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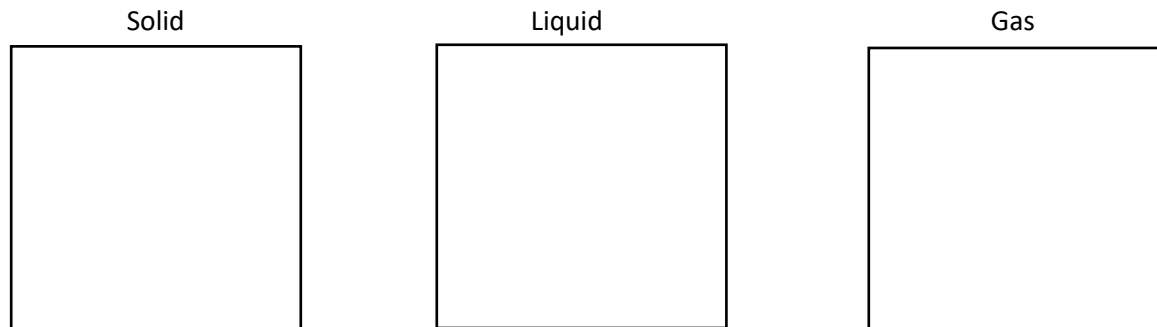
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Unit 2 Matter and Energy- Guided Notes

Nature of Matter

- Chemists are interested in the _____ of matter and how this is related to its _____ and _____.
- Macroscopic world:
- Microscopic world:
- Symbols:
- Kinetic Theory of Matter-
 - Molecules are always _____. This is known as the _____ theory of matter.
 - We measure this _____ energy with a _____ as _____.
 - The greater the material's internal energy, the _____ the temperature of that material.
 - _____ is the flow of energy between objects of _____ temperatures.
 - Heat and temperature are NOT the same.

