Chapter 1

Human Organ Systems

Students' Learning Outcomes

After completing this chapter, the students will be able to:

- describe various components of human digestive system.
- describe digestion and its importance.
- describe how digestive system helps in the digestion of various kinds of foods.
- identify common disorders of the digestive system.
- list the factors that lead to constipation and diarrhoea and the measures that can be taken to prevent them.
- describe the mechanism of respiration in humans.
- differentiate between breathing and burning processes.
- identify the common diseases of respiratory system and discuss their causes and preventive measures.

The human body is made up of trillions of cells. Cells group together to tissues, organs and organ systems. The combined action of all the systems allows people to perform various activities like offering salah.

Key Points

- Mouth, oesophagus, stomach, small and large intestines, liver and pancreas are the components of human digestive system.
- Digestion is a process of changing the food into simpler form. This process helps our body to get important nutrients.
- Some parts of our digestive system secrete chemicals which change carbohydrates (in mouth), proteins (in stomach) and fats into simpler substances. These substances are then absorbed into blood.
- Diarrhoea, heartburn, constipation, ulcer, gas-trouble, etc. are some common disorders of digestive system.
- Diarrhoea may be caused by an infection, by eating contaminated food or a reaction to some medicine.
- Washing hands frequently and washing fruits and vegetables before eating or cooking can help to prevent diarrhoea.
- Constipation may be caused by taking food low in fibre, lack of physical activity, not drinking enough water, etc.
- We can prevent constipation by eating food rich in fibre, by drinking plenty of water and by taking regular exercise.
- Our respiratory system helps to produce energy which we use in our activities.
- Breathing and burning are similar processes, but release of energy is very slow during breathing.
- Common cold, influenza, pneumonia, tuberculosis, lung cancer, etc. are some common disorders of the respiratory system.
- We can keep our lungs healthy by eating fruits and vegetables, and by taking regular exercise.

Questions

Complete each of the following sentences by writing the correct terms.

The process of breaking down of food Digestion

Muscular contractions that move food Peristalsis

The grape-like clusters of tiny thin-walled balloons in lungs Alveoli

The dome-shaped muscle at the bottom of our chest Diaphragm

The process of getting air into and out of the lungs Breathing

Encircle the correct answers in the following.

The place where digested food is absorbed:

(a) small intestine (b) large intestine

(c) stomach (d) mouth

What part of our body contracts and moves down when we inhale?

(a) bronchioles (b) alveoli

(c) diaphragm (d) kidneys

Air is moistened, filtered, and warmed in the:

(a) oesophagus (b) nose

(c) mouth (d) stomach

A large muscle that separates the chest cavity from the abdominal cavity and helps in breathing:

(a) larynx (b) trachea

(c) diaphragm (d) alveolus

Which produces juice for the final digestion of proteins, fats and carbohydrates?

(a) mouth (b) large intestine

(c) pancreas (d) gallbladder

The reverse process of peristalsis:

(a) breathing (b) burning

(c) vomiting (d) blood circulation

Give short answers.

How is carbon dioxide produced in our body? Pg 9

How is small intestine important in our digestive system? Pg 6

Why are we provided with teeth? Pg 4

What are alveoli? Pg 9

Briefly describe the mechanism of breathing. Pg 9

What measures can one take to prevent diarrhoea? Pg 7

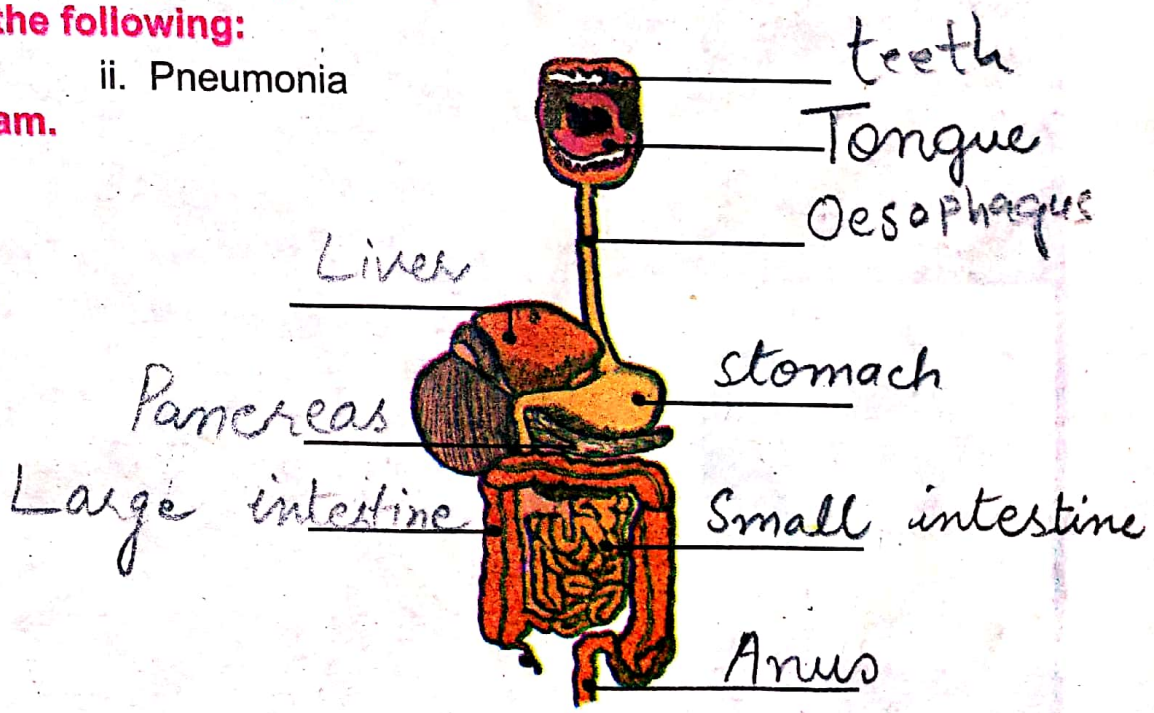
Explain the process of digestion of food in the mouth and the stomach.

Describe the human respiratory system.

Write notes on the following:

i. Constipation ii. Pneumonia

Label the diagram.



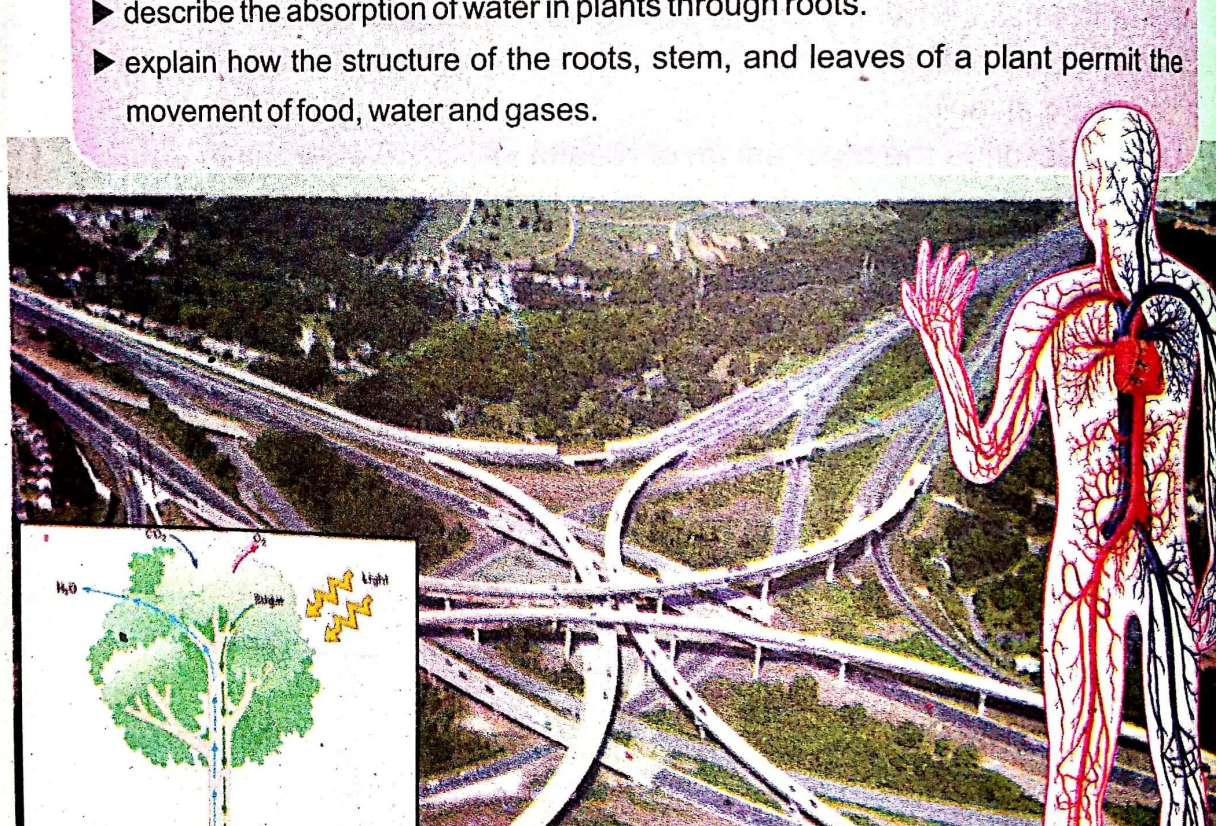
Chapter 2

Transport in Humans and Plants

Students' Learning Outcomes

After completing this chapter, the students will be able to:

- explain the transport system in humans.
- describe the structure and function of heart and blood vessels.
- explain the working of the circulatory system.
- identify scientific developments that provide alternatives for dysfunctional body parts such as artificial tissues and organs, and their transplantation.
- find out that some disorders in human transport system can be affected by diet.
- describe the absorption of water in plants through roots.
- explain how the structure of the roots, stem, and leaves of a plant permit the movement of food, water and gases.



The highway system of a city helps to move food, water, petrol, garbage, an other goods. Similarly, the transport systems help to move food, wate gasses and wastes throughout our body and a plant's body.

chambers, two atria and two ventricles. Heart pumps the blood into blood vessels, i.e. arteries, capillaries and veins.
organ transplant replaces a failing organ with a healthy one from another person.
gans transplanted more often are the kidney, heart, lung and liver.
ur diet and lifestyle also affect our circulatory system and may cause some sorders, such as heart attack, high blood pressure, diabetes, asthma, etc.
ny root hair on roots help to absorb water and minerals from the soil. Root essure pushes water up the plant.
ansportation in plants takes place through xylem and phloem.
tructures of roots, stem and leaves of plants help in transportation of water, inerals and food.

Questions

Complete each of the following sentences by writing the correct term.

Blood vessels which carry blood towards heart — Veins
Blood vessels which supply blood only to the heart — Coronary arteries
Transports food in a plant body — Phloem tissue
Pores to exchange gases in plants — Stomata
Transports water and minerals from roots to leaves — Xylem Tissue

Encircle the correct answers in the following.

Blood is carried away from the heart in:
(a) arteries (b) veins
(c) nerves (d) ureters

Where does the exchange of food, oxygen and wastes occur in the human body?
(a) in arteries (b) in veins
(c) in capillaries (d) in coronary arteries

Why does the blood turn dark red as it circulates through the body?
(a) It starts to clot.
(b) It gets old and dirty while flowing through the body.
(c) The oxygen in it is replaced with carbon dioxide.
(d) The farther blood is from the heart, the more dark red it is.

The movement of prepared food from leaves to those parts of plant body where it is needed is called:
(a) transpiration (b) translocation
(c) osmosis (d) active transport

Which chamber of the heart receives the oxygenated blood from the lungs?

(a) right atrium (b) left atrium

(c) right ventricle (d) left ventricle

The loss of water by evaporation from plants is called:

(a) translocation (b) transpiration

(c) pressure flow (d) diffusion

Give short answers.

What do you mean by oxygenated blood?

What is the estimated size of our heart?

Which arteries carry deoxygenated blood from heart to the lungs?

Name at least two diseases that can damage our kidneys.

Which tissue does transport water in plants?

Name three parts of the circulatory system.

Explain why it is important to circulate blood through the body.

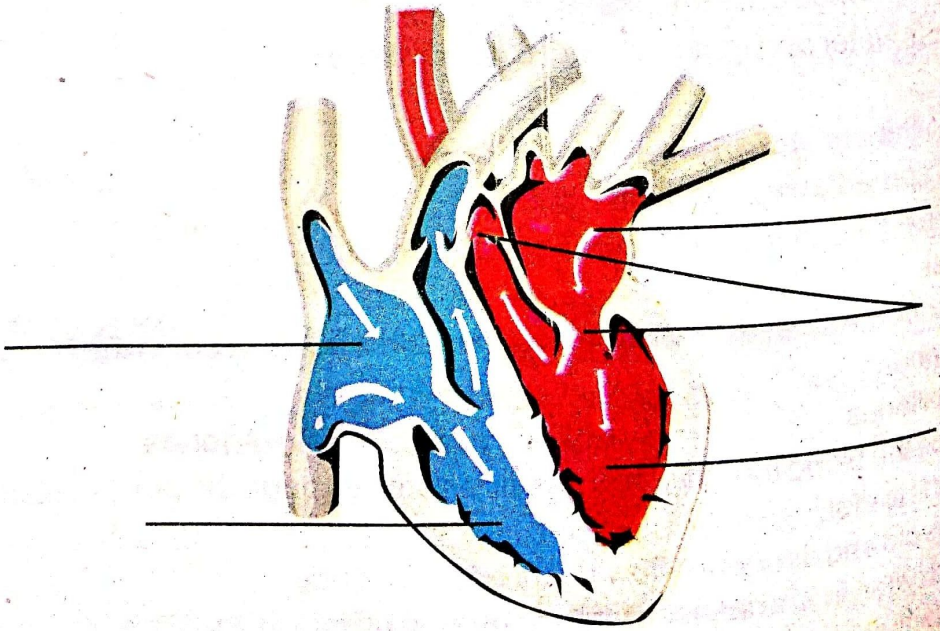
How many chambers does the human heart have? Give names.

Describe the structure of human heart.

Compare the structures and functions of blood vessels.

Describe that structure of a plant's root permits the movement of materials.

Label the diagram.



Links For more information visit:

• http://www.biologymad.com/master.html?http://www.

v. Which chamber of the heart receives the oxygenated blood from the lungs?
(a) right atrium (b) left atrium
(c) right ventricle (d) left ventricle

vi. The loss of water by evaporation from plants is called:
(a) translocation (b) transpiration
(c) pressure flow (d) diffusion

3. Give short answers.

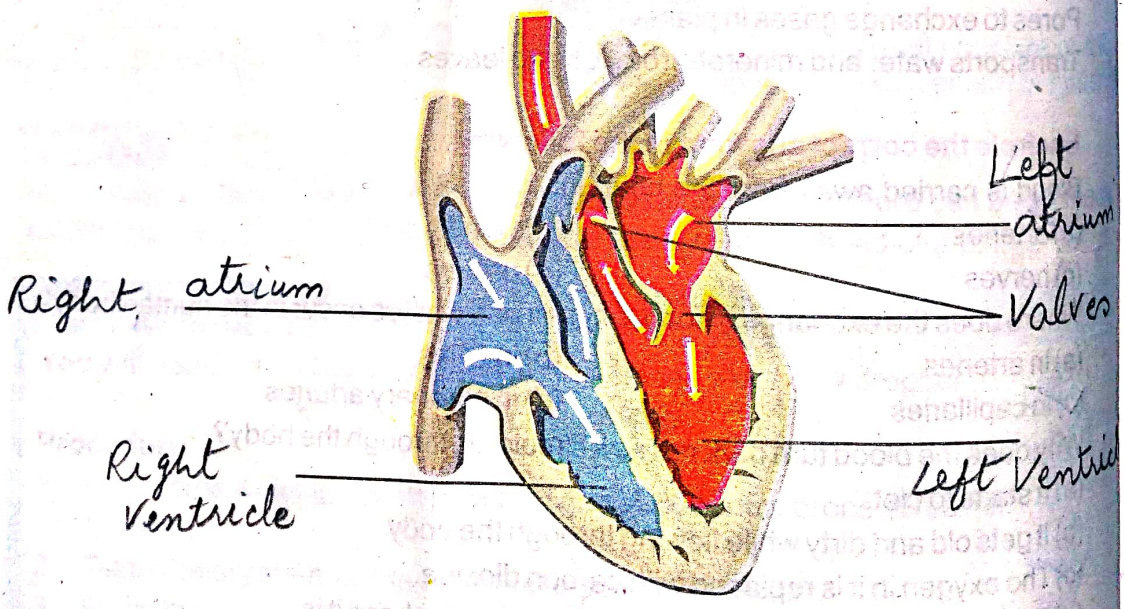
i. What do you mean by oxygenated blood?
ii. What is the estimated size of our heart?
iii. Which arteries carry deoxygenated blood from heart to the lungs?
iv. Name at least two diseases that can damage our kidneys.
v. Which tissue does transport water in plants?
vi. Name three parts of the circulatory system.
vii. Explain why it is important to circulate blood through the body.
viii. How many chambers does the human heart have? Give names.

