

BLM 3-48, Unit 3 Review

1. B
2. B
3. A
4. B
5. C
6. A
7. B
8. B
9. A
10. B
11. C
12. A
13. G
14. I
15. J
16. F
17. E

18. A solid has a definite shape and volume. A liquid has a definite volume but its shape is determined by its surroundings. The volume and shape of a gas are determined by its surroundings.

19. All matter is made of very small particles.

There is empty space between particles.

Particles are constantly moving. The particles are colliding with each other and the walls of their container.

Particles of a solid cannot move freely; particles of a liquid can slide past one another; particles of a gas can move freely and quickly.

Energy makes particles move. The more energy that particles have, the faster they move and the farther apart they can get.

20. The particles of the cold water gain energy from the particles in your body as heat is transferred from your body to the water. At the same time, the particles in your body are losing energy.

21. (a) The boat's motion is not changing, so the forces on the boat must be in balance.

(b) The diagram could show as many as four forces. Equally sized arrows should indicate the forces of buoyancy (upward) and gravity (downward). Equally sized arrows could also indicate friction (against the boat) and engine propulsion (in the direction of the boat).

22. Air is a gas, and is compressible. These properties are the reason why the air-filled balloon could be reduced in volume. Liquids and solids are not compressible. These properties are why the water and cement-filled balloons could not be compressed. A water-filled balloon can be deformed because water particles can slide past each other to assume different positions. The particles of a solid cannot change position, so the cement-filled balloon could not be deformed.

23. (a) Both systems use applied force to create pressure. Both systems are capable of transmitting force to perform tasks.

(b) Hydraulic systems use an incompressible liquid such as oil. Pneumatic systems use compressible air.

24. (a) 8.9 g/cm^3

(b) 0.79 g/mL

(c) 500 Pa

(d) $70\,000 \text{ Pa}$