Phases of Matter

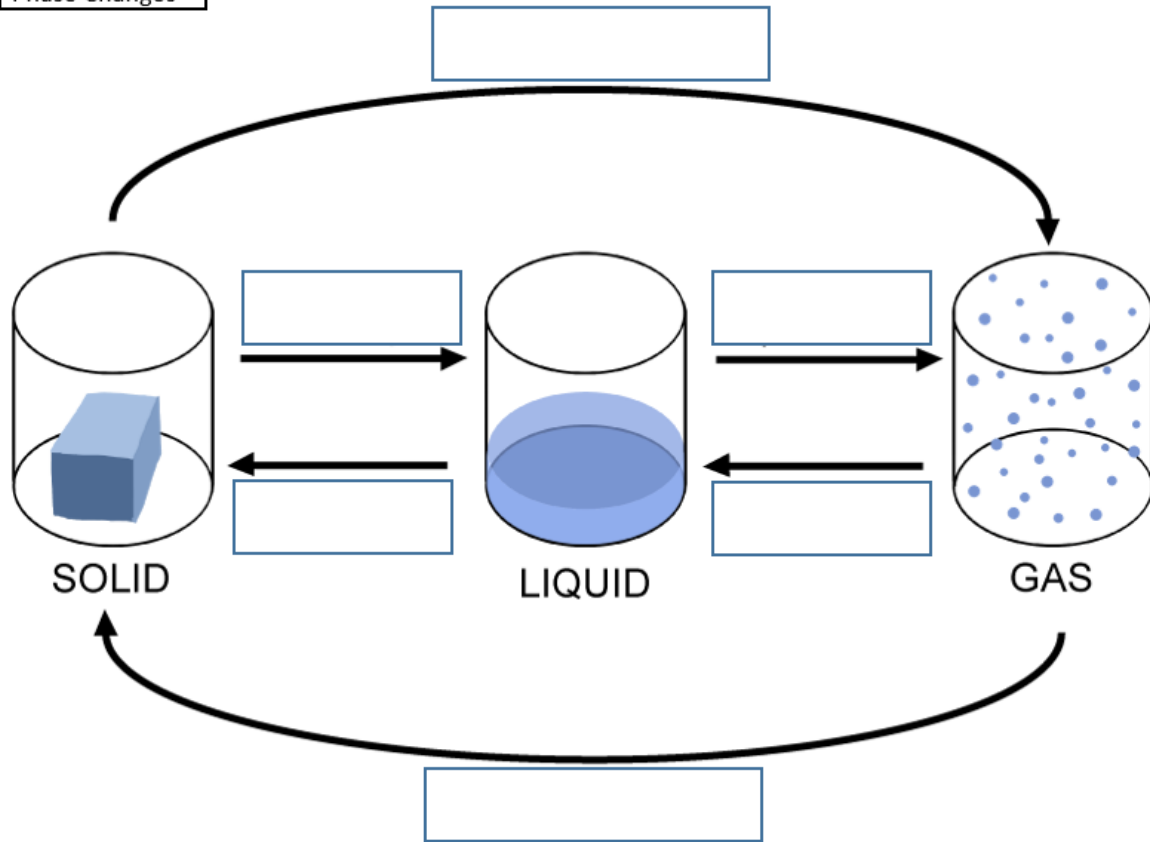


- What differences do you see between the different states?
- _____ — have rigid shape, fixed volume. External shape can reflect the atomic and molecular arrangement.
 - Little space between atoms, little energy
 - Most dense state (one exception)
- _____ — have no fixed shape and may not fill a container completely.
 - Space between molecules, medium energy
 - Have a medium density
- _____ — expand to fill their container.
 - A lot of space between molecules, High energy
 - Have very low density
- _____ — an electrically charged gas; Example: the sun or any other star

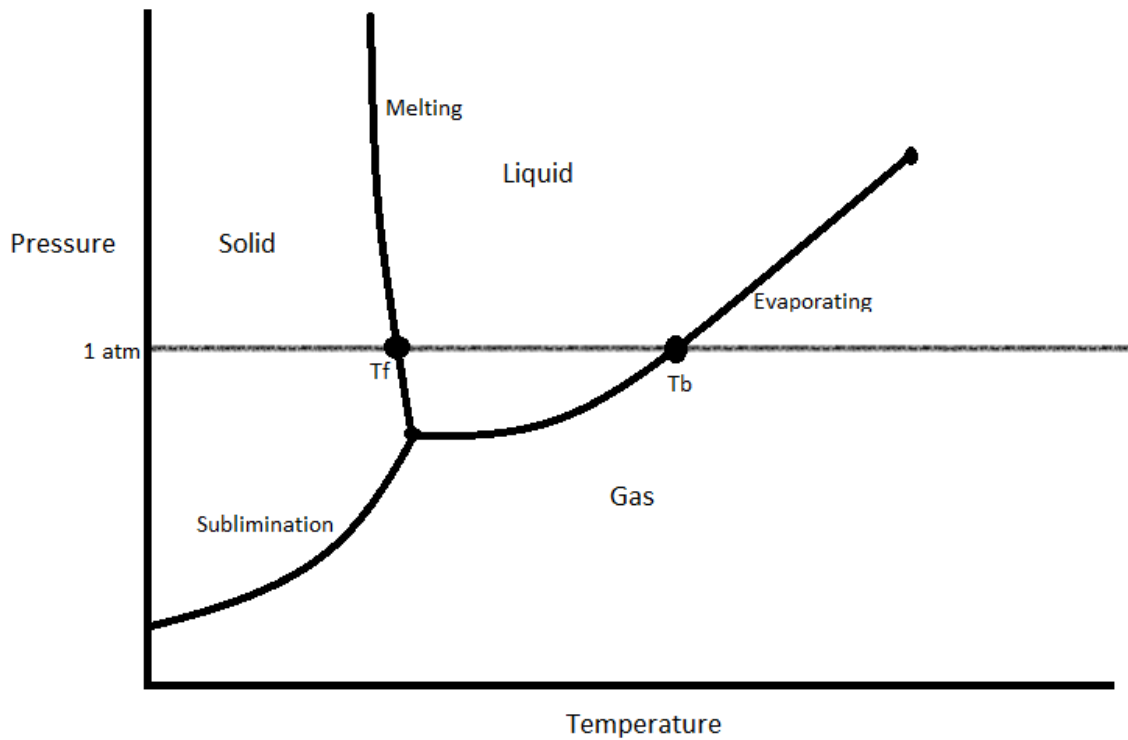
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Phase Changes



