

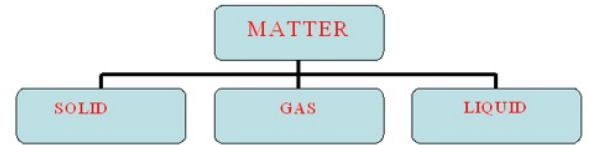
**Science 8**  
**Unit 2: FLUIDS**  
**Topic 1: Matter And The Particle Theory**



Student Name: \_\_\_\_\_

**Matter** is anything that has mass or takes up space.

Examples: Books, humans, Oxygen, water...etc



The hypothesis that matter is made up of tiny particles - has become widely accepted as the "particle theory of matter. The theory has proven useful in explaining many observations of matter.

**Particle theory of matter states that :**

- 1) All matter is made up tiny particles.
- 2) All particles in a thing are the same.
- 3) Different things are made up of different particles.
- 4) Particles are attracted to each other.  
-They can have a strong attraction or a weak attraction.
- 5) Particles are always moving.  
-When particles gain energy, (heat up) they move faster.  
-When they lose energy, (cool down) they move slower.
- 6) There are spaces between all particles

**Solid, Liquid and Gas**

The particle theory is useful in explaining the differences among solids, liquids and gases:

Solid	Liquid	Gas
source: States of matter	source: States of matter	source: States of matter
<ul style="list-style-type: none"><li>• definite volume</li><li>• definite shape</li><li>• noncompressible</li></ul>	<ul style="list-style-type: none"><li>• definite volume</li><li>• no definite shape</li><li>• noncompressible</li></ul>	<ul style="list-style-type: none"><li>• no definite volume</li><li>• no definite shape</li><li>• compressible</li></ul>

**Solids:**

A solid has a definite shape and volume because the particles of a solid can move only a little. They vibrate back and forth, but strong forces hold them in fixed positions. As a result solids are very hard to compress.

**Liquid:**

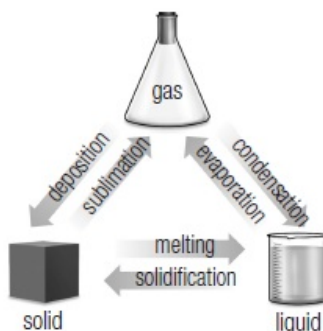
A liquid takes the shape of its container because the particle can move more free than in a solid. Its particles are held together by strong attractive forces causing liquid to occupy a definite volume.

**Gas:**

The attractive forces among the particles of gases are so weak that the individual particles are quite far apart, with space among them. A gas will spread out to fill whatever container it is placed in. This is due to the fact that gas particles are constantly moving randomly in all directions. They spread throughout the container, regardless of the shape and volume of the container.

## Changes Of State And The Particle Theory

According to the particle theory, particles with more energy move faster. One way to add energy is to heat it. The amount of energy gain or lost can affect the state of matter in six ways:



**1. Melting:** the change of state from a solid to a liquid. As a solid is heated, the particles start to move faster until they have enough energy to break away from their fixed positions. As a result the particles can move more freely.

**2. Solidification ( Freezing):** The change of state from a liquid to a solid. Here, the particles in the liquid lose energy due to the lowering of temperature. The particles start to move slower and the attraction between the particles starts to increase. The liquid eventually becomes frozen or solidified.

**3. Evaporation:** the change of a liquid to a gas. Here a liquid is heated, the particles move about more and more quickly. Some particles gain enough energy to break free of the attraction of other particles.

**4. Condensation:** the change of a gas to a liquid. Here the particles are cooled. As a result the particles start to move slower and the attraction between the particles start to increase. It is the reverse process of evaporation.

**5. Sublimation:** The change of state from a gas to a solid, without passing through the liquid phase.

**6. Deposition:** occurs when a gas becomes a solid without going through the liquid state of matter.

CHANGE	FROM	TO	EXAMPLE
Sublimation	solid	gas	Moth crystals disappear when left in a closet for several days
Deposition	gas	solid	frost forms on a car's windshield
Melting	solid	liquid	An ice cube turns into water when left out of the freezer
Solidification (Freezing)	liquid	solid	bottle of water will turn into ice if left in the freezer
Condensation	gas	liquid	Drops of water form on the mirror when taking a hot shower
Evaporation	liquid	gas	Rain dries up when the sun comes out

**PART A: MULTIPLE CHOICE.**

*Instruction: Circle the correct answer below each question. Also, transfer your answers to the bubble sheet provided.*

1. All of the following are states of matter EXCEPT:
  - (A) Solid
  - (B) Liquid
  - (C) Gas
  - (D) Gravity
  
2. This matter has a fixed shape and volume with particles closely packed together with little movement. It is a:
  - (A) Liquid
  - (B) Solid
  - (C) Gas
  - (D) Plasma
  
3. Which of the following is NOT a way that matter changes phase?
  - (A) Melting
  - (B) Freezing
  - (C) Evaporation
  - (D) Mixing
  
4. Matter changing from a solid to a liquid is called:
  - (A) Evaporation
  - (B) Sublimation
  - (C) Deposition
  - (D) Melting
  
5. Matter changing from a solid to a gas is called:
  - (A) Evaporation
  - (B) Sublimation
  - (C) Deposition
  - (D) Melting
  
6. Evaporation occurs when
  - (A) Gas changes to liquid
  - (B) Gas changes to solid
  - (C) Liquid changes to solid
  - (D) Liquid changes to gas
  
7. Sublimation occurs when
  - (A) Solid changes to gas
  - (B) Gas changes to solid
  - (C) Solid changes to liquid
  - (D) Liquid changes to solid
  
8. Deposition occurs when
  - (A) Liquid water becomes ice
  - (B) Ice becomes water vapour
  - (C) Liquid water becomes water vapour
  - (D) Water vapour becomes ice

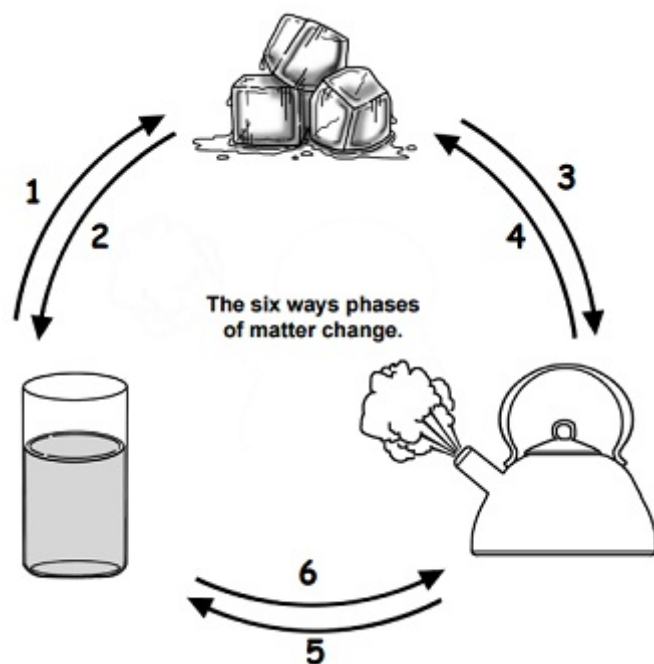
9. Condensation occurs when
- (A) A liquid is cooled
  - (B) A gas is cooled
  - (C) A liquid is heated
  - (D) A gas is heated
10. Melting occurs when
- (A) A solid is heated
  - (B) A liquid is heated
  - (C) A gas is heated
  - (D) All of the above
11. Solidification occurs when
- (A) A liquid is cooled
  - (B) A gas is cooled
  - (C) A liquid is heated
  - (D) A gas is heated
12. When you heat a sample of a solid, the particles that make up the solid:
- (A) Get bigger
  - (B) Loose mass
  - (C) Move faster
  - (D) Slow down
13. When you heat a sample of a solid, the sample gets a little bigger. This is mainly because:
- (A) The particles move faster and get a little further apart
  - (B) Heat helps the particles grow
  - (C) Heating the sample makes it lighter
  - (D) Heating helps the particles slide past each oth
14. Which of the following would you use to describe a liquid?
- I The particles of a liquid are attracted to one another
  - II The particles of a liquid are in motion
  - III The particles of a liquid are able to move past one another
  - IV A liquid has mass and takes up space
- (A) I
  - (B) I and IV
  - (C) I, II and IV
  - (D) I, II, III and IV
15. Which of the following would you use to describe a solid?
- I The particles of a solids are attracted to one another
  - II The particles of a solid are in motion
  - III The particles of a solid are able to move past one another
  - IV A solid has mass and takes up space
- (A) I
  - (B) I and IV
  - (C) I, II and IV
  - (D) I, II, III and IV

