

PVA Slime

Student Worksheet

Name _____

Overview If you've ever dreamed of making Dr. Seuss's oobleck, seen the movie "Flubber," or just love goop, this experiment is the one for you!

What to Learn After today's experiment, you will understand how atoms, molecules, and polymers work. You'll also see the wonderful result of adding a cross-linking agent to a polymer called polyvinyl alcohol, or PVA.

Materials

- polyvinyl alcohol (PVA) ([MSDS](#))
- distilled water
- ½ teaspoon Borax (sodium tetraborate) ([MSDS](#))
- disposable cups
- popsicle sticks
- food coloring (optional)

Lab Time

1. Put a few tablespoons of water into a cup (it does not need to be an exact measure).
2. Add ½ teaspoon sodium tetraborate (Borax) and stir. The solution will become cloudy and bits of undissolved sodium tetraborate may sink to the bottom. This is ok. You will only need the cloudy solution.
3. Measure 1 tablespoon liquid polyvinyl alcohol (PVA) into a second cup. If your PVA came as a solid, a few of the solid bits must first be dissolved in HOT water. If the PVA does not easily dissolve, it may need to sit overnight.
4. Add a few drops of food coloring if desired and stir with a popsicle stick.
5. Slowly pour ½ teaspoon Borax solution into the PVA. Only do a little at a time, and observe the reaction.
6. Play with your slime. Pull it slowly. Pull it quickly. See what it can do!

PVA Slime Data Table

Experiment with adding different concentrations of PVA (the polymer) and Borax (the cross-linking agent), and record your results. Determine another combination of PVA/Borax you could try and record your results in the boxes below.

PVA Solution	Borax solution	Observations
1 Tablespoon PVA + 1 Tablespoons water	$\frac{1}{2}$ teaspoon Borax + 2 Tablespoons water	
1 Tablespoon PVA + 1 Tablespoons water	1 teaspoon Borax + 2 Tablespoons water	
2 Tablespoons PVA + 1 Tablespoon water	$\frac{1}{2}$ teaspoon Borax + 2 Tablespoons water	

Exercises Answer the questions below:

1. What did the sodium tetraborate do to the long chains of PVA molecules?
2. What is one fun fact you learned about atoms today?
3. What is the difference between molecules and polymers?
4. Viscosity is the resistance of a liquid to flow, or its "thickness." Water has low viscosity, while honey has a higher viscosity. What did you notice about the viscosity of your slime?

Exercises

1. What did the sodium tetraborate do to the long chains of PVA molecules? (It acted as a cross-linking agent. It caused the long chains of PVA molecules to clump together in a fish-net design, forming the slime.)
2. What is one fun fact you learned about atoms today? (answers will vary.)
3. What is the difference between molecules and polymers? (Molecules are groups of atoms, while polymers are long chains of molecules all stuck together.)
4. Viscosity is the resistance of a liquid to flow, or its "thickness." Water has low viscosity, while honey has a higher viscosity. What did you notice about the viscosity of your slime? (The viscosity changes. If you stir it gently, it acts like a liquid. If you pull it quickly, it breaks in half.)

Closure Before moving on, ask your students if they have any recommendations or unanswered questions that they can work out on their own. Brainstorming extension ideas is a great way to add more science studies to your class time.