Phase Change Diagram



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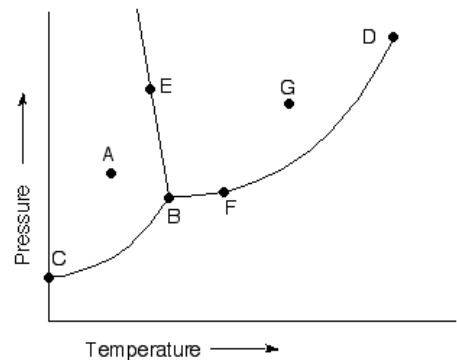
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- How is the phase change diagram for water different than for most other substances?

- Why?

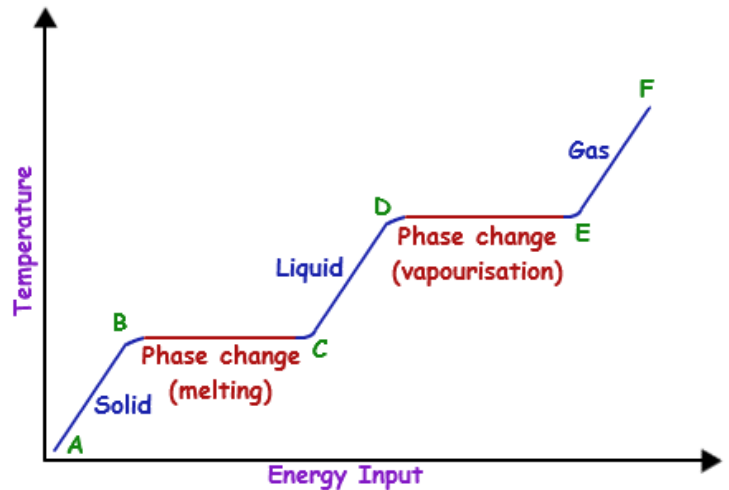
- Practice Questions:

1. What state of matter does point G represent?
2. What do we call point B?
3. What do we call moving from point G to point A?
4. What substance could this heating curve represent?

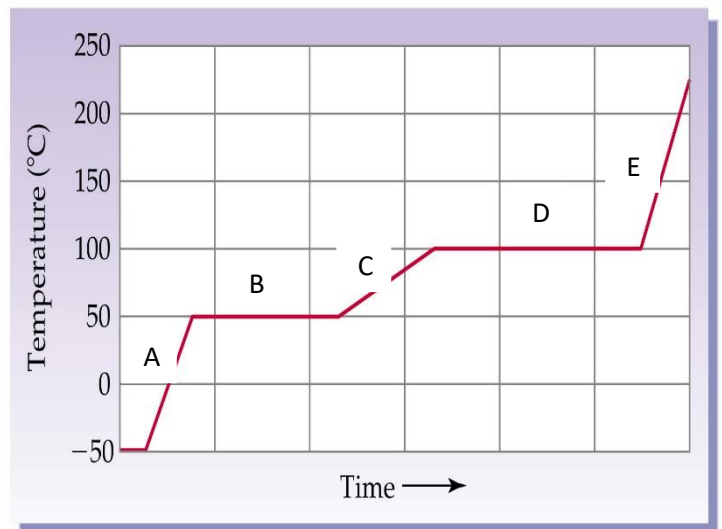


Phase Change Graph

- How do we measure kinetic energy?
- Where is kinetic energy increasing?
- Where is potential energy increasing?



1. Which letter represents the liquid phase?
2. What is the melting point of this substance?
3. Which letter represents sublimation?
4. Which letter has the lowest energy?
5. Where is kinetic energy increasing?



