

172 A, Ahmed Block, New Garden Town, Lahore.

Phone: 042-354288554 Web: www.pen.org.pk

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Chapter 01

Characteristics and Life Process of Organisms

Student learning outcomes:

1. Compare and contrast characteristics that distinguish major groups of living things(plants and animals)
2. Classify animals in terms of vertebrates and invertebrates with examples.
3. Classify plants in terms of flowering and non-flowering plants with examples.
4. Identify major parts and organs in animals.
5. Relate the parts and organs of body of animals to their functions.
6. Identify parts of a plant body.
7. Relate the structures of plants to their functions.

Characteristics of living things



MOVEMENT



RESPIRATION



GROWTH



SENSITIVITY



REPRODUCTION



EXCRETION

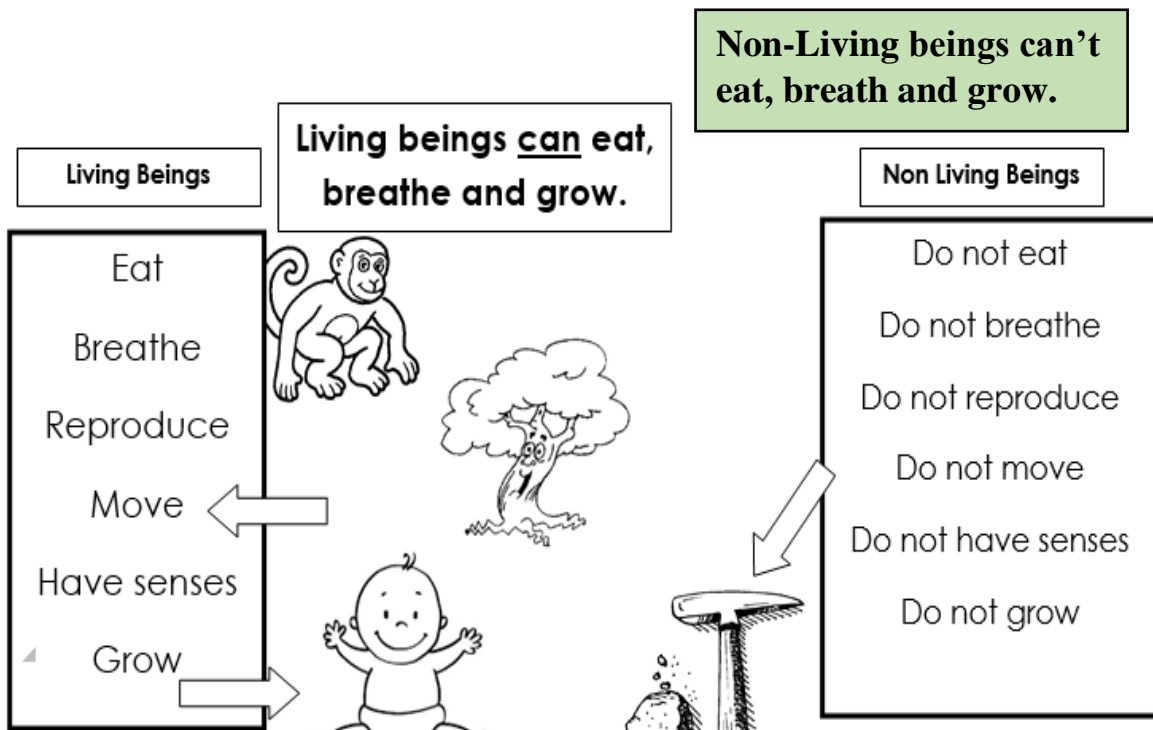


NUTRITION

Brain Storming

Write the names of any two living things.

Living and Non-Living Things



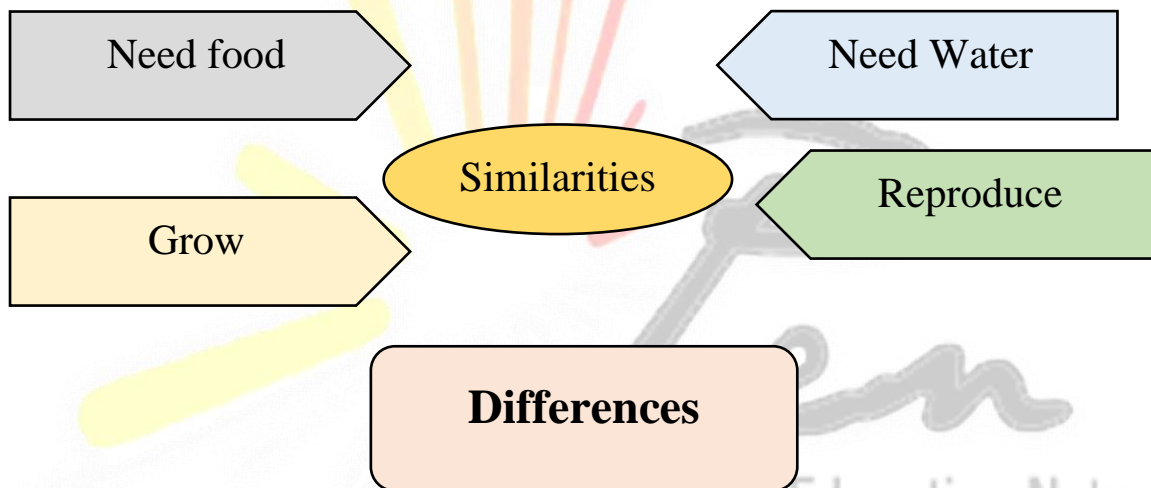
Q 1: Write Living and Non-Living things from your surroundings.

Living Things	Non-Living Things

Major Groups of Living Things



Similarities and Differences between Plants and Animals

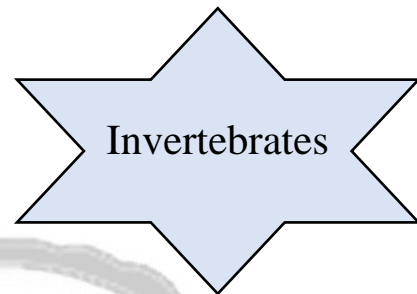
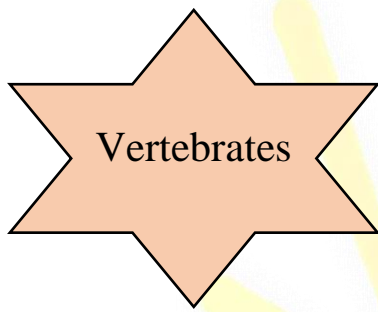


Plants	Animals
Make their own food.	Can not make their own food.
Can not move.	Can move.
Give off Oxygen	Give off Carbon dioxide
Take in Carbondioxide	Take in Oxygen
No basic ability to sense.	Have a Nervous system.

Q 2: Tick✓ the similarities and circle the differences among plants and animals.

	Grow	
Need Water.		Respire
Make own food.	Have Nervous System	
Need Food.	Take in Oxygen.	

Classification of Animals



Vertebrates: Animals with a backbone

Frog



Fish



Sparrow



Invertebrates:

Animals without a backbone.

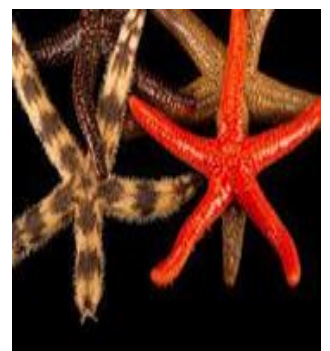
Butterfly



Honeybee



Starfish



Activity: Write “V” for vertebrates and “I” for invertebrates.



Classification of Plants

Flowering plants: Plants on which flowers grow are called flowering Plants.



Mustard



Rose



Apple

Write the name of your favourite flower.

Non-flowering plants: Plants on which flowers do not grow are called non-flowering plants.



Ferns



Mosses



Pine

Activity: Write the name of these plants below into the correct group.



Moss



Daisy



Pine Tree



Fern



Tulip



Sunflower



Snake plant



Rose



Conifer



Orchid

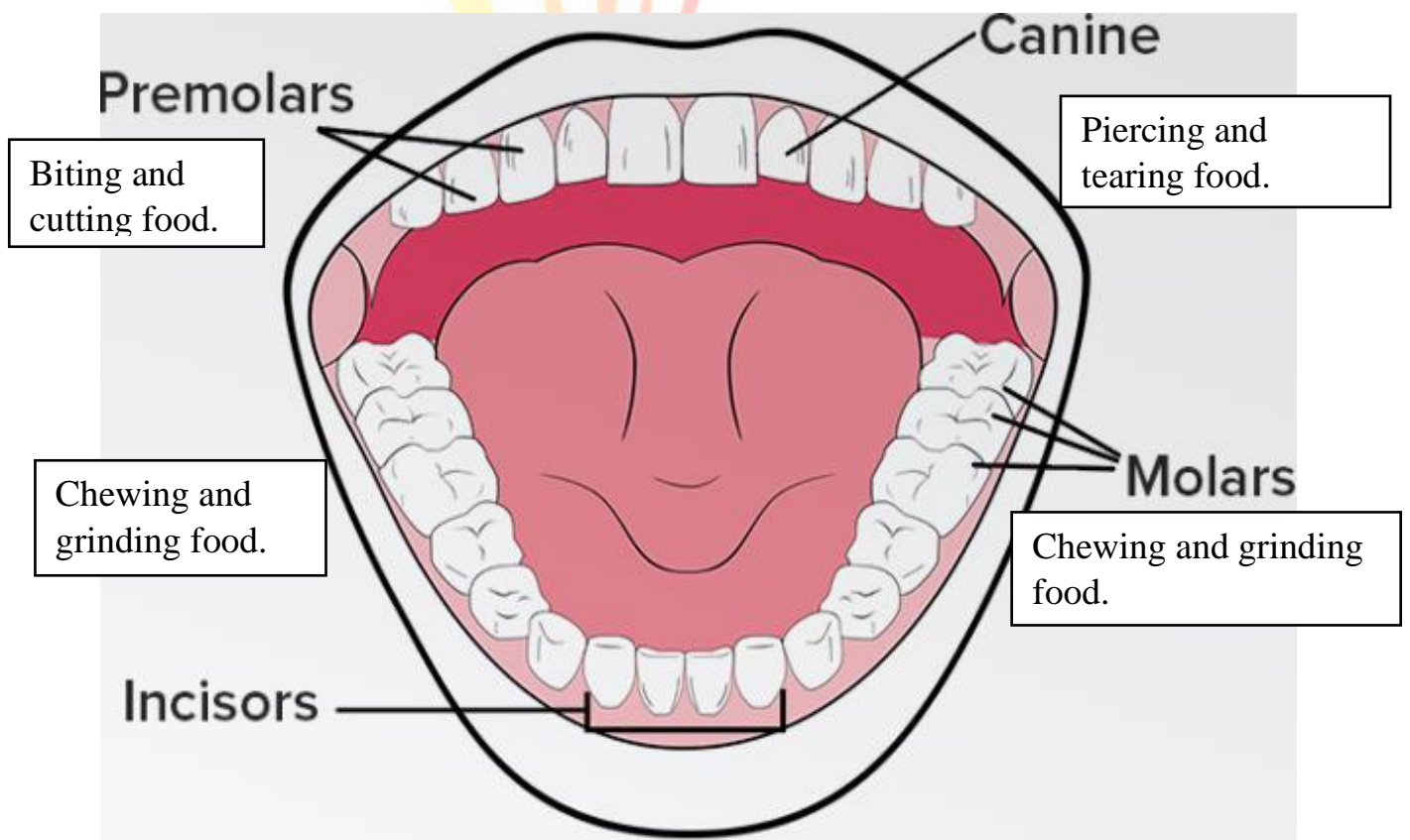
Flowering Plants	Non-flowering Plants

Biodiversity: The number of types of living things present in a particular place is called biodiversity.

Q 3: Define man-made forest.

Conifers are found in northern areas of Pakistan, These are very important for our economy. Its wood is used to make furniture, construction materials, and ornaments.

Major Body Parts, Vital Organs, and their Functions



Q 4: Diagrams show human and rabbit teeth.

Human



Rabbit



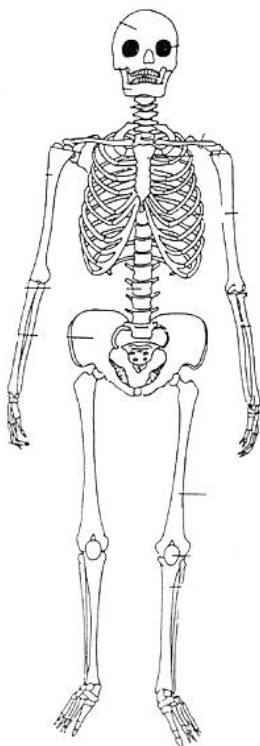
Human has sharp canines and rabbit has large incisors.

Human are omnivores. Rabbit is herbivore.

1) What does a human do with its canines?

2) What does a rat do with its incisors.

