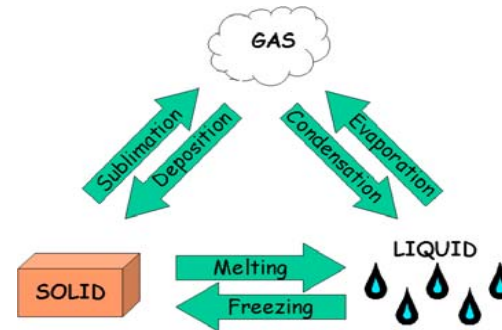




Understanding Matter and Energy

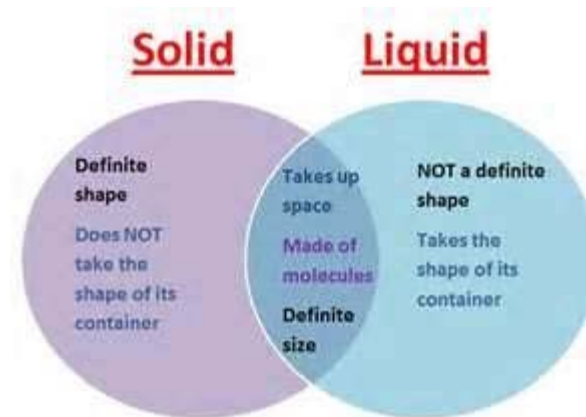
Properties of Liquids and Solids



- ✓ We are learning to assess ways in which the uses of **liquids** and **solids** can have an impact on society and the environment
- ✓ We are learning to investigate the properties of and interactions among **liquids** and **solids**
- ✓ We are learning the properties of **liquids** and **solids**

Solids, Liquids and Gases

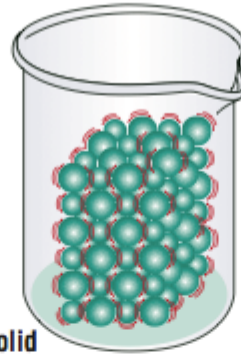
Solids	Liquids	Gases
 <ul style="list-style-type: none"> A solid has a definite shape. The molecules are packed tightly together and are arranged in regular patterns. The molecules vibrate in a fixed position. 	 <ul style="list-style-type: none"> A liquid has no definite shape. It takes the shape of the container it is in. The molecules are farther apart and are not in any particular pattern or order. The molecules move and slide over each other. 	 <ul style="list-style-type: none"> A gas has no definite shape. It takes the shape of the container it is in and spreads out to fill the container. The molecules are far apart. The molecules move about freely.
		
<p>An increase in temperature can cause a solid to change to a liquid or a liquid to a gas. A decrease in temperature can cause a gas to change to a liquid or a liquid to a solid.</p>		



The particle model

Properties of solids:

- have a definite shape
- do not flow
- virtually impossible to compress
- expand if heated, but usually less than liquids and gases.



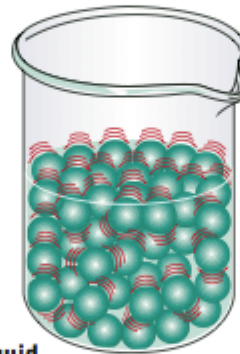
solid

Particles in solids:

- strongly bonded to each other
- vibrate a little, but not much compared to liquids and gases
- vibrate faster when heated.

Properties of liquids:

- no definite shape
- can flow to take the shape of the bottom of a container
- very difficult to compress (virtually incompressible).



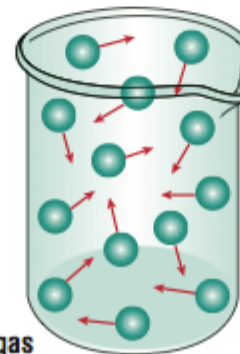
liquid

Particles in liquids:

- weakly bonded to each other
- break their bonds easily
- vibrate and move more than those in a solid
- move faster when heated.

Properties of gases:

- no fixed shape
- gases spread (or diffuse) to completely fill a container
- gases are easily compressed.



gas

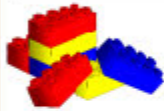
Gas particles:

- are 'free', having no bonds between them
- have much more energy than those of a solid or liquid
- fly around, bouncing off each other and the walls of their container.

Solids

- Keep a fixed shape and volume
Rigid particles locked into place
- Can't be compressed easily
Little space between particles
- Do not flow easily
Particles cannot slide past one another

Microscopic view of a solid



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Liquids

- Take the shape of the part of the container they are in
Particles can move/slide past one another
- Can't be compressed easily
Little space between particles
- Flow easily
Particles can move/slide past one another

Microscopic view of a liquid (particles can move to next energy levels)



Gases

- Take the shape and volume their container
Particles can move past one another
- Can be easily compressed
Lots of space between particles
- Flow easily
Particles can move past one another

Microscopic view of a gas



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Three States of Matter



Solids



Liquids



Gases

A grid of 12 examples of solids, each with a small image and a label below it:

- hat
- skateboard
- pencil
- table
- snow
- bicycle
- apple
- computer
- treehouse

A central circle containing 10 examples of liquids, each with a small image and a label below it:

- milk
- water in pool
- drink
- hot chocolate
- rain
- soup
- juice

A grid of 10 examples of gases, each with a small image and a label below it:

- wind
- air
- hot air balloon
- wind from fan
- steam
- fog
- wind