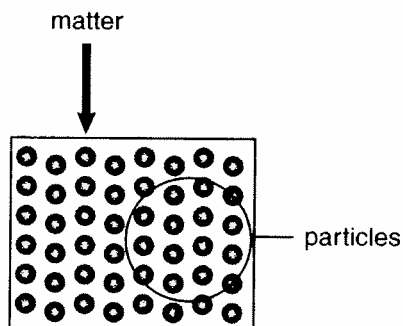


SUGGESTED ANSWERS

WHAT DO YOU REMEMBER?

- Matter is anything that has mass and takes up space.
- (a) The five main points of the particle theory are:
 - all matter consists of tiny particles;
 - there are empty spaces between particles;
 - particles move continuously in random directions;
 - heating particles increases their speed and the distance between them;
 - since particles attract each other, they tend to stay together.
- (b) All matter consists of tiny particles. A sample diagram is shown below:



- (a) The three states of matter are solids, liquids, and gases. All are composed of particles that are attracted to each other. The particles in a solid are not moving fast enough to overcome this attraction so solids have definite shapes and volumes. The particles in a liquid are moving fast enough to partly overcome this attraction, but not fast enough to completely escape the pull of the other particles. So liquids take the shape of their containers, but have a definite volume. The particles in a gas are moving very quickly and easily overcome this attraction; thus, gases do not have definite volumes or shapes.

(b) Sample answer: Water particles form ice when solid, water when liquid, and water vapour when gas.
- The particles of a solid are strongly attracted to each other. Consequently, they vibrate but cannot move; this holds solids together in definite shapes and volumes. The particles of a gas are much less attracted to each other. Consequently, they move quickly, so that gases take the shapes and volumes of their containers.
- (a) A pure substance contains only one kind of particle.

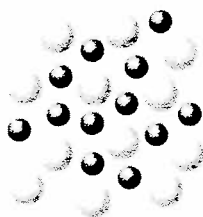
(b) A mixture contains two or more different kinds of particles.
- A sample picture is shown below:



(a) pure substance



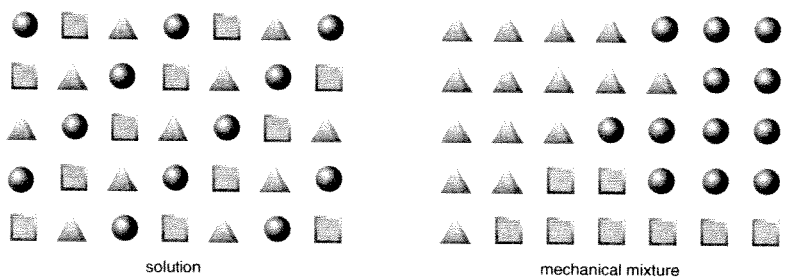
pure substance



(b) mixture

7. Although it looks like a pure substance, clear apple juice is a mixture. It is made up of different kinds of particles, including water, sugar, and various vitamins.
8. Because tap water contains small amounts of various minerals and chemicals in addition to water particles, tap water is a mixture.
9. (a) Mechanical mixtures are mixtures in which the various types of materials in the mixture are visible.
(b) The various kinds of particles in a solution are evenly mixed together. Consequently, solutions have a uniform appearance very similar to that of pure substances.
10. (a) A fruit salad is a mechanical mixture.
(b) Clear liquid hand soap is a solution.
(c) Oil-and-vinegar salad dressing is a mechanical mixture.
11. Sample answer: Two solutions that you can drink are milk and tea.
12. The particles in a mechanical mixture do not mix uniformly together. Because there are so many identical particles clumped together, each type of matter is visible. In a solution, the particles mix uniformly together. Each individual particle is too small to see, so the solution takes on a uniform appearance.

13. Sample pictures are shown below:



14. Sample answer: A piece of wood, a salad, and my body are all made up of tiny particles. There are many different kinds of particles in each of these three things. Since these different kinds of particles are not mixed uniformly together, we can see the different kinds of matter that make up the wood (i.e., bark, knots), the salad (i.e., lettuce, tomatoes), and my body (i.e., hair, fingers, eyes).

WHAT DO YOU UNDERSTAND?

15. The copper wire and table sugar are pure substances. Fruit salad is a mechanical mixture. Iced tea and seawater are solutions. Salad dressing may be a mechanical mixture or a solution, depending on whether you can see the different ingredients.
16. It was hotter outside, since the balloon got bigger outside. Heat causes particles to move more quickly and to travel greater distances. The heated particles inside the balloon pushed with greater force against the balloon, causing it to expand.
17. No, the particles do not change to different types of particles. The difference is that they are moving more quickly, which causes them to break the bonds holding them in solid form.
18. Pedro is correct. Since you can see the pulp in the orange juice, it is considered a mechanical mixture.
19. No, you cannot tell the difference between pure substances and solutions by looking at them. The particles in a solution are mixed uniformly together; consequently, no single kind of particle stands out and the solution takes on a uniform appearance, as though it were composed of a single kind of particle.
20. The dough will be a mechanical mixture. Since the solid peas and onions will not dissolve in the oil mixture, Madur will see them as distinct chunks in the dough.
21. (a) The unopened ginger ale is a solution. It possesses a clear, uniform appearance.
(b) Once the ginger ale begins to fizz, it becomes a mechanical mixture. The fizz results from the carbon dioxide that had been dissolved in the water escaping to the surface as bubbles.