









Matter:

Anything that has mass and occupies space is called matter. Everything around us is made of matter.

Short Questions

- Define matter

Examples:

		
Rocks	Ice	Wood
		
Plants	Animals	Humans

States of Matter:

Matter exists in three states.

- Solid
- Liquid
- Gas

Short Questions

- Write three states of matter.



Solid



Liquid



Gas



Characteristics of States of Matter:



Solid

Solids have a fixed shape. They do not change shape easily. For example, a pencil always looks like a pencil, whether it is on your desk or in your hand.

Liquid

Liquids do not have a fixed shape. They take the shape of their container. For example, if you pour milk into a bowl, it will take the shape of the bowl.

Gases:

Gases do not have a fixed shape. They spread out to fill the shape of their container. For example, air in a balloon will take the shape of the balloon





1. Everything that has mass and occupies space is called:			
(A) Atom	(B) Molecule	(C) Matter	(D) None of these
Reason: Matter is defined as anything that has mass and takes up space.			
2. The states of matter are:			
(A) 2	(B) 3	(C) 4	(D) 5
Reason: The three states of matter are solid, liquid, and gas.			
3. _____ particles vibrate on their fixed position.			
(A) Solid	(B) Liquid	(C) Gas	(D) Water
Reason: In solids, particles vibrate around fixed positions.			
4. Due to applying _____ the shape of body changes:			
(A) Motion	(B) Gravity	(C) Friction	(D) Force
Reason: Applying force can change the shape of an object.			
5. _____ has a specific shape and specific volume.			
(A) Solid	(B) Liquid	(C) Gas	(D) Air
Reason: Solids have both a definite shape and volume.			
6. Which is not included in three physical states of matter?			
(A) Plasma	(B) Solid	(C) Liquid	(D) Gas
Reason: Plasma is a fourth state of matter, not one of the three classical states (solid, liquid, gas).			
7. Which of the following is a physical state of matter?			
(A) Solid	(B) Liquid	(C) Gas	(D) All of these
Reason: Solid, liquid, and gas are the three classical states of matter.			
8. When a solid gets heat, the forces of attraction between particles become:			
(A) Stronger	(B) Remain same	(C) Weaker	(D) All of these
Reason: Heating a solid increase the kinetic energy of its particles, weakening the forces of attraction between them.			



Physical Changes in Matter:

Physical changes of matter are changes that affect the form or appearance of a substance but do not alter its chemical composition. These changes do not involve the formation of new substances.

Examples: of Physical Changes:

Crushing an Aluminum Can:

When you crush an aluminum can, it changes shape, but it is still made of aluminum.

Dissolving Sugar in Water:

- When you mix sugar in water, the sugar spreads out, but it is still sugar. You can taste it, and if the water dries up, the sugar comes back.

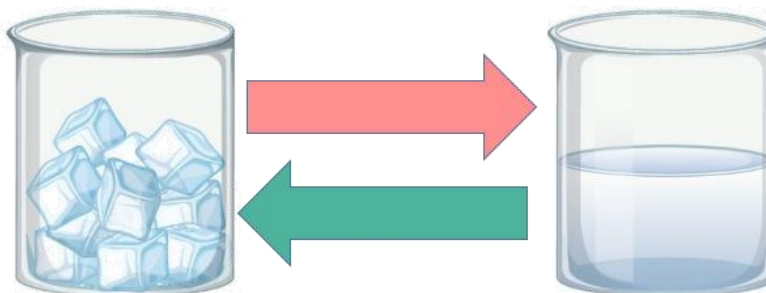


Cutting Paper:

- When you cut paper, it changes size and shape, but it is still paper.

Melting Ice:

- When ice melts, it turns into water. It changes from solid to liquid, but it is still water.



Related SLO

Students' Learning Outcomes

- Identify observable materials that do not result in new materials with different properties (e.g., dissolving, crushing aluminum can)

Short Questions

- Define physical change. Give example.