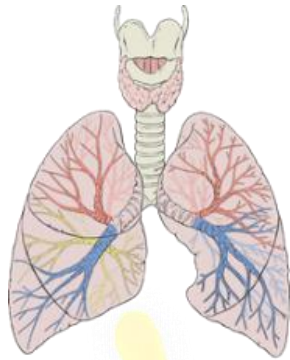
Skeleton



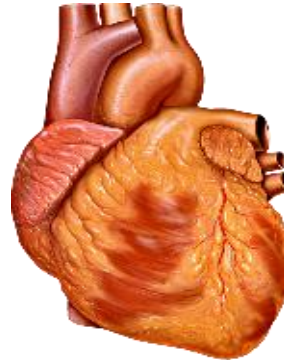
An internal or external framework of bone, cartilage, or other rigid material supporting or containing the body of an animal or plant.

Q 5: Why bones are important?

Lungs: The oxygen exchange between blood and air occurs in the lungs.



Heart: it is surrounded by ribs



Stomach: The stomach is a bag-like organ. The muscles of the stomach grind food.



Muscles: Muscles can contract and relax. 600 muscles are present in our body.

Progressive Education Network

Brain:



Activity: Enlist the functions of the brain.

Q 6: Match the organs with their functions.

Organs	Functions
Heart	Thinking
Brain	Pumping of Blood
Stomach	Respiration
Lungs	Contraction and relaxation
Muscles	Digestion of food

Parts of plants and their functions

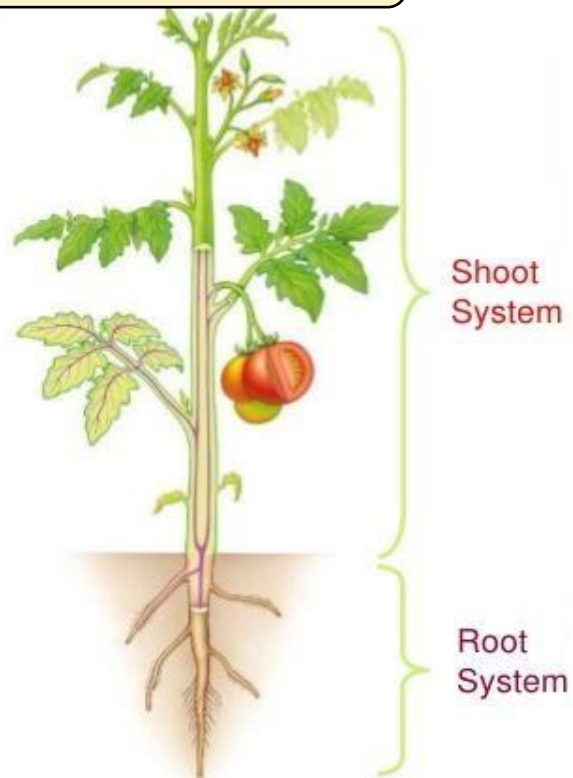
Shoot and Root Systems

Shoot

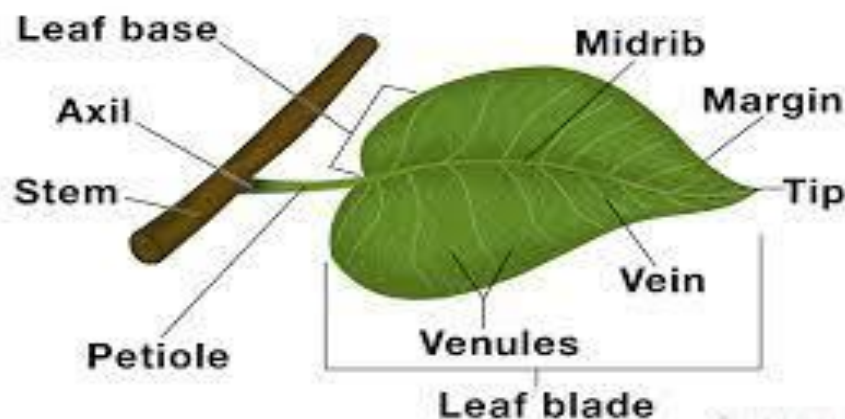
- produces sugars by photosynthesis
- carries out reproduction
- transport

Root

- anchors the plant
- penetrates the soil and absorbs water and minerals
- stores food



Parts of Leaf



Fruits with Seeds

Apple



Mango



Apricot



Q 7 : Write the names of 2 fruits without seeds.

1. _____

2. _____

Q 8 : Write Difference between flower and fruit?

Fill in the blanks

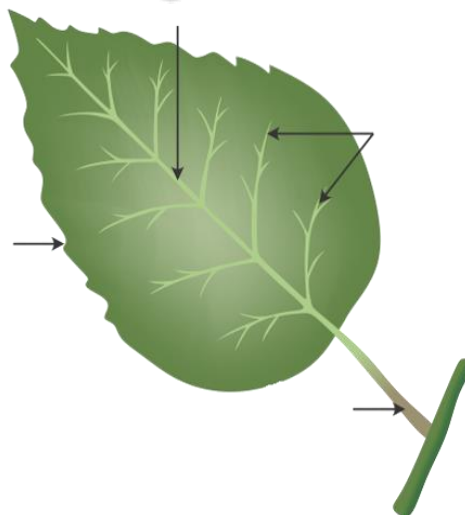
_____ is organ for photosynthesis.

Stem transports _____ to parts of plant.

Fruits grow from _____ plants.

_____ anchors the plant.

Activity: Label the diagram.



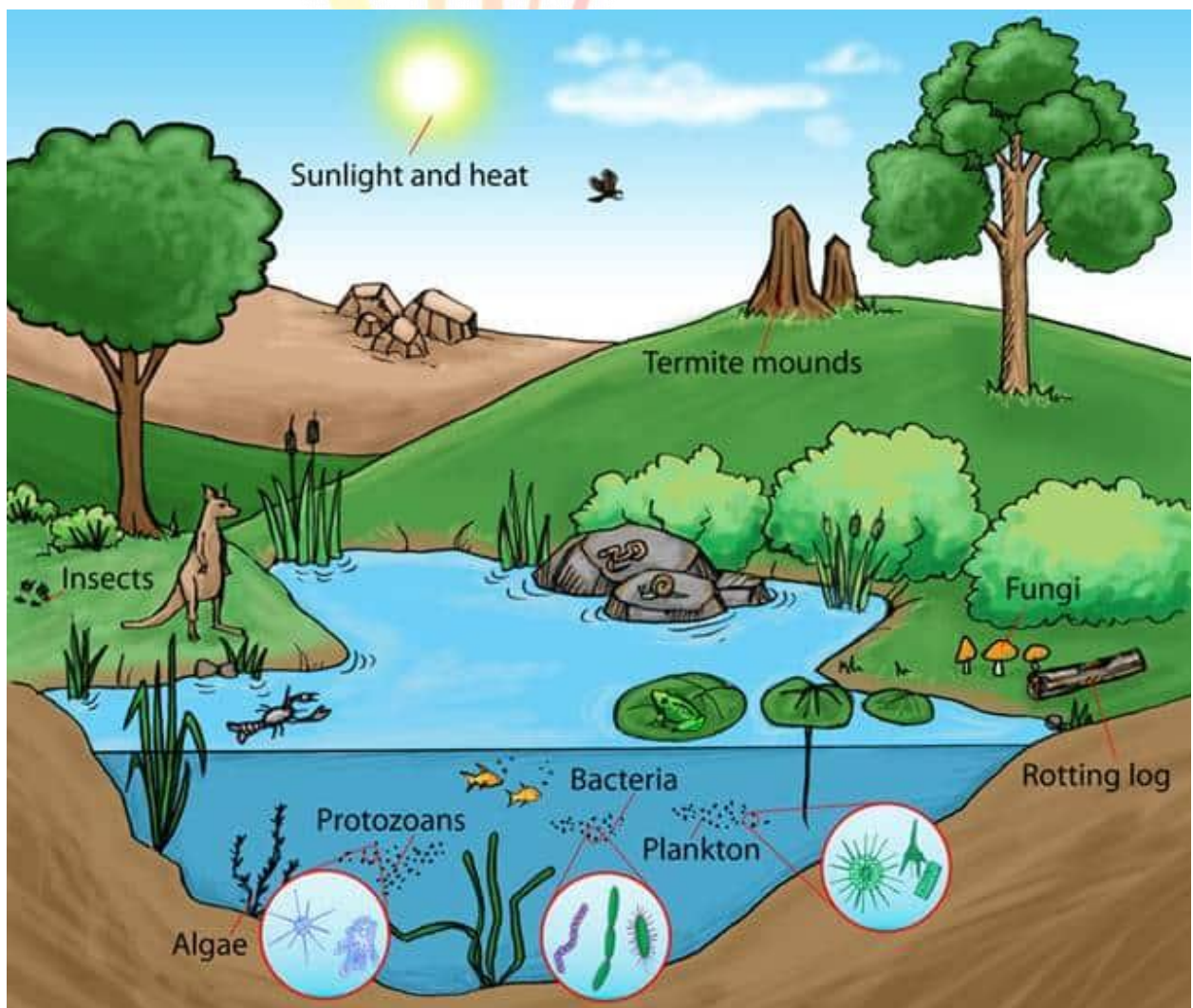
Chapter 02

Ecosystem

Student learning outcomes:

- 1) Recognize an ecosystem
- 2) Explain biotic and abiotic factors
- 3) Recognize the interactions between plants and animals.
- 4) Describe a few food chains and analyze their structures.
- 5) Identify and describe common predators and their prey.
- 6) Recognize the value of a balanced ecosystem.
- 7) Interpret that human actions affect food chains in an ecosystem.
- 8) Identify various actions and roles that humans can play in preserving various ecosystems.

Ecosystem



Brain Storming

Question: As a human what can we do to save our ecosystems?

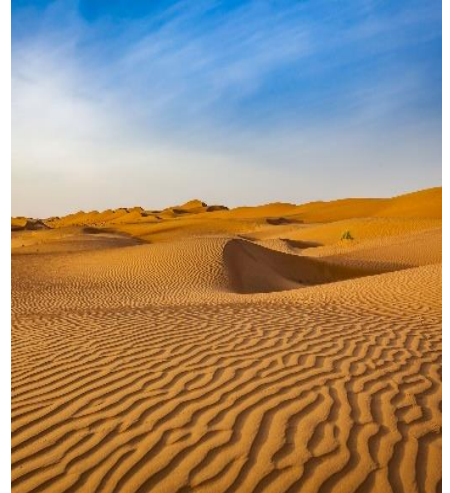
Snow region



Grassland



Desert



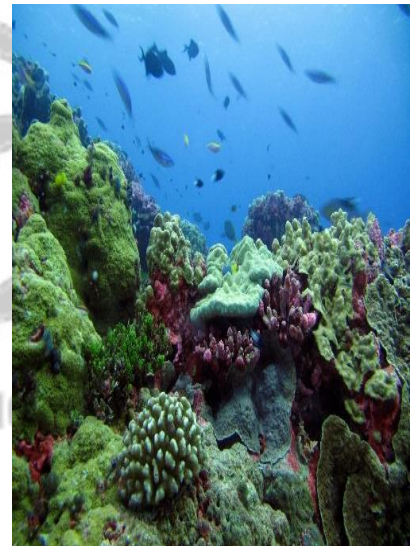
Pond



Forest



Ocean



Components of Ecosystem

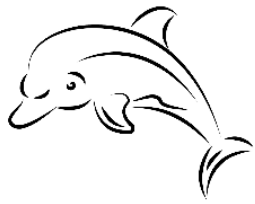
Abiotic

Non-Living components

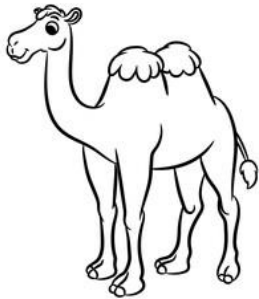
Biotic

Living components

Activity: Match the animals with their suitable ecosystems.



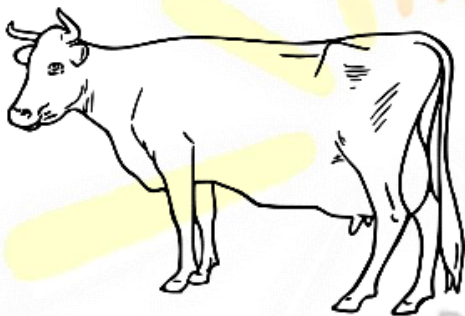
Pond



Forest



Ocean



Desert



Grassland

Desert of
Bhakkar is
Thal.

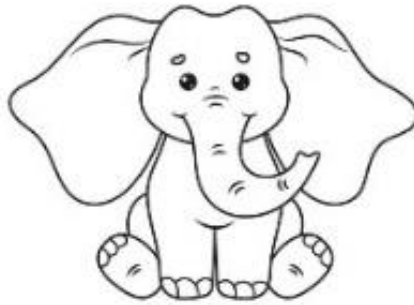
Desert of
Sindh is
Thar.

Sahara is
world's
largest desert.

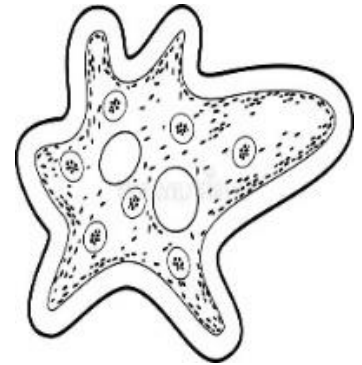
Biotic components



Producer: Make their own food.



Consumer: Obtain food from other living things.



Decomposer: Break down dead bodies of living things.