4. Describe the structure of human heart.

5. Compare the structures and functions of blood vessels.

6. Describe that structure of a plant's root permits the movement of materials.

7. Label the diagram.



Computer Links

For more information visit:
- http://www.biologymad.com/master.html?http://www.biologymad.com/planttransport/planttransport.htm
- http://kidshealth.org/parent/general/body_basics/heart.html

Chapter 3

Reproduction in Plants

Students' Learning Outcomes

After completing this chapter, the students will be able to:

- define pollination.
- compare self and cross-pollinations in plants.
- list various factors involved in cross-pollination.
- investigate plants, which are cross-pollinated.
- differentiate between sexual and asexual reproduction.
- describe fertilization.
- describe seed and fruit formation.

A flower's colourful petals attract insects that pollinate the flower. Pollen grains stick to their bodies. Thus, they carry the pollen grains to part of the flower that makes seeds.

Key Points

- Pollination is the transfer of pollen grains from the stamen to the carpel of a flower.
- There are two kinds of pollination, i.e. self-pollination and cross-pollination.
- Self-pollination is the transfer of pollen grains from anther to the stigma of the same flower or another flower on the same plant.
- Cross-pollination is the transfer of pollen grains from the anther of a flower to the stigma of another flower on another plant of the same kind.
- Coloured petals, long and sticky stigmas, nectar and fragrance are some factors that favour cross-pollination in plants.
- Poplar, willow, apple, papaya, trees, etc. are cross-pollinated.
- Plants reproduce both by asexual reproduction and sexual reproduction.
- Asexual reproduction is the reproduction in which a cell from only one parent develops into offspring.
- In sexual reproduction, two gametes from both parents combine to form a zygote.
- Fertilization is the process of fusion of sperm and egg.
- After fertilization the ovary of a flower changes into fruit while the ovules become seeds.

Questions

1. Complete each of the following sentences by writing the correct term.

i. It protects a seed — Fruit
ii. Male and female sex cells — Gametes
iii. The exchange of pollen grains between two plants of similar type — Cross Pollination
iv. Most grasses are pollinated by — Wind
v. It is present in the ovary of the flower and develops into seed — Ovule

2. Encircle the correct answers in the following.

i. The part of a plant that forms seeds is the:
(a) stem (b) root
(c) leaf (d) flower

ii. When a bee visits a flower:
(a) Seeds stick to its body. (b) Cones stick to its body.
(c) Pollen grains stick to its body. (d) Fruit sticks to its body.

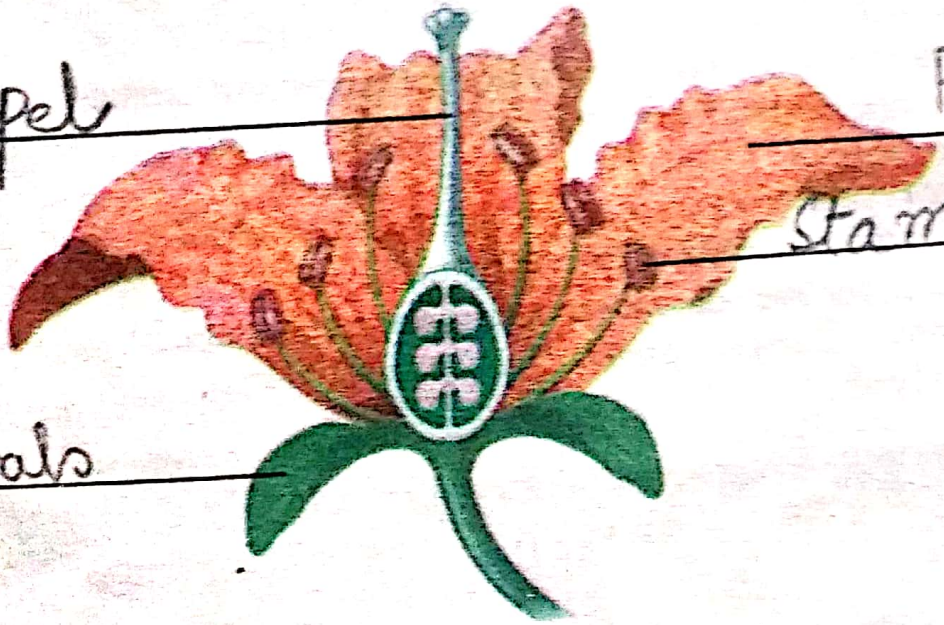
iii. Which structure is helpful to the pollen grains to carry sperms to the ovary?
(a) cotyledon (b) carpel
(c) pollen tube (d) seed

v. The sticky part of a flower is called:
(a) sepal (b) stamen
(c) ovary (d) stigma

Asexual reproduction involves:
(a) two gametes (b) a single parent plant
(c) only male sex cell (d) fertilization

Give short answers.

Differentiate between asexual and sexual reproduction. 25
What are the male and female parts of a flower? 26
Define pollination. 26
Name a few pollinators. 27
Define a sperm and an egg.
Which part of a seed develops into the first root? 30
Write a detailed note on pollination in plants. 25-27
Explain fertilization in plants. 29
Describe the structure of a seed. 30
Write a note on fruit. 31
Label the parts of the flower and write the purpose of each part.



1. Sepals protect flower from sun & rain.
2. Petals attracts insects for pollination
3. Stamen are male parts of flower.
4. Carpels are female parts.

Computer Links

For more information visit:
- en.wikipedia.org/wiki/plant_reproduction
- http://www.desktopclass.com/education/9th-10th/seed-and-fruit-formation-10th-biology-lesson-16-4.html

Chapter 4

Environment and Feeding Relationships

Students' Learning Outcomes

After completing this chapter, the students will be able to:

- explain the ecosystem.
- define the term habitat.
- compare the different kinds of habitats.
- investigate the various features that allow animals and plants to live in a particular habitat.
- identify the factors that cause daily and yearly changes in a habitat.
- explain how living things adapt to daily and yearly changes in their habitat.
- explain the ways in which living things respond to changes in daily environmental conditions such as light intensity, temperature and rainfall.
- explain why food chains always begin with a producer.
- illustrate the relationship between producers and consumers.
- describe two food chains in the environment around them.
- explain a food web.

Key Points

Ecosystem is the system formed by the interaction of living organisms and non-living things in an environment.

A habitat is the natural home of an organism where it lives and reproduces.

Grassland is a grassy, windy, partly-dry area. A pond habitat is rich in life. Deserts are the driest land areas with a few number of plants and animals. A large number of plants and animals is found in a rainforest.

Plants and animals adapt to live in a particular habitat.

Light intensity, temperature, water, droughts, floods, earthquakes, etc. are the factors that can bring changes in a habitat.

People can also bring changes in habitats by adding pollution.

Animals and plants adapt to their environment for their survival.

Green plants make food, so they are producers. Animals eat plants so they are consumers.

A food chain and a food web are feeding relationships among organisms.

The feeding relationship among organisms is called a food chain.

Several food chains in an ecosystem overlap to form a network called food web.

Questions

Complete each of the following sentences by writing the correct term.

The basic source of energy for every ecosystem — Sunlight

Any living thing in the environment — Biotic part

All the populations living in an area make a — Community

Several food chains overlap in a — Food web

Breakdown the bodies of dead animals and plants — Decomposer

Encircle the correct answers in the following.

The sunlight energy enters in an ecosystem through:
(a) plants (b) decomposers
(c) animals (d) water

Organisms that make their own food are called:
(a) producers (b) heterotrophs
(c) consumers (d) decomposers

Bacteria and fungi are:
(a) decomposers (b) producers
(c) grazers (d) predators

Which one is a producer in an ecosystem?
(a) lion (b) hawk
(c) plant (d) rat

Which organisms have maximum amount of energy in a food chain?
(a) primary consumers (b) secondary consumers
(c) tertiary consumers (d) producers

A group of tigers living and reproducing in a forest is an example of:
(a) a community (b) a population
(c) an ecosystem (d) a habitat

Give short answers.

What kinds of organisms are these at the start of most food chains?

Name biotic factors of an ecosystem.

How are producers, consumers and decomposers related to each other?

Define an ecosystem.

What do you mean by community in an ecosystem?

Name the ways by which we can save our natural resources.

