



Slimy Polymers

Concept: Physical properties of slimy polymers

National Science Standards:

A	B	C	D	E	F	G

Objective: Students will observe, measure, classify, and collect data as they investigate the introduction of cross linking and additives in polymers.

Suggested grade levels: K-8

Estimated time:

- Four days of activities:
 - Teacher prep: 20 min. per day
 - Activity: 30 min. per day

Materials needed:

- teacher-constructed chart for comparing physical properties of polymers
- Elmer's glue
- coloring
- Pyrex Sta-flo™ liquid starch
- 4% borax solution (40g powdered borax per 1000 mL water)
- crushed chalk or Plaster of Paris™
- talcum powder
- oil-free moisturizing lotion
- polyvinyl alcohol solution (purchased from Flinn)
- guar gum (purchased from Flinn)
- Ziploc™ baggies
- stirring sticks
- paper cups
- water
- GOGGLES

Safety/Disposal: Wear goggles during recipe constructions.

Discard glue putty in a sealed plastic bag in the waste can.
Discard crushed chalk/Plaster of Paris™ putty in a sealed plastic bag in the garbage.
Slime can be discarded in sealed plastic bags or allowed to evaporate over several days in an open disposable container.

Procedure:

Guar Gum Slime

1. Measure 80 mL warm tap water and pour into a paper cup.
2. Using a stir stick, add 0.75g guar gum.
3. Mix until gum dissolves and observe. (Optional food coloring may be added.)
4. Add 30 mL of 4% borax solution.
5. Once this gels, remove from the cup and knead in your hands.
6. Store in a Ziploc™ plastic baggie.

Polyvinyl Alcohol Slime

1. Put 30mL of 4% polyvinyl alcohol solution in a paper cup. (Optional food coloring may be added.)
2. To this solution, add 3 mL of 4% borax solution and stir constantly.
3. Once this gels, remove from the cup and knead in your hands.
4. Store in Ziploc™ baggie.

Glue Polymer

1. Place 30 mL white glue in a paper cup. (Optional food coloring may be added.)
2. Add 30 mL Pyrex Sta-flo™ starch and stir. The polymer will thicken on the stirring stick. Remove putty from cup and form into a ball under running water.
3. Store in a Ziploc™ baggie.

Borax-glue putty

1. Use 30 mL of 50/50 glue/water mixture. (Optional food coloring may be added.)
2. Stir in 10 mL of 4% borax solution until mass of glue putty forms on stick.
3. Form into ball under running water.
4. Store in Ziploc™ baggie.

POSSIBLE ADDITIVES: 5 mL talcum powder, crushed chalk or Plaster of Paris™, or 10 mL oil-free lotion and 5 mL talcum powder

Experiment with the optional additives by adding them to the above procedures. Record your results.

Remember to save your slimes and the data chart from this activity if you plan to do the next activity in this book (“The Gym Shoe Corporation”).

Wrap-up:

- Expected results: Differences will be found in the various polymers.
- Discussion questions:
 - How does the additive change the polymer?
 - What could your slime be used for?

Why would it be important to change the property of a polymer?

Resources: Sarquis, Mickey, ed. Chain Gang- The Chemistry of Polymers. Miami University, Middletown, OH: Terrific Science Press, 1995.