A coral reef is an underwater ecosystem characterized by reef-building corals. Reefs are formed of colonies of coral polyps held together by calcium carbonate.

During the day, sand's radiation of the sun's energy superheats the air and causes temperatures to soar. But, at night most of the heat in the sand quickly radiates into the air and there is no sunlight to reheat it, leaving the sand and its surroundings colder than before.

Ecosystems:

Biotic and Abiotic Factors

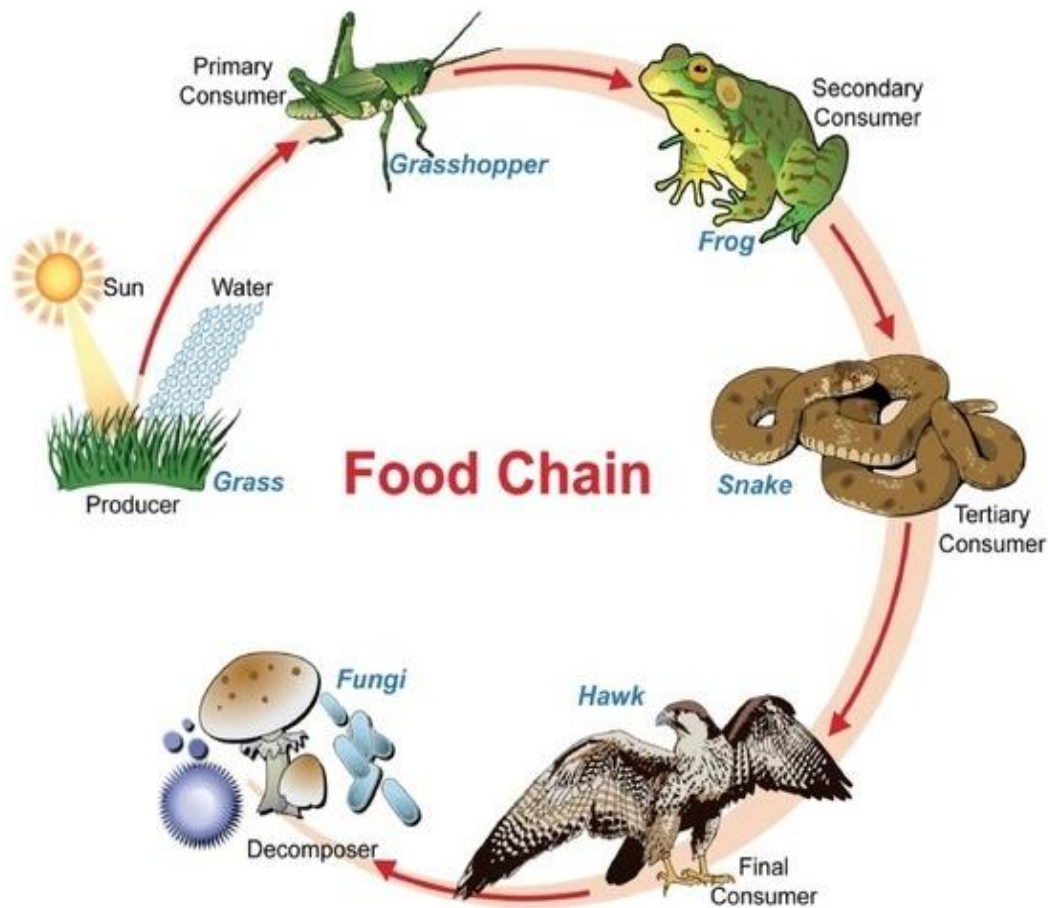


Activity: Write 4 biotic and 4 abiotic factors from the picture.

Biotic

Abiotic

Food Chain: a series of organisms each dependent on the next as a source of food.



Links of Food Chain

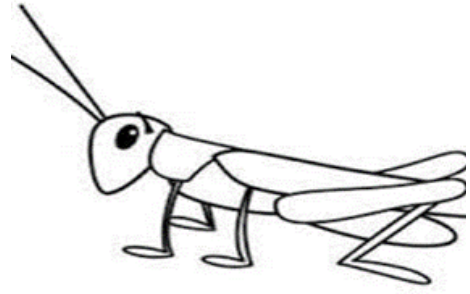
Producers - Plants are producers.

Consumers - Animals are consumers.

Decomposers - Decomposers eat decaying matter (like dead plants and animals).

Activity: Draw a food chain by using the following components.





Food Chain



Impacts of human actions on food chain

Over population



Deforestation



Hunting



Question: Tick✓ the correct answer.

1. _____ signifies a habitat which is sustainable.
(a) Food chain (b) Balanced ecosystem (c) Forest
2. Plants are producers. This is because they produce energy for
(a) Ecosystem (b) Snow region (c) Desert
- 3) The organism that does the hunting is called.
(a) Prey (b) Biotic (c) Predator
4. A _____ is an underwater ecosystem characterized by reef-building corals
(a) coral reef (b) Predator (c) Food chain
5. The organism that is hunted is called.
(a) Ecosystem (b) Predator (c) Prey

Chapter 03

Human Health

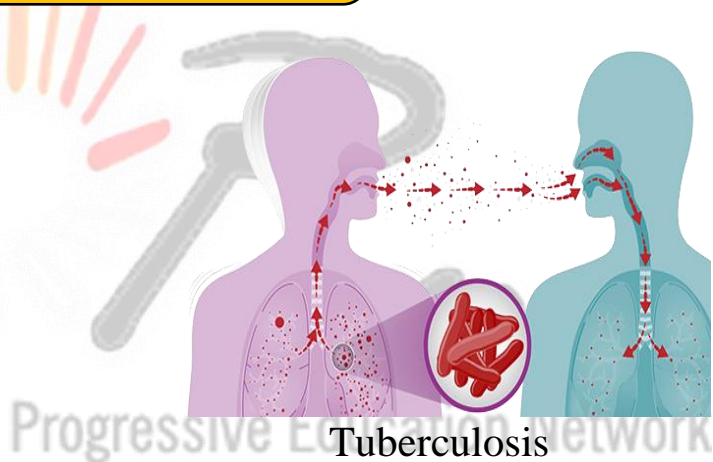
Student learning outcomes:

1. Observe and recognize some common symptoms of illness.
2. Differentiate between contagious and non-contagious diseases.
3. Relate the transfer of common communicable diseases.
4. Explain some methods of preventing common diseases and their transmission.
5. Describe the importance of maintaining good health.
6. Recognize everyday behaviors that promote good health.
7. Define a balanced diet and its components.
8. Identify common food sources.
9. Understand the value of clean drinking water and inquire about the factors
10. Explore a few ways that can help make water clean and suitable for drinking water.

Contagious disease

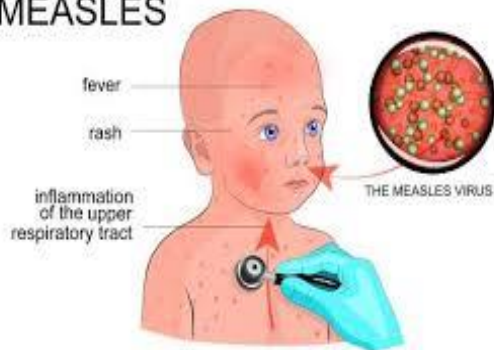


Flu



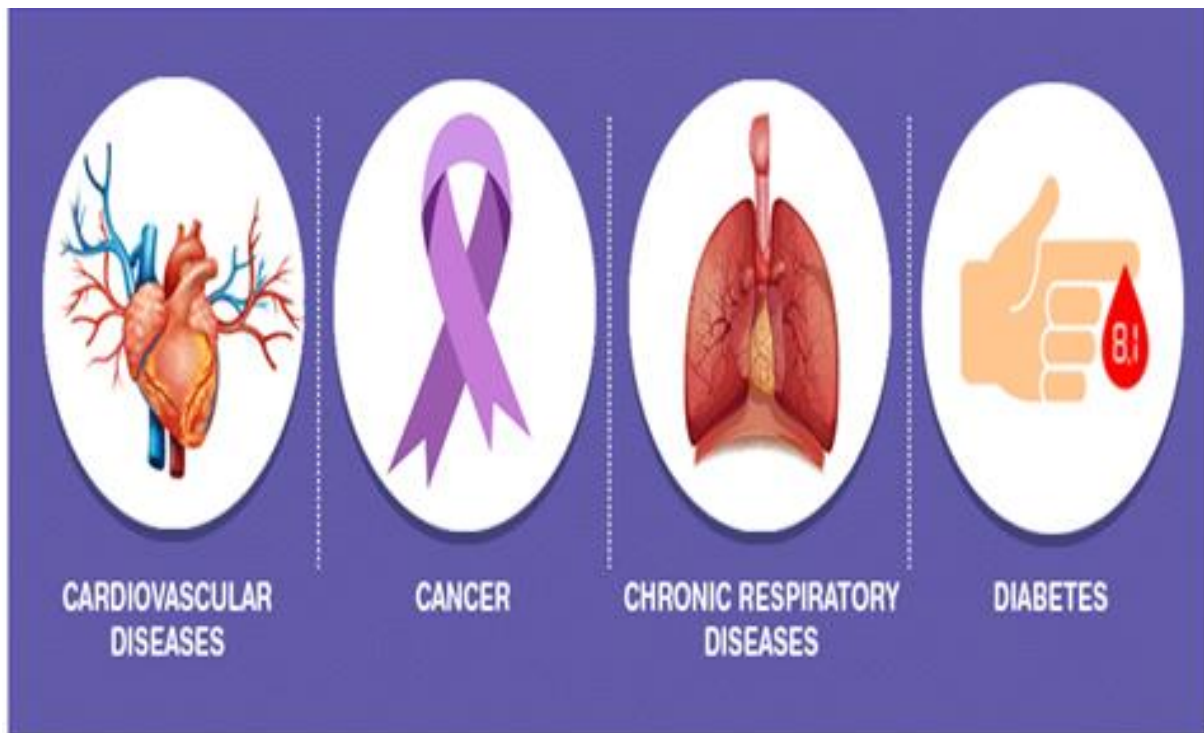
Tuberculosis

MEASLES



Covid 19

Non-Contagious disease



Brain Storming: How can you prevent yourself from contagious diseases?

Activity: Write contagious and non-contagious diseases in the correct boxes.

Flu	Cancer	Diabetes	TB
Respiratory disease	Polio	Heart disease	COVID-19

Contagious	Non-contagious

Human body temperature is 98.6 °F or 37 °C. When our body temperature exceeds this limit, it is called fever. Cough is an instant response of the body. It is due to soreness and scratchiness of the throat.

Prevention of Contagious Diseases



Regularly clean all surfaces, equipment and gear



Wearing a mask does not allow germs to enter your body.



Encourage handwashing whenever possible



Encourage early flu vaccines.



Educate about the signs and symptoms of common communicable disease.

Cleanliness day is celebrated on 30th January.

Global hand washing day is celebrated on the 15th of October every year.

Steps of Hand Washing



Water and soap



palm to palm



between fingers



focus on thumbs



back of hands



focus on wrists

Ways of maintaining Good Health

Balanced diet



Drinking Clean Water



Exercise



Brushing teeth



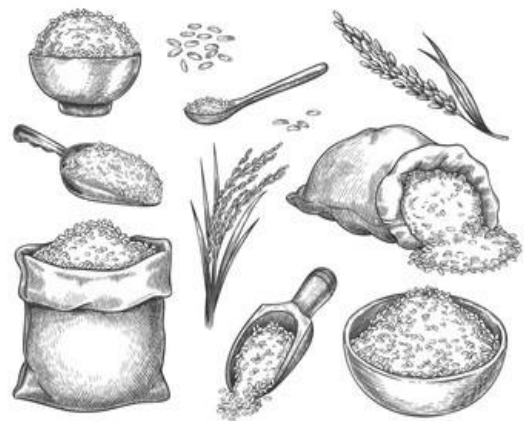
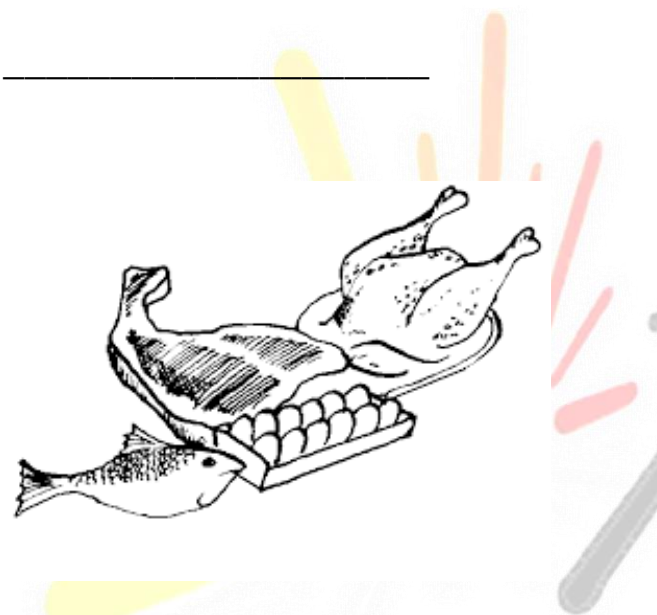
Getting enough sleep



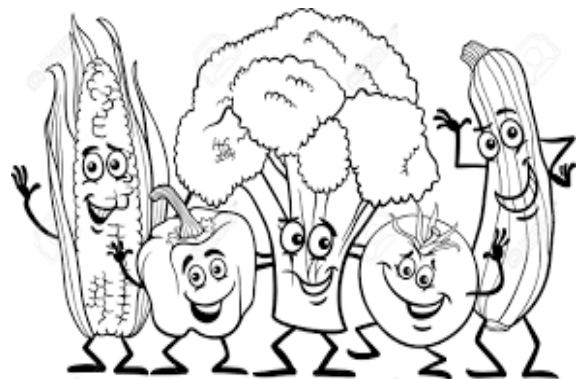
Breath fresh air



Activity: Name the components of a Balanced diet.



