

1. Matter

Worksheet

A. State whether the following statements are true or false.

1. Liquids have fixed shape and volume.
2. The volume of liquid depends on the size of the particles.
3. The molecules of gases are in constant motion.
4. The process of change of a liquid into its gas state at a fixed temperature is called freezing.
5. The law of conservation of mass states that mass can be created as well as destroyed.

B. Name the following.

1. Name the law that states that mass can neither be created nor destroyed.
2. Name the substance formed on burning of wood in air.
3. Which state of matter takes the shape and volume of the container they are kept in?
4. Name the theory that explains why matter exists in different states and how it can change from one state to another.
5. Which state of matter has fixed shape and volume?

C. Choose the correct answer.

1. Which of the following refers to the distance between the molecules of a substance?
(a) Intermolecular forces of attraction (b) Intermolecular space
(c) Matter (d) Atom
2. Which of the following refers to a process of change of a solid state into its liquid state at a fixed temperature?
(a) Sublimation (b) Evaporation
(c) Distillation (d) Melting
3. Which of the following refers to law of conservation of mass?
(a) Mass can be created as well as destroyed.
(b) Mass can only be created but not destroyed.
(c) Mass can only be destroyed.
(d) Mass can neither be created nor destroyed.
4. What will be the mass of water if we mix 30g ice with 50g water?
(a) 50g (b) 30g
(c) 80g (d) 45g
5. What will happen if we burn magnesium ribbon in air?
(a) A white solid called magnesium oxide is formed.
(b) It leads to the formation of magnesium dioxide in air.
(c) It leaves behind ash.
(d) It forms acid.

D. Fill in the blanks.

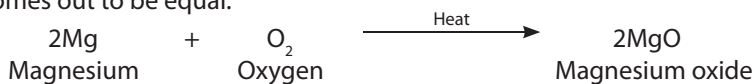
1. The volume of liquid depends on the _____ of the particles.
2. The average kinetic energy of the particles is directly proportional to the _____ of the gas.
3. The change of substance from one physical state to another is known as _____.
4. The process of change of a gas into its liquid state is called _____.
5. The process of change of a substance from gaseous state to its solid state directly without changing into a liquid state is called _____.

E. Answer the following.

1. Explain the behaviour of matter in solids on the basis of kinetic molecular theory.
2. Why do molecules in liquids move from one position to another?
3. On the basis of motion of molecules and the forces between these molecules, discuss how does solid change into liquid?
4. What happens on burning magnesium ribbon in air? Write the chemical equation for the reaction.
5. State law of conservation of mass.

Answers to Worksheet

- A. 1. False 2. True 3. True 4. False 5. False
- B. 1. Law of Conservation of Mass 2. Ash 3. Gases
4. Kinetic Molecular Theory of Matter 5. Solids
- C. 1. (b) 2. (d) 3. (d) 4. (c) 5. (a)
- D. 1. size 2. temperature 3. change of state
4. condensation 5. deposition
- E. 1 The molecules are closely packed to each other in solid and the intermolecular space is negligible. Due to this, the intermolecular force of attraction between the particles is the strongest. The molecules are arranged in a well-defined order and remain fixed in their positions. The interparticle force of attraction between the molecules is so strong that the kinetic energy is not enough to break the force. Hence, the molecules in solids hardly move about, they only vibrate about their position.
2. The molecules in liquids move from one position to the other within the liquid. The following properties explain the nature of liquids.
- Liquids consist of closely packed molecules which are in random motion and maintain the volume.
 - The volume of liquid depends on the size of the particles. This in turn affects the properties of a liquid.
 - The decrease in the motion of the molecules of liquids allows the interparticle force of attraction to act which significantly affect the properties of a liquid.
 - Liquids have fixed volume and take the shape of the container.
 - The average kinetic energy of the particles is directly proportional to the temperature of the liquid.
 - The intermolecular space in liquids is more than that in solids and the molecules are less closely packed.
3. When a solid is heated, its molecules gain kinetic energy and become active. The molecules try to overcome the intermolecular force of attraction. So, they vibrate faster and start to move and the intermolecular space between them increases. As the temperature increases so does the intermolecular space and the intermolecular force of attraction decreases. Eventually, the solid changes to a liquid.
4. On burning magnesium ribbon in air, magnesium oxide (a white solid) is formed. In this case, we compare the total mass of the reactants and the products, which comes out to be equal.



5. The law of conservation of mass states that mass can neither be created nor destroyed. The mass of a substance remains the same during a change. The density of matter and the volume occupied by the matter may vary within a system but the mass remains constant. The law of conservation of mass holds because the naturally occurring elements are stable. The atom is also neither created nor destroyed.

2. Physical and Chemical Changes

Worksheet

A. State whether the following statements are true or false.

1. A change refers to the transformation of a substance from one form to another.
2. Changes in which we can get back the original substance by reversing the action are called irreversible changes.
3. Changes that take place over a long period of time are called fast changes.
4. Dissolving is a process in which a solid, liquid or gas mixes uniformly with another substance to form a solution.
5. Changes in which two substances react to form new substances with different properties are called physical changes.

