capsules on the surface of speaker. It shows that loud sound processes more energy. So it is proved that sound is a form of energy.

Loud sound = Much energy

Soft sound = Less energy

**Q:2 How does sound travel?**

Ans: Sound travels in the form of waves. Sound travels through different medium at different speed. Sound needs a material medium to travel from one place to the other. This material medium can be air liquid (water) or solid. Sound cannot travel in vacuum due to the absence of a material medium.

**Q:3 How do we hear sound?**

Ans: The organ of hearing is "Ear" The outer part of the human ear directs sound into the ear canal. Inside the ear canal sound waves make the eardrum vibrate. It causes three tiny bones in the middle ear to vibrate. Then vibration moves into the cochlea in the inner ear. Due to the vibration of cochlea hair present in the ear also vibrate and send signal to the brain through auditory nerve thus we become able to hear the sound.

(Outer Ear) Pinna \_\_\_ Ear canal \_\_\_ Ear drum \_\_\_ (middle bones) cochlea \_\_\_ Auditory nerve brain (inner Ear)

### Expand Your Thinking

**Q: 1 what happens if you sprinkle paper pieces on a drum head and then hit the drumstick?**

Ans: The pieces of paper start vibrating.

**Q : 2 Could sound from a radio travel through a room with no air .Explain.**

Ans: No sound cannot travel through a room with no air because sound does not travel through a vacuum .It always requires a material medium for its propagation.

**Q:3 Does sound move faster through the ear canal or through the tiny bones in the middle year?**

Ans: Sound moves faster through the tiny bones in the middle ear because bones are solid and ear canal is a hollow passage and sound travels faster through solids as compared to air.

**Q:4 Explain how covering the ears can prevent a person from hearing a sound?**

Ans: The outer part of human ear "Pinna" directs the sounds into the middle and inner parts of the ear. Ear covering does not allow the sound waves to enter the inner parts of the ear so we cannot be able to hear a sound.

**Q:5 How can sounds be harmful and helpful.**

Ans: Some sounds are loud and unpleasant and some sounds are soft and pleasant. Loud sounds are harmful because they can damage our ear drum. Soft sounds are helpful we can differentiate among sounds by hearing them softly. Such as sound of birds, our friends etc. Soft sounds help us to recognize different objects.

**Q:6 Why there is no sound heard in vacuum.**

Ans: There is no sound heard in vacuum because sound always needs a material medium for its propagation.

**Q:7 A bird sitting in a tree hears the chirping of another bird. A whale hears the sound made by another whale swimming near it .Which of these sounds travel faster? Explain.**

Ans: The sound of whale travels faster because the speed of sound in ~~air~~ <sup>water</sup> is more than the speed of the sound in ~~water~~ <sup>air</sup>.

**Concept Map**

- Ear Canal
- Ear Drum
- Hammer
- Cochlea
- Brain

**Chapter No: 12 Space and satellites**

**Q:1 Write a detailed note on comet.**

Ans: **Comet:-**

A comet is a large ball of ice and dust that orbits the sun.

**Parts of a comet:-**

A comet has three parts a head coma and a tail.

**Head:-**

The head of a comet is made of ice particles of rocks and gases. The head of a comet is only a few Km wide.

**Coma:-**

A large fuzzy circular cloud around the head is called "coma"

**Tail:-**

A long tail of gases and dust particles is present behind a comet. The tail can be millions of Km long. It points away from the sun. A comet far away from the sun bear no tail.

**Comet Halley:-**

Comet Halley is the comet which has appeared many times in the sky. It appears after every 76 years. Last time it was seen in 1986.

**Q:2 What do you know about asteroids and meteors?**

Ans: **Asteroids**

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Asteroids are made of rock, metal or minerals. An asteroid is a piece of rock that orbits the sun between Mars and Jupiter in a wide band. This band is called "Asteroid Belt" The asteroid belt is about 15 hundred thousand Km wide. Asteroids have different shapes and sizes.

**Ceres and Vesta:-**

Ceres and Vesta are the two asteroids which can be seen from Earth without the help of a telescope. Ceres is the largest asteroid. Its diameter is 933 Km and Vesta is the half size of Ceres.

**Meteors:-**

A meteor is a stray particle which comes from the asteroid belt and enters the atmosphere of the Earth. Due to the friction of air it gets size and a trail of light is seen that's why people call them falling stars, shooting star or a fire ball. Most meteors entering our atmosphere burn up to 50 to 100 Km above the surface of our Earth and add tons of dust into our atmosphere every day.

**Q:3 What are the key milestones in space technology.**

Ans: Key milestones in space technology:-

- (i) **Sputnik I:-**  
Soviet Union launch first artificial satellite in space in 1957.
  
- (ii) **Explorer I:-**  
United States launch Explorer I in space in 1958 and Yuri Gagarin became the first man to enter the space and returned softly.
  
- (iii) **Apollo 11 :-**  
Apollo 11 launched in 1969 it took first man to the Moon.
  
- (iv) **Skylab:-**  
USA launched its first space station "Skylab" in 1973.
  
- (v) **First women in space:-**  
In 1983 Sally Ride was the first woman in space.
  
- (vi) **Landing on Mars:-**  
Phoenix lander landed on Mars in 2007.

**Q:4 Write a note on any three artificial satellites.**

Ans: **Sputnik-I**

In 1957 Russia sent the world's first artificial satellite "Sputnik I" into space. It weighed only 83 Kg. It carried a thermometer and two radio transmitters which sent information about the atmosphere to the Earth. Its transmitters worked only for 21 days. After 57 days in orbit it destroyed.

**Explorer I:-**

Explorer I was the first satellite launched by the United States of America (USA) into space in 1958. It weighed only 14 Kg. It sent information about the radiation environment in Earth orbit.

**Geostationary satellite:-**

It moves at a height of about 36000 Km above the Earth. They move around the Earth with the same speed that Earth moves around its axis. They are used as communication satellites. Pakistan launched its first geostationary satellite in 2011 named "PAKSAT 1R"

**Expand Your Thinking**

**Q:1 How are asteroids and meteorites alike?**

Ans: Asteroids and meteorites are alike because both of these are the pieces of rocks or metals that orbit the sun.

**Q:2 Why does a comet's tail always stream away from the Sun?**

Ans: A comet's tail always stream away from the Sun because the gases escape from the head to tail due to the heat of the Sun.

**Q:3 Is it not a good idea to make the space station an international project?**

- Ans: 1 Yes of course it is a good idea because it will be beneficial for the whole world.
- 2 Third world countries which cannot afford to establish a space station individually can also get information about the world space easily.
- 3 It will shorten the distances and lessen the communication gap.
- 4 The dominance of one country in the space will also be denied.

**Concept Map**

Solar System

Comet

Asteroids

Meteors

Sometimes enter the

Earth's atmosphere

Space object made

of ice and dust

Move between Mars and Jupiter.