Progressive Education Network



Activity: Write the steps for hand washing.

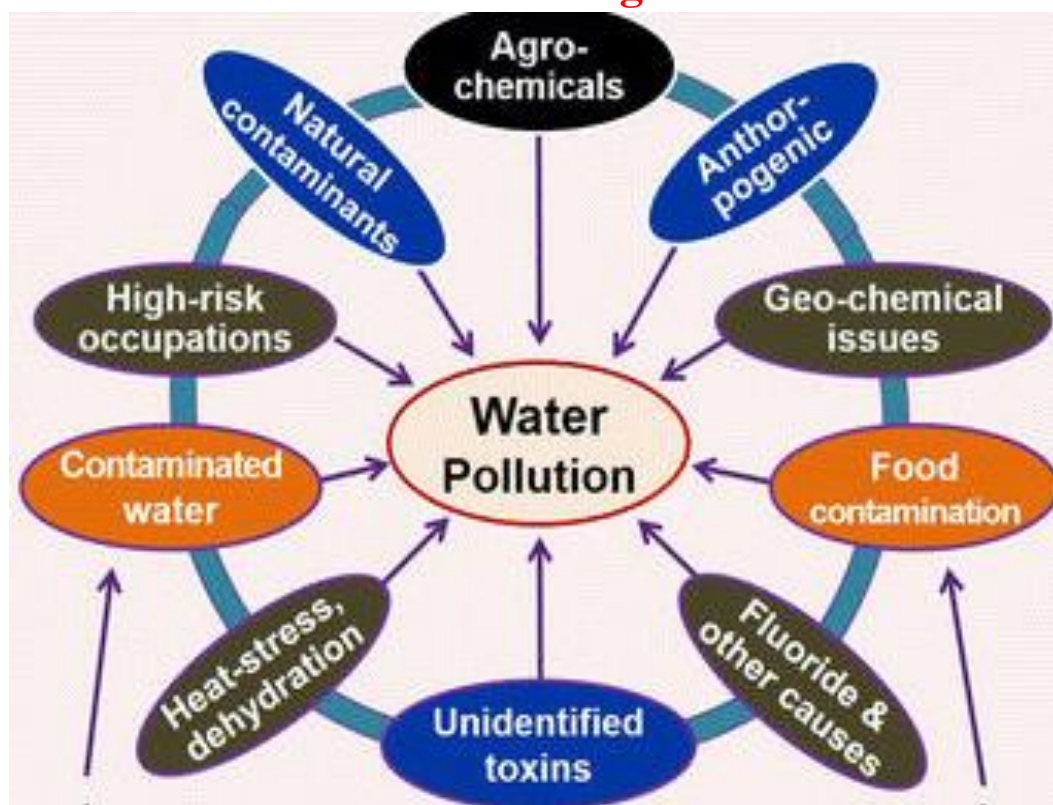


Minerals are found in vegetables and calcium is found in milk.
Proteins should be taken in early age to increase height.
Sleep is essential to every process in the body, affecting our
physical and mental functioning the next day.

Fill in the blanks.

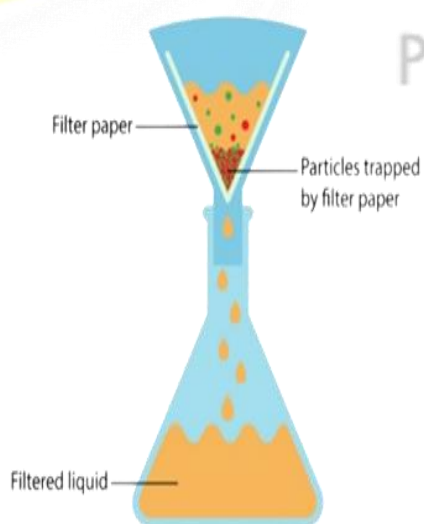
1. _____ are found in vegetables.
2. Proteins should be taken _____ to increase height.
3. Meat group includes _____.
4. Apple, orange, carrot, and cabbage are included
in _____.
5. Sleep increases our ability to develop _____.

Factors Polluting Water



Make Water clean and sustainable for drinking:

Filtration



Boliling



Q 1: Look at the picture and write answers.

(1) Can boiling stop the germs?

(2) How can germs be killed in water?

(3) How can water be made suitable for drinking?



Activity:

1. Match the causes of water pollution.

Sewage

Oil spill

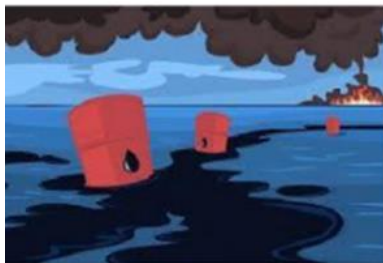
Rubbish / Trash

Solid waste

Plastic

Ships

Industrial / Factories waste



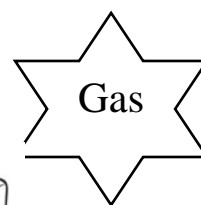
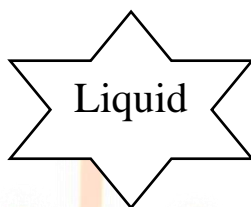
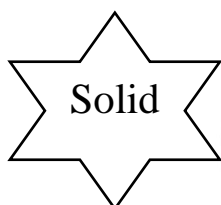
Chapter 04

Matter and its characteristics

Student Learning Outcomes:

1. Describe matter and its states.
2. Describe the characteristics of each state of matter with examples.
3. Compare and sort objects and materials on the basis of physical properties
4. Identify properties of metal and related these properties to the use of metals.

States of Matter:



Solid: Solids have definite shapes & Volumes.



Liquid: Liquids have definite volumes but no definite shape



Gas: Gases do not have a fixed shape or volume.



Mass: The quantity of matter in an object is called mass.



Volume: The amount of space that a substance or object occupies, or that is enclosed within a container.

Brainstorming



Why do we use gloves while baking?

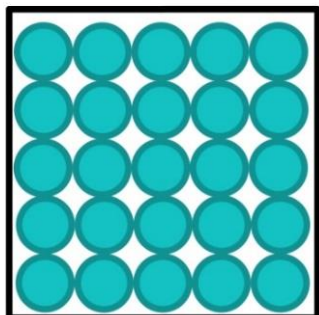
1. Why are utensils made up of metals?

2. Why are metals good conductors of heat?



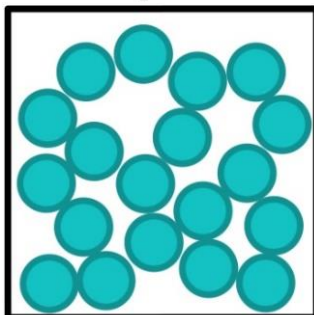
Particle Arrangement in Phases of Matter

Solids



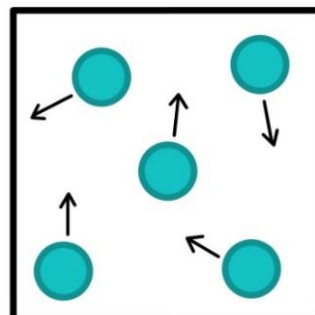
Particles are packed tightly together in a fixed arrangement. Particles can vibrate but not move

Liquids



Particles are close together with no distinct arrangement. Particles can move and slide around each other

Gases



Particles are free-floating with no distinct arrangement. Particles move and collide with each other

Q 1: Study the following table.

Properties of matter No 1	Properties of matter No 2
Particles are packed tightly.	Particles are freely floating
Matter has no definite volume.	Matter has a definite volume.
Matter has a fixed shape.	Matter has no fixed shape.

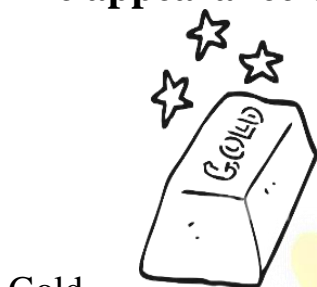
According to the above table which statement is correct about matter

No 1 and Matter No 2? Tick the correct one.

- Matter no 1 is oil and matter no 2 is wood.
- Matter no 1 is gas and matter no 2 is a book.
- Matter no 1 is a chair and matter no 2 is milk.

Physical properties of metals:

The appearance of metals: All metals are lustrous.



Gold



Steel



Silver

Texture of metals: All the metals are solid.

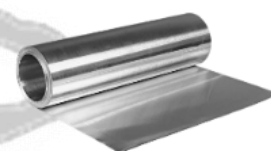
Copper wire



Gold wire



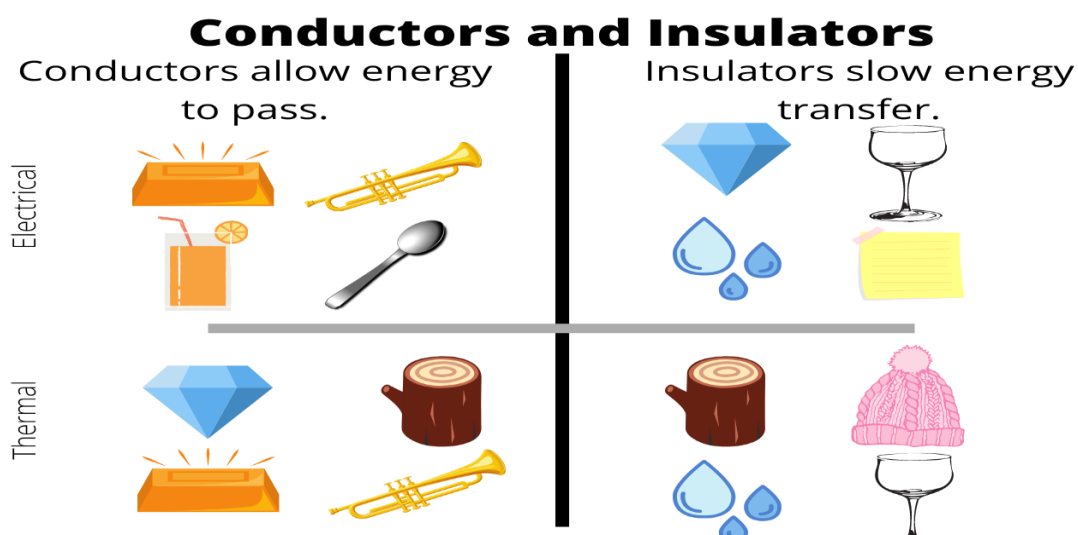
Aluminum foil



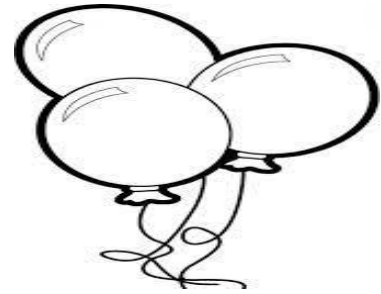
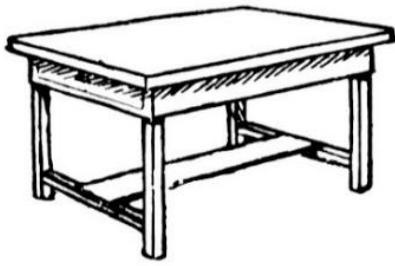
Metals as conductors:

Metals are good conductors (both of heat and electricity).

Q 2: Circle the conductors present in the picture.



Q 3: Observe the pictures given below. Which state of matter are the objects shown in the pictures?



Q 4: The following items are all about the same size but have different densities. Which items would sink to the bottom of the water?

If an object is less dense than water, it will float but if it is denser it will sink.

Circle the items that would sink because of their densities.



Chapter 05

Forms of Energy and Energy Transfer

Student learning outcomes:

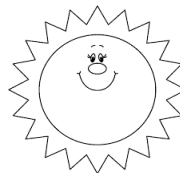
1. Identify sources of energy.
2. Describe and demonstrate the transformation of energy.
3. Understand the importance of energy conservation.
4. Relate familiar physical phenomena to the behavior of light.
5. Relate familiar physical phenomena to the production and behavior of sound.
6. Investigate the changes that occur in hot objects.
7. Identify ways to measure temperature and understand its unit.
8. Describe and demonstrate that electrical energy in a circuit can be transformed into other forms of energy.

