

SCHOLASTIC

ScienceWorld

STATES OF MATTER



Supersaturated Solution

A solution that contains more solute than it can normally hold at a given temperature.

Amorphous Solid

A solid material in which the particles are found in a *random arrangement*.

Crystalline Solid

Particles are in a rigid organized structure of repeating patterns called a *crystal lattice*.

WHAT DO YOU KNOW ABOUT STATES OF MATTER?

- What are the three commonly known states of matter?
- What is the **gas**, **liquid** and **solid** form of water?
- How does matter change state?

Watch this animation on states of matter (click “Play Video”):

[Animation: States of Matter](http://teacher.scholastic.com/activities/studyjams/matter_states/)

http://teacher.scholastic.com/activities/studyjams/matter_states/

WHAT ARE STATES OF MATTER?

States of matter are the **physical forms** a substance can take.

There are three common states of matter: **solid, liquid, and gas.**

Each of these states is also called a **phase.**

THE THREE COMMON STATES OF MATTER

Most substances, like water, can exist in all three states.



An iceberg is made of water in **solid** form.

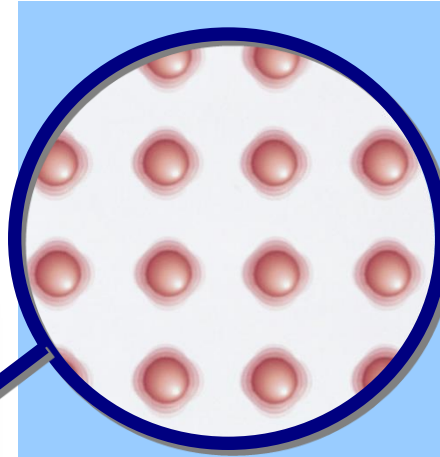


This glass contains **liquid** water.



A cloud is made of water vapor, a type of **gas**.

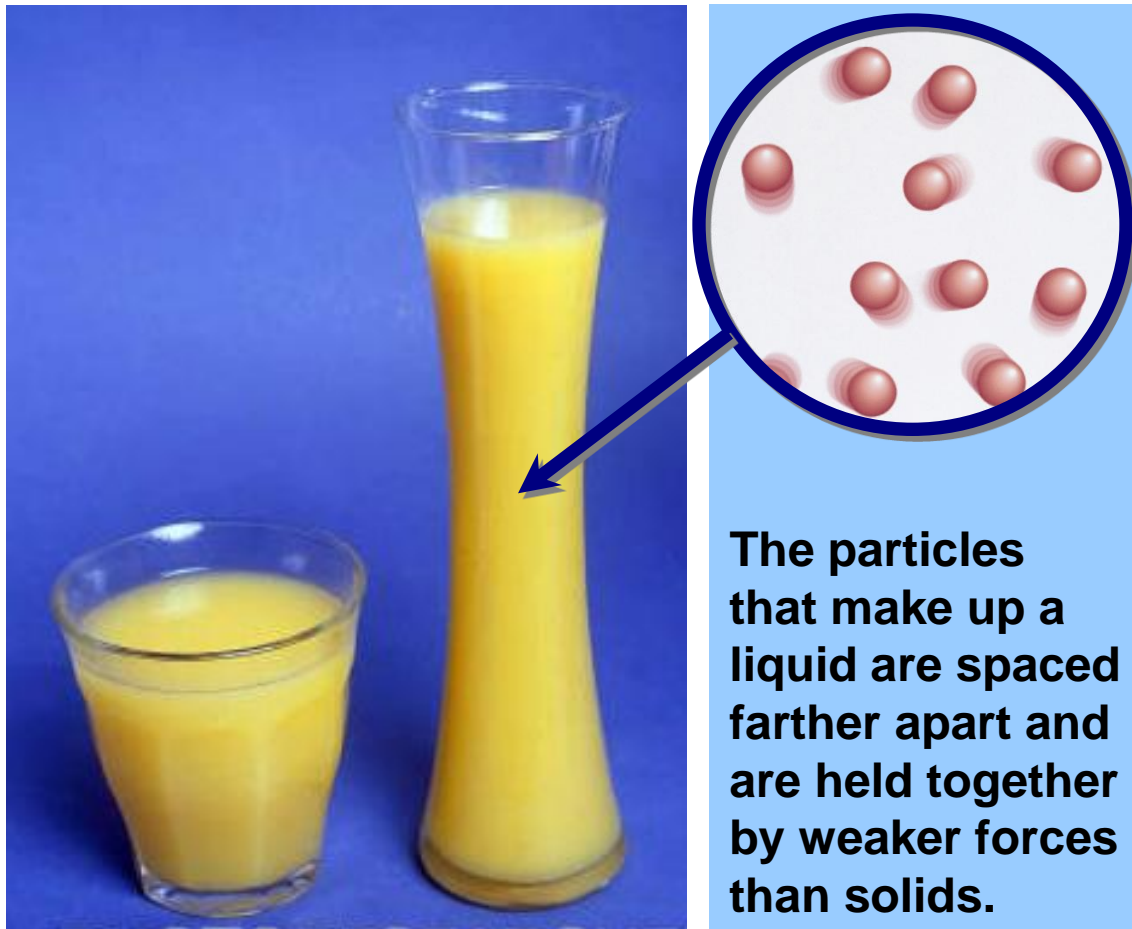
SOLIDS



The particles that make up a solid are packed tightly and held together by strong forces.

- **Solids** have a definite shape and **volume**, or amount of space an object takes up.
- **Solid particles** vibrate in place but cannot move from their position, which is why solids maintain their rigid shape.

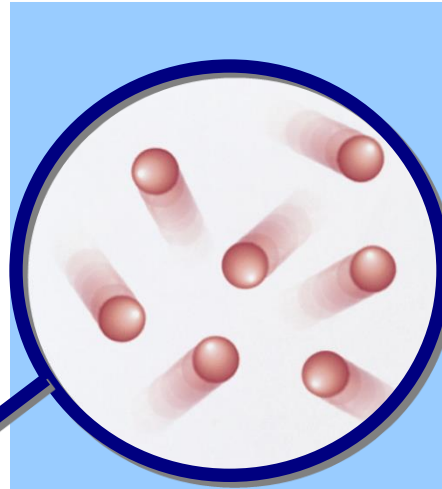
LIQUIDS



The particles that make up a liquid are spaced farther apart and are held together by weaker forces than solids.

- **Liquids** have a definite volume but not a definite shape.
- **Liquid particles** move slightly, which allows liquids to flow and take the shape of the container they are in.

GASES



The particles that make up a gas are fast-moving and are held together by extremely weak forces.

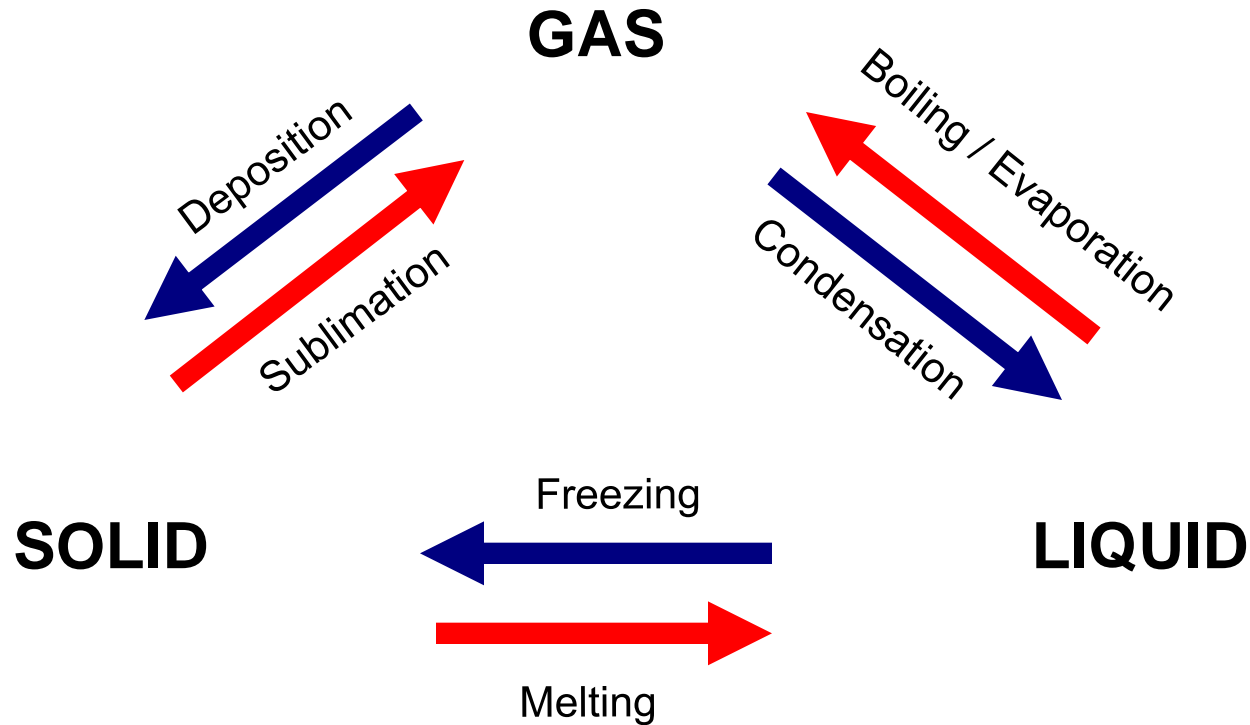
- **Gases** do not have a definite volume or shape.
- **Gas particles** move freely and will expand to fill a container of any size or shape.

