



Gooney Gak

Learn about Complex Fluids

INTRO

In this activity, students experiment with another type of non-Newtonian fluid called Gak. Complex fluids are special kinds of mixtures that have characteristics of more than one phase of matter. These types of fluids that don't behave like what we think of as "normal" fluids are called non-Newtonian fluids. Students also will define polymers and compare and contrast the properties of a linear polymer (glue) and the properties of a cross-linked polymer (Gak).

SUPPLIES

- Borax Powder
- Water
- White Glue
- Food Coloring (Optional)
- Cups
- Spoons

VOCAB

- Molecule
- Non-Newtonian Fluid
- Polymer
- Linear Polymer
- Cross-linked Polymer

INSTRUCTIONS

1. Have each student make a saturated Borax solution by stirring one tablespoon of Borax powder into one cup of water. Explain to students that a solution is saturated when the substance that they are mixing in no longer dissolves. Students should continue to add Borax powder until it no longer dissolves in the water. Set the solution aside.
2. Have students pour one teaspoon of glue in a separate cup. Ask students to describe the characteristics of the glue. Was the glue easy to pour? Explain to students that glue is a type of polymer consisting of long chains of repeating molecules. Ask students to predict what will happen if they add water into the glue. Have students add one teaspoon of water and a drop of food coloring (optional). How does the mixture feel when they stir it?
3. Ask students to predict what will happen if they combine the glue/water mixture with the saturated Borax solution. Have students stir one teaspoon of the saturated Borax solution into the glue/water mixture. How did the mixture change? Have students touch the mixture and describe what it feels like. If the mixture feels sticky, try adding a little more Borax solution. If the mixture feels very wet and slippery (and no longer runny), remove it from the cup and knead it until it is a stretchy, gooey substance. If the mixture is stringy and not malleable, try adding a little more glue.
4. Have students perform various actions on the Gak (bounce it, tear it, squeeze it, hold it gently, etc.) and record their observations. Does the Gak have the characteristics of a solid or a liquid?

DISCUSS

- What will happen to the Gak if you leave it exposed to air for a few days?
- What are the processes that led to its physical change?
- Can the Gak be restored to its original state?