Sources of Energy

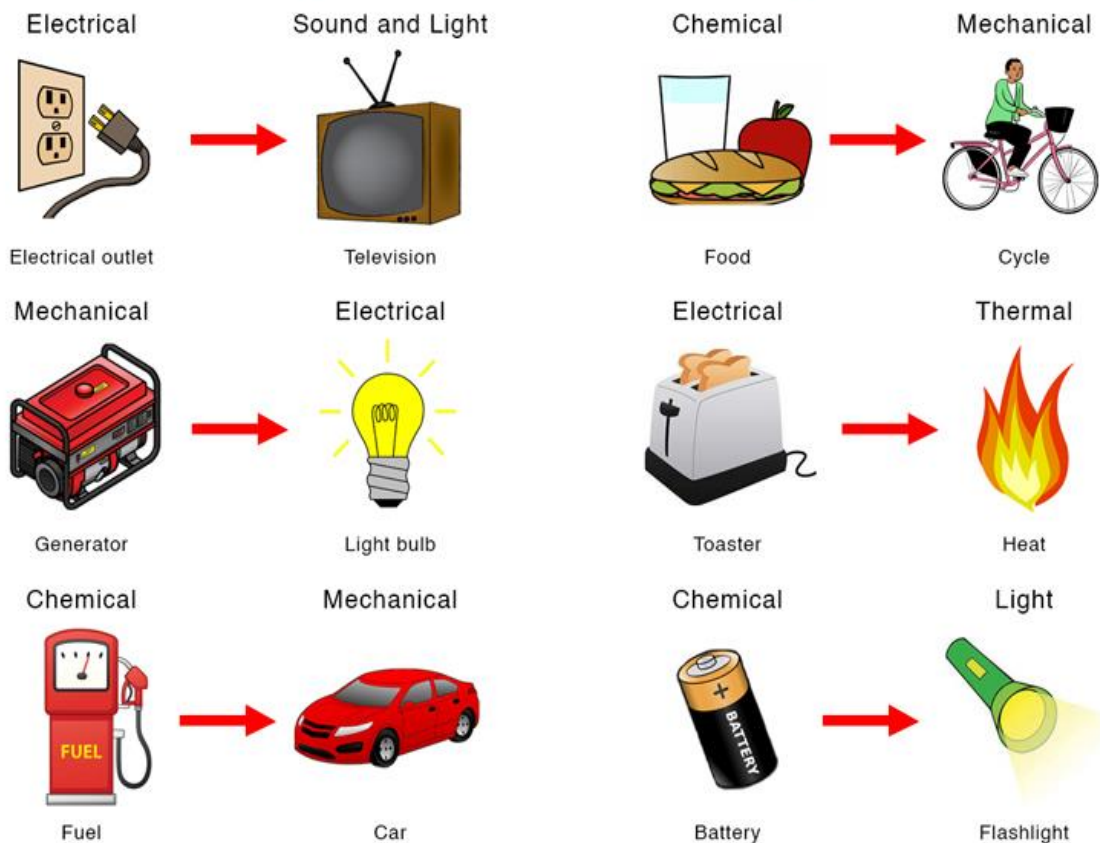
- Solar energy from the sun.
- Thermal energy from heat.
- Wind energy.
- Biomass from plants.
- Hydropower from flowing water.
- Electrical energy.

Energy is the capacity for doing work.

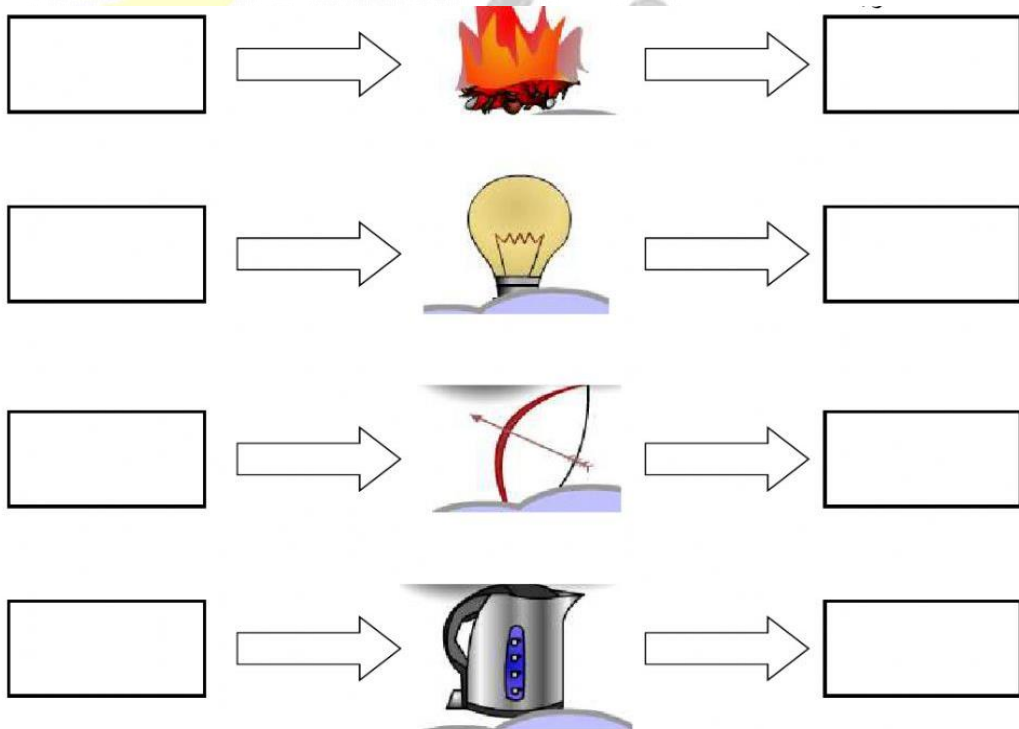
Activity: See the pictures given below and name the different energy sources shown in the pictures.



Energy Transformation



Activity: Write the names of energy transferred into other energy forms.

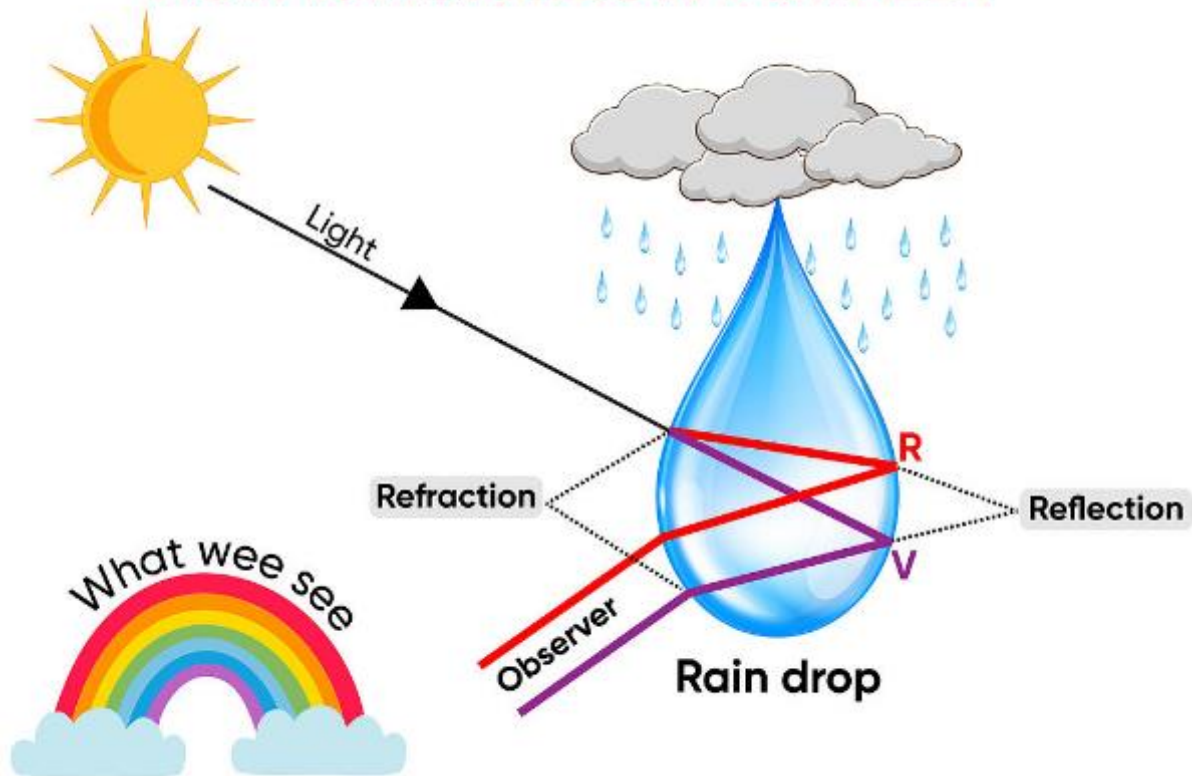


Reflection of Light:

When light strikes the shiny and smooth surface of a mirror, it bounces back and enters our eyes. It is called the reflection of light.



HOW IS A RAINBOW FORMED?



Light is a form of energy that helps us to see things around us. The sun, stars are natural sources of light.

Q 1: How many colors are present in the rainbow? Write names of any

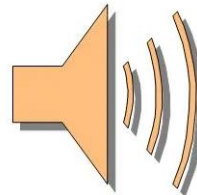
Sound cannot travel in space. This is the reason we cannot hear sound of explosion in sun. Hard and smooth object reflects sound better.

Do you know?

Within a blink of eye, the world uses energy of 85,000 gallons of petrol. Hydroelectricity changes mechanical energy into other forms of energy.

Sound Energy

- Sound is created when an object vibrates.
- The object vibrates and pushes the air molecules nearby which travel as sound



Bat uses echo to catch its prey. To hear a clear echo, the reflecting surface should be at least 17 meters away from the source of sound.

Heat:

Heat is a form of energy that travels from a hot object to a cold one.

Activity: Draw arrows in the picture to show the directions of heat flow.

Sun Temperature: 27 million Fahrenheit

Snow Temperature: 32 degrees Fahrenheit



Activity: See the pictures carefully. Write “S” for sound energy sources and “H” for heat energy sources.





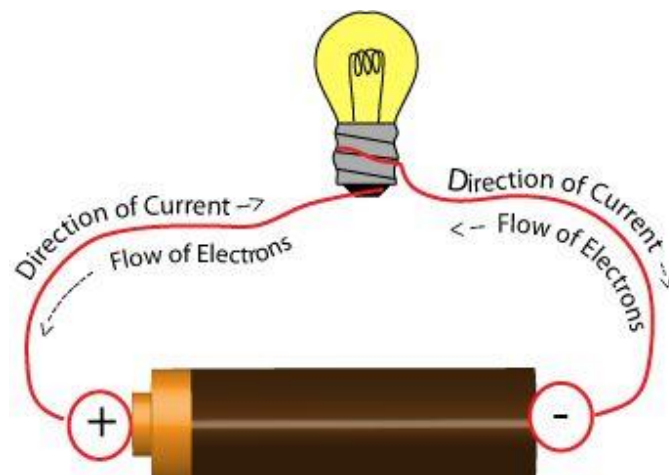




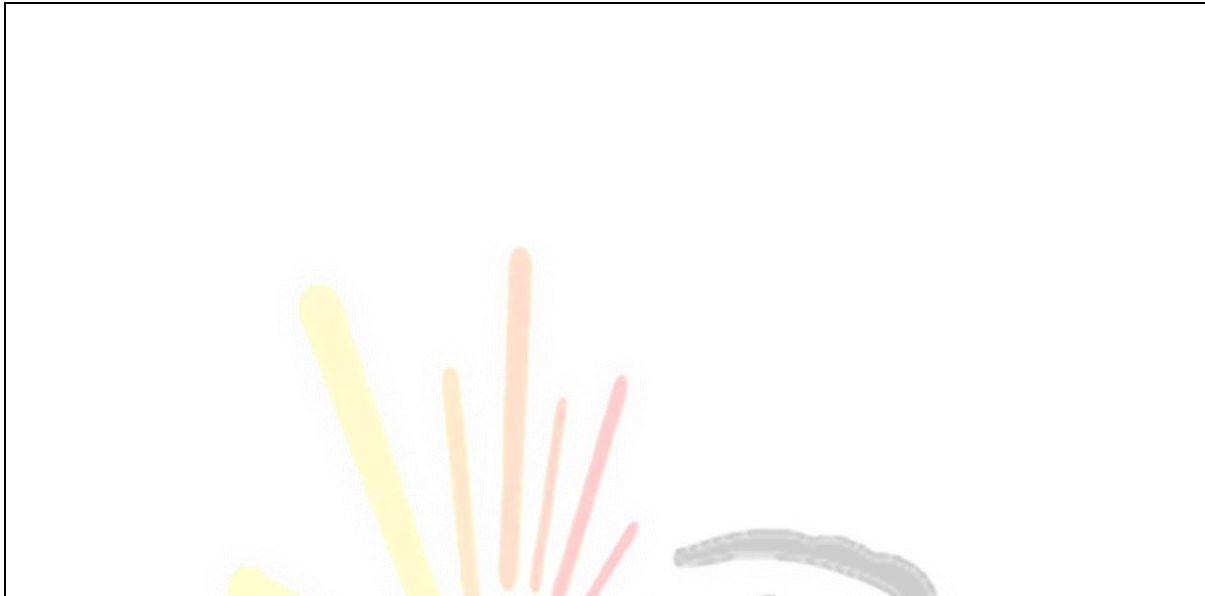


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Simple Electric Circuit:



Q 2: Make an electric circuit by using given objects.



Chapter No 6

Force and Motion

After studying this chapter the students will be able to:

1. Recognize the Earth surface is made up of land and water and is surrounded by air.
2. Identify gravity as a force that draws objects to Earth.
3. Investigate that friction works against the direction of motion.
4. Provide reasoning with evidence that friction can be either detrimental or useful under different circumstances.
5. Recognize that simple machines help make motion easier.



