

BLOOD SUGAR ACTIVITY

Materials:

- Baking soda
- White vinegar
- Water
- Small plastic cups or beakers
- Pipettes or droppers
- Graduated cylinder
- Scale
- Hydrion Test Strips
0-13pH (2 inches)

Preparation:

1. Measure 30g of baking soda. Dissolve into 50mL of water. (Stir until most of the solids are dissolved.)
Pour 15mL of the baking soda solution into a cup or test tube for each group of students. (Labeled "Insulin")
2. Distribute 5mL of vinegar in a cup or beaker to each group of students. (Labeled "Glucose")
3. Give students a cup with 10mL of water. (Labeled "Blood")
4. Give each group of students two pipettes or droppers.

Methods:

The water in the cup represents blood. Blood consists of red blood cells, white blood cells, platelets and plasma. Plasma is a liquid that allows molecules to travel around the body. When you eat food like fruit, vegetables, grains and dairy you take in glucose. Glucose dissolves in the plasma and travels to all your body cells where it is used for energy.

Note for instructor: This experiment uses the properties of acids and bases to model sugar and insulin regulation. The strips are testing for pH. All liquids are safe to use.

1. Dip one test strip into the blood (water) and record the color. This color will be considered normal. Find the number that corresponds to the color and record it on the data table.
2. Add 10 drops (0.5mL) of glucose (vinegar) to the blood sample (water.)
Slowly swirl the blood. This is modeling eating a piece of fruit.
3. Dip one test strip into the blood (water) and let dry for 20 seconds.
Record the color. This would be considered high blood sugar.
4. When your pancreas detects increasing sugar in the blood, it releases insulin to help move the sugar into cells where it is used to make energy. Using a new dropper, add 10 drops of insulin (baking soda) to the blood sample. Insert a test strip into the blood sample and let dry for 20 seconds. Record the color. Keep adding insulin until you get back to normal color.

Challenge: Choose one of the foods below and add the amount of glucose noted into the blood. Predict how much insulin it will take to bring it back to normal. Then test it!

1. Candy bar = 15 drops glucose
2. Raisins = 10 drops glucose
3. Yogurt = 13 drops glucose
4. Toaster pastry = 20 drops glucose

Data:

Ask students to record their observations on the data table.



	Test	Color	Low/Normal/High
	Normal		
	10 drops glucose		
	10 drops insulin		
Challenge	___ drops glucose		
	___ drops insulin		

Analysis: (KEY)

1. What is the function (job) of insulin?

Answer: Insulin is a molecule released by the pancreas. It allows glucose to move from the bloodstream into the cells so the cells can turn it into energy.

2. If someone has type 1 diabetes, they don't make insulin and have to have shots of insulin throughout the day. What information do you think they need in order to know how much insulin to take?

Answer: They need to know how much glucose they have in their blood. They also need to know if they plan to eat soon and how much glucose they will get from their food so they can dose insulin ahead of the meal to balance the food.

3. What happens if you add too much insulin?

Answer: Too much insulin will cause the glucose level to drop quickly. You would need to add more glucose to balance it out.