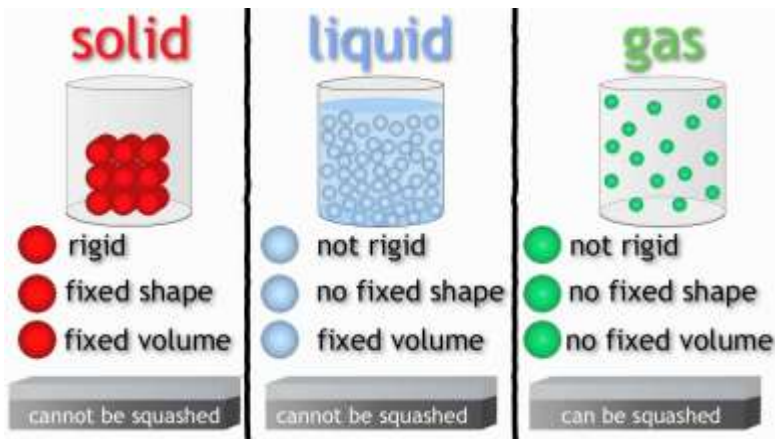


States of Matter Worksheet

1. Describe the following states of matter: gas, liquid, solid. Draw a diagram to describe what particles might look like at the molecular level for each.



2. What is kinetic energy? Does kinetic energy increase or decrease as particle speed increases?

Movement energy

Increases with speed

3. Describe what is meant by an elastic collision. What would happen to particles over time if most collisions were not elastic?

Don't lose energy in collision

If not elastic, eventually everything would slow into solid

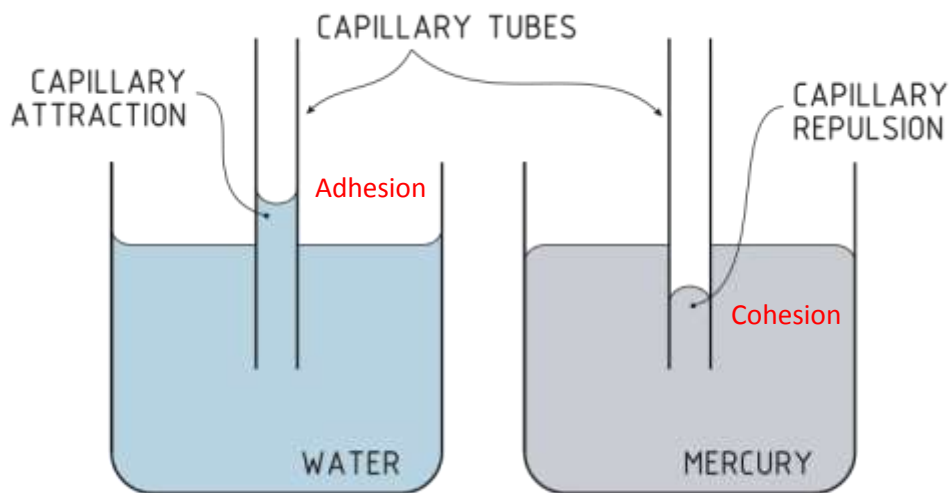
4. Summarize the major points of the kinetic-molecular theory.

- Molecular mass is negligible
- Molecules don't interact
- All collisions are elastic
- Constant random motion
- Temperature depends on kinetic energy

5. Determine whether or not the following gases would be ideal; that is, do they fit the points of kinetic-molecular theory?

- As a gas is heated, its particles start to move more slowly. **NO**
- When one gas particle bumps into another, no energy is lost. **YES**
- The gas particles follow predictable, circular paths within a container. **NO**

6. Define viscosity. Give an example of how temperature influences viscosity.
- How much molecules stick together
 - Colder means that they will stick together more
7. Define surface tension. Would you expect water to have a stronger or weaker surface tension than olive oil?
- Surface molecules stick together
 - Water is less than oil
8. Draw a picture of a liquid displaying adhesion and a liquid displaying cohesion in a glass jar.



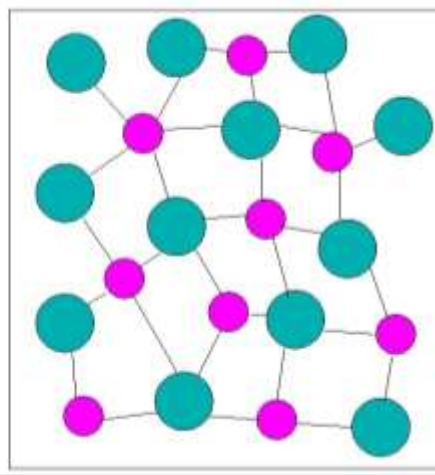
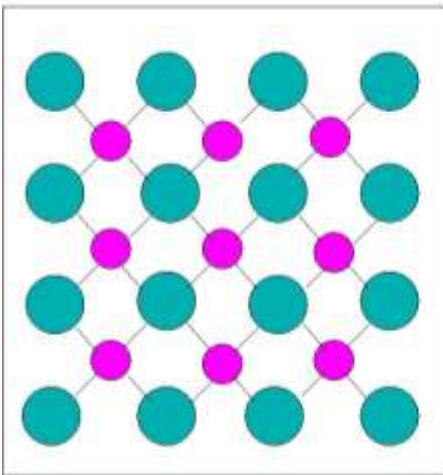
9. What distinguishes crystalline and amorphous solids?