Forces can cause **change**.

They can make things move, change speed, change direction, or change their shape.



move



change



change



change

Q 1:

Draw an example for each way force can cause change.

move

change speed

change direction





change shape

Brain Storming

Suppose you are playing in a playground. Answer the following questions based on observation.

1. What force do you use while playing football?
2. What is the role of friction in walking?

Q 2: Circle the correct answer.

	push	pull
	push	pull
	push	pull
	push	pull

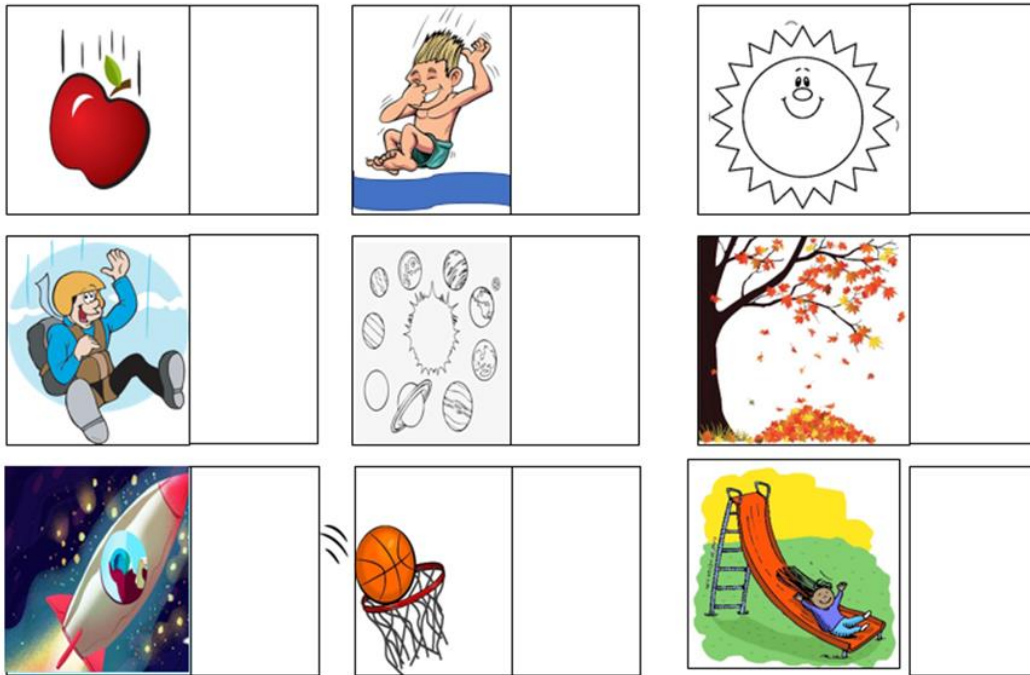
When you pick an object, you are pulling it. When you throw an object, you are pushing it.

Gravity: an invisible force that pulls objects towards Earth.

Friction: It is the force that stops or tends to stop moving objects.

By applying lubricants and streamlined design objects we can reduce friction.

Activity: Tick (✓) the pictures that are showing gravity.

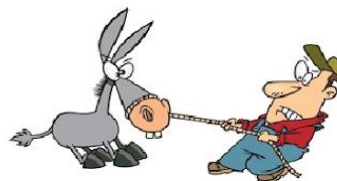


Q 3 : See the pictures carefully and write “F” below the picture in which friction is showing.









Q 4 : Give some examples of disadvantages of friction. What will happen if there were no friction?

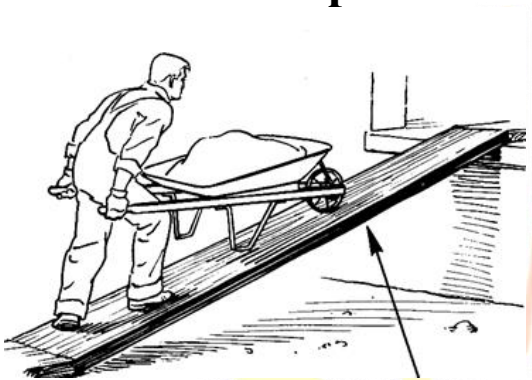
Lever:



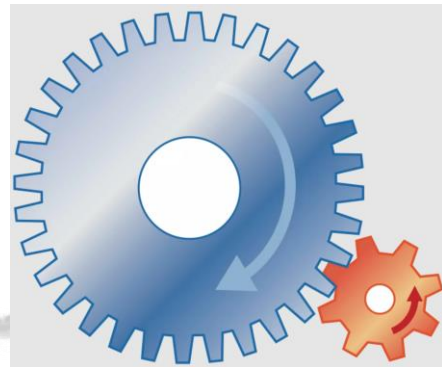
Pulley:



Inclined plane:



Gear:



Which simple machine is shown in the picture below?



- A. Lever
- B. Inclined Plane
- C. Pulley

Q 5: There is a well in the picture. Which machine will be helpful to take water from well and why?



Chapter No 7

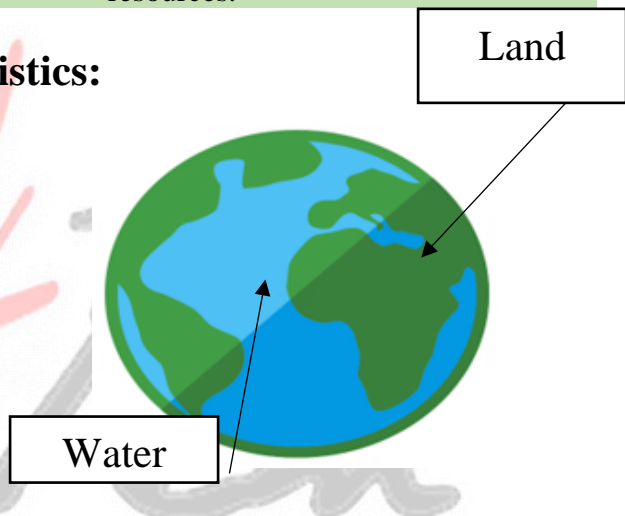
Earth and its Resources

Students Learning Outcomes

- Recognize that Earth's surface is made up of land and water and is surrounded by air.
- Recognize the water in rivers and streams flows from mountains to oceans or lakes.
- Identify some of Earth's natural resources that are used in daily life.
- Recognize that some remains of plants and animals that lived on Earth a long time ago are found in rocks.
- Differentiate between renewable and nonrenewable resources.
- Suggest ways to conserve natural resources.

Earth and its Physical Characteristics:

71% of Earth's surface is water and 29% is land about 11% of the land is cultivate.



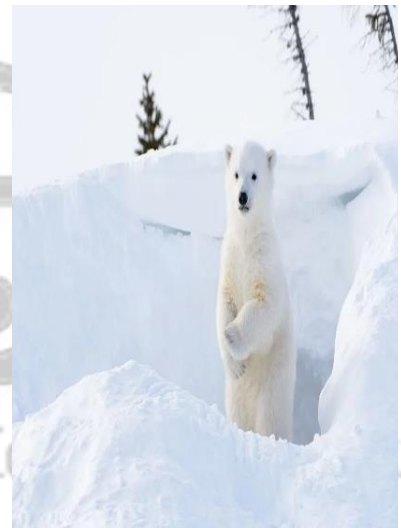
Activity: Look at the globe picture given below. Colour green in the land portion and blue in the water portion.



Distribution of water on Earth's surface



97% ocean



3% is present in form of rainwater, rivers, streams, and glaciers.
Earth's Resources:



Water



Forest



Air



Minerals



Soil



Natural oil

Q 1:

Match each item to the natural resource it comes from.



sand

sweater



cow

baseball bat



tree

gasoline



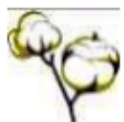
metal ore

glass



oil

milk



cotton

soda can





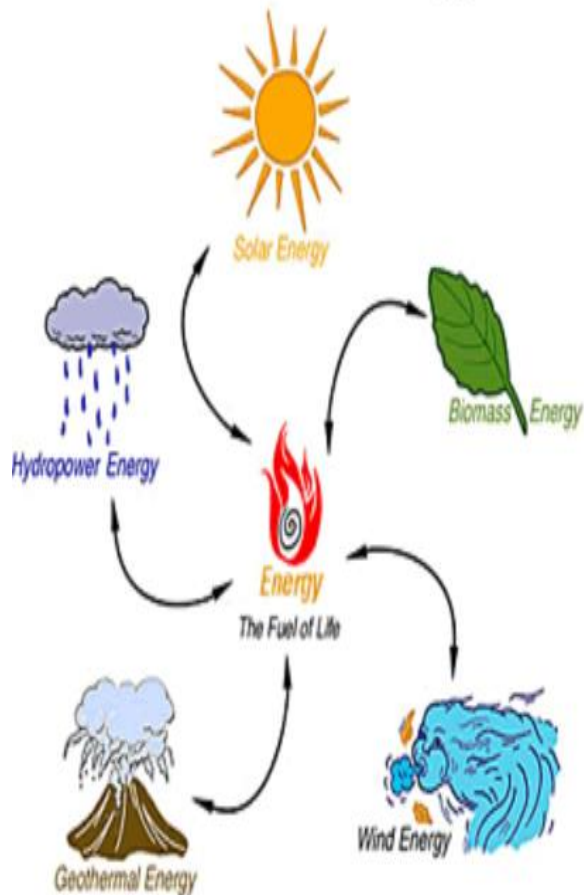
Natural Gas:

Fossils:

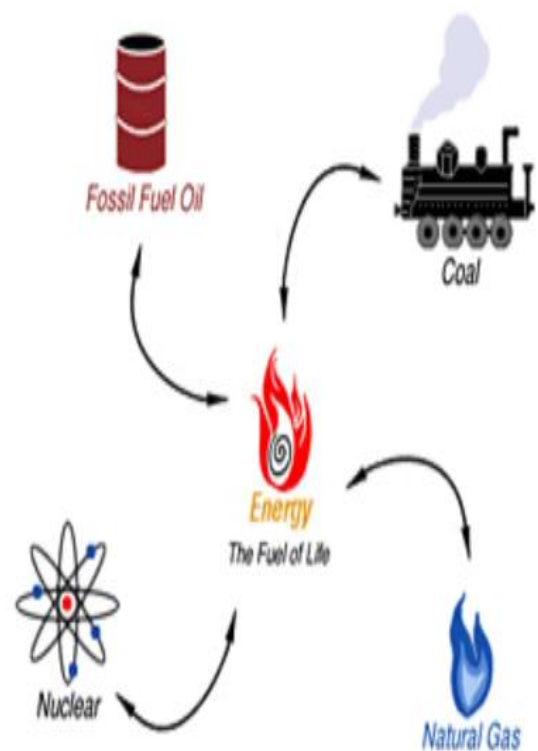


The remains of animals found under rocks are called fossils. Fossils help us to know about animals' feeding habits through their teeth and bones.

Renewable Energy



Non-Renewable Energy



Q 2: We found the skulls of many animals during an excavation.

1. How do we know about their feed?

2. Starfish is a soft invertebrate. Can we obtain fossils of Starfish?

Q 3: Label the following energy resources and tick the correct source.

Coal Wind farms Natural gas Oil Solar energy Hydroelectric power station



☒ Renewable source
☐ Non-renewable source



☐ Renewable source
☐ Non-renewable source



☐ Renewable source
☐ Non-renewable source



☐ Renewable source
☐ Non-renewable source



☐ Renewable source
☐ Non-renewable source



☐ Renewable source
☐ Non-renewable source

Do you know?

Coal is a Natural mineral whereas Charcoal is a man made mineral.

Electricity is also produced from renewable sources such as wind, hydropower, solar power, biomass, wind.

Second largest mine of natural salt in the world is located at Khewra in Pakistan.

After shortage of natural resources we will face Soil erosion, Global Warming caused by the rise of greenhouse gases- Extinction of species and loss of biodiversity. Flooding and drought.

Conserving Natural Resources

Use less water. Taking shorter showers or turning off the faucet while brushing your teeth can reduce water waste in your home. ...

Turn off the lights. ...

Use renewable energy. ...

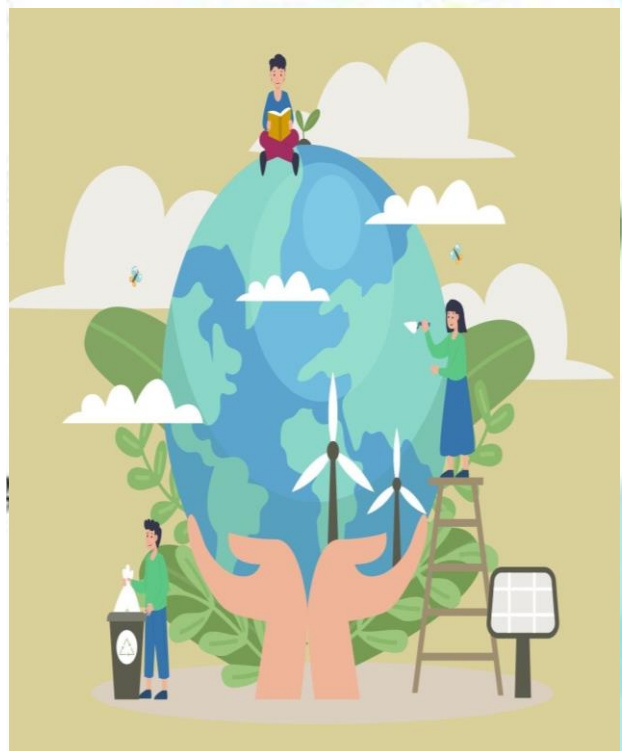
Recycle. ...