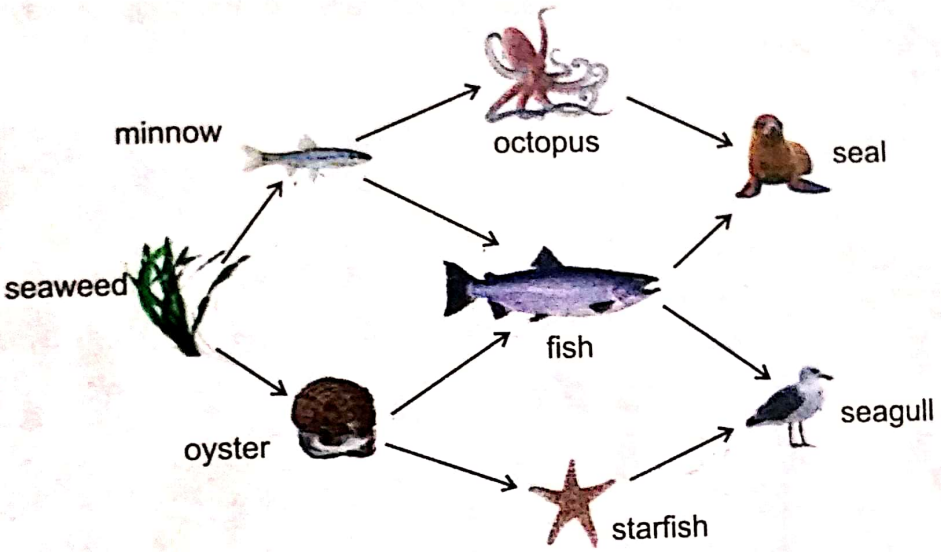
What is a habitat? Describe its few kinds.

Describe factors that can bring daily and yearly changes in the habitat.

Describe adaptations of some aquatic animals to live in their habitat.

Explain a food chain and a food web with examples.

Look at the following food web and answer the questions given below.



Name the producer in the food web.
Sea weed

From where does the producer gets energy?
Sun

Name three consumers in the food web.
Minnow , Oyster , Starfish

Write down two food chains in this food web.
Sea weed → minnow → Octopus
Sea weed → oyster → Starfish

Computer Links

For more information visit:
- http://www.bbc.co.uk/schools/ks3bitesize/science/organisms_behaviour_health/food_chains/revise2.shtml
- http://www.geography.learnontheinternet.co.uk/topics/ecosystem.html

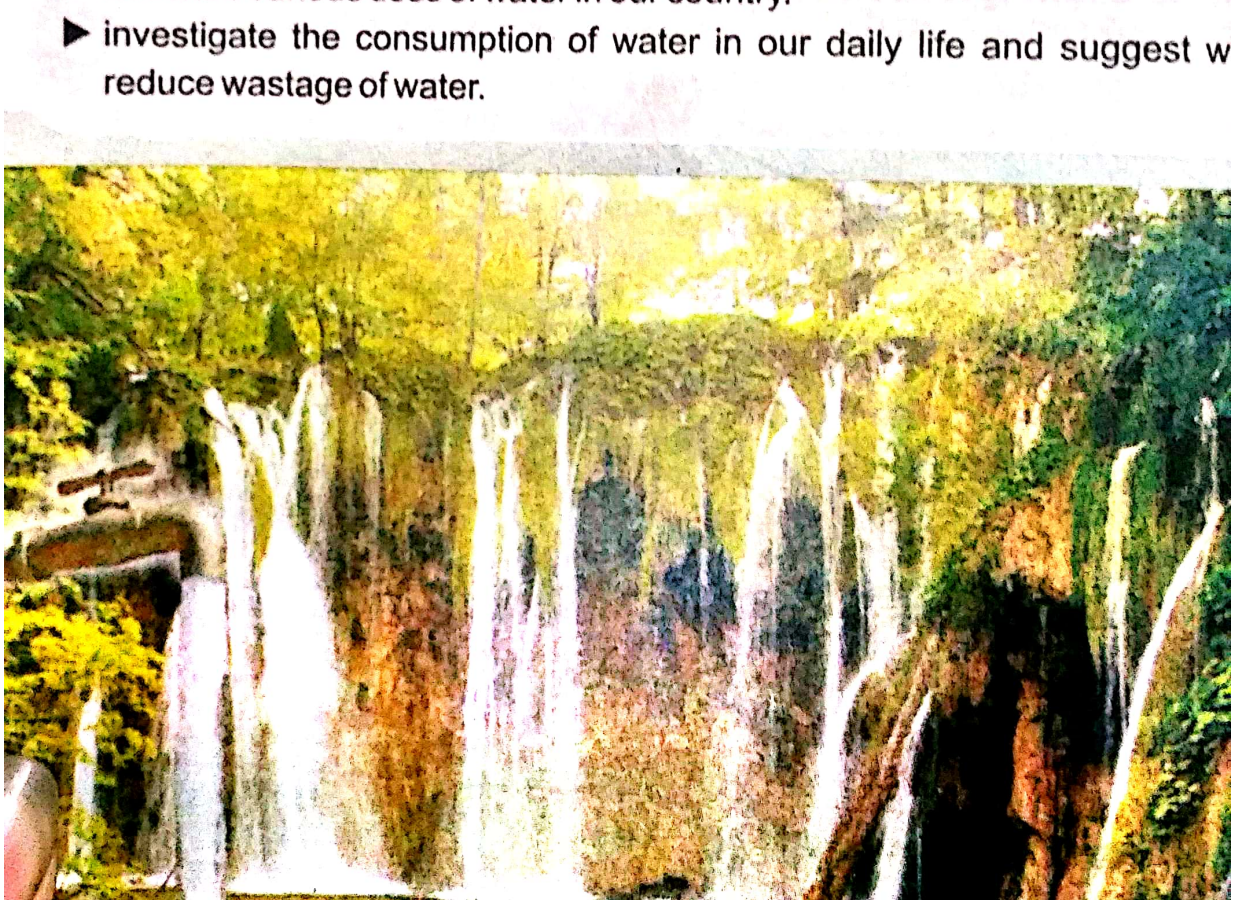
Chapter 5

Water

Students' Learning Outcomes

After completing this chapter, the students will be able to:

- describe the ways in which clean water is vital for meeting the needs of hu and other living things.
- identify the sources of water.
- recognize the substances present in water that make the water impure.
- suggest different ways to clean the impure water.
- describe various uses of water in our country.
- investigate the consumption of water in our daily life and suggest w reduce wastage of water.



Key Points

Water is the most essential part of life. Plants, fish, insects, humans and all other animals need water to survive.

Water is present not only on the surface of the Earth but also beneath its surface.

Rivers, lakes, ponds, glaciers, wetlands, etc. are the sources of fresh water. Water is also present in seas and oceans.

Harmful and unwanted substances are making the water polluted.

Microorganisms, acids, oil, pesticides, etc. are water pollutants.

The process of removal of impurities from water is called purification of water. We can clean water by filtration, boiling, chlorination and adding potash alum.

We use water in homes, agriculture, industries and to generate electricity.

Water is precious, we need to conserve it.

Questions

1. Complete each of the following sentences by writing the correct term.

i. Large sheets of ice are called Glaciers
ii. The process of removal of impurities of water Purification
iii. Rivers, lakes and ponds are the sources of Fresh water
iv. Harmful and unwanted substances in water Pollutants
v. Toxic gases in the air react with rain water to make Acid rain

2. Encircle the correct answers in the following.

i. Drinking water sources can be contaminated by:
(a) natural materials (b) run-off from fields and roads
(c) forests (d) mountains

ii. What percentage of the Earth's water supply is fresh water?
(a) 3% (b) 5%
(c) 10% (d) 15%

iii. We can get the purest form of water:
(a) by boiling water (b) by distillation process
(c) from tube-wells (d) from rivers

iv. Heavy mechanical complexes use a large amount of water for:
(a) cooling (b) freezing
(c) washing (d) wasting

v. Which one is not the source of water pollution?
(a) human wastes (b) industrial wastes
(c) fertilizers (d) rain water

3. Give short answers.

i. Why is fresh water important?
ii. Where is most of the fresh water found?
iii. Why is the most of the Earth's water salty?
iv. If water runs downhill to the seas, what are some ways that make fresh water polluted?
v. Why clear water is not necessarily safe to drink?

Chapter 6

Structure of an Atom

Students' Learning Outcomes

After completing this chapter, the students will be able to:

- describe the structure of an atom.
- differentiate between atomic and mass number.
- draw diagrams of the atomic structure of the first eighteen elements in t periodic table.
- define valency.
- explain formation of ions.
- differentiate between cations and anions.
- describe isotopes and their uses in medicine and agriculture.
- identify the types and number of elements present in simple molecules a compounds.
- make chemical formulae from list of anions and cations.
- state the law of constant composition and give examples.

