Name_____ Date_____

CUMULATIVE TEST FOR LESSON CLUSTERS 5-9

1. When you breathe on a piece of cold glass, it fogs up.
   (a) What do you think that fog is?

   _____

   (b) What state (solid, liquid, or gas) do you think the fog is?_____
   (c) Explain how you think the fog formed on the glass. Remember to talk about substances and molecules.

   _____

   _____

   _____

2. I dropped some salt in water. After a few minutes, it had disappeared. One of my friends said that the salt had melted, then became part of the water. What would you say to explain why the salt disappeared?

   _____

   _____

   _____

3. A solid chunk of steel was sitting outside on the sidewalk on a very hot and sunny day. The steel got very hot. By the middle of the afternoon, would you expect it to:

   a. be a little smaller than before
   b. be a little larger than before
   c. stay exactly the same size as before
   d. I don't know

   Explain your answer.

   _____

   _____

TEACHER'S GUIDE FOR SCORING
CUMULATIVE TEST FOR LESSON CLUSTERS 5-9

1. (a) The fog is water--liquid water, in very tiny drops. Some students call it moisture; they may or may not know that moisture is water.

   (b) It is a liquid. Some students call it "water vapor," but it is not a gas at all.

   (c) Students' answers should include the following points:

   1. water vapor in your breath was cooled by the cold glass;
   2. the water molecules slowed down;
   3. and they stuck together to form little drops of liquid water.

   Some students will mention that the reason they stick together is that there is an attraction between molecules that holds them together if they are moving slowly enough. Explicitly mentioning attraction is desirable, but not necessary, for an explanation of condensation at the sixth grade level.

2. Students should say that the salt dissolved, not melted, and that the molecules of salt are broken off the salt grains and mix in with the water molecules.

3. The correct response is: (b) be a little larger. Students should say that when the steel is heated, its molecules move faster and, therefore, farther apart, making the steel expand. (Substances: the steel expands when it is heated. Molecules: the molecules of the steel move faster and farther apart.)

4. Explain what is happening to the molecules that make up ice when ice melts.

_____

_____

_____

Draw pictures of what you might see if you looked with magic eyeglasses at ice and the puddle of water under the melting ice.

ice water

5. You put a glass of water on a table where no one touches it, and you leave it there for a week. Does anything happen to the water?

_____

How can you explain what you think happens to the water. Remember to talk about substances and molecules.

_____

_____

_____

6. Explain why a piece of candy dissolves faster in hot water than in cold water. Remember to talk about substances and molecules.

_____

_____

_____

4. The important parts of the explanation of melting are that (a) the molecules move faster as the ice is warmed and (b) they eventually move fast enough to break out of the rigid pattern they were in as a solid. (Some students may include a statement about the attraction between molecules, but that is not essential for a sixth grade version of an explanation of melting.)

   The drawing for ice should show water molecules close together and in a pattern. Arrows should indicate that the molecules are vibrating back and forth.

   The drawing for water should show molecules close together, but in no particular arrangement. Arrows should indicate that the molecules can move past each other.

5. Students should say that the water level goes down, or that the water evaporates.

   The explanation of evaporation is that some of the molecules of the water are moving fast enough so that they can break away from the liquid and mix with the air. As more and more of the molecules leave the liquid, the water level goes down. (Some students may talk about the attraction between molecules, but this idea probably is not essential in a sixth grade explanation of evaporation.)

6. Candy dissolves faster in hot water than in cold because the molecules of hot water are moving faster, hit the solid candy more often, and break molecules of candy off of the piece of candy more quickly.

7. Explain what is happening when you smell ammonia, or perfume, or the odor of skunk or anything that is smelly.

_____

_____

_____

8. Fill in the blanks with "solid," "liquid," or "gas."

   a. Solidification is a process that changes a substance from a

   _____ to a _____

   b. Evaporation is a process that changes a substance from a

   _____to a _____

   c. Boiling is a process that changes a substance from a

   _____to a _____

   d. Condensation is a process that changes a substance from a

   _____to a _____

9. A solar still can be used to change salt water into drinking water.

   (a) Explain how a solar still works. You can use a drawing to help your explanation, if you like.

_____

_____

_____

7. A good response should say that molecules of the smelly substance are mixed in with the air when you smell something. Students may say that molecules of the substance are reaching your nose when you smell something; this response is acceptable. Some students fail to mention the substance when they explain smells (by saying something like "molecules in the air reach your nose"), but it is not clear what they think molecules are from this type of response.

8. a. liquid to solid
   b. liquid to gas
   c. liquid to gas
   d. gas to liquid

9. (a) Students should explain that water from the salt water container evaporates (or turns into water vapor and goes into the air), hits the plastic cover and condenses (or turns back into liquid water), then runs down the plastic cover and collects in the drinking water container. Students may use a drawing to illustrate this.

9. (b) Describe what happens to a simple water molecule from the time it is part of the salt water until it is part of the drinking water. Tell about everything that happens to this molecule--where it is, how fast it is moving, and how close it is to other molecules.

_____

_____

_____

(Please do not give molecules human characteristics.)

10. You take a can of soda pop out of a machine and leave it on a table for a while.

(a) What would you see on the outside of the can?_____

(b) Where has this stuff come from?_____

(c) Explain how it formed on the outside of the can.
Use a three-step process.

EVAPORATION:
_____

_____

SPREADING: _____

_____

COOLING AND CONDENSATION: _____

_____

9. (b) Students should include these steps as they trace the movement of a water molecules:

1. The molecule leaves the surface of the salt water and mixes with the air (evaporation).

2. The molecule moves through the air until it reaches the plastic cover (spreading).

3. The molecule slows down, and eventually sticks together with other water molecules to form drops on the plastic cover (cooling and condensation).

4. The molecule, as part of the drop, moves with the drop down the plastic cover and into the container.

10. (a) small drops of water

(b) The water on the outside of the can was in the air in the form of invisible water vapor.

(c) Evaporation: water evaporates from oceans, lakes, plants, animals, etc.

Spreading: water vapor (or water molecules) mix with the air and move around until they come close to the can.

Cooling and condensation: the can cools off the water vapor and it condenses (or the can slows down the water molecules and they cluster together).