B. Name the following.

1. Name the change in which we cannot get back the original substance by reversing the reaction.
2. Name the change that takes place over a long period of time.
3. Name the changes that occur due to human effort or activity and are brought about artificially.
4. Name the process in which a substance changes from its liquid state to its gaseous state at a temperature below the boiling point.
5. Name the process in which a substance is broken down by the action of micro organism with the release of heat and carbon dioxide.

C. Choose the correct answer.

1. Which of the following is a periodic change?
(a) Precipitation (b) Earthquake
(c) Wilting of plant (d) Phases of the moon
2. Which of the following is a natural change?
(a) Formation of coal (b) Cooking of food
(c) Air pollution (d) Manufacturing of clothes
3. Which of the following is a physical change?
(a) Germination of seeds (b) Ripening of fruits
(c) Melting of ice (d) Burning of wood
4. Which of the following refers to a chemical change that absorbs energy in the form of light?
(a) Dissolving (b) Evaporation
(c) Photosynthesis (d) Melting
5. Which of the following refers to a physical change that releases energy in the form of heat?
(a) Photosynthesis (b) Combustion
(c) Digestion of food (d) Freezing

D. Fill in the blanks.

1. Changes that are not beneficial and may bring harm to us are called _____ changes.
2. A _____ change is temporary and reversible.
3. _____ is a process by which a substance changes directly from its solid state to its gaseous state without changing into its liquid state.
4. A chemical change is _____ and irreversible.
5. A piece of iron when left out in moist air comes in contact with oxygen to produce a dull brittle brown substance called _____.

E. Answer the following.

1. What is the difference between periodic and non-periodic changes?
2. What is the difference between evaporation and boiling?
3. What are the characteristics of chemical changes?
4. Write a short note on fermentation.
5. Mention the changes in which energy is released.

Answers to Worksheet

- A. 1. True
2. False
3. False
4. True
5. False
- B. 1. Irreversible change
2. Slow change
3. Man-made changes
4. Evaporation
5. Fermentation
- C. 1. (d)
2. (a)
3. (c)
4. (c)
5. (d)
- D. 1. undesirable
2. physical
3. Sublimation
4. permanent
5. rust

E. 1.

Periodic changes	Non-periodic changes
Changes that repeat themselves after a regular interval of time and are bound to happen are called periodic changes.	Changes that do not repeat after a regular interval of time, i.e., they occur irregularly are called non-periodic changes.
For example, rising and setting of the sun, changing of seasons and phases of the moon are periodic changes.	For example, precipitation, earthquake and wilting of a plant are some non-periodic changes.

2.

Evaporation	Boiling
Evaporation is a process by which a substance changes from its liquid state to its gaseous state at a temperature below the boiling point.	Boiling is a process by which a substance changes from its liquid state to its gaseous state when heated to its boiling point.
The evaporation of water is a physical change which is slow, natural, desirable and reversible.	Boiling of water is a physical change which is man-made, fast, reversible and desirable.

3. Characteristics of a chemical change are listed below.
- A chemical change is permanent and irreversible.
 - The composition of a substance changes during a chemical change.

- During a chemical change, one or more new substances with new sets of properties are formed.
 - There is an exchange of energy during a chemical change.
 - A chemical change is accompanied by a change in mass.
4. Fermentation is a process by which a substance is broken down by the action of microorganisms with the release of heat and carbon dioxide. When dough is fermented, bread is made which is soft. Fermentation of dough is a chemical change which is man-made, slow and desirable.
 5. Physical change like freezing of water releases energy in the form of heat. This is because when water freezes into ice, i.e., water changes its state from liquid to solid, the intermolecular force of attraction increases and intermolecular space decreases. This is possible only when heat energy is released by the liquid or gas. Chemical changes like combustion and digestion of food also involve release of energy.

3. Elements, Compounds and Mixtures

Worksheet

A. State whether the following statements are true or false.

1. A substance that has a fixed composition and fixed chemical properties is a pure substance.
2. An element is a substance composed of two or more elements chemically combined in a definite proportion by mass.
3. A type of mixture in which a component is not dissolved completely into another component is called an emulsion.
4. The liquid that passes through the filter is called filtrate.
5. Chromatography can be used to separate very small quantities of a substance.

B. Define the following.

1. Metalloids
2. Noble gases
3. Homogeneous mixture
4. Emulsion
5. Sieving

C. Choose the correct answer.

1. Which of the following techniques is used to separate different components of a mixture based on the differences in the rate of absorption of the components present in the mixture?
(a) Chromatography (b) Distillation
(c) Fractional distillation (d) Sieving
2. Which of the following processes is used to change a substance directly from its solid state to its gaseous state without passing through the immediate liquid state?
(a) Evaporation (b) Boiling
(c) Freezing (d) Sublimation
3. Which of the following techniques is a method of separating a mixture using wind or moving air?
(a) Handpicking (b) Sieving
(c) Winnowing (d) Filtration
4. Which of the following is a noble gas?
(a) Oxygen (b) Nitrogen
(c) Helium (d) Chlorine
5. Which of the following is a liquid-solid heterogeneous mixture?
(a) Water in flour (b) Salt in water
(c) Moisture in air (d) Air

D. Fill in the blanks.

1. The method in which components of a mixture can be separated by picking them with one's hand is called _____.
2. The process used to separate a mixture which has one of the components made up of iron is called _____.
3. The process used to separate components of a mixture based on their relative solubility is called _____.
4. The process of pouring the clear liquid without disturbing the sediments is called _____.
5. A separating funnel is a device made up of glass with a tap called _____.

