

original science bus lesson which lesson was adapted from Polymers

The students will create polymer bouncy balls by mixing together a specific set of ingredients. Each group will choose how much of each ingredient to use, record these amounts, and share the results with the class. We will find patterns and draw conclusions about the relationship between the ingredients and the properties of the resulting polymer.

Materials

Ingredients: borax, cornstarch, glue (Elmer's white or clear), warm water, food coloring

Equipment: electric kettle, measuring spoons, stirrers, plastic cups for mixing, rulers

Lecture

What is a polymer? A polymer is a large molecule made of small units linked together, like a chain.

Examples of polymers: rubber, nylon, plastics, cellulose (in paper), DNA

Polymers can have a variety of interesting properties. These properties depend upon the starting materials used to make the polymer.

Today you will make your own polymers. Record the amounts of each ingredient you use, and at the end of the lesson we will compare the polymers from each group and how they were made.

We will try to find how the amounts of each ingredient affect the properties of the polymer.

Lesson

The students will form as many groups as there are tutors, and within each group the students can pair up. Go over the entire procedure with the students and have each pair decide the amounts of each ingredient they will use. Get the warm water for them and make sure it is not painfully hot. When the ball is formed, have the students test and record its different properties. If there's time, you can make a second set of balls.

Observations you can make and then compare as you change the composition of the ball include the diameter of the finished ball, how sticky it is, how long it takes to solidify into a ball, and how high it bounces.

Adding more cornstarch will make a ball that stretches and bends. Using less borax will produce a 'goopier' type of ball. Add more glue for a slimier ball.

Adapted from <http://chemistry.about.com/od/demonstrationexperiments/ss/bounceball.htm>

Polymers

Name: _____

Circle the amount of each ingredient you use.

3 teaspoons = 1 tablespoon

1. Label one cup 'Borax' and the other cup 'Ball'.
2. Pour warm water and borax into 'Borax' cup and stir to dissolve. Add food coloring.

1 2 4 6 tablespoons warm water

1/2 1 2 3 teaspoons borax

1 2 4 6 drops food coloring

3. Pour glue into 'Ball' cup. Add in borax solution and cornstarch. **DO NOT STIR!**

1/2 1 2 3 tablespoons glue

1/4 1/2 1 1 1/2 teaspoons borax solution

1/2 1 2 2 tablespoons cornstarch

After 10-15 seconds, stir the mixture until it becomes firm, then take it out of the cup and mold into a ball with your hands. Time how long it takes to solidify.

Write down the properties of your polymer ball.

Time to solidify:

Diameter of ball:

Height of bounce when dropped from 12 inches:

Sliminess (1 not slimy at all – 10 extremely slimy):

Stickiness (1 not sticky at all – 10 extremely sticky):

Color intensity (1 almost colorless – 10 deeply colored):

Write any other observations and conclusions below: