

Name _____

Date _____

How Structure Affects Properties

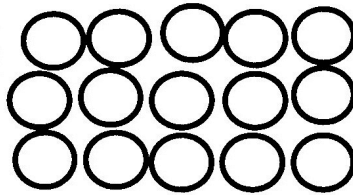
Part 1

Directions: Answer the following questions after watching each segment of the introduction video.

1. An ice cube is in the **Solid** phase.
2. Solids have a **Definite** shape and **Definite** volume.
3. Describe how the molecules are arranged and moving in the solid phase. Include a picture with your description.

The molecules in the solid phase are tightly packed together and vibrating.

Molecules are vibrating slightly.



4. What are some unique properties about ice that differ from liquid water or water vapor?

 Ice is hard, brittle, has a definite shape, and has a definite volume.

 Ice is a crystal.

5. The phase change from a solid to a liquid is called **Melting** .

6. Describe how the structure of the molecules in a solid change as it becomes a liquid.

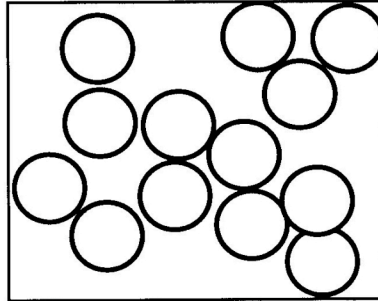
The molecules absorb energy and start to move around more freely. They move faster and start to break away from their rigid structure.

7. A glass of water is in the Liquid phase.

8. Liquids have a definite Volume but not a definite Shape.

9. Describe how the molecules are arranged and moving in the liquid phase. Include a picture with your description.

The molecules are moving around with more speed and freedom. They are still stuck together but can move around each other.



10. In order to get liquid water to become water vapor energy must be absorbed into the liquid water.

11. The phase change from liquid to gas is called vaporization. There are two types of vaporization. Evaporation which occurs only at the surface while Boiling occurs anywhere within the liquid.

12. Gases have no definite Shape and no definite Volume.

13. Describe how the molecules are arranged and moving in the gas phase. Include a picture with your description.

The molecules in a gas are free to move where ever they would like. They move very fast and there is not set arrangement.

14. As we changed from an ice cube to water vapor how did the structure of the water molecules change and what properties changed.

The molecules in ice are very structured. As energy is added they can move faster and break their rigid structure. They start to move in more directions and are no longer held in place. At this point the water no longer has a set shape. With the addition of more energy, the molecules are able to go completely free. Because of this freedom, gasses have no definite shape or volume.

15. The phase change from a gas back to a liquid is called Condensation.

16. During this phase change energy is Released by the gas molecules as they slow down and rearrange into liquid molecules.

17. Describe how taking a shower in a bathroom is an example of condensation.

When you take a shower in a bathroom you add water vapor into the air. When this gas hits a cool object, like a mirror or wall, it will condense into liquid water.

18. The phase change from a liquid back to solid is called Freezing

19. Dry ice turning directly into a gas is an example of what kind of phase change?

Sublimation

20. On a cold winter morning when you go out to a car and there is frost all over the windows where did the ice come from?

The water vapor that was in the air hit the cold windows and went through deposition to form the ice.

21. Frost is an example of what phase change? Deposition

22. Pretend you are a molecule of ice. Write a paragraph about how your structure and properties change as you move from solid ice to liquid water, and ending with the gas water vapor.

As a molecule of ice, I am trapped in a tightly packed structure of other water molecules. As some energy is added I am able to move around a little more. I can push away from the other molecules but must still stay fairly close. I will spread out but can not break off and go on my own. With the addition of a little more energy I am able to completely break away from my fellow water molecules. I can roam anywhere with no limits or boundaries. I am moving very fast.