

Items 6, 7, 10 and 11 are linking items. The items marked in red, were excluded from the analysis

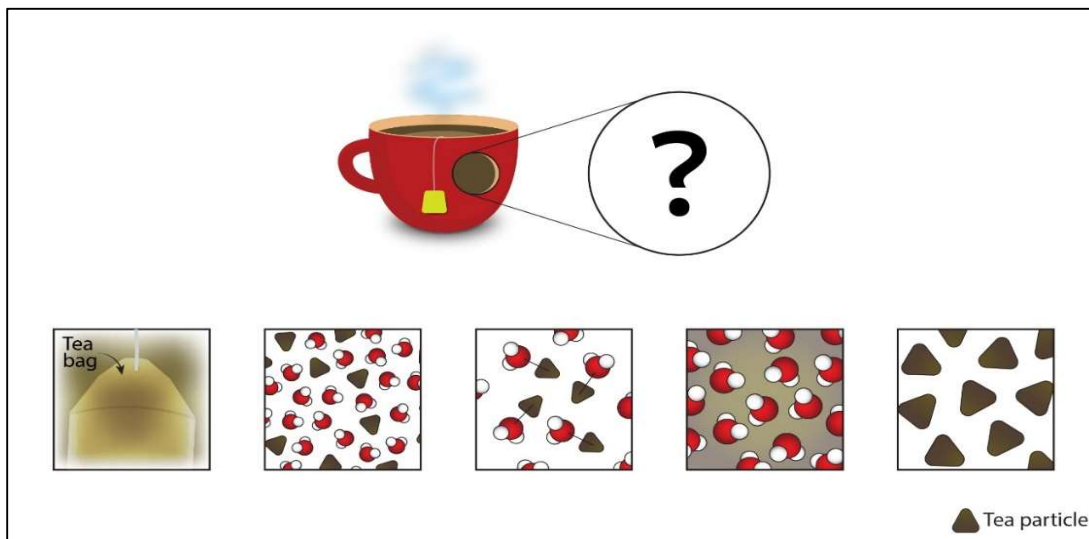
Models of Matter Survey – Version I

Are you male / female? _____ What language do you speak at home? _____

1. Julie wants to sleep but the dripping faucet in the bathroom in the room next door keeps her up. While she lies in bed, she imagines how water is composed. How do you think the particles of which water is composed look like?

- A. The droplet contains particles look like water drops and are surrounded by air.
- B. There are no particles in the water drops.
- C. The droplet contains particles that look like water drops.
- D. The droplet contains particles look like small balls that swim in water.
- E. The droplet contains particles with a shape that does not look like a droplet.

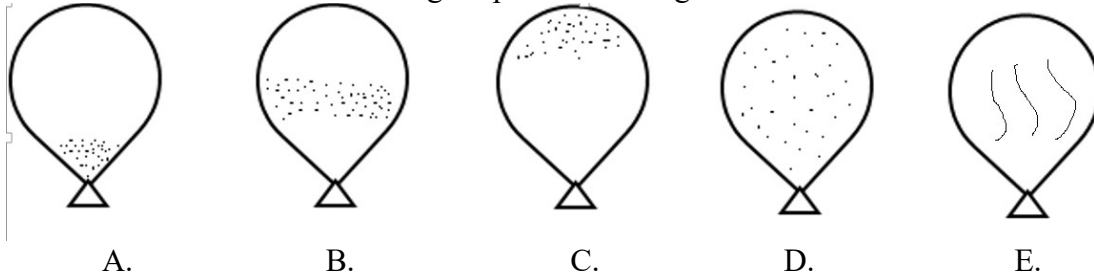
2. We put a tea bag in a cup, and pour hot water over it, and obtain a reddish brown liquid. Why does the color of water change from clear and colourless to reddish-brown when we make tea?



3. When you bring two drops of water near each other, they combine and become one drop. Which of the following explains why this happens?

- a) One of the drops extends itself and touches the other drop.
- b) The molecules of water in one drop bounce and join the molecules in the other drop.
- c) The forces between the water molecules in one drop pull the molecules of the other drop.
- d) There are little magnets inside the drops that pull on each other
- e) The molecules in the drops combine to form bigger molecules which make a bigger droplet.

4. Some air is released from a balloon filled with air. The balloon is closed with a knot afterwards. How do the remaining air particles arrange in the balloon?



Explain your choice.

