

## **Rotten Bananas: Chemical Changes**

### **4th Grade**

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#### **Benchmarks:**

PS-1: Identify characteristics of simple physical change

PS-2: Identify characteristics of simple chemical changes.

SI-1 Select the appropriate tools and use relevant safety procedures to measure and record length, weight, volume, temperature, and area in metric and English units.

SI-3, 4, 5, 6 (Benchmark C): Develop, design, and safely conduct scientific investigations and communicate the results.

#### **Objectives:**

Students will learn about chemical change, they will explore how rotting is a type of chemical change.

#### **Materials:**

- One banana per group (of 3)
- Three baggies per group
- Any ingredients the kids suggest that are cheap

Possibilities (things left over from other experiments)

- Vinegar
- Sugar
- Salt
- Other fruit cut up
- Plastic wrap
- Water
- Lemon juice

#### **Initial Demonstration:**

Hold up a green banana and ask the kids if they would like to eat it? Why not?

**Why would they rather eat it in a few days? How would they feel about eating it in two months?**

Kids will discuss how green bananas are not ripe, yellow bananas are good for eating, brown bananas are good for baking, but really brown bananas are too rotten to eat.

Ask the kids if the banana will turn brown faster if you peel it? Do they have any hypotheses? Write a few hypotheses on the board.

**Procedure:**

- 1) Tell the kids that each group will be given three baggies and one banana. Ask them what fraction of the banana should go in each baggy. (1/3)
- 2) The kids should now be told that they are to hypothesize what materials they can add to their baggies to keep their bananas from rotting? What materials could they add to their baggies to make them turn brown faster?
- 3) The kids should choose one bag to try and 'rot' their banana and one bag to 'slow rot' (Encourage the kids to label their baggies).
- 4) Ask the kids what their control bag should contain. Remind them that everyone in the class must choose the same control bag. What will they need to compare their bananas with? (*We brainstormed this on the board and decided on just a banana.*)
- 5) Let the kids set up their own experiments. Decide as a class the best time to check up on their experiments (it may be good to limit this experiment to a week).

**Target Observations:**

- Some things will slow the rotting of bananas
- Bananas do not rot at the same rate if mixed with different substances
- Chemical changes include rotting.

**Summary:**

A chemical change involves the change in a substance through chemical reactions. The chemical reactants form a new product with equal mass. The following is a list of evidence that can indicate that a chemical change took place: the formation of gas; change in color; change in temperature or energy; or light, heat, or sound is given off. A physical change alters a substance without changing it into another substance. Examples of physical change include: change of state, creation or separation of a mixture, physical deformation such as cutting, change in color by addition of dye.

Students will learn that chemical changes require a reaction between two substances. (The main reaction was banana with air). If you add additional substances the chemical change may be slower or faster.

**Extensions:**

Encourage the kids to do some background research at home. Do their parents use anything to keep their fruit salads from turning brown? What do they do when they need brown bananas for banana bread? The kids may consider bringing in their own materials from to improve their experiments and involve their family.