Compost. ...

Choose reusable goods. ...

Manage your thermostat. ...

Thrift shop

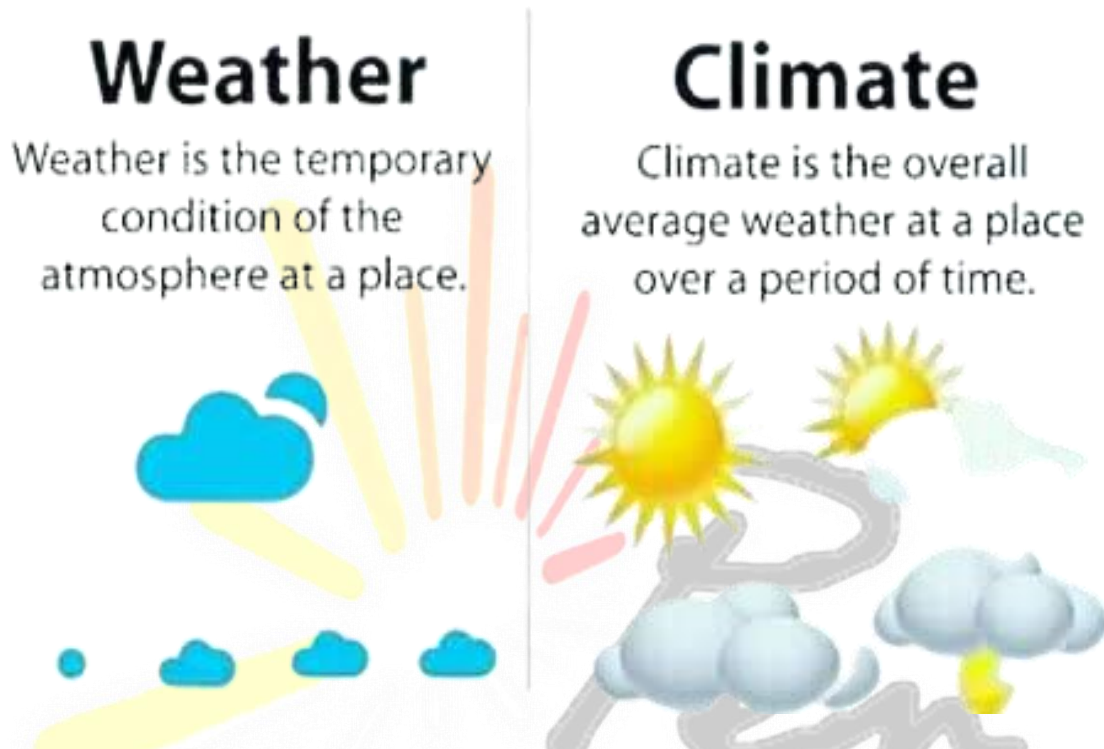


Chapter 08

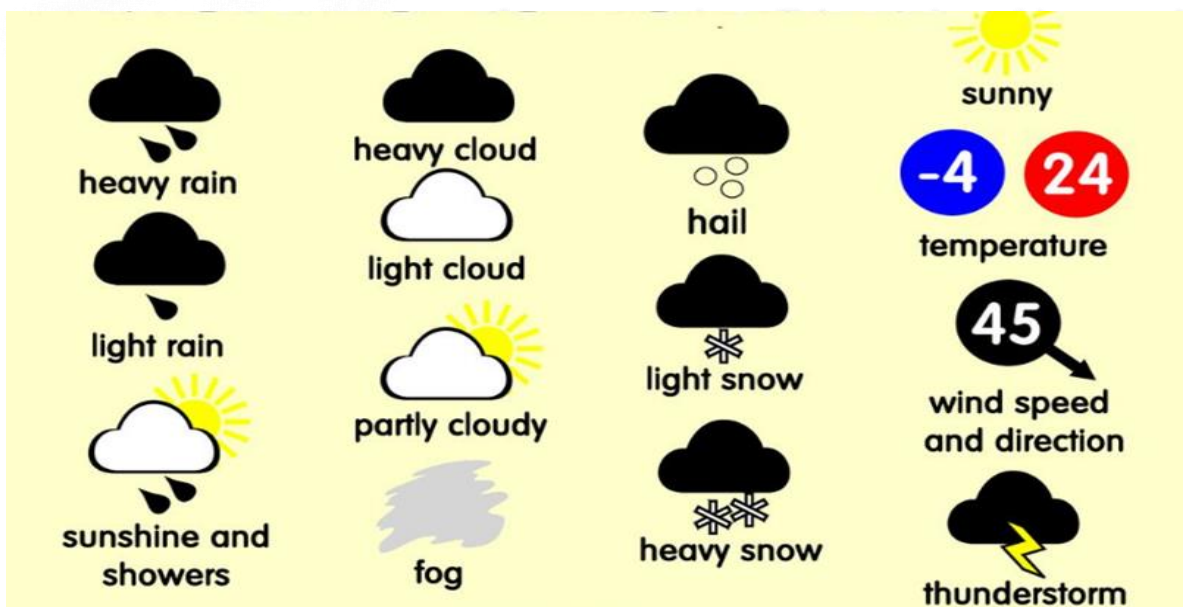
Earth's Weather and Climate

Students learning outcomes

- Understand the difference between weather and climate.
- Recognize that average temperature and precipitation can change with seasons and location.
- Relate that weather changes with changing geographical locations.



Following are some symbols for the demonstration of weather.



Brain Storming

In winter the temperature of Khaplu, a city in Gilgit Baltistan is below zero degrees centigrade while the temperature of Gwadar is mild. Why is it so?

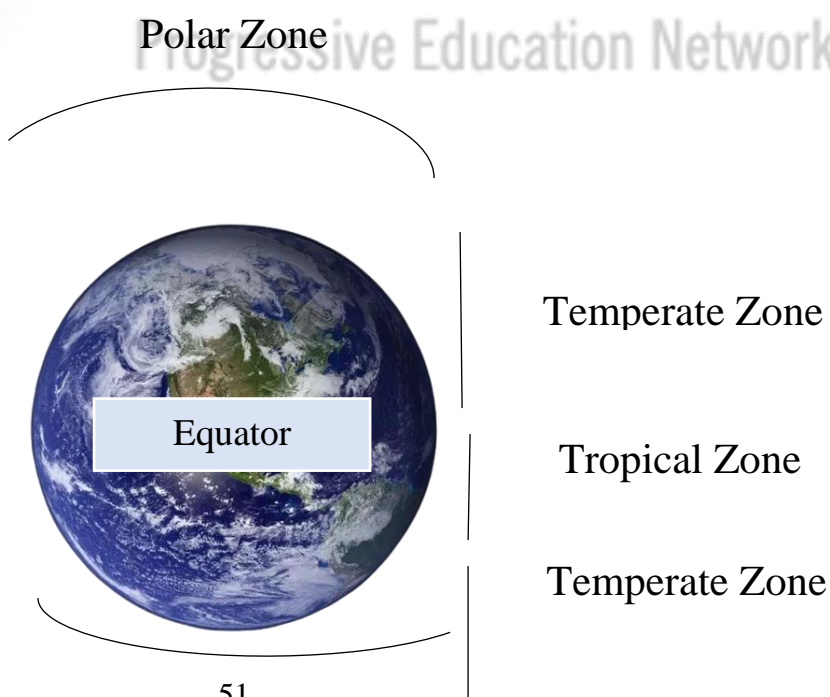
Activity: Fill out the following table by using the weather symbols.

Days	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Maximum Temperature							
Minimum Temperature							
Weather							

Factors that affect the climate of any geographical location.



Division of Earth on the basis of climate:



The climate of Zones:

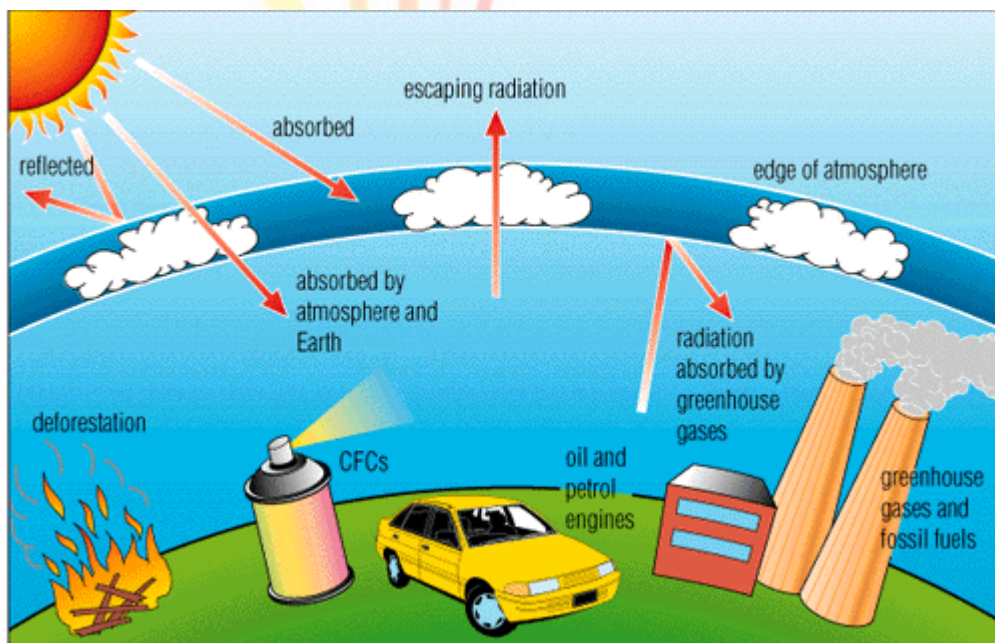
Temperate Zone: Temperature is hot.

Tropical Zone: Temperature is mild.

Polar Zone: Temperature is cold.

Equator: Temperature is high.

Global Warming



Q 1: Write the reasons of Global Warming.

Q 2: Identify the different zones on the figure of the Earth, on the basis of climate.



Interesting Information:

Maximum rain in one day: 23 July 2001 in Islamabad.

Maximum Temperature: 53.5 26 May 2010 Mohenjo Daro.

Minimum Temperature: -18 degree Quetta 8 January 1970.

Maximum day temperature: 58 degree Libya 1922.

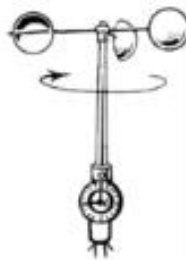
There is no weather on Moon. Moon does not have any rain, storms or climate.

Instruments for measuring Weather conditions.

Weather Instruments



Thermometer
(temperature)



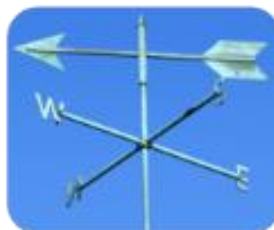
Anemometer
(wind speed)



Hygrometer
(humidity)



Rain gauge
(amount of rain)



Wind vane
(wind direction)



Snow gauge
(amount of snow)

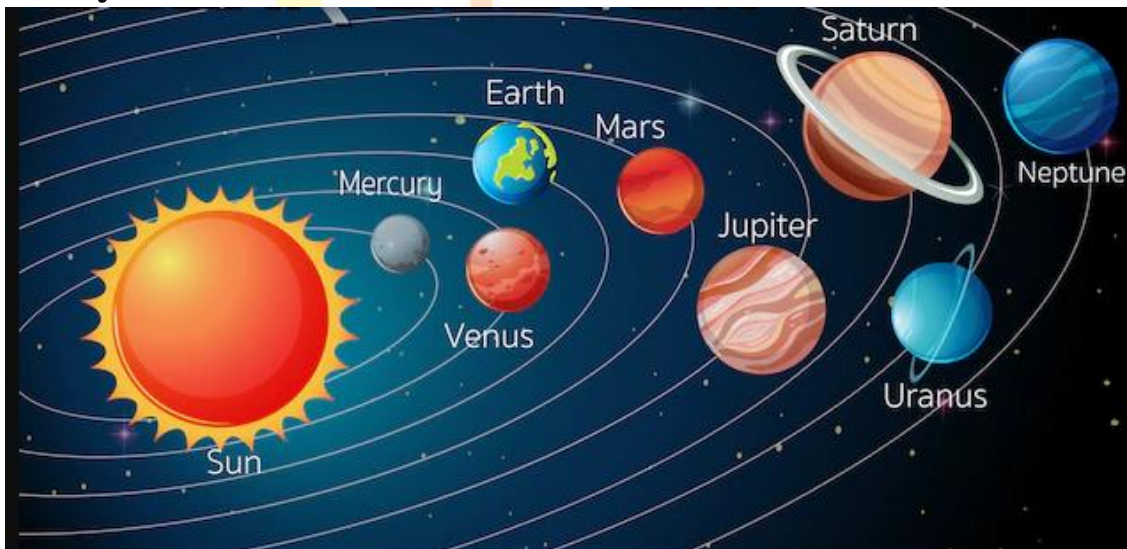
Chapter 09

Solar System and our Earth

Student Learning Outcomes:

1. Describe and demonstrate the Solar System with the Sun at the center and planets revolving around the Sun.
2. Identify the Sun as a source of heat and light.
3. Recognize the Earth has a moon that revolves around it.
4. Investigate and describe how day and night are related to Earth's daily rotation of its axis.
5. Provide evidence of Earth's rotation from changing the appearance of shadows during the day.
6. Illustrate and explain how solar and lunar eclipses occur.