- An atom is the smallest particle of an element that can combine with the other atom.
- Atomic mass is the sum of protons and neutrons in the nucleus of an atom.
- Electrons are the negatively charged particles present in the outermost shell of an atom.
- Valency is the combining capacity of an atom to combine with the other atom.
- An ion is the atom with positive or negative charge.
- When an atom releases its one or more electrons, it becomes a positive ion (cation).
- When an atom absorbs electrons in its outermost shell, it becomes a negative ion (anion).
- Isotopes are the atoms of the same element, having same atomic number, but different mass numbers. Isotopes are used in medicines and industries.
- A chemical formula is the description of a molecule in the form of symbols and valencies.
- The Law of Constant Composition states that the composition of a compound is always the same, regardless of how the compound was made or obtained.

Questions

1. Complete each of the following sentences by writing the correct term.

i. Two or more atoms of the same element with a different number of neutrons — Isotopes

ii. The atomic particle with no charge — Neutron

iii. It is the number of protons in an atom — Atomic Number

iv. An atom with positive or negative charge — ion

v. A molecule having one atom in it — Mono-atomic

2. Encircle the correct answers in the following.

i. An atom has no overall charge if it contains equal number of:
(a) electrons and neutrons
(b) electrons and protons
(c) protons and neutrons
(d) positrons and neutrons

ii. Isotopes are found because atoms of the same element can have different number of:
(a) protons
(b) electrons
(c) neutrons
(d) none of the above

iii. In the chemical formula CO_2, which of the following is shown by subscript 2?
(a) There are two oxygen ions.
(b) There are two oxygen atoms.
(c) There are two carbon atoms.
(d) There are two CO_2 molecules.

iv. The atomic number of flourine (F) is 9. Its mass number is 19. How many neutrons are present in its atom?
(a) 7
(b) 8
(c) 9
(d) 10

v. The number of electrons in N-shell can be:
(a) 2
(b) 8
(c) 18
(d) 32

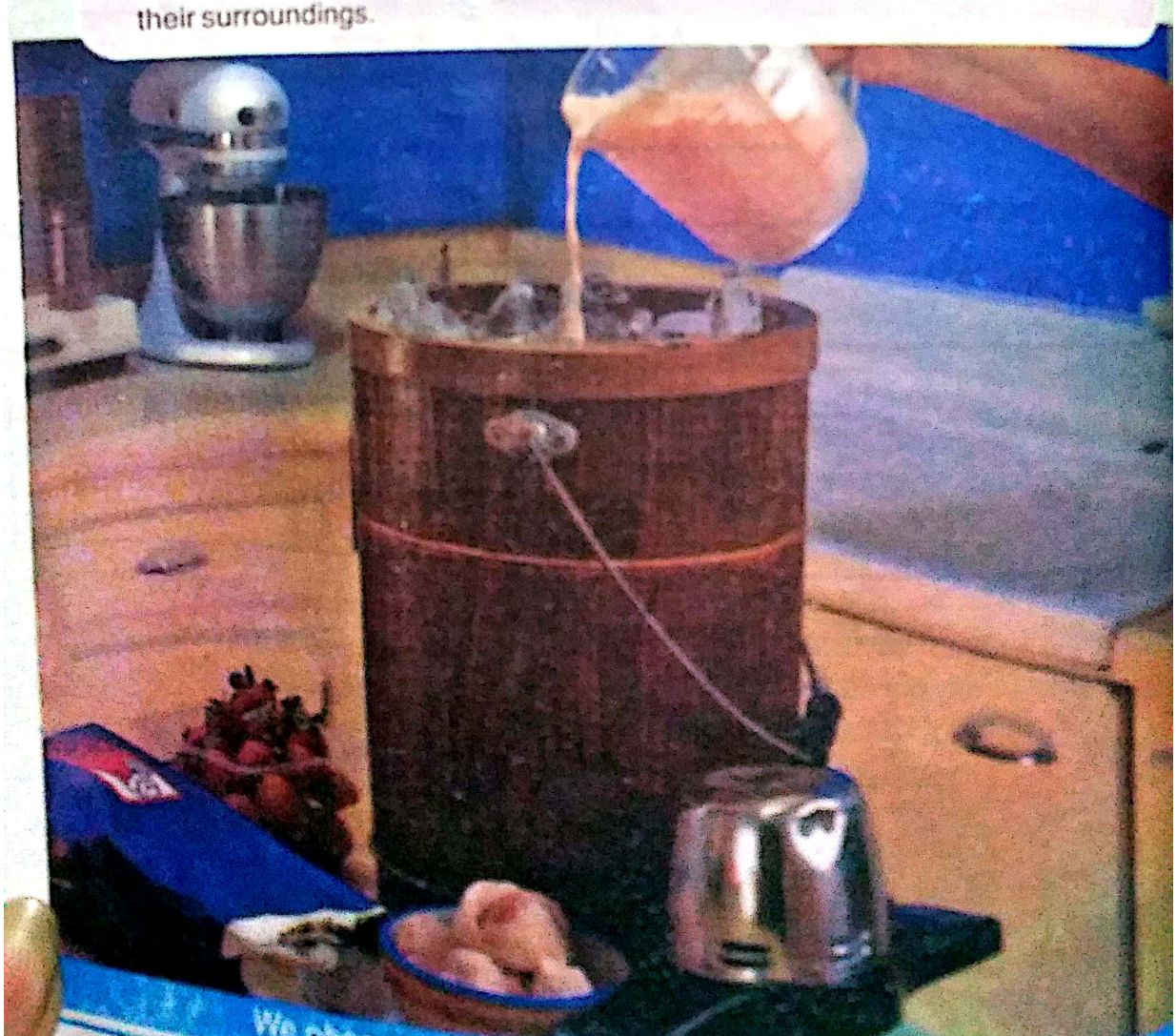
Chapter 7

Physical and Chemical Changes and Processes

Students' Learning Outcomes

After completing this chapter, the students will be able to:

- differentiate between physical and chemical changes.
- identify the physical and chemical changes taking place in environment.
- explain the use of hydrocarbons as fuels.
- explain the use of physical and chemical properties of fertilizers, which make them useful in agriculture.
- discuss harmful effects of improper use of fertilizers.
- describe the chemical process in which vegetable oil changes into fat.
- describe the simple process for the manufacture of plastics.
- distinguish between reversible and non-reversible changes in materials.
- identify a variety of reversible and non-reversible changes in materials and in their surroundings.



We observe many

ical change, only shape, size or physical state of a material change. In a mical change, a material changes into a new material.
ling and freezing of water, cutting fruit into pieces, switching on the bulb, etc. re some physical changes. Rusting of iron, burning of paper, cooking of food, etc. re some chemical changes.
lydrocarbons burn in the presence of oxygen and change into heat, water and arbon dioxide. This heat is used for different purposes.
hemical fertilizers, banaspati ghee and plastics are the result of chemical hanges.
he size and hardness of grains of chemical fertilizers help to release nutrients radually in the soil.
mproper use of chemical fertilizers can cause water pollution.
chemical process hydrogenation changes vegetable oil into solid fat.
lastics are very large molecules which are made from many smaller molecules alled monomers.
n reversible change the product formed can again go back to its original form. In an irreversible change, the product formed cannot again go back to its original orm.
oiling or freezing of water, melting of wax, etc. are examples of reversible hanges. Rotting of egg or fruit, turning of milk into yogurt, etc. are examples of rreversible changes.

Questions

Complete each of the following sentences by writing the correct term.

A change in size, shape or state of matter — Physical change
Results in new substances with different properties — Chemical change
Farmers use to increase crop production — Fertilizer
A compound containing only carbon and hydrogen atoms — Hydro Carbon
A polymer that can be easily moulded — Plastic

Encircle the correct answers in the following.

Burning a match stick is an example of a:
(a) physical change
(b) chemical change
(c) change in pressure
(d) change of colour

Which one is a physical change?
(a) frying an egg
(b) breaking a wooden stick
(c) burning of candle
(d) toasting a bread

An example of a chemical change is:
(a) boiling of water
(b) evaporation of water
(c) burning of paper
(d) melting of ice

The red colour of a rose turns brown. It is a:

(a) physical change (b) chemical change

(c) reversible change (d) sudden change

The vegetable oil is changed into banaspati ghee (solid fat) by the addition of:

(a) nitrogen (b) carbon

(c) oxygen (d) hydrogen

A chemical change results in a:

(a) loss of matter (b) solution

(c) phase change (d) different kind of matter

Give short answers.

What is meant by a physical change?

