

Check Your Understanding of Topic 2.3

OP Questioning and Predicting PC Planning and Conducting PA Processing and Analyzing E Evaluating
AI Applying and Innovating C Communicating

Understanding Key Ideas

1. List the three main states of matter on Earth and describe the physical properties associated with each state. **PA C**
2. Identify a scientific model not mentioned or depicted in Topic 2.3 and briefly describe its purpose. **E C**
3. A liquid conforms to the shape of its container but does not expand to fill the container. Use kinetic molecular theory to explain why. **PA C**
4. A student sets a glass filled with ice water on a table. He notes that the outside of the glass is dry. The photograph below shows what the student observed after a short time had passed. Use the kinetic molecular theory to explain this observation. **PA C**



5. Use kinetic molecular theory to explain what happens when an ice cube is placed in a glass of warm water.
6. Some people use air fresheners in their cars with scents such as lemon, leather, or even “new car smell.” One type of freshener consists of an ornament that has been infused with scented oil. Use the kinetic molecular theory to describe what happens when this type of air freshener is first removed from its package and hung from the rearview mirror of the car. **PA C**

Connecting Ideas

7. Use kinetic molecular theory to explain why puddles will eventually evaporate, even when the water never reaches the boiling point of water (100°C). Include diagrams in your explanation. **AI C**
8. A student freezes water in one ice cube tray and olive oil in another. She finds that the ice cubes float in liquid water while the olive oil cubes sink in liquid olive oil.
 - a) Compare the densities of the liquid and frozen water and the liquid and frozen olive oil.
 - b) Compare the two solids and liquids in terms of the differences in the spaces between their particles.
 - c) Most liquids behave like the olive oil when frozen. However, it is fortunate for life on Earth that water is an exception. Suggest one reason why.
 - d) List at least two science-related questions that you have based on this information.
 - e) Choose one question from part d) and describe how you would investigate to find an answer. **OP PA E AI C**

Making New Connections

9. The Mpemba effect is the name for a surprising observation: hot water freezes faster than cold water.
 - a) Why is this observation surprising?
 - b) Describe an experiment you could carry out to test this observation.
 - c) Conduct online research to find out how this effect got its name. **PC AI C**