

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Wrangle Culinary Chemistry: 5th Grade States of Matter Quiz

Evaluate how molecular energy shifts during 10 kitchen-based scenarios, from caramelizing sugar to cooling lava cakes with dry ice.

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**1. A chef is using a 'syphon' to turn fruit juice into a foam by adding pressurized Nitrous Oxide gas. Which statement best explains how the gas particles behave compared to the liquid juice particles?**

- A. They have less kinetic energy and move in fixed patterns.
- B. They have more kinetic energy and fill the entire container.
- C. They occupy a fixed volume and cannot be compressed.
- D. They are packed tightly together with strong attractive forces.

**2. When making 'mirror glaze' for a cake, a baker cools a hot liquid mixture until it thickens into a gel-like state. This process of removing thermal energy to change a liquid to a solid is called \_\_\_\_\_.**

- A. Sublimation
- B. Evaporation
- C. Freezing
- D. Condensation
- E. none

**3. True or False: In a high-pressure pressure cooker, liquid water can reach temperatures above 100°C without turning into steam because the added pressure forces the particles to stay closer together.**

- A. True
- B. False

**4. Imagine you are observing a block of solid gallium metal melting in a scientist's hand. What is happening to the particles at the molecular level during this transition?**

- A. The particles stop moving entirely as they gain heat.
- B. The particles are losing energy and bonding more tightly.
- C. The particles gain enough energy to slide past one another.
- D. The particles are breaking apart into individual atoms.

**5. If a lab technician puts 'dry ice' (solid carbon dioxide) on a table, it transitions directly into a gas without becoming a liquid. Scientists categorize this specific phase change as \_\_\_\_\_.**

- A. Deposition
- B. Sublimation
- C. Vaporization
- D. Fusion

**6. True or False: When water vapor in the air touches a cold soda can and turns into liquid droplets, it is releasing energy into the surroundings.**

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- A. True
- B. False

**7. A balloon filled with air is placed in a freezer. After an hour, the balloon looks partially deflated. Why did this happen?**

- A. The air particles leaked through the rubber.
- B. The particles froze into tiny solid ice crystals.
- C. The particles lost energy, moved slower, and moved closer together.
- D. The cold temperature destroyed some of the air matter.

**8. Molten glass is stirred by an artisan. Although it glows like a fire, it behaves as a liquid because its particles can \_\_\_\_\_, unlike the particles in the finished, cold glass vase.**

- A. Evaporate instantly
- B. Slide past each other
- C. Stay in fixed rows
- D. Expand to fill the room

**9. True or False: If you increase the temperature of a sealed container of gas, the pressure inside decreases because the particles have more room to move.**

- A. True
- B. False

**10. In the 'water cycle' of a self-contained terrarium, you see 'mist' forming on the glass. What sequence of phase changes is occurring to move water from the soil to the glass walls?**

- A. Melting then Freezing
- B. Sublimation then Deposition
- C. Evaporation then Condensation
- D. Vaporization then Sublimation