16. Attractive forces between particles is weakest in
- (A) Solids
  - (B) Liquids
  - (C) Gases
  - (D) All of these
17. Which statement about the particle theory of matter is true?
- (A) The particles that make up matter are too small to see without a microscope
  - (B) A solid stays in one place because its particles are at rest
  - (C) The particles in a liquid have more kinetic energy than the particles in a gas
  - (D) When a solid melts its particles no longer exist
18. Which statement is not a key point of the particle theory of matter?
- (A) The particles of matter are in constant motion
  - (B) There are spaces between particles
  - (C) All matter is made up of particles
  - (D) Particles naturally repel one another
19. The particles in a solid that is melting move farther and farther apart because
- (A) The particles begin to lose their shape.
  - (B) The particles slow down.
  - (C) The particles have more energy and bump into each other more often.
  - (D) The particles repel each other more intensely.
20. The force of attraction is greatest between the particles of a
- (A) Gas.
  - (B) Pure substance.
  - (C) Mixture.
  - (D) Solid.

**PART B WRITTEN RESPONSE**

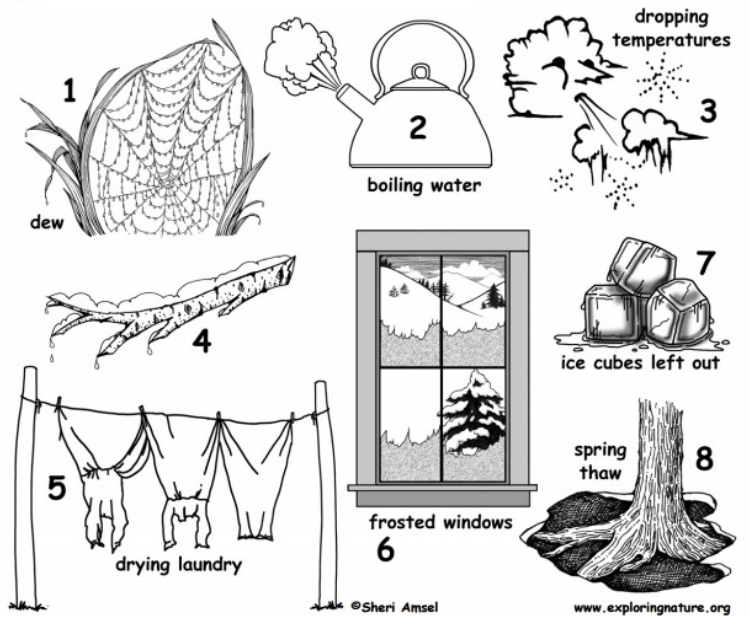
1. Name the six ways the phase (state) of matter changes:

- 1. \_\_\_\_\_
- 2. \_\_\_\_\_
- 3. \_\_\_\_\_
- 4. \_\_\_\_\_
- 5. \_\_\_\_\_
- 6. \_\_\_\_\_



2. Write the correct term to describe the state change of water shown in each of the pictures.  
 Note , you will use some terms more than once and some not at all.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_



3. Use the spaces below to explain whether heat is being added or released. Also, describe how the state of the water changes.

Term	Is heat added or released?	Change in state from _____ to _____
1. evaporation		
2. melting		
3. condensation		
4. solidification		
5. deposition		
6. sublimation		