Melting Ice



Boiling Water



Breaking Glass



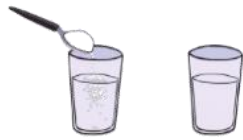
Chopping Wood



Folding paper



Breaking Egg



Dissolving sugar in water



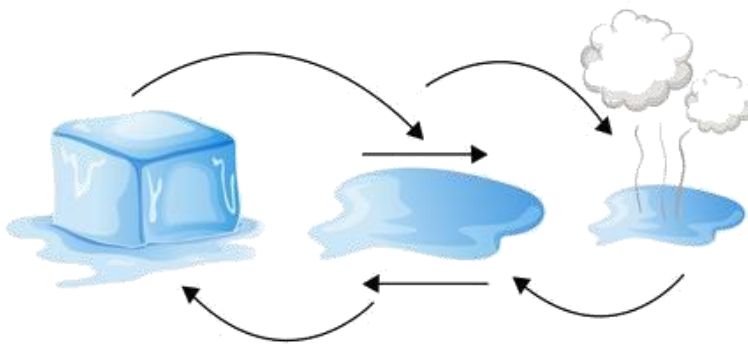
Crushing Aluminium Can



Mixing Sand and Water

Changes in States of Matter:

Matter can change from one state to another on heating or cooling.



Related SLO

Students' Learning Outcomes

- Recognize that matter can be changed from one state to another by heating or cooling (candle wax)
- Differentiate between physical and chemical changes of matter with examples.



Examples:

- When sunlight falls on snow (solid) on the mountain, it melts and take the form of a river (liquid). When water (liquid) in the river gets heated by the sunlight, it changes into water vapors (gas)
- When you heat candle wax, it melts and changes from solid to liquid. When it cools down, it hardens and changes back from liquid to solid. This shows how matter can change from one state to another by heating or cooling.



Processes in Change of State of Matter:

Melting

Melting is a process in which a solid changes into a liquid. It happens when the solid gets warm enough. The heat makes the solid's particles move faster and break apart.

- **Example:**

Related SLO

Students' Learning Outcomes

- Describe and demonstrate the process of melting, freezing, boiling evaporation and condensation.

Short Questions

- Define melting. Give example.
- How a solid is changed into a liquid?

<p>Ice cream melting on a hot day.</p>	<p>Butter melting in a hot pan</p>	<p>A candle wax melting when the candle is lit.</p>



Freezing

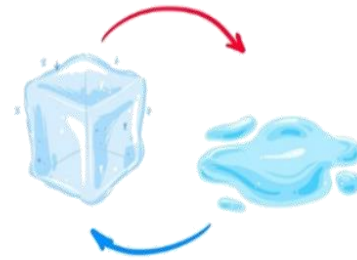
Freezing is the process in which a liquid changes into a solid. It happens when the liquid gets cold enough. The cold makes the liquid's particles slow down and stick together. This process is called freezing. It is like turning water into ice cubes in the freezer.

Example:

Water freezing into ice.

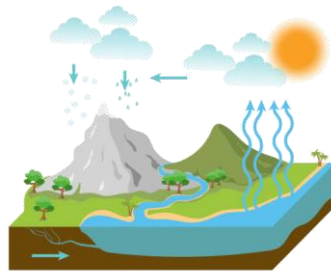
Short Questions

- Define freezing.



Evaporation

Evaporation is the process in which a liquid changes into a gas. This happens slowly and can occur at any temperature. Evaporation occurs when water is heated, like when the sun warms a puddle. The heat makes the water molecules move faster and escape into the air.



Short Questions

- Define evaporation at which temperature it take place?
- How evaporation occurs?
- Give daily life examples of evaporation.

Examples:



Wet clothes drying



The pond is drying



Boiling water into steam



Boiling

Boiling is a process where a liquid changes into a gas rapidly at a specific temperature called the boiling point. The heat makes the liquid's particles move fast and escape into the air.

Example:

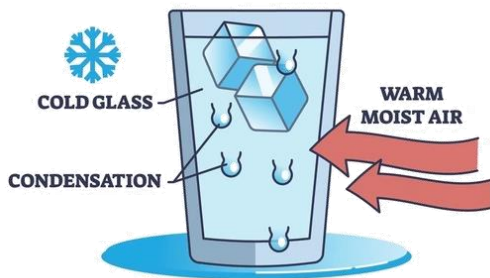
Water boiling in a pot on the stove.

Short Questions

- Define Boiling.

Condensation

Condensation is the process in which a gas changes into a liquid. This process often happens when warm air meets a cold surface. You can see condensation on the outside of a cold glass or as dew on grass in the morning. It's an important part of the water cycle, helping form clouds and precipitation.