Solar System:



Q 1(a) Which planet is nearest to Sun?

(b) Which is the biggest planet in the Solar system?

(c) Which planet is adjacent to Earth?

(d) Which planet is far away from the Sun?

Brainstorming

Write the side effects, if Sun stops providing heat and light to Earth.



Rotational Movement of Earth:



Takes:
24 hours or 1 day

Day



Day

Night



Takes:
365 days or 1 year

Seasons



Spring

Summer

Fall

Winter

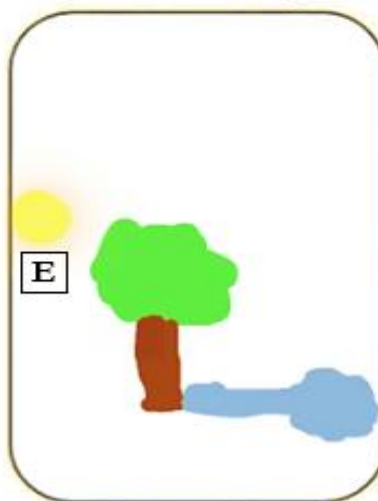
Q 2: Differentiate the following.

(a) Crescent and Badar

(b) Rotation and Revolution

Shadow Casting

Morning



Afternoon

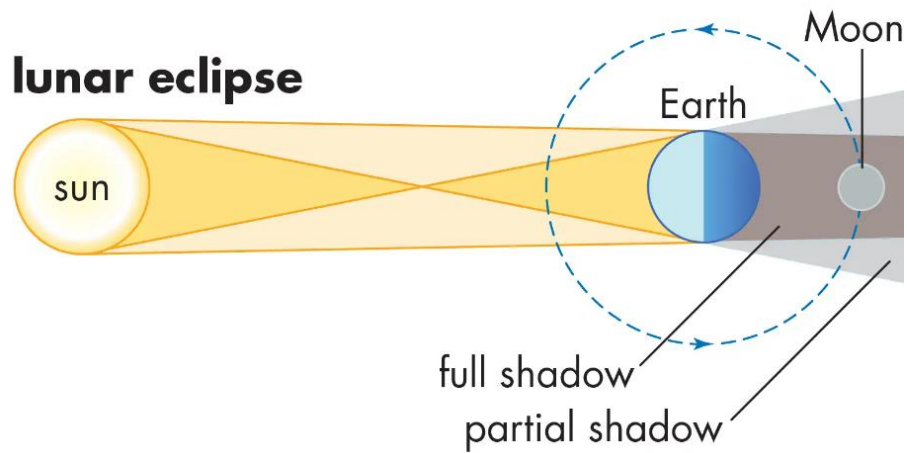
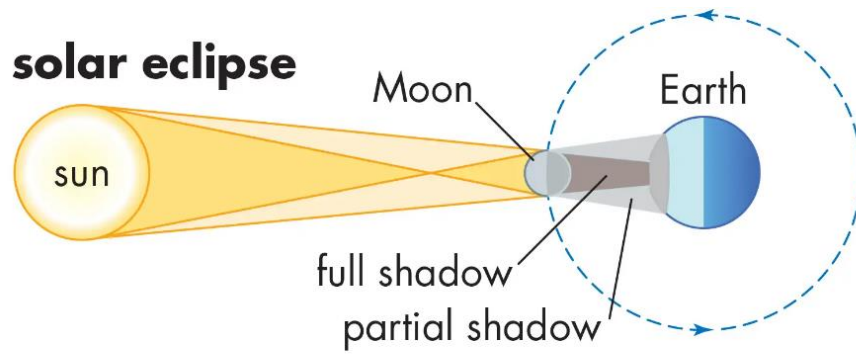


Evening

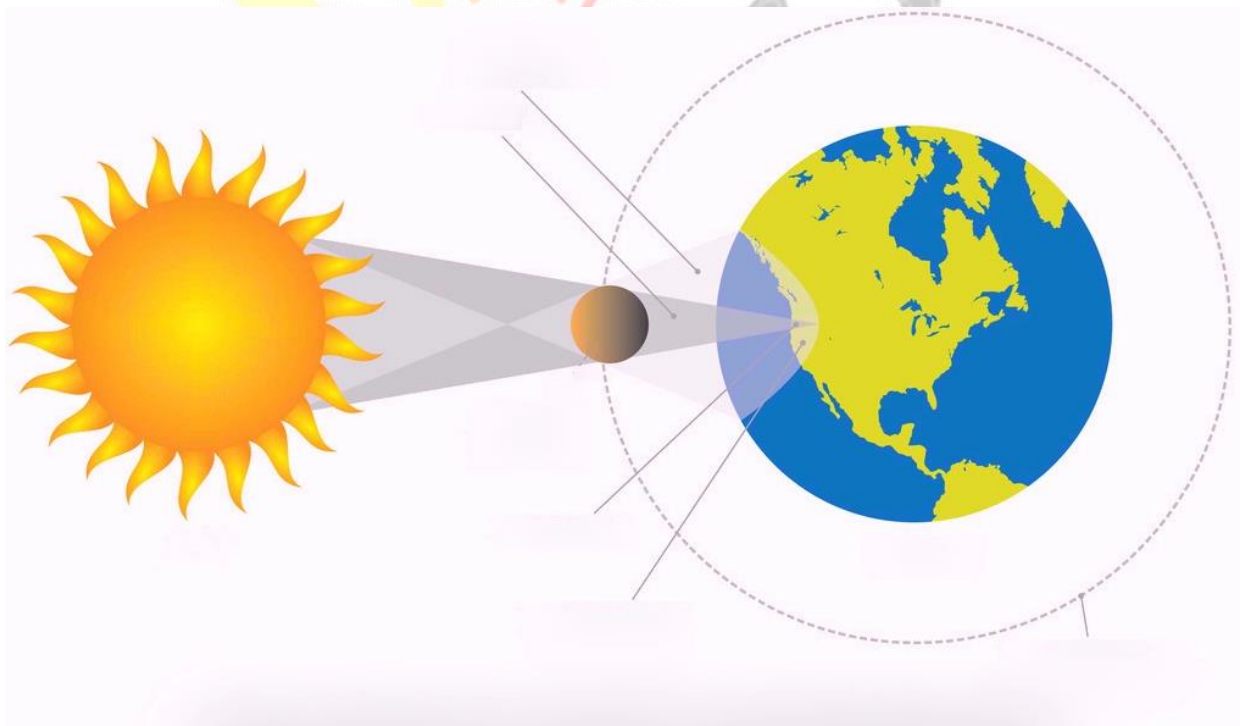


Q 3 : (a) what time of day is there no shadow?

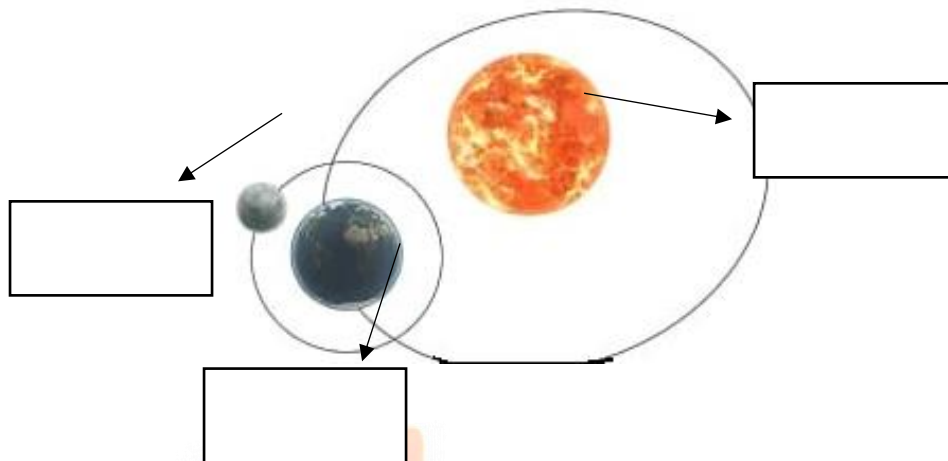
(b) In which picture the day is long?



Activity: Label the diagram



Activity: Write the correct type of movement in the box given near each arrowhead.



Point to Ponder

Stars aren't visible during the sunlit hours of daytime because the light-scattering properties of our atmosphere spread sunlight across the sky.

Gravitational attraction is responsible for movement of Moon around Earth.

The plane of the Earth's poles would always be perpendicular to the sun. The sun would always be just on the horizon 24 hours a day on every day at the poles.

Earth rotates from west to east. This is the reason that Sun appears to rise in the east and sets in the west.

Chapter 10

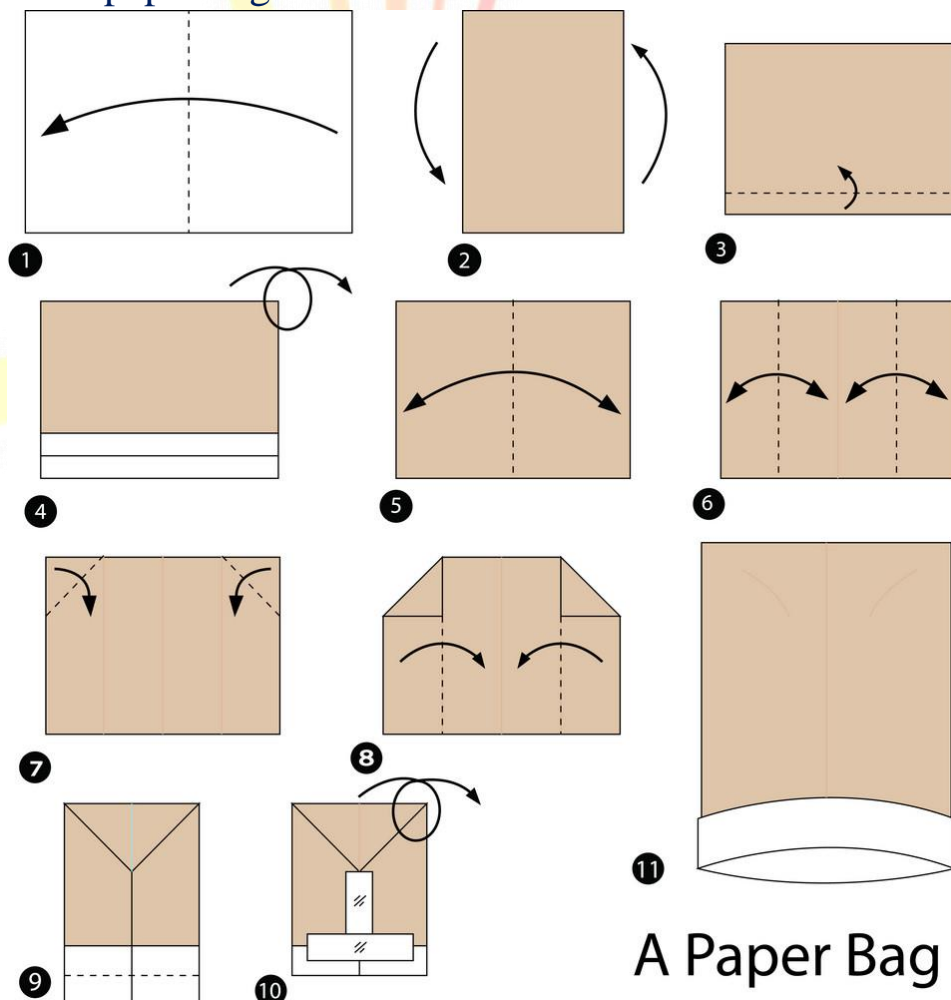
Technology in Everyday Life

Students Learning Outcomes:

1. Practice techniques of folding, cutting, tearing, and pasting papers, and cardboard to make objects and patterns.
2. Design paper bags, envelopes, cards, and face masks.
3. Design models of the sphere, cube, prism, and cylinders and come with clay or play dough.
4. Design hammers, wheels, rollers, and gears using clay or play dough.
5. Operate tablets/mobile phones for use of a calculator, alarm clock, and calendar.
6. Recognize the items in the first aid box.
7. Use digital and clinical thermometers externally to measure body temperature.
8. Check blood pressure with a digital blood pressure monitor.

Basic Craft Making:

Paper is not only used for writing but also for making models. Let us know how a paper bag can be made.



Brainstorming

How would life be different if there were no electricity?

Greeting Cards



Activity: Make a greeting card for your mother with the help of paper, a chart, and colours.



Q 1: Why is the wearing of a mask necessary?

First Aid Box:

Activity: Encircle the things that you can use if you meet an accident.



Q 2: Give examples of the various items used in everyday life which look like a circle, Prism, Cylinder, and cube.

Q 3: Do you use a Mobile phone? What does it look like? Draw a Mobile phone and show its apps.