Define a chemical change.

Give an example to show that people change the environment.

What is hydrogenation?

What is a plastic?

Explain with examples that a chemical change brings change in the properties of a substance.

Write brief notes on:

i. Plastics **ii. Change of vegetable oil into fat**

How are fertilizers useful and harmful for us?

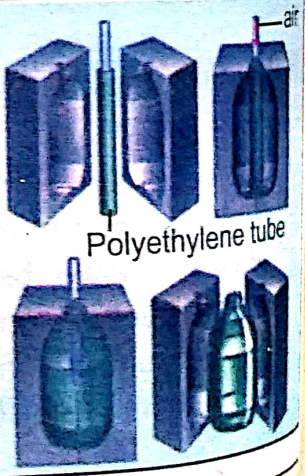
Explain reversible and irreversible changes with examples.

Making of Plastic Soft Drink Bottles

Amazingly, the making of plastic soft-drink bottles is same as to blow up a balloon.

- A tube of warm polyethylene is placed inside a bottle-shaped mould.
- After closing the mould, compressed air is blown into the polyethylene tube. The tube expands and takes the shape of the mould.

The mould is then opened. Your soft-drink bottle is ready for filling.



Computer Links

For more information visit:

- http://www.learnnext.com/lesson/CBSE-VII-Science-Physical-and-Chemical-Changes.htm
- http://en.wikipedia.org/wiki/Chemical_process

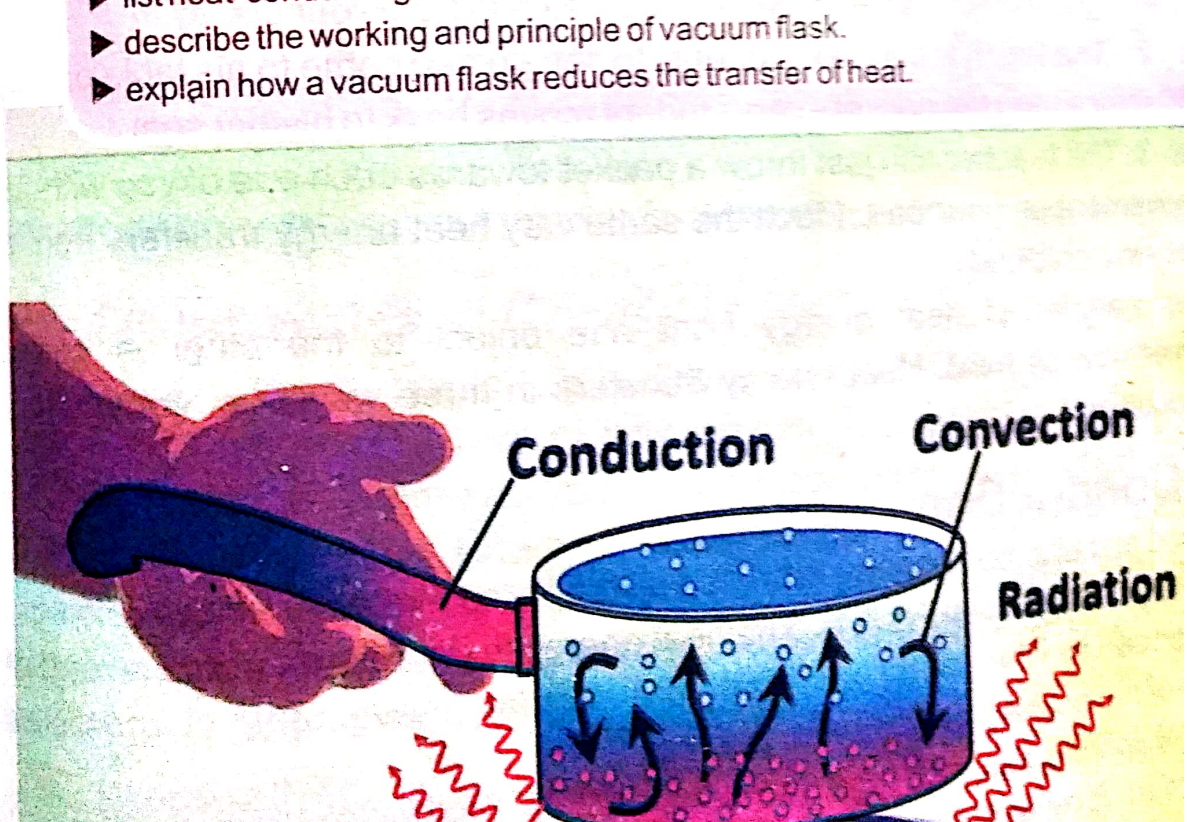
Chapter 8

Transmission of Heat

Students' Learning Outcomes

After completing this chapter, the students will be able to:

- explain the flow of heat from hot body to a cold body.
- explain conduction, convection and radiation through experimentation.
- recognize the three modes of transfer of heat from environment.
- suggest how birds can glide in the air for hours.
- identify examples of appliances that make use of different modes of transfer o heat.
- list heat-conducting materials in their surroundings.
- describe the working and principle of vacuum flask.
- explain how a vacuum flask reduces the transfer of heat.



Heat can be transferred from one object to the other by three methods, e. conduction, convection and radiation.

Key Points

- Heat is a form of energy. Heat always flows from an object at higher temperature to an object at lower temperature.
- Conduction is the transfer of heat through matter without the actual movement of particles from their positions.
- Convection is the transfer of heat in which molecules of a medium actually move to the source of heat energy to absorb heat and then move away from it.
- Radiation is the transfer of heat from a hot body to a cold body directly, without heating the space in between the two bodies.
- Conduction occurs in solids, liquids and gases. But metals are better heat conductors.
- Convection occurs only in liquids and gases.
- Radiation needs no material medium to transfer heat energy.
- Good and bad conductors of heat play very important role in our lives.
- Convection causes wind and ocean currents.
- Heat from the Sun reaches us by radiation.
- Some birds take advantage of convection currents and glide in the air for hours.
- A good radiator of heat is also a good absorber of heat.
- A vacuum flask reduces the transfer of heat by conduction, convection and radiation to keep things hot or cold.

Questions

1. Complete each of the following sentences by writing the correct term.

The transfer of heat by movement of molecules from place to place Convection

i. It can maintain the temperature of drinks Vacuum Flask

ii. The transfer of heat by direct contact of molecules Radiation

v. The surface which absorbs and radiates heat better Black

2. Encircle the correct answers in the following.

When we sit in the sun we are heated by:

(a) convection (b) conduction

(c) radiation (d) convection current

Warm air rises because of:

(a) light (b) convection

(c) conduction (d) radiation

i. A metal spoon is placed in a cup of hot water. The spoon gets warm by:

(a) conduction (b) convection current

(c) radiation (d) convection

In a vacuum flask, the vacuum prevents the transfer of heat by:

(a) conduction and convection (b) convection

(c) radiation (d) air

v. What is happening when warm water rises in a lake and cold water sinks?

(a) conduction (b) convection

(c) radiation (d) mixing

vi. Heat energy can be transferred well by conduction from one material another only if both are:

(a) solids (b) liquids

(c) gases (d) all the three

vii. Wind blows due to:

(a) conduction of heat (b) convection of heat

(c) radiation of heat (d) emission of heat

viii. Which colour is a good reflector of heat?

(a) red (b) black

(c) blue (d) white

ix. What happens if two objects at different temperatures are touching?

(a) Heat energy transfers from the warmer object.

(b) Heat energy transfers from the colder object.

(c) Heat energy transfers to the warmer object.

(d) No heat energy transfer takes place.