CHANGES OF STATE



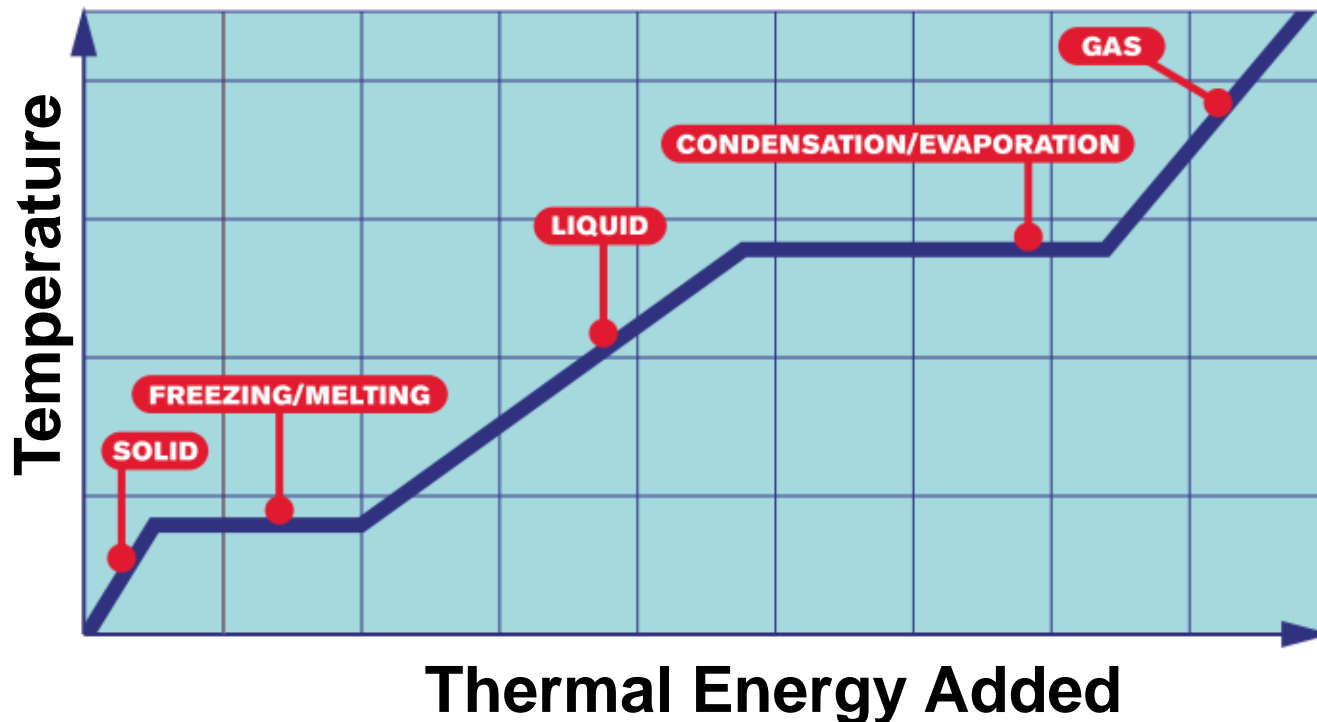
- Matter can change from one state to another.
- Even though the physical form of the matter changes, it remains the same substance.
- Changes of state occur when **thermal energy** (*heat energy*) is absorbed or released by a substance.

WHAT ARE THE CHANGES OF STATE?



HOW DOES MATTER CHANGE STATE?

Changes of State



- As heat increases, a substance changes from a solid to a liquid, and finally to a gas.
- As heat decreases, a substance changes from a gas to a liquid, and finally to a solid.

DISCUSSION QUESTIONS

- How does pressure and temperature affect the state of water, carbon dioxide, and hydrogen?

Use this interactive PBS Web site to find out:

www.pbs.org/wgbh/nova/zero/matt-flash.html

- On Earth, we typically see gases, liquids, and solids. But is there a fourth state of matter?

Learn about a fourth state of matter at this Web site:

http://www.spaceweathercenter.org/amazing_plasmas/02/02.html

HANDS-ON SCIENCE

(No Lab Required)

This demo explores melting points.

Materials

chocolate chips, candy-coated chocolates, baggies, two mugs, water, thermometer

Directions

1. Place chocolate chips and candy-coated chocolate in separate bags.
2. Place each bag of chocolate in a half-filled mug of room-temperature water.
3. Your teacher will continue to increase the temperature in each mug by adding boiling water a little at a time.
4. As a class, monitor the temperature with a thermometer until the chocolate starts to melt in the bag.

Conclusion

At what temperature does each type of chocolate start to melt?

Why do you think this is?