Short Questions

- Define Condensation

1. What type of change is it when metal expands on heating?			
(A) Permanent	(B) Chemical	(C) Physical	(D) Temporary
Reason: When metal expands upon heating, it's a physical change because the metal retains its chemical composition.			
2. Mixing of salt with water is a:			
(A) Physical change	(B) Chemical change	(C) Evaporation	(D) Condensation
Reason: This is a physical change because the salt dissolves without altering its chemical composition.			
3. An example of physical change is:			
(A) Burning of coal	(B) Cooking of food	(C) Dissolving salt in water	(D) All of these
Reason: This process is physical as it only involves a change in the state, not in the chemical structure.			
4. Conversion of water into vapours is called:			
(A) Condensation	(B) Sublimation	(C) Evaporation	(D) Freezing



Reason: The process of turning liquid water into vapor is evaporation.

5. The conversion of water vapours into liquid is called:

- | | | | |
|-------------|-------------|--------------|------------------|
| (A) Boiling | (B) Melting | (C) Freezing | (D) Condensation |
|-------------|-------------|--------------|------------------|

Reason: The process of condensation involves the transition from vapor back to liquid form.

6. The change in which no substance is formed is called:

- | | | | |
|---------------------|---------------------|----------------------|------------------|
| (A) Physical change | (B) Chemical change | (C) Temporary change | (D) All of these |
|---------------------|---------------------|----------------------|------------------|

Reason: Physical changes do not create new substances; they only alter the form or appearance.

7. Which one of the following is physical change?

- | | | | |
|----------------------|----------------------|-----------------------|----------------------|
| (A) Burning of paper | (B) Yogurt formation | (C) Rotting of fruits | (D) Formation of ice |
|----------------------|----------------------|-----------------------|----------------------|

Reason: Freezing water into ice is a physical change as it only involves a change in state.

8. The process of conversion of liquid into solid state is called:

- | | | | |
|-------------|--------------|-------------|-----------------|
| (A) Melting | (B) Freezing | (C) Boiling | (D) Evaporation |
|-------------|--------------|-------------|-----------------|

Reason: Freezing is the process where a liquid turns into a solid.

9. Wet cloth dries by which process?

- | | | | |
|-------------|--------------|-------------|-----------------|
| (A) Melting | (B) Freezing | (C) Boiling | (D) Evaporation |
|-------------|--------------|-------------|-----------------|

Reason: The moisture in the cloth turns into vapor and evaporates into the air.

10. Which process increase with increase in temperature?

- | | | | |
|--------------|-------------|------------------|-----------------|
| (A) Freezing | (B) Boiling | (C) Condensation | (D) Evaporation |
|--------------|-------------|------------------|-----------------|

Reason: Evaporation rate increases as temperature rises due to increased kinetic energy.

11. In which process solid when heated force of attraction between particles become weaker and they move away from each other?

- | | | | |
|-------------|--------------|------------------|-------------------|
| (A) Melting | (B) Freezing | (C) Condensation | (D) None of these |
|-------------|--------------|------------------|-------------------|

Reason: In melting, solids absorb heat, causing particles to vibrate more and break free from their fixed positions.

12. The process during which solid changes into liquid is called:

- | | | | |
|--------------|-------------|-------------|-------------|
| (A) Freezing | (B) Boiling | (C) Melting | (D) Cooling |
|--------------|-------------|-------------|-------------|

Reason: Melting is the process of a solid turning into a liquid.

13. The liquid is changed into water vapour is called:

- | | | | |
|--------------|-------------|-------------|-------------|
| (A) Freezing | (B) Cooling | (C) Melting | (D) Boiling |
|--------------|-------------|-------------|-------------|

Reason: Boiling is the process where a liquid changes into vapor.

14. The change of water (liquid) into water vapours (gas) is called:

- | | | | |
|-------------|-------------|------------------|-----------------|
| (A) Melting | (B) Boiling | (C) Condensation | (D) Evaporation |
|-------------|-------------|------------------|-----------------|



Reason: Evaporation is the process where liquid water turns into vapor.

15. When a solid piece of ice absorbs heat it becomes:

- | | | | |
|---------|-----------|-----------|------------|
| (A) Gas | (B) Solid | (C) Water | (D) Vapour |
|---------|-----------|-----------|------------|

Reason: When ice absorbs heat, it melts and turns into liquid water.

16. Boiling a liquid requires temperature:

- | | | | |
|---------|--------|-------------|----------|
| (A) Low | (B) No | (C) Minimum | (D) High |
|---------|--------|-------------|----------|

Reason: Boiling requires high temperatures to overcome intermolecular forces in the liquid.

17. When our sweat dries we feel cold because of:

- | | | | |
|------------------|-----------------|-----------------|-------------------|
| (A) Condensation | (B) Evaporation | (C) Temperature | (D) Concentration |
|------------------|-----------------|-----------------|-------------------|

Reason: Evaporation of sweat absorbs heat from the body, making us feel cooler.

18. Which is a physical change?

- | | | | |
|-----------------------------|----------------------|----------------------|------------------|
| (A) Solid wax become liquid | (B) Burning of paper | (C) Making milk curd | (D) Burning milk |
|-----------------------------|----------------------|----------------------|------------------|

Reason: This change involves a phase transition from solid to liquid without altering the chemical composition of the wax.

19. Which one of these is a reverse process of evaporation?

- | | | | |
|--------------|-------------|-------------|------------------|
| (A) Freezing | (B) Melting | (C) Boiling | (D) Condensation |
|--------------|-------------|-------------|------------------|

Reason: Condensation is the process where vapor turns back into liquid.

20. What happens in a physical change?

- | | | | |
|---|---|--|----------------------|
| (A) The appearance of a substance changes | (B) Chemical composition of a substance changes | (C) Appearance and chemical composition both will change | (D) No change occurs |
|---|---|--|----------------------|

Reason: Physical changes alter the form or appearance without changing the chemical composition.

21. What does happen during melting?

- | | | | |
|-------------------------------|----------------------------|--------------------------------|-----------------------------|
| (A) Solid changes into liquid | (B) Solid changed into gas | (C) Liquid changed into solids | (D) Liquid changes into gas |
|-------------------------------|----------------------------|--------------------------------|-----------------------------|

Reason: Melting involves the transition from solid to liquid as heat is absorbed.

22. At high temperature the process of evaporation becomes:

- | | | | |
|----------|-----------|----------|-----------------|
| (A) Slow | (B) Rapid | (C) Zero | (D) Remain same |
|----------|-----------|----------|-----------------|

Reason: Higher temperatures increase the rate of evaporation by providing more energy to the molecules.

23. Physical changes are mostly:

- | | | | |
|----------------|------------------|---------------|---------------|
| (A) Reversible | (B) Irreversible | (C) Temporary | (D) Permanent |
|----------------|------------------|---------------|---------------|

Reason: Many physical changes, such as melting or freezing, can be reversed.



Dissolving Substances in Water:

Many substances can dissolve in water. When you mix a teaspoon of sugar in a glass of water the sugar dissolves in it. It is because the molecules of sugar fill the empty spaces between the molecules of water. The process results in the formation of sugar solution.



Related SLO

Students' Learning Outcomes

- Identify ways of accelerating the process of dissolving materials in a given amount of water and provide reasoning (i.e., increasing the temperature, stirring and breaking the solid into smaller pieces increases the process of dissolving).

Solution and its Components:

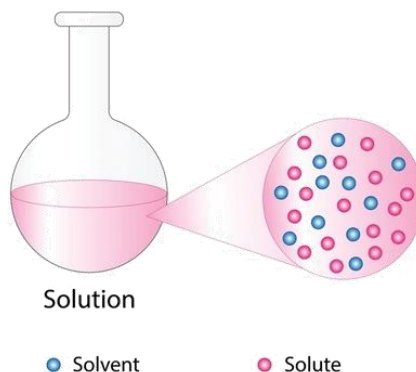
A solution is a special type of mixture where one substance (the solute) is dissolved in another (the solvent). Solution is formed when a solid or liquid mixes with other liquid uniformly forming a mixture.

Short Questions

- Define solution.
- Give examples of solutions.
- When solution is formed?

Examples:

- Saltwater:
- Sugar water:
- Carbonated drinks:
- Vinegar:
- Alcoholic beverages:





Solute:

Solute is a substance that is dissolved in a solvent to form a solution. It is typically present in a smaller amount compared to the solvent. For example, in a saltwater solution, salt is the solute that dissolves in water (the solvent).

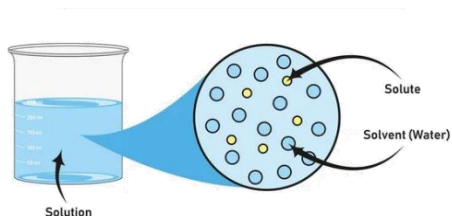
Short Questions

- Define solute. Give example.
- What is difference between solute and solvent?