4 Give short answers.

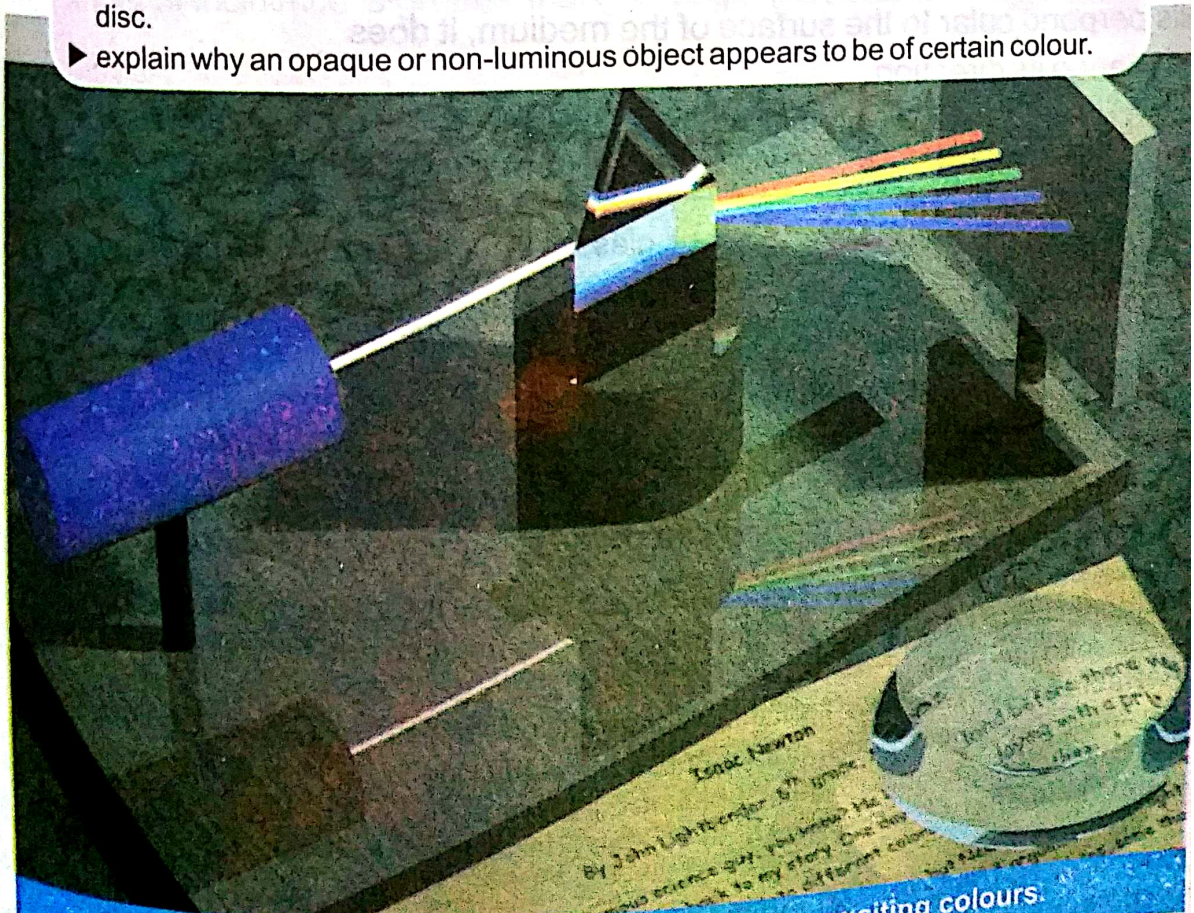
Chapter 9

Dispersion of Light

Students' Learning Outcomes

After completing this chapter, the students will be able to:

- explain refraction of light and its causes.
- discuss the effects of refraction with examples.
- list the colours of light using a prism.
- describe the dispersion of light by a prism.
- identify different uses of light of different colours at home, school and country and explain the relationship of choice of colours to their purpose.
- define spectrum of light.
- identify primary colours and show how they are combined to form secondary colours.
- identify a device in their surroundings that uses different combinations of colours.
- demonstrate how spinning of a rainbow disc results in the appearance of white disc.
- explain why an opaque or non-luminous object appears to be of certain colour.



Light passing through a prism can be split into exciting colours.

Key Points

- When light passes from a transparent medium to another, it changes speed and bends. This bending of light is called refraction.
- Refraction causes images to form in our eyes.
- When light passes through a prism, it refracts and bends at an angle. A prism can split white light into its component colours.
- Red, orange, yellow, green, blue, indigo and violet are the component colours of white light.
- The band of seven colours of light is called the spectrum of light.
- A rainbow disc has all the seven colours of light. When it is spinned, white disc is seen.
- Red, blue and green are three primary colours of light. Primary colours combine to make secondary colours of light.
- The colour of an object is the colour of light it reflects. A red flower reflects red colour and appears red. A white surface reflects all the colours of light and appears white. A black surface reflects no colour.

Questions

1. Complete each of the following sentences by writing the correct term.

i. They can carry thousands of phone conversations at the same time Optical fibres
ii. The bending of light, when it enters from one medium to another Refraction
iii. The angle of incidence at which maximum refraction occurs Critical angle
iv. The ratio of the speed of light in vacuum to its speed in another medium Refractive index
v. The splitting of white light into its component colours Dispersion of light

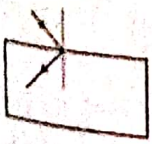
2. Encircle the correct answers in the following.

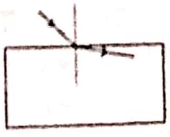
i. When a light ray passes from one medium to another at an angle:
(a) reflection occurs (b) refraction occurs
(c) refraction does not occur (d) reflection does not occur

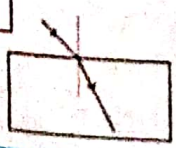
ii. Which of the following objects does not refract light?
(a) a microscope (b) a magnifier
(c) a camera (d) a mirror

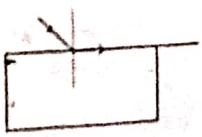
iii. The splitting of white light into its component colours is called:
(a) dispersion of light (b) reflection of light
(c) total internal reflection (d) mirage

iv. A ray of light strikes at an angle on one side of a rectangular glass block. Which diagram shows the right path of the light ray?

(a)


(b)


(c)


(d)


v. We see a mirage due to the:
(a) reflection of light
(b) refraction and total internal reflection of light
(c) dispersion of light
(d) refraction of light

vi. A coin in the bowl becomes visible when water is added. It is because of:
(a) reflection of light
(b) refraction of light
(c) total internal reflection
(d) dispersion of light

3. Give short answers.

i. What happens, when light travels from glass into air at

ii. What is refractive ind

Chapter 10

Sound Waves

Students' Learning Outcomes

After completing this chapter, the students will be able to:

- explain the wavelength, frequency and amplitude of sound waves and give their units.
- state factors on which sound depends.
- investigate objects in home and surroundings that are designed and made to produce different sounds.
- compare audible frequency range of humans and different animals.
- design a musical instrument to explain the relation between its sound and shape.
- identify the application of different sounds in daily life.

- Sound waves are longitudinal waves.
- Wavelength of a sound wave is the distance between two adjacent compressions or rarefactions. It is measured in metres (m).
- Frequency is the number of vibrations produced by a vibrating body in one second. It is measured in hertz (Hz).
- Amplitude of a wave is the maximum distance the wave vibrates from its rest position. It is also measured in metres (m).
- Pitch and loudness are the characteristics on which sound depends.
- A healthy human ear can hear sounds of frequencies from about 20Hz to 20,000Hz. Different animals have different audible frequency ranges.
- We use doorbells, sirens, telephones, alarms, stereo players, etc. that produce different sounds.

Questions

1. Complete each of the following sentences by writing the correct terms.

i. The lowest points of a transverse wave — Trough
ii. The shrillness or graveness of a sound — Pitch
iii. The distance a wave covers in one second — Speed
iv. A compression and a rarefaction combine to form — Longitudinal wave
v. A material thing through which a wave travels — medium

2. Encircle the correct answers in the following.

i. When a wave travels through a medium:
(a) particles are transferred from one place to the other
(b) energy is transferred from one place to the other
(c) particles and energy both are transferred from one place to the other
(d) nothing happens

i. The speed of sound in air is:
(a) greater than that of light
(b) 100 kilometres per hour
(c) 100 metres per hour
(d) 330 metres per second

i. A sound wave is a:
(a) transverse wave
(b) longitudinal wave
(c) standing wave
(d) sometimes transverse and sometimes longitudinal

Objects that vibrate slowly have a pitch that is:
(a) high
(b) loud
(c) soft
(d) low

Sound waves travel more quickly through:

(a) solids (b) gases

(c) space (d) liquids

Give short answers.

Sketch a transverse wave and label a crest, a trough, a wavelength, and amplitude.

Define the wavelength of a longitudinal wave.

Name a few devices that use different sounds in our everyday life.

What makes some sounds louder than others?

What is the relationship between frequency and pitch?

How does sound travel?

Compare transverse waves and longitudinal waves.

