

Flubber!

Students have fun making flubber while using the scientific method.

Grade Level: Kindergarten

Phenomena:

Combining two different ingredients can create a new material.

Objectives:

- Students will list at least two steps of the scientific method.
- Students will create and conduct their own experiments with flubber.

Materials:

- 3/4 cups warm water
- 1 cup Elmer's Glue
- Food coloring (any color)
- 2 tsp. Borax
- 1/2 cup warm water
- A copy of the recipe
- Sandwich bags (1 per student)

Appendixes:

- Flubber recipe: Page 4

Time Considerations:

Preparations: 15-20 minutes

Lesson Time: 30-40 minutes

Introduction: 10 minutes

Activity 1: 5-10 minutes

Activity 2: 5-10 minutes

Conclusion: 10 minutes

Related Lesson Plans:

Yellow/Blue Switcheroo, Mentos Super Fountain, Eggs-plosion, H₂Olympics, Blood-Typing, Mystery Box



Next Generation Science Standards

2-PS1-1. Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.

Science And Engineering Practices (SEP):

Planning and Carrying out Investigations.

Disciplinary Core Ideas:

Structure and Properties of Matter

Background

Most people probably know the word “flubber” from the movie. Or they know simply that it is slippery-slimy goop. However, few people know what it takes to make flubber and all the amazing things that can be learned by making and playing with it.

Flubber is similar to slime in many ways, with just a variation on the recipe. The slight change in the amounts of water, Borax and glue makes a huge difference in the consistency of the final product. This lesson allows students to explore the difference between the ingredients and final product, as well as discover flubber’s unique properties.

Flubber is a special type of material called a polymer which means “many parts”. Polymers are large molecules consisting of many smaller molecules bonded together in

Crosscutting Concepts:
Patterns

Excellence in Environmental Education Guidelines

Strand 1—Questioning, Analysis and Interpretation Skills

- A) Learners are able to develop questions that help them learn about the environment and do simple investigations.

a repeating pattern. These smaller molecules are called monomers meaning “one part” and a polymer may be made of one type of monomer or many.

Common polymers include rubber, nylon, rayon, plastic wrap and PVC, in addition to a number of biological molecules. Depending on the type, number and arrangement of the monomers, the resulting polymer can have a variety of properties. Teflon, the non-stick coating on our pans, is a polymer as are most glues.

However, the important thing for the students to remember about this lesson is the scientific method. At this grade level the students will not have been exposed to very many steps of the scientific method, if any.

The scientific method is a process for experimentation that is used to explore observations and answer

questions. Scientists use the scientific method to search for cause and effect relationships in nature. Conclusions are reached through asking questions, formulating guesses, creating and performing experiments, and analyzing the results.

Just as it does for a professional scientist, the scientific method can help students to focus a project question, construct a hypothesis, and design, execute and evaluate an experiment (*Science Buddies*). Review the steps of the scientific method and be prepared to explain them to the students in a simplified way they will understand.

Preparation

Practice making flubber beforehand to ensure you know exactly how to do it.

Come up with questions that will help students understand the steps of the scientific method. (What do you do when you want to find out something? What would you use to perform an experiment?)

Introduction

Ask the students if any of them have done an experiment before. If they have, ask them what they did. Make sure the students realize the purpose of an experiment is to answer a question.

Tell the students that when doing an experiment, we become scientists and therefore must use the scientific method. Ask the students if they have ever heard of this before.

Either write the steps on the

board or simply tell the students.

1. Question: When scientists do experiments, they always begin with a question such as: I wonder if we can make flubber using these ingredients? What will the flubber feel like?

2. Hypothesis/Prediction: With students at this grade level it is better to use simpler words; a guess is something students will know and is less confusing than hypothesis. After asking the question scientists then try to guess the answer.

3. Research: Tell the students that randomly combining things from around the house is dangerous so scientists have to do some research by reading, looking on the internet or asking other scientists. Explain that you already did some research and brought the chemicals that should safely make flubber.

4. Experiment: Tell the students that this is generally the fun part. Scientists do the experiment by following the directions and they have fun! But they are always safe and careful. In a minute we'll do an experiment and finish up with the last step.

5. Results/ 6. Conclusion: For this grade level, it makes more sense to combine these two steps and call them the end. At the end of the experiment, scientists look at what happened. Did it work? Did it not work?

Doing the Activity

Activity 1: FLUBBER!

Show the recipe and ingredients to make flubber to the students.

Have the students make observations about the separate ingredients.

Now, ask the students what they think will happen when all the ingredients are mixed together. Write their guesses on the board. Tell the students that their guesses are what scientists call a hypothesis or prediction.

Remind the students that you started with a question, did some research to pick ingredients and made hypotheses so now it is time to experiment.

Begin to mix the ingredients, make sure to show the students what is happening in each step. Stir mixture one (3/4 cups warm



Flubber dyed different colors

water, 1 cup Elmer's Glue and food coloring) in one bowl. Stir mixture two (2 tsp. Borax and 1/2 cup warm water) in another bowl. Make sure both are mixed well. Pour mixture one into mixture two. There is no need to stir, just reach in and pull out some flubber (*Science Cafe*)!

Activity 2: More questions!

Tell the class that now everyone will get to be a scientist. Many of them probably have questions like what does it feel like? Will it run, squish, bounce, stick to stuff? Now is the time to test

these questions.

From the flubber you just made, tear off a piece for each student. Tell them to roll the flubber in a ball; what happens? The students can also make a pancake with their flubber.

When the students are exploring the flubber, make sure they are also predicting what will happen and then making observations. Ask them to describe what happened. After the students have explored the flubber, have them come back as a group and talk about what was done.

Conclusion

Ask the students about the different experiments they conducted. What did they predict would happen? What actually happened? What materials did they use? Were they surprised by the results?

Give each student a sandwich bag to take their flubber home in and continue experimenting! Observe the students' experiments and ask them to explain their method, predictions or conclusions.

Assessment

Ask each student to show the rest of the class their experiment

Sources

- MakingFriends.com. (2010). *Recipe for Flubber*. Retrieved Aug. 26, 2010, from http://www.makingfriends.com/r_flubber.htm
- Science Buddies. (2010). *Steps of the Scientific Method*. Retrieved Aug. 26, 2010, from http://www.sciencebuddies.org/science-fair-projects/project_scientific_method.shtml
- Science Cafe. (2008, Dec 22). *Make Your Own Flubber*. Retrieved Aug. 26, 2010, from <http://sciencecafe.org/content/2008/12/22/make-your-own-flubber/>

Images:

- Kidoozy.com (2009, Sept. 24). *Flubber7*. Retrieved Aug. 26, 2010, from <http://kidoozy.com/blog/?m=200909>

and explain what they are doing. The student will pose a question, make a prediction, explain what material they are using and show the results

Extensions

Ask the students to make flubber using different amounts of chosen ingredients. Have them make a hypothesis and conduct the experiment.

Vocabulary

Conclusion: a decision or realization based on available facts

Hypothesis: a temporary prediction that can be tested about how a scientific investigation or experiment will turn out

Materials: tools or apparatus for the performance of a given task

Polymer: a natural or synthetic compound made up of small, simple molecules linked together in long chains of repeating units

Results: the consequence of a particular action, operation or course; an outcome

Scientific Method: a system of advancing knowledge by formulating a question, collecting data about it through observation and experiment, and testing the hypothetical answer

Flubber Recipe

Materials:

Mixture 1:

- 3/4 cup warm water
- 1 cup Elmers Glue
- Food coloring

Mixture 2:

- 2 tsp. Borax
- 1/2 cup warm water

Here's how to make it:

Stir mixture one together in one bowl, mixture two in another bowl. Make sure both are mixed well. Pour mixture one into mixture two. No need to stir, just reach in and pull out glob of flubber! Work it for two or three minutes.