

# What's the Matter?

## Summary

Students observe a discrepant event--matter seems to disappear in a chemical reaction--and are then challenged to create experiments to solve the dilemma.

## Time Frame

2 class periods of 30 minutes each

## Group Size

Small Groups

## Materials

For each group:

A piece of steel wool, the size of walnut. The more fine the steel wool, the better.

1 test tube

Water

a small balloon

## Background for Teachers

A physical change occurs when the appearance of the matter changes but the composition of the matter does not change. Matter can change in size, shape, color, odor, hardness, or in state such as gas, liquid, or solid.

A chemical change occurs when new kinds of matter are formed. The composition of the matter changes, and the new kinds of matter have different properties from the old matter.

Evidence of a chemical change is production or use of energy such as heat or light.

The balloon in this experiment keeps air from getting in or out of the test tube. When the water and oxygen are mixed with the iron in the steel wool, a chemical reaction takes place. The new matter is rust (ferris oxide). Because oxygen is used in the reaction, the balloon will be pushed into the test tube by the air pressure on the outside of the tube.

Allowing students to discover answers rather than be given explanations encourages scientific thinking. Questions can be used to guide students' inquiry.

## Intended Learning Outcomes

Observe events.

Plan and conduct simple experiments.

Formulate simple research questions.

Know science information.

Record data.

Explain observations.

Cite examples of how science affects life.

## Instructional Procedures

Step 1. Give the students the following instructions:

Form groups of 2-3.

For each group, get a test tube, a walnut-sized piece of steel wool, and a balloon.

Place the steel wool in the test tube.

Add water to moisten the steel wool but not to make a puddle of water in the test tube.

Stretch the balloon, not filled with air, over the top of the test tube

Set the test tube with the balloon aside, preferably near a source of light. Leave it overnight.

Step 2. Return the next day. Ask the students observe their test tubes and to record their observations. Ask them to describe what happened.

Step 3. The teacher should gather the students together to share ideas and to form questions or hypothesis about what happened in the test tubes. Students questions and hypotheses should focus on what happened to the matter (steel wool and water and air) in the test tube.

Step 4. Students' ideas should be used for further investigation. The background notes give information for the teacher. Students may investigate by repeating the experiment, changing one variable in each experiment, trying new experiments, and/or researching answers from reference materials.

Step 5. After the students have completed their investigations, gather the class together. Discuss their findings. Introduce the term chemical change. Discuss the difference between chemical and physical changes. Introduce the terms reactant and product. Ask them the following questions:

What evidence do we have that the change in the test tubes was a chemical change?

If we were to measure the weight of the reactants and the weight of the products, how would the weights compare?

What are some examples of chemical reactions in daily life?

What would happen to the product if we changed one of the reactants in our test tube?

### Assessment Plan

Provide for the students a variety of safe, household items such as baking soda, vinegar, sugar, salt, milk, etc... Give each a test tube and instruct each student to use the materials provided to make a chemical reaction. Have them answer the following questions about their reaction:

Describe the reactants.

Describe the products.

How do you know that yours was a chemical reaction?

### Authors

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