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Density

- Density is mass per unit volume
 - $D = m/V$
 - Density is measured in units of _____ or _____
 - Density is a _____ property
 - How would you determine the density of a metal?
-
- Practice:
 1. What is the density of an object that weighs 4.0g and has a volume of 1.0 mL?
 2. What is the mass of an object with a density of 0.99 g/mL and a volume of 12mL?
 3. What is the volume of an object with a density of 1.23 g/mL and a mass of 50.0g?

Chemical and Physical Properties and Changes

- What are some examples of physical properties?

- _____ can be observed without changing the identity of the substance
- _____ are always physical changes
- A _____ is a property or characteristic of a substance that is observed during a reaction in which the chemical composition or identity of the substance is changed.
 - Examples of chemical properties:

- Chemical _____ or chemical _____ — transformation of one or more atoms or molecules into one or more different molecules.
 - Examples of chemical changes:

 - Indicators of a chemical change:

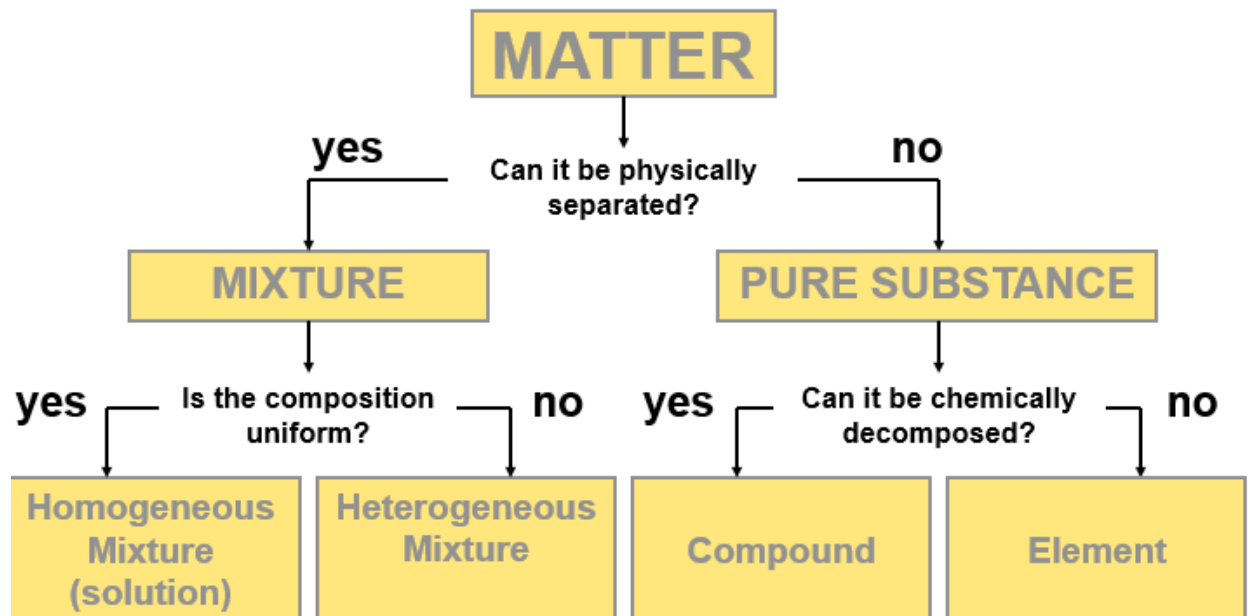
- Practice: Indicate whether the following are chemical or physical properties:
 - melting point
 - flammable
 - density
 - magnetic
 - tarnishes in air

- Practice: Indicate whether the following are chemical or physical changes:
 - rusting iron
 - dissolving in water
 - burning a log
 - melting ice
 - grinding spices

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Matter



- Pure Substance-

- Element-

- Compound-

- Mixtures-
 - Heterogeneous mixture-

 - Homogeneous mixture (AKA _____)-