Solvent:

A solvent is a substance that dissolves a solute to form a solution. It is typically present in a larger amount compared to the solute.

For example, in a saltwater solution, water is the solvent that dissolves the salt (the solute).



Short Questions

- Define solvent. Give example.

Ways of Accelerating the Process of Dissolving:

The process of dissolving can be accelerated by using the following methods:

- **Temperature**

Heating the solvent (like water) makes its molecules move faster, which helps the solute (like sugar or salt) dissolve more quickly.

Example:

Sugar dissolves faster in hot tea than in cold tea because the hot water molecules move faster and help break down the sugar.



Short Questions

- How can we increase the rate of dissolving of salt in water?

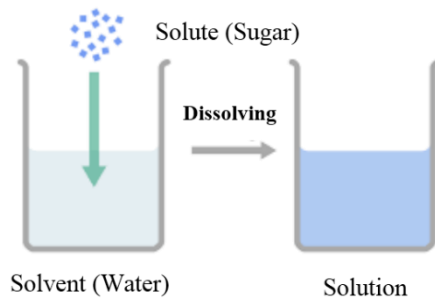
- **Size of Solute Particles**



Smaller solute particles dissolve faster than larger ones because they have more surface area in contact with the solvent.

Example:

If you crush a sugar cube into smaller pieces, the sugar will dissolve faster in water than if you put the whole cube in.

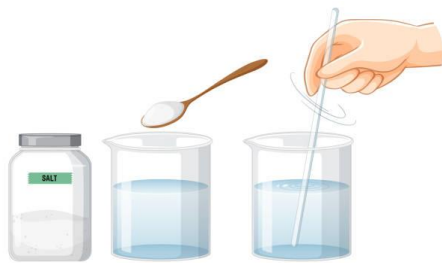


- **Stirring**

Stirring the mixture helps spread the solute particles throughout the solvent (like water). This helps the solute dissolve faster.

Example:

Stirring salt in water helps it dissolve quicker than if you leave it without stirring.



Short Questions

- What is the effect of stirring on solution?



1. Which factor will not affect the dissolving of sugar in water?			
Ⓐ Adding salt in water	Ⓑ Making sugar powder by grinding	Ⓒ Heating water and sugar	Ⓓ Stirring water and sugar
Reason: Adding salt to water affects the solubility of sugar. It does not directly impact how sugar dissolves in the water, unlike stirring, heating, or grinding sugar.			
2. Mixing of salt with water is a:			
Ⓐ Physical change	Ⓑ Chemical change	Ⓒ Evaporation	Ⓓ Condensation
Reason: This is a physical change because the salt dissolves without altering its chemical composition.			
3. The component of solution which is less in amount is called:			
Ⓐ Compound	Ⓑ Mixture	Ⓒ Solute	Ⓓ Solvent
Reason: The solute is the substance that is dissolved in the solvent.			
4. An example of solute is:			
Ⓐ Salt	Ⓑ Water	Ⓒ Milk	Ⓓ All of these
Reason: In a saltwater solution, salt is the solute.			
5. The component of solution which is more in amount is called:			
Ⓐ Solvent	Ⓑ Solute	Ⓒ Saturated solution	Ⓓ Supersaturated solution
Reason: The solvent is the component that is present in a greater amount and dissolves the solute.			
6. An example of solvent is:			
Ⓐ Sugar	Ⓑ Salt	Ⓒ Alcohol	Ⓓ Water
Reason: Water is a common solvent used to dissolve various solutes.			
7. A solution which has less of quantity of solute is called:			
Ⓐ Buffer solution	Ⓑ Aqueous solution	Ⓒ Saturated solution	Ⓓ Supersaturated solution
Reason: A buffer solution maintains a stable pH and usually has a low concentration of solute compared to its solvent.			
8. The mixture of two or more substances is called:			
Ⓐ Solution	Ⓑ Solute	Ⓒ Solvent	Ⓓ Condensation
Reason: A solution is a homogeneous mixture of two or more substances.			
9. The minimum components of a solution are:			
Ⓐ 1	Ⓑ 2	Ⓒ 3	Ⓓ 4
Reason: A solution requires at least a solute and a solvent.			



10. The speed of solute dissolution increases on:

- | | | | |
|----------------------------|----------------|-------------------------------|------------------|
| (A) Increasing temperature | (B) Dissolving | (C) Smaller size of particles | (D) All of these |
|----------------------------|----------------|-------------------------------|------------------|

Reason: Increasing temperature, dissolving, and smaller particle size all speed up the dissolution process.

11. The example of solution is:

- | | | | |
|----------|---------|-----------|------------------|
| (A) Milk | (B) Tea | (C) Juice | (D) All of these |
|----------|---------|-----------|------------------|

Reason: Milk, tea, and juice are all examples of solutions.

12. Which is solute?

- | | | | |
|-----------|----------|-----------|-------------------|
| (A) Water | (B) Milk | (C) Sugar | (D) None of these |
|-----------|----------|-----------|-------------------|

Reason: In a solution, sugar is the solute that dissolves in a solvent.

13. Which is solvent?

- | | | | |
|-----------|-----------|----------|-------------------|
| (A) Sugar | (B) Water | (C) Salt | (D) None of these |
|-----------|-----------|----------|-------------------|

Reason: Water is commonly used as a solvent to dissolve solutes.

14. Which is solution?

- | | | | |
|----------|---------|----------------|------------------|
| (A) Milk | (B) Tea | (C) Soft drink | (D) All of these |
|----------|---------|----------------|------------------|

Reason: Milk, tea, and soft drinks are all solutions, as they consist of solutes dissolved in solvents.

15. A solution having a relatively large amount of dissolved solute is called:

- | | | | |
|---------------------|---------------------------|----------------|-------------------|
| (A) Dilute solution | (B) Concentrated solution | (C) Both and b | (D) None of these |
|---------------------|---------------------------|----------------|-------------------|

Reason: A concentrated solution has a high amount of solute relative to the solvent.

Short Questions

- A student weighs a piece of ice and then allows it to melt. In your opinion what will be the weight of water and why?

The weight of water will be the same as the weight of the ice. This is because the mass remains constant only the state of matter changes from solid to liquid.

Short Questions

- Write three states of matter and their interconversion.

The three states of matter solids, liquids and gases can be interconverted through processes like melting, freezing evaporation and condensation.



Concentration of Solution:

The concentration of a solution refers to the amount of solute dissolved in a given volume of solvent or solution. Depending upon the amount of solute dissolved in the solvent, a solution may be:

- Weak Solution
- Strong Solution

Weak Solution: (Dilute Solution)

A weak solution or dilute solution has a small amount of solute compared to the amount of solvent. It contains a low concentration of solute.

Example:

In a sugar solution, concentration of sugar is low compared to the amount of water.

Strong Solution: (Concentrated Solution)

A strong solution has a large amount of solute compared to the amount of solvent. It contains a high concentration of solute.

Example:

If you add a lot of sugar (like five tablespoons) to the same glass of water, you create a concentrated sugar solution.

Related SLO

Students' Learning Outcomes

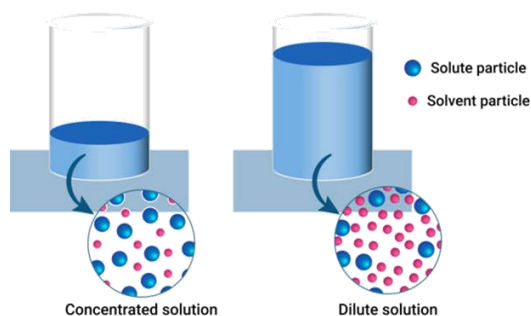
- Distinguish between strong and weak concentrations of simple solutions.

Short Questions

- Define dilute solution.

Short Questions

- Define concentrated solution.





Chemical Properties of matter:

Chemical change of matter describe the ways in which a substance can change to form a new substance. These properties can be observed during a chemical reaction.

Examples:

Burning

Burning is a chemical process called combustion, where a substance reacts with oxygen to produce heat, light, and new products such as carbon dioxide and water. It is an exothermic reaction, meaning it releases energy.

- **Example:** Wood turning into ash and smoke when it burns in a fireplace.

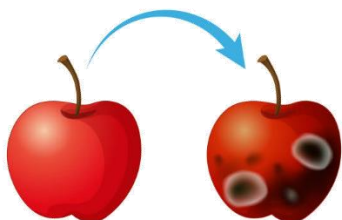


Decaying

Decaying is a chemical process in which things like plants and animals break down and turn into simpler materials. This process is carried out by microorganisms such as bacteria and fungi. It is a natural part of the nutrient cycle and is essential for recycling organic matter in ecosystems.

