

# Critical Thinking Skills

## The Nature of Matter

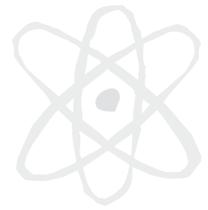
Properties of Matter – Atoms, Molecules & Elements – Energy – The Nature of Matter - Big Book

Skills For Critical Thinking		Reading Comprehension							Hands-on Activities
		Section 1	Section 2	Section 3	Section 4	Section 5	Section 6	Section 7	
<b>LEVEL 1</b> Knowledge	<ul style="list-style-type: none"> <li>List Details/Facts</li> <li>Recall Information</li> <li>Match Vocab. to Definitions</li> <li>Define Vocabulary</li> <li>Label Diagrams</li> <li>Recognize Validity (T/F)</li> </ul>	✓	✓	✓	✓	✓	✓	✓	✓
<b>LEVEL 2</b> Comprehension	<ul style="list-style-type: none"> <li>Demonstrate Understanding</li> <li>Explain Scientific Causation</li> <li>Rephrasing Vocab. Meaning</li> <li>Describe</li> <li>Classify into Scientific Groups</li> </ul>	✓	✓	✓	✓	✓	✓	✓	✓
<b>LEVEL 3</b> Application	<ul style="list-style-type: none"> <li>Application to Own Life</li> <li>Model Scientific Process</li> <li>Organize and Classify Facts</li> <li>Utilize Alternative Research Tools</li> </ul>	✓	✓	✓	✓	✓	✓	✓	✓
<b>LEVEL 4</b> Analysis	<ul style="list-style-type: none"> <li>Distinguish Roles/Meanings</li> <li>Make Inferences</li> <li>Draw Conclusions Based on Facts Provided</li> <li>Classify Based on Facts Researched</li> </ul>	✓	✓	✓	✓	✓	✓	✓	✓
<b>LEVEL 5</b> Synthesis	<ul style="list-style-type: none"> <li>Compile Research Information</li> <li>Design and Application</li> <li>Create and Construct</li> <li>Imagine Self in Scientific Role</li> </ul>		✓	✓	✓	✓	✓	✓	✓
<b>LEVEL 6</b> Evaluation	<ul style="list-style-type: none"> <li>State and Defend an Opinion</li> <li>Justify Choices for Research Topics</li> <li>Defend Selections and Reasoning</li> </ul>				✓	✓	✓	✓	✓

Based on Bloom's Taxonomy



# Mixtures and Solutions



1. Write each word or group of words beside its meaning.

mixture  
pure material

solution  
physical change

dissolve  
physical property

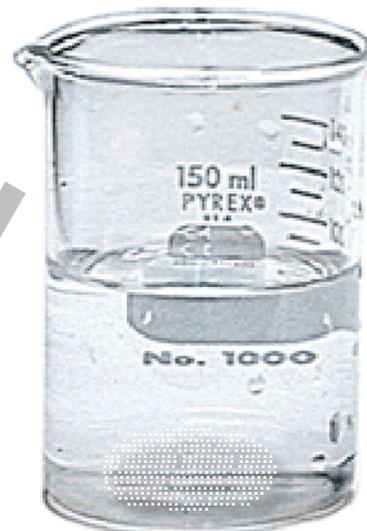
- \_\_\_\_\_ a) a property that tells how a material looks or behaves as long as it does not change into an new material
- \_\_\_\_\_ b) a material that is made of only one kind of particle
- \_\_\_\_\_ c) what something does when it forms a solution
- \_\_\_\_\_ d) a mixture of a material and a liquid where the particles of the materials are completely scattered among each other
- \_\_\_\_\_ e) a combination of two pure materials
- \_\_\_\_\_ f) a change that does not produce a new materia

2. Circle **T** if the statement is True or **F** if it is False.

- T** **F** a) Air is a mixture.
- T** **F** b) Ocean water is a mixture.
- T** **F** c) Sugar is a mixture.
- T** **F** d) Mixtures can be separated into their parts.
- T** **F** e) Sand dissolves in water.



# Mixtures and Solutions



**P**ure materials are made of only one kind of particle. The particles may be atoms or molecules. Water, gold, oxygen, salt, sugar, and snow flakes are all pure materials.

Two or more pure materials mixed together are called a **mixture**. Soil, ocean water, air, blood, and chocolate chip cookies are all mixtures.

There are two kinds of mixtures. In some mixtures, chunks of different pure materials are mixed together. You can usually see the bits of the different materials. Soil and chocolate chip cookies are this kind of mixture.

In the other kind of mixture, separate particles are mixed together. Air is a mixture of oxygen, nitrogen, and other gas molecules. Ocean water is a mixture of salt particles and water molecules. **Solutions** are formed when the particles of one material are scattered among the particles of a liquid.

**Write P after each material that is a pure material. Write M after each material that is a mixture.**



Air ( )

Lemonade ( )

Ice ( )

Iron ( )

Chicken Soup ( )

Oxygen ( )

When salt is mixed with water, it seems to disappear. But the salt is in the water, and it is still salt. We can't see it because it is separated into single particles. When we make this kind of mixture we say the solid **dissolves** in the water. The amount of solid that will dissolve is called its **solubility**. Dissolving is a physical change and solubility is a physical property.

Mixtures can usually be separated into their parts. When heat is added to salt water, the water **evaporates**, and the solid salt is left behind. A mixture of salt, sand, and sawdust can be separated by adding water. The sand sinks, the sawdust floats, and the salt dissolves in the water.



# Mixtures and Solutions

1. Put a check mark next to the answer that is most correct.

a) Which material is a mixture?

- A table salt
- B lemonade
- C aluminum
- D snow flakes

b) Which is a pure material and not a mixture?

- A blood
- B ice
- C milk
- D soil

c) Which property could be used to separate sand and sugar?

- A color
- B hardness
- C size
- D solubility

2. Salt, sand, and sawdust can be **separated** in four steps. Number the steps from **1** to **4** in the order they should be done.

- a) Remove the sawdust from the top.
- b) Evaporate all the water to get the salt.
- c) Pour the water off of the sand.
- d) Dump the mixture into a bucket of water.