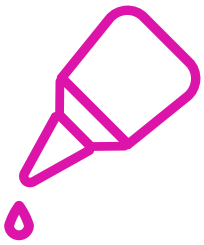
3M Young Scientist Lab

Family Activity | Grades K–2

Fun with Adhesives



SUMMARY OF CLASSROOM LEARNING

Adhesives are all around us. They cause bandages to stick to our skin, enable us to wrap gifts, and help us post reminder notes. Adhesives vary in stickiness depending on the purpose of their use. In this lesson, students encountered a real-world problem that required an inventive solution. When an art teacher ran out of glue for her classes, students worked together as engineering teams to create a formula for homemade glue. Then students tested their glue concoctions using various materials (e.g. paper, cardboard).

LEARNING OBJECTIVES

Students will be able to:

- observe and record the properties observed when two substances are mixed together.
- measure and record capacity using appropriate science tools and measurement units.
- work in teams to develop a solution to a technology problem.

BACKGROUND INFORMATION

A major emphasis in the primary grades is on children observing and describing the properties of objects. However, in addition to describing how objects look, feel, sound, etc., children also benefit from exploring what happens when materials are manipulated through actions such as mixing, heating, cutting, wetting, etc. Sometimes when materials are mixed together, they retain their original properties. Other times when materials are combined, the result is a substance with properties very different from the properties of the original materials.

While students in the primary grades will not discuss what is going on in the reaction at a molecular level, emphasis should be placed on the problem solving and inquiry skills required to complete these activities, such as measuring, observing, and describing.

HOME ACTIVITY

Your young scientist should be able to explain how the physical properties of the flour changed when water was added to it during the classroom activity. As a family, you will explore more changes in physical properties by creating marshmallow treats or by creating a paper mache object. Discuss which project you would like to complete. Use the conversation starters listed below to initiate a conversation about what you are about to explore as a family.

MATERIALS

Marshmallow Treat Activity

- Large saucepan
- 3 tablespoons butter
- 1 pack of marshmallows (10oz.)
- 6 cups cereal of choice

Paper Mache Activity

- Flour
- Balloon
- Newspaper (cut into strips)
- Water
- Candy (optional)

VOCABULARY

- **Physical properties:** characteristics that can be observed, like appearance, texture, color, size, mass, and volume.
- **Ingredient:** one of the substances that makes up a mixture.
- **Combine:** to bring or join together.

THOUGHT/CONVERSATION STARTERS

Marshmallow Treat Activity

- What happens when you melt marshmallows?
- How can we turn these ingredients into a tasty treat?
- What do we need in order to melt the butter and marshmallows?

Paper Mache Activity

- How are piñatas made?
- What are some different ways we can get this newspaper to stick to this balloon?
- How can we make this newspaper turn from flimsy paper to a hard material?

STEPS

Parent/Guardian Note: Be sure to take the appropriate safety precautions when cooking together to avoid burns or other injuries when using heated materials.

Marshmallow Treat Activity

1. Gather all of the **ingredients**.
2. In a large saucepan, melt 3 tablespoons of butter.
3. Add the bag of marshmallows to the saucepan to make a sticky, edible adhesive.
4. Add 6 cups of cereal to the mixture to make a tasty marshmallow treat.
5. Discuss as a family how the **physical property** of the marshmallows changed and became an adhesive that is now holding the cereal pieces together.

Paper Mache Activity

1. **Combine** flour and water to make a paste suitable for paper mache. (Add a little water at a time until you reach your desired consistency.)
2. Cut newspaper into strips.
3. Blow up a balloon.
4. Dip a newspaper strip into the paper mache paste and wring out any excess liquid.
5. Spread the newspaper strip onto the balloon.
6. Repeat until the balloon is fully covered.
7. Allow time for the paper mache to dry completely.
8. Optional: Decorate and fill with candy to create a colorful piñata.
9. Discuss as a family how the **physical property** of the newspaper changed when it was dipped into the adhesive mixture and dried.

DOCUMENT THE LEARNING IDEA

- Take pictures or draw pictures of your family completing different steps of the activity. Send them to school with your young scientist to share with their class.

CONTINUE MAKING CONNECTIONS

Let's go on a house hunt! Look for items that might have a change in their physical properties if they were heated, frozen, or combined with another substance. Make a list of everything you find and how it would change. For example, a bottle of water, if put into the freezer, would become a frozen, hard solid object. Send the list to school with your young scientist to share and compare with their classmates.