5. In a hot summer day, Ercan wants to play soccer outside with his friends. He takes his ball from home and comes to the soccer field. He leaves the ball in the sun for a while. When they start playing the game, they notice that the ball has expanded a little. What made the ball expand?

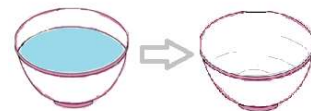
- A. Some hot air particles got into the ball.
- B. The air particles in the ball got larger.
- C. The air particles in the ball moved from the center to the sides of the ball.
- D. The air in the ball got hotter and as a result the ball expanded
- E. The distance between air particles increased as the particles of air started moving faster.

6. When we add a sugar cube to hot water and stir the water, the sugar cube is no longer seen. Which of the following statements describes what happens to the sugar in the hot water?

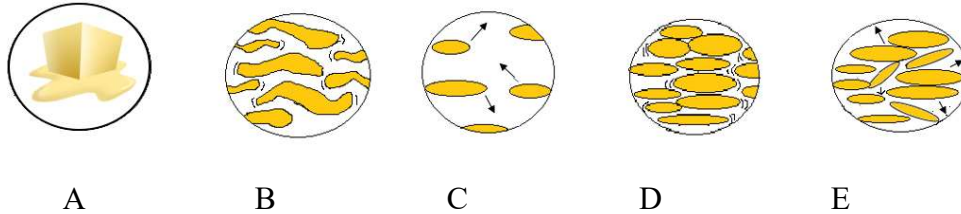
- a) The sugar scatters to the bottom of the cup
- b) The sugar molecules mix and scatter between the water molecules
- c) The sugar cube turns into water molecules
- d) The sugar disappears, and the sweet taste is transferred to the water molecules
- e) The sugar particles become air particles that form bubbles and escape from the water

7. On a hot summer day a boy puts a bowl of water in the garden so that birds can drink from it. After three hours, although he didn't see any bird, there is almost no water left in the bowl. How would you explain this observation?

- a) The water vaporized and only the water particles remained in the bowl.
- b) The water sank through the bowl into the ground.
- c) The bowl absorbed the water.
- d) The water molecules went into the air.
- e) The water particles turned into hydrogen and oxygen gas.



8. A package of butter was left outside the fridge and melted. Which of the following drawings depicts the particles in the butter after it melts?

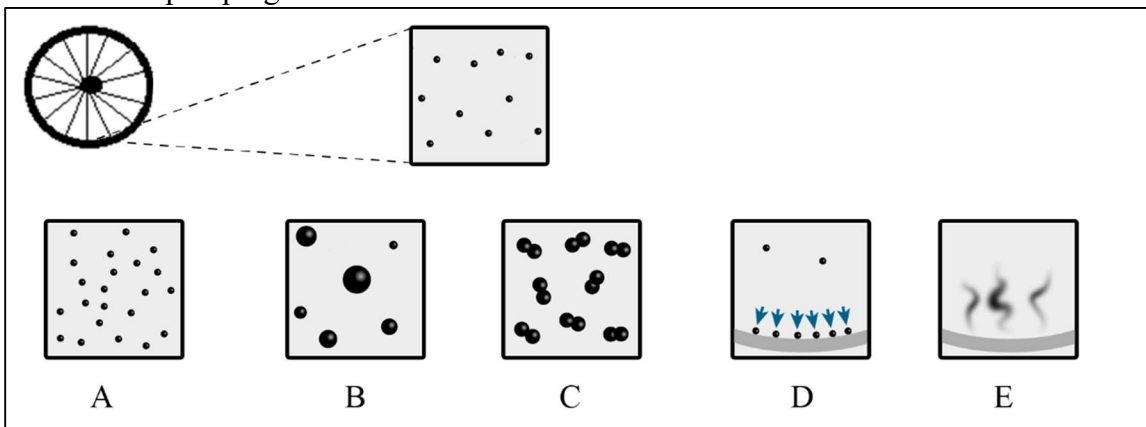


Explain your choice:

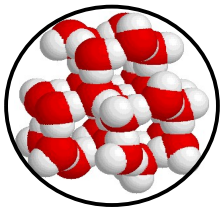
9. Playing in his room, Danny smelled the smell of the flowers in the other room. How did the smell of the flowers reach Danny's nose?