Example:

A banana turning brown and soft as it rots.



Related SLO

Students' Learning Outcomes

- Identify observable changes in materials that make new materials with different properties (e.g., decaying, burning, rusting)

Short Questions

- Define chemical change give example.
- What is meant by burning process?
- Give an example of chemical change in which carbon dioxide is produced?

Short Questions

- Describe the decaying process



Rusting

Rusting is a specific type of oxidation, where iron reacts with oxygen and moisture to form iron oxide, commonly known as rust. This is a slow process that results in the deterioration of the metal.

- **Example:** An iron nail left in the rain develops a reddish-brown coating of rust.

Prevention from Rusting:

Iron is prevented from rusting by coating it with protective layers like paint or zinc, which block moisture and oxygen.



Short Questions

- Define rusting.
- How iron is prevented from rusting?
- What is rust? And which type of change is this?

Short Questions

- On mixing vinegar and boiling water bubbles are produced. Out of the two one is a chemical change and the other is a physical change. Explain.
The bubbles from boiling water are a physical change because the water is just turning into steam. However if vinegar reacts with something to create bubbles, that is a chemical change making new substances.

Short Questions

- Why is the formation of fertilizers from leaves a chemical change?
It is a chemical change because the leaves decompose and their chemical composition changes resulting in new substances.



1. The change of milk into yogurt is:			
(A) Physical change	(B) Climate change	(C) Chemical change	(D) Change of colour
Reason: The conversion of milk into yogurt is a chemical change, where bacteria convert lactose into lactic acid, resulting in a new substance with different properties.			
2. Why did a person paint his iron gate?			
(A) To save from rusting	(B) To save from sunlight	(C) To make it beautiful	(D) To save from water
Reason: Painting creates a protective layer that prevents air and moisture from reaching the iron, thus preventing rusting.			
3. Which one is not a chemical change?			
(A) Seed germination	(B) Making paper board	(C) Burning of wood	(D) Cooking food
Reason: This is a physical process involving the compression and binding of fibers, not a chemical transformation.			
4. To prevent iron from rusting, its surface is coated with:			
(A) Paint	(B) Oil	(C) chromium	(D) all of these
Reason: Paint, oil, and chromium are all used to prevent rusting by creating a protective barrier.			
5. The change in which a new substance is formed is called:			
(A) Chemical change	(B) Temporary change	(C) Freezing	(D) Condensation
Reason: Chemical changes result in the formation of new substances with different properties.			
6. The flame develops during combustion reaction is called:			
(A) Decaying	(B) Burning	(C) Rusting	(D) Melting
Reason: Burning is a type of combustion reaction that produces flame.			
7. Which is chemical change?			
(A) Rusted iron	(B) Boiled water	(C) Turning water into ice	(D) Turning of ice into water
Reason: Rusting is a chemical change where iron reacts with oxygen and water to form rust.			
8. Which is a chemical change?			
(A) Solid wax become liquid	(B) Burning of paper	(C) Turning water into ice	(D) Boiling of water
Reason: Burning paper involves a chemical reaction with oxygen that produces new substances.			
9. Which one is a chemical change?			
(A) Decaying	(B) Evaporation	(C) Freezing	(D) Boiling
Reason: Decaying involves chemical reactions that break down organic matter into new substances.			



10. The change that occurs on the surface of iron due to action of oxygen and water is called:

- | | | | |
|------------|-----------|-----------|------------|
| Ⓐ Decaying | Ⓑ Burning | Ⓒ Rusting | Ⓓ Freezing |
|------------|-----------|-----------|------------|

Reason: Rusting is a chemical process where iron reacts with oxygen and water to form rust.

11. The remains of dead organisms and waste matter disappears gradually through

- | | | | |
|---------------|----------------|-----------|-----------------|
| Ⓐ Evaporation | Ⓑ Condensation | Ⓒ Melting | Ⓓ Decomposition |
|---------------|----------------|-----------|-----------------|

Reason: Decomposition involves breaking down organic matter into simpler substances through biological processes.

12. Chemical changes are mostly:

- | | | | |
|--------------|----------------|-------------|-------------|
| Ⓐ Reversible | Ⓑ Irreversible | Ⓒ Temporary | Ⓓ Permanent |
|--------------|----------------|-------------|-------------|

Reason: Chemical changes often result in the formation of new substances, making them difficult to reverse.