Crystalline Solids

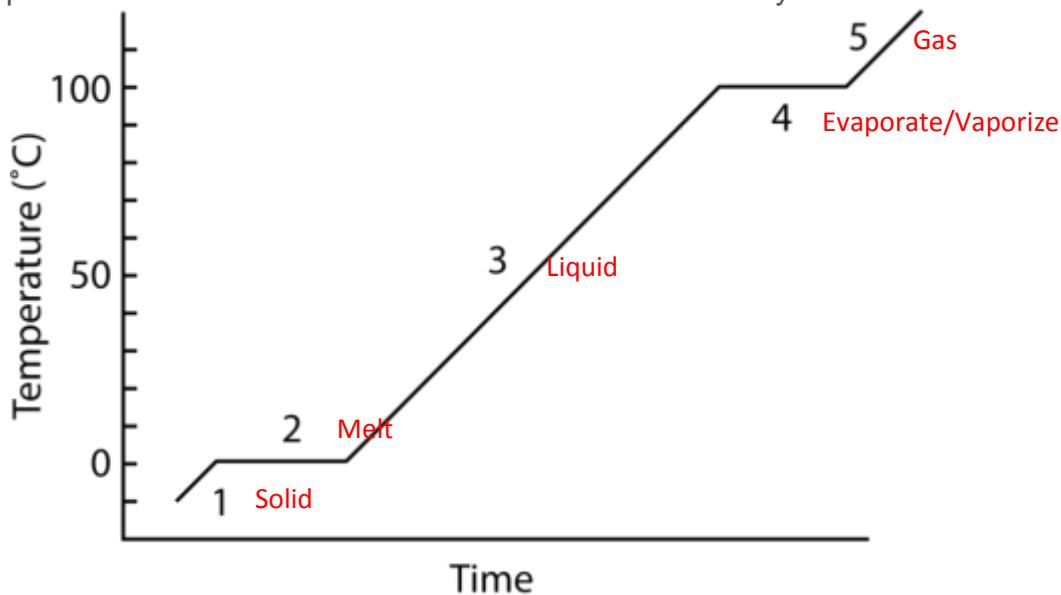
- Have a regular arrangement of particles
- Have different physical properties (thermal conductivity, electrical conductivity, refractive index etc.) in different directions i.e. Anisotropic
- Melting point is very sharp

Amorphous Solids

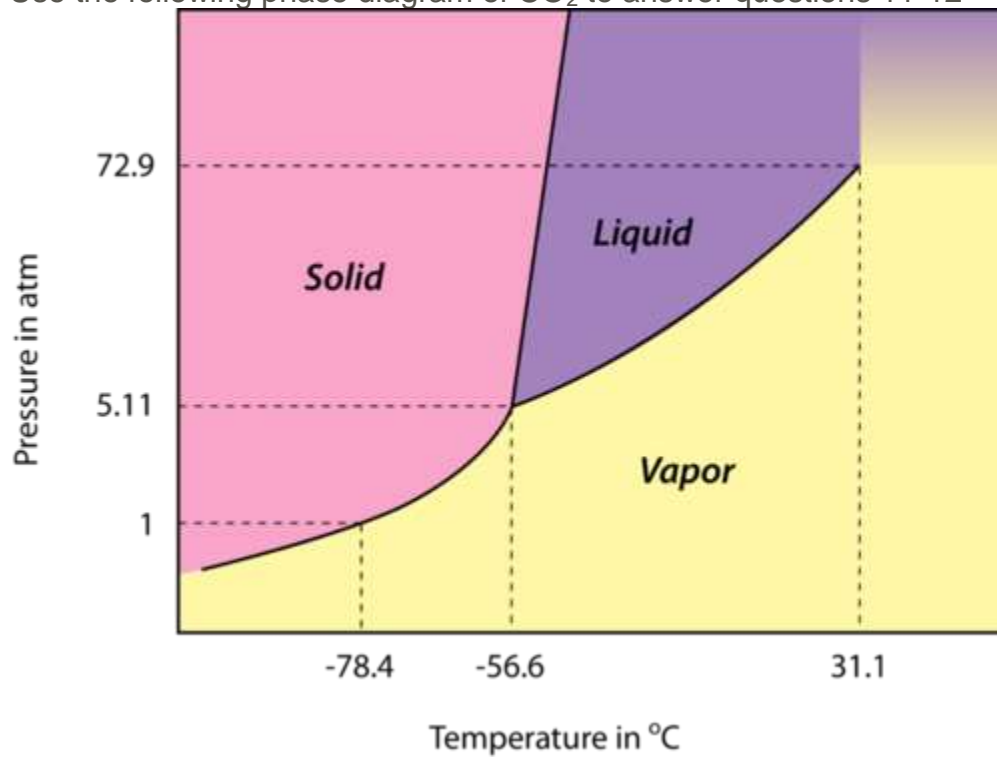
- Have completely random particle arrangement
- Have physical properties same in all directions, i.e. isotropic
- Do not have sharp melting point e.g. as the temperature of glass is gradually raised, it softens and starts flowing without any sharp change from solid state to liquid state



10. The following heating curve of an unknown substance shows several phase changes that take place as heat is added. Label each section indicated by a number.



Use the following phase diagram of CO₂ to answer questions 11-12



11. What phase of CO₂ exists at a temperature of 0°C and a pressure of 0.006 atm?

Vapor

12. What phase of CO₂ exists at a temperature of -56°C and a pressure of 5 atm?

Vapor