- The air particles absorb the smell of the flowers and carry it to the nose
- Danny inhaled and thereby drew the smell particles from the flowers to his nose
- The air molecules collide with the smell particles so that some of them reach Danny's nose
- The smell tends to spread in the room like smoke
- The smell particles expand and fill the room

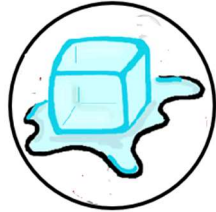
10. Tom noticed that his bicycle's front tire is a little flat. Then he pumped it up until it was hard enough to ride. Which of the following pictures shows what happened inside the tire after pumping?



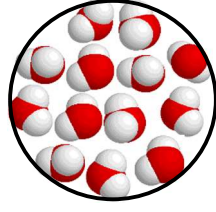
11. A piece of ice was left on the kitchen counter, and it started melting at room temperature. Which of the following pictures best shows what water would look like after melting?



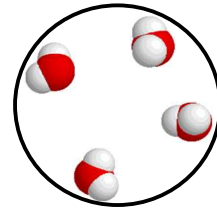
A.



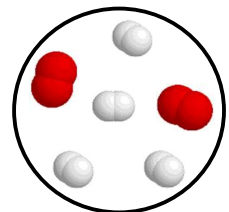
B.



C.

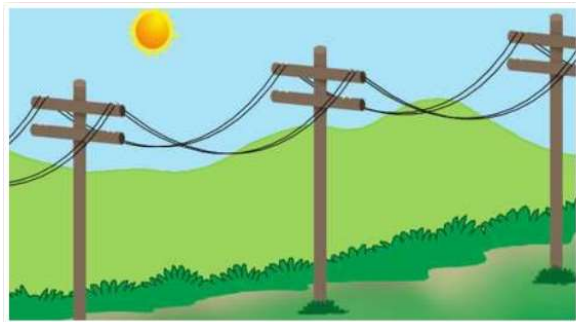


D.

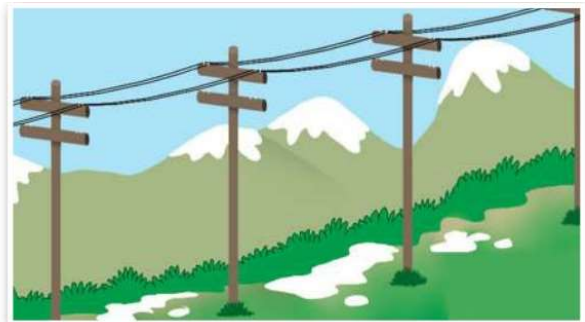


E.

12. As seen in the picture below, power-line wires, which are usually made up of copper metal, look loose in the summer and tight in the winter.



August

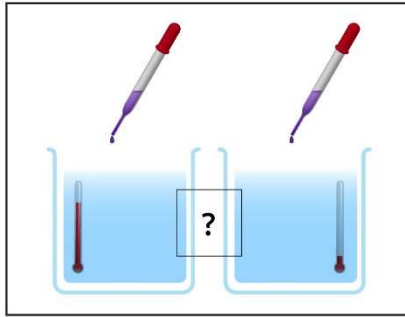


January

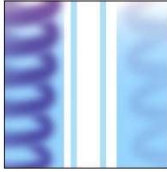
Which of the following best explains why metal wires are loose in summer?

- A. The metal wires start to melt at high temperatures, causing the wires to expand.
- B. The particles of the metal wire get wider at high temperatures, causing the wires to expand.
- C. The particles of the metal wires start to vibrate more and move slightly apart, causing the wires to expand.
- D. Due to heat, more particles flow across the metal wires, causing the wires to expand.
- E. Air particle penetrates the metal wires at high temperatures, causing the wires to expand.

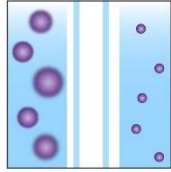
13. Katy added purple food colouring to two beakers: one beaker with hot water (left) and one with cold water (right). She noted that the food colouring spreads in the hot water more quickly than in the cold water. Which of the pictures below shows what happens inside the hot water (left) and in the cold water(right)?



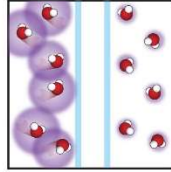
← Fast
← Slow



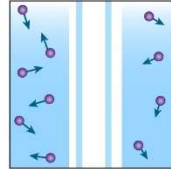
A



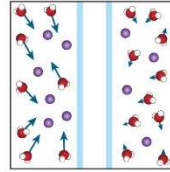
B



C



D



E

Explain your choice:
