

Name _____ Date _____

CUMULATIVE TEST FOR LESSON CLUSTERS 1-4

1. Why can you change ice into water but not into glass?

2. Why can't you see air?

3. Describe the ways in which ice, liquid water, and water vapor are different when you look at them through magic eyeglasses. Draw pictures if you want to, but also use words.

4. Describe, as best you can, what molecules are.

**TEACHER'S GUIDE FOR SCORING
CUMULATIVE TEST FOR LESSON CLUSTERS 1-4**

1. Students should say that ice and water are made up of the same kind of molecules, but ice and glass are not.
2. Students should say that the molecules that make up air are so small and so far apart (that is, not clumped together as they are in solids and liquids) and air cannot be seen. This is true for most gases.
3. Students should describe both the arrangement **and** motions of water molecules in the three states:

ice: molecules are close together, in a rigid pattern, vibrating back and forth

liquid water: molecules are also close together, but not in a pattern, sliding past each other as they constantly move around

water vapor: molecules are very far apart, constantly moving, sometimes colliding with each other.
4. Sixth grade students should be able to say that molecules are the smallest pieces of a substance, or that molecules are the particles or bits that the substance is made up of. Some students say that molecules are very small things in substances. When they say that, it is not clear what they mean.

5. Why is it that we can see trees, but we can't see the molecules that trees are made up of?

6. When you put your finger over the end of an empty syringe and push down on the plunger, you can push it in part of the way, but not all of the way.

(a) We know that there is air in the syringe. Explain why you can push the plunger in with your finger over the end and push air together.

(b) When you push it in almost to the end, it gets very hard to push it any farther. Explain why you can't push the plunger all the way in.

7. When you smell soup cooking on the stove, what does that tell you about the molecules in the air?

5. The important part of a correct answer is that individual molecules are too small to be seen. (The situation is analogous to seeing a beach. We can see the beach even when we are much too far away to see individual grains of sand.)

6.
 - (a) Students should talk about molecules in their answer, and not just say that air is compressible. The plunger can be pushed part of the way in because the molecules that make up air are far apart and they can be pushed closer together.

 - (b) The plunger can't be pushed in all the way because the air molecules are pushed closer together. They hit back on the plunger more and more often, until it becomes too hard to push them in any farther. (This is a difficult question, and you may want to use it as an "extra credit" question.)

7. The important part of a correct answer is that there are soup molecules in the air if you can smell the soup. (Of course, soup is a mixture of different substances, and not all of them evaporate into the air, nor are all of them smelly. But if you can smell it, then some smelly molecules have left the soup and mixed in with the air.)

8. How is it that molecules of smelly substances can move through the air and finally get to your nose?

9. Industries sometimes dump poisonous or harmful liquids that they want to get rid of into rivers and lakes.

(a) If you took some water out of a river or lake that had been polluted in this way, would that water be a mixture or a pure substance?

(b) Explain your answer.

(c) Draw what you think you would see if you looked at polluted water with magic eyeglasses.

10. How are ice, water, and water vapor the same? Talk about molecules, if you can.

8. Students should say that molecules are always moving. That is why some of them that are mixed in with the air eventually get to your nose. Some students say that the air carries the smell (or the molecules) to your nose. A better explanation includes the idea that the molecules of the smelly substance are always moving.

9.
 - (a) The polluted water is a mixture.

 - (b) It is a mixture because it is made up of two or more kinds of molecules, water molecules and the molecules that make up the poisonous or otherwise harmful liquids.

 - (c) Drawings should show water molecules and at least one other kind of molecule.

10. Students should talk about water molecules in their answers. The molecules that make up ice, liquid water, and water vapor are the same--they are all water molecules.

11. Is air a pure substance or a mixtures? _____

Explain your answer:

12. How is humid air different from air that is not so humid?

Teacher's Guide Test 1

11. Air is a mixture. Students should say that it is a mixture because it is made of more than one kind of molecule. Whether they list the different components of air (nitrogen, oxygen, carbon dioxide, water vapor, and other substances) or not, is not important.
12. Humid air has more water vapor in it than air that is not so humid. Another acceptable way of saying this is that humid air has more water molecules mixed in with the other molecules.