

What are inside things?

Pre Test Questions

1. Why can things break?
2. A puddle of water is placed on the floor and left alone for a few days. If we assume that water is made up of parts that move, would the puddle a) suddenly disappear, b) gradually get smaller, or c) stay exactly the same? Why?
3. Is air made up of one piece or many pieces? How do we know this?
4. Which has more pieces, a cube of solid wax or a cube of liquid wax the same size? How do you know this?
5. Which has more pieces, a cube of ice or a cube of water the same size? What is between the pieces? How do you know this?
6. How do we know there is space between the parts of things?
7. Where do water particles (molecules) go when they disappear?
8. How are the particles (molecules) in cold water different from the molecules in hot water? How do you know this?
9. Why do you feel so cold when you come out of a hot shower?

Use the following links to learn the necessary concepts:

Search Engine for Lesson Plans:

<http://thegateway.org>

How Dirty is the Air We Breathe? (P)

<http://www.tnrcc.state.tx.us/air/monops/lessons/partlesson4.html>

Molecules and Heat Lesson Plan:

<http://ericir.syr.edu/Virtual/Lessons/Science/Physical/PHY0024.html>

Learn about and view common molecules:

<http://www.recipnet.indiana.edu/common/common.html>

Learn about heat, temperature, and more as related to hot air balloons:

<http://www.omsi.edu/sln/air>

Mad Scientist Archive of Questions:

<http://www.madsci.org/archive.html>

Why doesn't air flow easily through the gaps between the fibers of clothes?

<http://www.madsci.org/posts/archives/960298135.Ph.r.html>

How can gas particle have mass when they are in constant motion?

<http://www.madsci.org/posts/archives/959171084.Ch.r.html>

Concepts

Most things we encounter are made up of parts called molecules.

Molecules are too small for us to see.

These parts have empty spaces between them, allowing them to mix with parts from other things.

Two things can mix so their molecules take up the empty spaces between them, so the sum of the volumes of two things is more than the volume measured when they're mixed together.

Most solids have less empty space between their parts than their liquid or gaseous forms. One exception is ice.

Even heavy (dense) objects like rocks have empty spaces between their parts. These spaces are large enough for other molecules to occupy.

Solids and liquids evaporate. When things evaporate, they release their molecules in the form of gas into the air around them.

The warmer things are, the quicker they will evaporate.

The warmer things are, the quicker they will mix.

Post Test Questions

1. Why can things break?

A: Things can break because they are made up of parts.

2. A puddle of water is placed on the floor and left alone for a few days. If we assume that water is made up of parts that move, would the puddle a) suddenly disappear, b) gradually get smaller, or c) stay exactly the same? Why?

A: B, since water is made up of parts that slowly evaporate into the air around it.

3. Is air made up of one piece or many pieces? How do we know this?

A: If we assume that air is made up of many pieces, objects such as our own bodies could move through spaces between the molecules in the air.

4. Which has more pieces, a cube of solid wax or a cube of liquid wax the same size? How do you know this?

A: The cube of solid wax, since the parts (molecules) have less space between them than the liquid wax parts (molecules). We know this because the liquid cube hardens into a smaller volume of solid wax than when it was liquid.

5. Which has more pieces, a cube of ice or a cube of water the same size? What is between the pieces? How do you know this?

A: The cube of water, since the parts (molecules) have less space between them than the ice parts (molecules). There is nothing (empty space) between the pieces because when we mixed alcohol and water the total volume was less than the sum of the original volumes. This experiment proves that the pieces have to be occupying a space that was empty before they were mixed.

6. How do we know there is space between the parts of things?

A: Various answers involving one thing moving through or mixing with another.

7. Where do water particles (molecules) go when they disappear?

A: The water particles (molecules) evaporate into the air.

8. How are the particles (molecules) in cold water different from the molecules in hot water? How do you know this?

A: The cold water particles (molecules) are moving around at a slower rate than the hot water particles (molecules),

9. Why do you feel so cold when you come out of a hot shower?

A. You feel cold because the water on your skin is evaporating into the air. As the warmer water molecules leave or evaporate off of your skin first, they leave behind the cooler, liquid water molecules.