

States of Matter: Observation Worksheet

Using the PhET Colorado "States of Matter" Simulation

Name: _____

Date: _____

Class: _____

Simulation Links

States of Matter (full version): <https://phet.colorado.edu/en/simulation/states-of-matter>

Open one of the simulations above. Use the "States" screen first, then the "Phase Changes" screen for the later sections.

Section A — Multiple Choice

1. In the simulation, which state has particles that are tightly packed and only vibrate in place?

- A. Gas
- B. Liquid
- C. Solid
- D. Plasma

2. As you increase the temperature of a solid in the simulation, what happens to the particles just before it melts?

- A. They stop moving completely
- B. They vibrate faster and begin to slide past one another
- C. They disappear from the container
- D. They move farther apart than in the gas state

3. Which state of matter shown in the simulation has particles that move fastest and spread out to fill the entire container?

- A. Solid
- B. Liquid
- C. Gas
- D. All states move at the same speed

4. On the Phase Changes screen, what generally happens to a substance's temperature while it is melting (changing from solid to liquid)?

- A. It rises steadily
- B. It stays constant until the phase change is complete
- C. It drops sharply
- D. It becomes negative

5. Using the Phase Changes screen, what effect does increasing pressure (while keeping temperature constant) tend to have on a gas?

- A. It has no effect on the gas
- B. It can compress the gas and push it toward the liquid state
- C. It instantly freezes the gas
- D. It turns the gas into a solid without becoming a liquid first

6. Which best describes the relationship between temperature and average kinetic energy of particles observed in the simulation?

- A. They are unrelated
- B. As temperature increases, average kinetic energy increases
- C. As temperature increases, average kinetic energy decreases
- D. Kinetic energy only depends on pressure, not temperature

Section B — Guided Observation Table

Select at least 3 different substances/materials available in the simulation (e.g., Neon, Argon, Oxygen, Water). For each, record your observations at room temperature and describe what happens as you heat and cool it.

Substance	State at Start (Solid/Liquid/Gas)	What Happens When Heated?	What Happens When Cooled?	Approx. Melting/Boiling Point (if shown)

Section C — Phase Change Investigation

Use the Phase Changes screen. Slowly heat a substance from solid to gas and record your observations at each stage.

Phase / Transition	Particle Behavior Observed	Energy Added or Removed?
Solid		
Melting (Solid → Liquid)		
Liquid		
Boiling (Liquid → Gas)		
Gas		