TESTING CANDY FOR GLUCOSE

Benedict's test for sugars Science Experiment

WHAT YOU NEED:

**Equal to the number of candies being tested*

- ☐ 3-4 different types of Halloween candy
  (Hint: We think non-chocolate types will work best: Smarties, lollipops, etc.)
- ☐ Disposable plastic cups*
- ☐ Disposable pipettes*
- ☐ Small glass test tubes*
- ☐ Benedict's solution
- ☐ Cutting board, knife, and fork
- ☐ Metal spatula
- ☐ 400 ml beaker
- ☐ Wax pencil
- ☐ Lab burner and stand
- ☐ Test tube rack
- ☐ Test tube clamp
- ☐ Safety goggles
- ☐ Gloves
- ☐ Adult helper

WHAT YOU DO:

1. Before beginning, put on your goggles and gloves. Safety first! You'll need to prepare a solution for each candy you're testing. Have an adult help you use a knife to finely chop them, or break them into small pieces and grind them up using the back of a fork. Take care to clean the knife/fork in between each candy as to not cross-contaminate.Chop solid candy to mix with water.
2. In a clean cup, measure 1 level spatula scoop of ground candy. Repeat with additional candy types crushed candy.
3. Use the pipette to add 3 droppers full of hot water to each cup. Stir, dissolving the candy as much as you can to make liquid solutions. Use the same amount of ground candy and water in each solution and to clean the spatula in between.
4. Label each solution, and observe and record the color. Predict (make a hypothesis) which candy you think contains the most glucose.
5. Using a different pipette for each solution, add 25 drops of one candy solution to the first test tube. Repeat with remaining candies in clean test tubes.
6. Label each test tube with the wax pencil.
7. Add 5 drops of Benedict's solution to each test tube. Gently swirl to mix.
8. Place the stand over the lab burner. According to the manufacturer's directions, use the lab burner to heat 300 ml of water in the beaker.
9. When the water boils (large bubbles appear at the surface), turn the heat to low and add the test tubes, placing them carefully inside the beaker. After 5 minutes, turn the burner off.
10. Use the test tube clamp to remove the test tubes from the beaker and place them in the test tube rack.
11. Allow the solutions to cool for several minutes. Swirl the contents of each test tube and observe and record the color of the liquid.

WHAT HAPPENED:

Glucose is a simple sugar that plants produce by the process of photosynthesis. Like all carbohydrates, it is made of hydrogen, carbon, and oxygen. Glucose is essential to life, as it is the primary source of energy for our body's cells, and it is able to enter our bloodstream quickly to provide energy right away. Without it, our bodies would not function. Plus, glucose is the primary energy source used by brain cells! Without enough glucose, brain function may be diminished.

Benedict's solutions (also called Fehling's solution) is bright blue liquid. It's made of copper sulfate, sodium citrate, and sodium carbonate. While it's usually bright blue, when it's mixed with a solution that contains glucose, it turns green, yellow, deep-red or brown, depending on the sugar concentration.

Other types of sugar include fructose, which comes from honey, fruit and vegetables, and sucrose, which is what most table sugar is made of. Since this test only detects the presence of glucose, you can't tell how much other types of sugar these candies contain.

FOR FURTHER STUDY:

For further testing, compare different foods that aren't typically thought of as sweet, like milk or bread, as well as other types of sweet foods besides candy, like fruit and soda pop. Also consider using glucose test strips instead of Benedict's solution and see how that affects your results. Think about and discuss why knowing which foods contain a lot of glucose might be beneficial.

EXAMINE YOUR RESULTS:

Any color change (green, yellow, orange, red) indicates the presence of glucose. A dark red-brown solution indicates more glucose than any other color. Using the chart above as a guide, which candy contains the most glucose? Which candy has the least glucose? Was your hypothesis correct?

NOTES: