

Learning About Pure Substances

Scientists often examine the particles that make up a substance. Close observation shows that in some cases all the particles that make up a substance are alike. In other cases all the particles are not alike. When all the particles are alike the substance is called a pure substance. A pure substance is made of only one kind of substance and is the same throughout. All the particles in a pure substance are exactly the same.

Elements are the simplest pure substance. They cannot be changed into a simpler substance by any chemical or physical process. Compounds are also pure substances. Water, salt and sugar are compounds that are pure substances because even though they are made of more than one element they are the same throughout.

So, compounds are pure substances and cannot be broken down into simpler substances without changing their properties. Elements cannot be broken down into simpler substances without losing their identity.

If you place a pure substance into water you create a solution. A solution is a mixture – not a pure substance. Kool-Aid and lemonade are solutions.

Teacher Demo

Materials: baking soda, Damp Rid, 2 -250 mL beakers with 50 mL of water, small spoon

What To Do:

1. Observe the baking soda your teacher shows you. It is a compound with the chemical formula NaHCO_3 . Is it the same throughout? _____ Is it a pure substance? _____
2. Observe the calcium chloride your teacher shows you. It is a compound with the chemical formula CaCl_2 . Is it the same throughout? _____ Is it a pure substance? _____

3. Observe the beakers of water your teacher shows you. Is it the same throughout? _____ Is it a pure substance? _____
4. Your teacher will now mix half a small spoon of baking soda in one of the beakers of water until it is clear. It is the same throughout? _____ Is it a pure substance? _____
5. Your teacher will now mix half a small spoon of Damp Rid in the other beaker of water. It is the same throughout? _____ Is it a pure substance? _____
6. Your teacher will now pour the solution of baking soda into the solution of Damp Rid. Observe what happens.

Observations:

1. In the beakers below draw what happened in the demonstration.



Baking soda
and water

Calcium chloride
and water

Calcium Carbonate
Salt and water

When two liquids are mixed together, sometimes they form a solid. When this happens the solid is called a precipitate and it is a chemical change. In this demonstration the water became cloudy with the precipitate. Your teacher will keep it over night and you will observe it again tomorrow.



Questions:

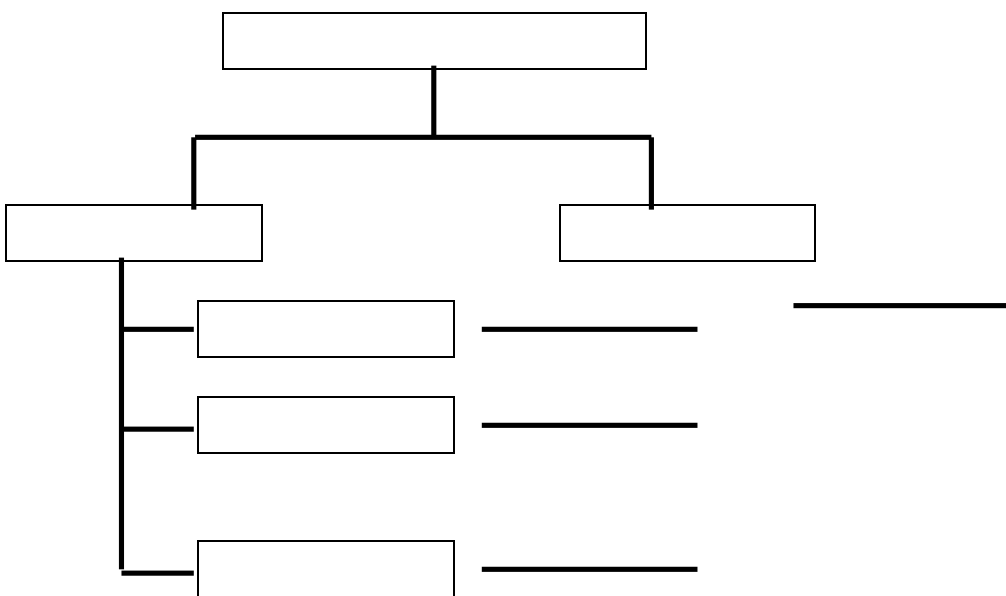
1. Describe what you observe in the beaker after it sat for at least 24 hours.

2. What are two types of pure substances?

3. Give three examples of pure substances.

Watch the video “Types of Pure Substances” from www.missdoctorbailer.com and fill in the concept map below.

Place an example of each substance on the lines.



DO NOT GLUE UNTIL TEACHER SAYS TO

1. Cut out the large rectangle and fold on the dotted line.
2. Write Pure Substances on the top and Elements and Compounds at the bottom.
3. Under the flap have students write at least 3 examples of elements and 3 examples of compounds.
4. Decorate the top flap.

Name _____ period _____

EXIT TICKET

Learning About Pure Substances

Determine if the following substances are pure substances or not. If they are pure substances place a P on the line. If not, leave it blank.

- _____ 1. Water (H₂O)
- _____ 2. Salt (NaCl)
- _____ 3. Lemonade
- _____ 4. Copper (Cu)
- _____ 5. Iron (Fe)
- _____ 6. Baking Soda (NaCHO₃)
- _____ 7. Baking Soda and water mixed together
- _____ 8. Sulfur (S)

Conclusion: (precipitate, elements, chemical, compounds, cannot, properties)

_____ and _____ are pure substances. A pure substance _____ be broken down and still maintain its _____. When a solution becomes cloudy is shows a _____ change. The solid that forms is called a _____.

Name _____ period _____

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