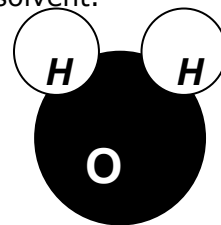


TITLE: Water – The Universal Solvent**OBJECTIVE:** Students relate the structure of water to its function as the universal solvent.

(TEKS 9A)

**PROBLEM:** Will various substances dissolve in water once shaken?

HYPOTHESIS: *What do you know about water? Predict what will happen when you dissolve (each separately) vinegar, sugar, oil, salt, sand, alcohol, flour, soap, ammonia, and cornstarch in water?*

BACKGROUND INFORMATION:

The structure of a water molecule can help us understand how water can dissolve so many substances. A water molecule is made up of one atom of oxygen bonded with two atoms of hydrogen. The atoms are bonded by sharing electrons. This sharing is like an unequal tug of war. The oxygen atoms attract the electrons more strongly than the hydrogen atoms. The shared electrons are more attracted to oxygen than to hydrogen. The oxygen "end" of the water molecule is more negative than the hydrogen "end." The hydrogen end is more positive than the oxygen end. The oxygen end is said to have a partial negative charge. The hydrogen end is said to have a partial positive charge. Molecules that have ends with partial negative and positive charges are called *polar*. Water is a polar molecule. Water molecules can attract particles of other substances. Many of the substances that water dissolves are made of polar molecules.

MATERIALS:

Graduated cylinder
test tube rack
flour
vinegar

test tubes
salt
ammonia

sugar
oil
soap flakes

sand
alcohol
cornstarch

PROCEDURES:

1. Copy the data table in your journal and make a prediction if the substances dissolve in water by placing a yes or no in the prediction column.
2. Place the test tubes in racks. Fill each test with 10 mL of water.
3. Pour 5 mL of alcohol into Tube 1. Gently shake the test tube. Record whether or not it dissolves in water.
4. Place 1 mL of soap flakes in Tube 2. Gently shake the test tube. Record whether or not it dissolves in water.
5. Place 1 mL of sugar in Tube 3. Gently shake the test tube. Record whether or not it dissolves in water.
6. Place 1 mL of flour in Tube 4. Gently shake the test tube. Record whether or not it dissolves in water.
7. Place 1 mL of salt in Tube 5. Gently shake the test tube. Record whether or not it dissolves in water.
8. Place 1 mL of cornstarch in Tube 6. Gently shake the test tube. Record whether or not it dissolves in water.
9. Place 1 mL of sand in Tube 7. Gently shake the test tube. Record whether or not it dissolves in water.
10. Place 5 mL of oil in Tube 8. Gently shake the test tube. Record whether or not it dissolves in water.



DATA: Draw the chart on the next page in your journal and record your results.

Contents of Test Tube	Prediction if Substance Dissolves in Water (Yes/No)	Dissolves in Water (Yes/No)
Alcohol		
Soap Flakes		
Sugar		
Flour		
Salt		
Cornstarch		
Sand		
Oil		

CONCLUSIONS/ANALYSIS: *Answer the questions in your journal.*

1. Did all the substances dissolve in water? Why or why not?
2. Which substances did not dissolve in water?
3. What is a polar molecule?
4. What is an ion?
5. What is a nonpolar molecule?
6. What is a solvent? Which substance(s) are considered a solvent?
7. What is a solute? Which substances are considered solutes?
8. What is hard water and how does it affect solubility?

REFLECTION QUESTION: What did you learn about water in this activity? Write about your new understandings in your science journal.