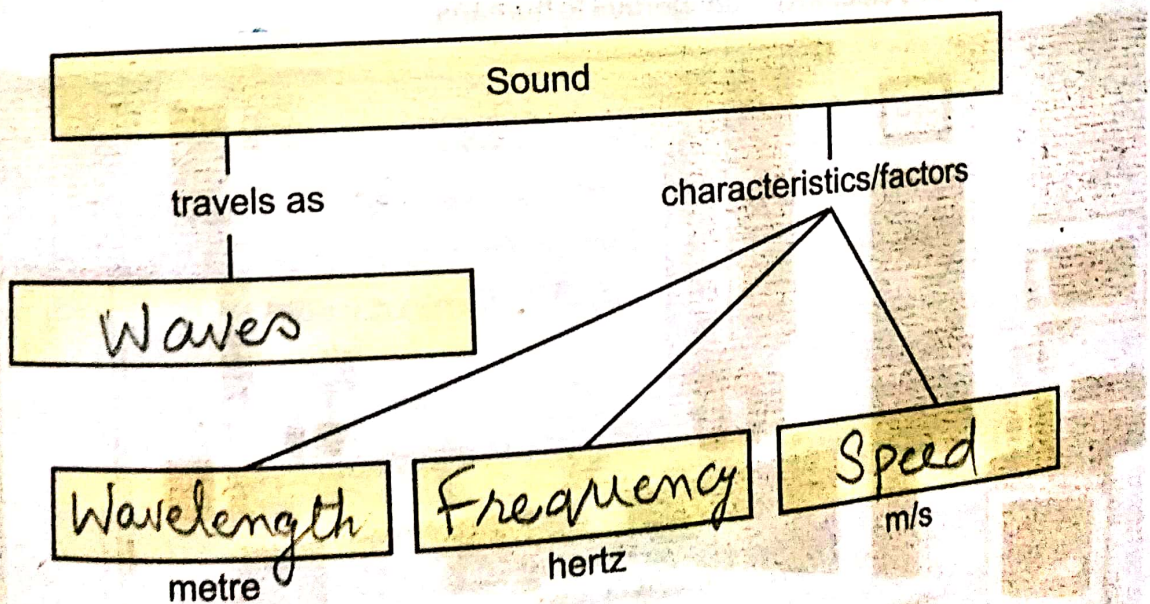
What type of waves are sound waves, and how do they transfer sound energy?

Describe loudness and pitch of the sound.

Write brief notes on:

(a) Audible frequency range **(b) Speed of sound**

Complete the concept map given below.



Computer Links

For more information visit:

- www.bowlesphysics.com/image/AP_Physics_B_waves_and_sound.pdf
- www.fi-edu/fellows/fellow2/apr99/soundvib.html

Chapter 11

Circuits and Electri Current

Students' Learning Outcomes

After completing this chapter, the students will be able to:

- define current.
- make parallel and series circuits.
- investigate about types of circuits used for different purposes.
- identify a disadvantage of a series circuit.
- differentiate between current and energy.
- explain the effects of electric current in daily use appliances.
- describe voltage.
- explain the resistance as an opposition to the flow of current.
- describe the relationship between voltage and resistance.
- measure current by using different devices.
- list the major uses of electricity in homes.
- list electrical hazards and precautionary measures to ensure the safe u electricity at home.
- describe why electricity is dangerous to humans.

You are familiar with electricity as many appliances/devices oper

path along which charges can flow is called an electric circuit.

- In a series circuit, all the components are connected one after the other in a single loop. In a parallel circuit, the components are connected in two or more loops.
- As there is only one path for the current to flow in a series circuit, a break at any part of the circuit stops the flow of current in the whole circuit
- We use many appliances which use heating, chemical and magnetic effects of the electric current.
- Voltage is the difference of potential between two points in a circuit or battery.
- Resistance is the hindrance to the flow of current. The resistance of a wire depends on length of the wire and thickness of the wire.
- An ammeter is used to measure the amount of electric current in an electric circuit.
- Electricity is very important for us, but it can also be dangerous. An electric shock can be fatal for a person.
- We use fuses, MCBs, Earth wires and ELCB's for the safe use of electricity.

Questions

1. Complete each of the following sentences by writing the correct term.

i. The circuit provides only one path for the current — Series circuit

ii. One unit on our electricity meter — Kilowatt-hour

iii. The unit of potential difference — Volts (V)

iv. The unit of electric current — Ampere (A)

2. Encircle the correct answers in the following.

i. Electric current is the:
(a) flow of atoms
(b) flow of protons
(c) flow of electrons
(d) flow of neutrons

ii. The potential difference in a circuit between two points is measured in:
(a) volts
(b) amperes
(c) watts
(d) coulombs

iii. Which one is an insulator?
(a) copper
(b) glass
(c) iron
(d) aluminium

iv. Resistance of a conductor depends on:
(a) thickness of the wire
(b) length of the pipe
(c) voltage of the electrical source
(d) speed of the flow of charges

v. The device to measure potential difference in a circuit is called:
(a) ammeter
(b) voltmeter
(c) barometer
(d) thermometer

vi. When there are more than one path for a current to flow, the circuit is called:

(a) series circuit (b) parallel circuit

(c) open circuit (d) closed circuit

3. Give short answers.

i. What is an electric current?

ii. What causes the current to flow in an electrical circuit?

iii. What are the functions of an ELCB?

iv. Compare fuses and circuit breakers. Which one is easier to use?

v. What is the main difference between a series circuit and a parallel circuit?

vi. How does increasing the potential difference affect the current?

4. Describe series and parallel circuits in detail.

5. Explain heating and chemical effects of the current.

6. Write notes on:

i. Resistance ii. Electrical Power

iii. MCBs (Miniature Circuit Breakers)

What a Speed!

Japan has made a high speed train. It can reach a speed more than 450 km/h. This train is moved by strong electromagnets instead of wheels. It is called a magnetically levitating train, or maglev train. Some people call it a bullet train.

For more information visit:

- http://www.physicsclassroom.com/class/circuits/u9l2c
- physics.northwestern.edu/lab/ec_c.pdf

Chapter 12

Investigating the Space

Students' Learning Outcomes

After completing this chapter, the students will be able to:

- explain the big bang theory of the origin of the universe.
- evaluate the evidence that supports scientific theories of the origin of the universe.
- describe a star using properties such as brightness and colour.
- identify bodies in space that emit and reflect light.
- suggest safety methods to use when observing the Sun.
- define the terms star, galaxy, milky way and the black holes.
- explain the types of galaxies.
- explain the birth and death of our Sun.
- identify major constellations visible at night in the sky.
- describe the formation of black holes.
- explain the working of a telescope.

A black hole is the last stage in ...
that nothing can escape from it.
Scientists classify galaxies in three main types on the basis of shape. These are spiral galaxies, elliptical galaxies and irregular galaxies.
A star (the Sun) starts its life as a protostar in a nebula. Then it changes to a star. After releasing its energy the star becomes a red giant and in the end a dwarf.
A telescope is a device that is able to make a far away object appear very close.
We can see many more stars in the night sky with the help of a telescope.
The Sun emits dangerous radiation. We must observe safety measures before viewing the Sun.

Questions

Complete each of the following sentences by writing the correct terms.

An oval-shaped galaxy is called Elliptical galaxy
A cluster of stars with a definite pattern Constellation
A large group of stars, gas, and dust Galaxy
The last stage of a massive star's life Black hole
A device that is able to make far away objects appear close telescope

Encircle the correct answers in the following.

Star distances are usually measured in:
(a) metres (b) kilometres
(c) light-years (d) yards

Bright stars may appear dimmer than others because they are:
(a) older (b) farther away
(c) younger (d) closer to the Earth

The last stage in the life of a massive star is:
(a) black hole (b) black dwarf
(c) white dwarf (d) red giant

iv. When great amount of energy is produced in a protostar, then a protostar is called:
(a) a supergiant (b) a star
(c) a neutron star (d) a black hole

v. A cluster of stars present in a nebula includes red stars, blue stars, yellow stars and white stars. Which stars are most like the Sun?
(a) red (b) yellow
(c) blue (d) white

vi. Our neighbouring galaxy is named as:
(a) Cepheus (b) Andromeda
(c) Canis Major (d) Taurus

3. Give short answers.

i. Are blue stars young or old? How can you tell?
ii. Name one observation that supports the Big Bang Theory.
iii. List in order, the four stages in the life cycle of a low-mass star.
iv. How do constellations differ from galaxies?
v. How do scientists think the universe began?
vi. What type of star ends its life cycle as a black hole?
vii. For how many years will the Sun be a red giant?
viii. On which factors does the brightness of a star depend?
ix. What is a light-year?
x. What galaxy our Sun belongs to?

4. Explain the Big Bang Theory of the origin of the universe.

5. Describe the life cycle of a low-mass star.

6. Describe the three main types of galaxies.

7. Write notes on:

i. Star Distances
ii. Safety methods to use when observing the Sun

End of Life

When our Sun will become a red giant, it may become so large that it will absorb Mercury and Venus planets. The Earth would become extremely hot. All life on the Earth would be wiped off.