E. Answer the following.

1. Write a short note on filtration.
2. Explain the principle of froth floatation. What kind of mixtures can we separate using this technique?
3. Define centrifuge. Explain the principle of centrifugation.
4. Write a short note on separating funnel.
5. What are the advantages of chromatography?

Answers to Worksheet

- A. 1. True 2. False 3. False 4. True 5. True
- B. 1. Metalloids possess properties of both metals and non-metals. Germanium, arsenic, silicon, boron, antimony, tellurium and bismuth are metalloids.
2. Noble gases are the inert gases present in gaseous state and are reluctant to react chemically with other elements or compounds. Helium, neon, argon, xenon, krypton and radon are noble gases.
3. A mixture in which the constituents are uniformly distributed throughout is called a homogeneous mixture. A salt solution, a glucose solution, and an alloy of iron and carbon are some examples of homogeneous mixtures. The constituents of these mixtures are not clearly visible and cannot be identified individually.
4. A type of mixture in which particles of one liquid are not dissolved but dispersed in another liquid is called an emulsion. A type of mixture consisting of two or more immiscible liquids is also an emulsion. An emulsion is formed on mixing oil and water.
5. The method in which the components of a mixture are separated using a sieve is called sieving.
- C. 1. (a) 2. (d) 3. (c) 4. (c) 5. (a)
- D. 1. handpicking
2. magnetic separation
3. solvent extraction
4. decantation
5. stopcock
- E. 1. The process by which insoluble solid particles can be separated from a liquid by allowing the mixture to pass through a filter is called filtration. We use this method to separate solid-liquid mixtures in which the solid particles are insoluble in the liquid. We can use filter paper, a layer of sand and charcoal as filters. These filters allow liquid to pass through them but restrict the passing of solid particles. Insoluble solid particles that are left behind in the filter are called residue. The liquid that passes through the filter is called filtrate.
2. The technique of froth floatation is based on the principle of preferential wetting of components of a mixture. In this process, a suitable liquid is mixed with a mixture and compressed air is allowed to pass through the mixture. Due to the absorbed liquid, the weight of the component that gets wet more, increases. As a result, the lighter component floats in the form of froth over the mixture and the heavier component settles down. This froth can be easily drained out. The heavier component can be obtained by drying.
- This technique of froth floatation is used for concentration of sulphide ores such as galena (ore of lead) and zinc blende (ore of zinc). In this process, pine oil, sodium ethyl xanthate (or potassium ethyl xanthate) and water are mixed with pulverised ore in a tank, and compressed air is allowed to pass through the tank. The passing of compressed air leads to the formation of a bubbly froth that consists of pine oil and

ore. The water wets the gangue (muddy impurities) due to which it becomes heavy. The gangue settles down and the ore particles trapped in the pine oil float on the surface of water.

3. The process of separating finely suspended solid components in a liquid by spinning the mixture in a closed container is called centrifugation. The spinning of the mixture occurs in a machine called a centrifuge.

The principle of centrifugation is that the heavier particles experience larger centrifugal force as compared to the lighter particles. In this process, the centrifuge spins rapidly to speed the process. The mixture is put in the test tubes which are kept in the centrifuge. After spinning the mixture in the centrifuge, the suspended components in the liquid get collected at the base of the container followed by the separation of liquid by the process of decantation. Centrifugation is used to separate butter from milk. It is also used in laboratories to separate blood cells from plasma.

4. A separating funnel is a device made up of glass with a tap called stopcock. The stopcock is attached to the bottom of the funnel and controls the flow of liquid. The separating funnel is used to separate a mixture of immiscible liquids, i.e., an emulsion. The principle behind the separation of liquids is that the lighter liquid floats above the heavier liquid.

- The mixture to be separated is put into a separating funnel and is allowed to settle.
- After some time, it is observed that the liquids form separate layers one above the other.
- The liquid forming the lower layer is collected in a container by opening the stopcock.
- The stopcock is closed once whole of the liquid in the lower layer is collected in the container.
- The liquid forming the upper layer is collected in another container in the same way.

The separating funnel can be used to separate a mixture of oil and water.

5. Chromatography has the following advantages.
 - Chromatography can be used to separate very small quantities of a substance.
 - It is used to separate components of a mixture exhibiting very similar physical and chemical properties.
 - It is used to identify various components of a mixture.
 - It is used in quantitative estimation of components of a mixture.
 - It is an effective method to test the purity of a sample.
 - It is used to separate contaminants, traces of harmful chemicals and other microbes in food.
 - Paper chromatography is used to separate various dyes from a mixture.
 - Paper chromatography is also used to test the quality of food by examining the presence of different vitamins, preservatives, amino acids and proteins.