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Educational Innovations Inc.®

Slime-Making Kit

SL-1

Materials Included

- 2 oz. mixing cup with lid
- Mixing stick
- Large 25 ml pipet containing 4% polyvinyl solution
- Small 5 ml pipet containing 4% sodium borate solution

Other Materials

- Scissors
- Food coloring (optional)
- Glow-in-the-Dark Pigment (optional)

Making Slime

1. With a pair of scissors, carefully cut the sealed tip off the stem of the large pipet containing the polyvinyl alcohol solution. Be careful not to squeeze the bulb of the pipet as you cut the tip.

2. Carefully squirt all of the polyvinyl alcohol solution into the mixing cup by gently squeezing the bulb. *Note:* It may take three or four squeezes of the pipet bulb to completely empty the pipet.

3. ***Optional:*** The polyvinyl alcohol may be dyed with one drop of food coloring (not included). Alternatively, Educational Innovations' Glow-in-the-Dark Pigment may be added to make glowing slime. To make glowing slime, simply add approximately ¼ teaspoon of glowing pigment to the polyvinyl alcohol solution. Mix well after adding any coloring or pigment and continue with the next step.

Use food coloring to make any color slime you like!

4. Use scissors to cut the sealed tip off the small pipet containing the sodium borate solution. Again, be careful not to squeeze the bulb of the pipet as you cut the tip.

5. While stirring with the included mixing stick, slowly add all the sodium borate solution to the polyvinyl alcohol solution in the mixing cup. Notice how the mixture thickens as the sodium borate solution is added. Continue until all the sodium borate has been combined. *Note:* It may take three or four squeezes of the pipet bulb to completely empty the pipet. Continue mixing for at least one full minute after all the sodium borate solution is combined.

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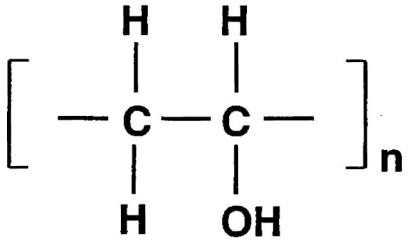
6. Your slime is finished! Pick it up in your fingers and feel your slime. Be sure to experiment with it. Notice that when you pull it apart it breaks, while if you let it sit on the table or in the mixing cup it flows like a liquid.

7. When you are finished experimenting, store your slime in the mixing cup and tightly cover the container with the included lid to keep your slime from drying out. Remember to wash your hands when you are finished.

8. Disposal. Both the empty pipets and the mixing stick may be disposed of in the trash. Your slime can be stored tightly covered in the mixing cup. As with any science experiment, your slime should not be consumed! Do not taste it or eat it, and do not leave it where a pet or young child might have access without supervision. If your slime should become smelly or moldy, throw it away. Slime will stick to some materials. To avoid a real mess, keep it away from fabrics, paper, and wooden furniture.

Explanation

Polyvinyl alcohol (PVOH) consists of a very long chain-like molecule called a polymer. The PVOH molecule is made up of repeating links called monomers. Each link in the PVOH chain looks like the following:



Poly(vinyl alcohol)

PVOH solution is viscous (thick) because all of these molecules stick to each other and to the water which surrounds them, just like a pot full of spaghetti.

When the sodium borate (borax) is added, the borax molecules form cross links between the PVOH polymers and connect many of the PVOH molecules together. The result is a new material which is even more viscous and has physical properties of both a solid and a liquid.

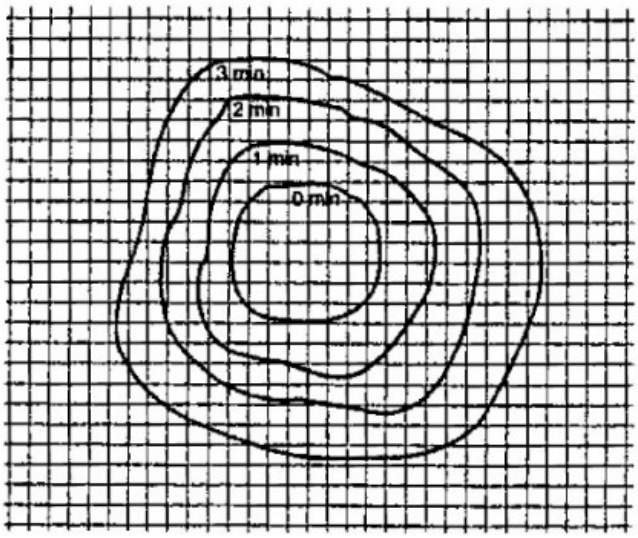
Because the bonds between the PVOH and the Borax consist of weak hydrogen bonds, the slime material is a visco-elastic gel and can flow like an extremely viscous liquid.

Slime Experiments

1. Place your slime onto a flat surface and observe that it flows like a liquid. Try stretching your slime into a very thin sheet by holding it in your fingers and carefully stretching it sideways as it flows down. Roll it, then pick it up and let it hang to make a very long slime snake.

2. Break your slime into two pieces and then hold the two pieces together. See how long it takes the two pieces to join together into one piece again.

3. Measure how fast your slime flows. Roll your slime into a ball and place it on a sheet of acetate. Use a marker to trace the shape of your slime onto the acetate. Trace it every minute or so and notice how it continues to flow outward... don't forget to mark each trace with the time. After a few minutes, remove your slime and place your acetate over a piece of graph paper. Calculate the area of each contour by counting the number of boxes within each tracing. Graph the area of each trace verses time to get a graph of the flow rate. Try taping the acetate to an inclined book or board to speed up the flow of the slime.



4. Try letting your slime dry out! Stretch your slime into a flat sheet and place it on a piece of plastic wrap. Let it dry for a couple of days, observing how it changes as the water it contains evaporates. Polyvinyl alcohol is a plastic, and as it dries it becomes hard and brittle.

5. Try to rehydrate your slime. After letting your slime completely dry out, add a tablespoon of water, and let it sit overnight. Notice once again how your slime changes.

NGSS Correlations

Our Slime Making Kit and these lesson ideas will support your students' understanding of these Next Generation Science Standards (NGSS):

Elementary

2-PS1-1
Students can use the Slime Making Kit to plan and conduct investigations to describe and classify kinds of materials by their observable properties.

5-PS1-3
Students can use the Slime Making Kit to make observations and measurements to identify materials based on their properties.

Middle School

MS-PS1-2
Students can use the Slime Making Kit to analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.

MS-PS1-5
Students can use the Slime Making Kit as a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.

High School

HS-PS1-7
Students can use the Slime Making Kit to construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table and knowledge of the patterns of chemical properties.

HS-PS1-4
Students can use the Slime Making Kit to develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in the total bond energy.

HS-PS1-7
Students can use the Slime Making Kit and then take it to a mathematical lesson to support the claim that atoms and mass are conserved during the chemical reaction.

Take Your Lesson Further

As science teachers ourselves, we know how much effort goes into preparing lessons. For us, "*Teachers Serving Teachers*" isn't just a slogan—it's our promise to you!

Please visit our website for more lesson ideas:

TeacherSource.com/lessons

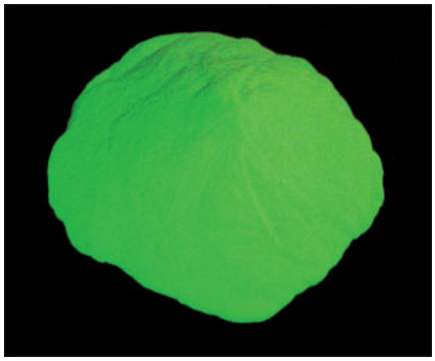
Check our blog for classroom-tested teaching plans on dozens of topics:

http://blog.TeacherSource.com

To extend your lesson, consider these Educational Innovations products:

Polyvinyl Alcohol Bags (SM-8A)
These polyvinyl alcohol bags can be dissolved in hot water to make a polyvinyl alcohol solution. When combined with a borax solution, the polyvinyl alcohol polymer is cross-linked to form a fluid more commonly called SLIME! Simply dissolve one in about 2 cups of hot water to make the 4% polyvinyl alcohol solution necessary for slime.

Glow-in-the-Dark Pigment (GLO-100A)
This terrific pigment is used to make paint and other products glow in the dark. To make a super glowing paint, simply mix this non-toxic powder with Elmer's glue. The pigment can be activated by just about any light source including sunlight, fluorescent, incandescent, and ultraviolet light. Use our colored light sticks to demonstrate the pigment's greater sensitivity to blue light.



Color Splash Tablets (CSP-700/705/710/715)
Finally a STAIN-FREE alternative to food coloring! The tablets are available in the primary colors of blue, red, and yellow. From these colors, your students can create more than two dozen different colors. Each tablet contains a small amount of baking soda to help in the dissolving process.