



Playing with Polymers

8th Grade Science
Mrs. Tracy Trimpe
Havana Junior High School

Polymer Word List

- Addition
- Amino Acids
- Bakelite
- Cellulose
- Chemical Reactions
- Chitin
- Complex Carbohydrates
- Condensation
- DNA
- Keratin
- Monomer
- Natural
- Nucleic Acids
- Nylon
- Petrochemicals
- Petroleum
- Plastic
- Polymer
- Proteins
- Silly Putty
- Styrofoam
- Synthetic

Polymerization ← Chemical reactions
↔ addition
↔ condensation

Polymers → Monomers
many parts one

→ Petrochemicals
→ Petroleum

Natural

Synthetic
(man-made)
→ Bakelite (1907)
→ Silly Putty
→ Plastic & styrofoam
→ Nylons or polyester

→ Cotton, wool, silk
Complex carbs → Sugars
→ DNA/RNA - nucleic acids
(nucleotides)
→ Proteins
→ Amino acids
20
→ Cellulose
→ Keratin
→ Chitin

Safety Rules

- (1) Read **directions** carefully! Ask for help if needed and do not make up your own **recipes**!
- (2) **Goggles** and **aprons** should always be worn when experimenting with chemicals.
- (3) Do not **smell** directly from the container!
WAFT - If you need to sniff a slime, hold it several inches away from your face and use your hand to wave fumes towards your nose.
- (4) No **eating** or **drinking** during the lab. This also means that you should NOT eat the slime or **taste** any substances used to make slime!
- (5) Do not put the slime where it doesn't belong, such as on **clothing**, carpeting, or other people!
Keep your slime out of reach of small **children** and **pets**.
- (6) **Dispose** of slime materials properly. All slime must be **thrown** away in the trash can. Use a dry towel to clean your hands, cup, and plate. DO NOT put any amount of slime in the **sink**!
- (7) Clean up **messes** immediately as well as at the **end** of class!

Safety Rules – Cont'd

(8) **Wash** your hands before you leave class.

(9) **Behave!** No hitting, shoving, or other horseplay is allowed!

(10) Slime must remain in the **classroom** until the end of the day on _____.

(11) Most of the slime will keep for **3-4** days. After your slime goes bad, throw it away! Do not dump in a sink!

(12) If you do not follow the **rules**, you will **not** be allowed to do the experiments and will **lose** any slime you have already made and will earn a zero grade for this activity!

To show that you agree to follow these safety rules, sign your name in the box on your note worksheet. If you do not agree, let me know and I'll provide the alternate assignment for you for the rest of the week.

NOTE: You will receive a grade for this activity and will need to show the completed data chart to the teacher on quiz day!

Oobleck

Work with your tablemates!
Each table will make a batch!

This is a mixture made from **corn starch** and **water**. Corn starch is a **natural polymer** made from corn used to thicken gravies and soups. It is also used in some types of baby powder. The plastic bin on your table and the other plastic materials we will use are **synthetic** (man-made) **polymers**.

Remember to fill in the chart on your notes →

2. Use this chart to keep track of the ingredients used to make each type of slime.

Slime	Ingredients	Slime	Ingredients
Oobleck		Boogers	
<u>Gloop</u>		Super Slime	
Boogers		New Goo	

Gloop

Each person will make a batch!

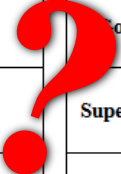
*This is a polymer made from **white glue** and **sodium tetraborate**.*

White glue is made with polyvinyl alcohol, or PVA, which is a plastic made from oil. Borax is a natural mineral mined from the earth, which is made of boron, sodium, oxygen, and water. It is used as a laundry agent and cleaning product.

When you add water to glue, the PVA starts to dissolve in the water. When you add the borax solution, it reacts with the PVA to crosslink. This crosslinking causes the gunk to undergo an irreversible gel-like reaction and forms the substance we call Gloop.

2. Use this chart to keep track of the ingredients used to make each type of slime.

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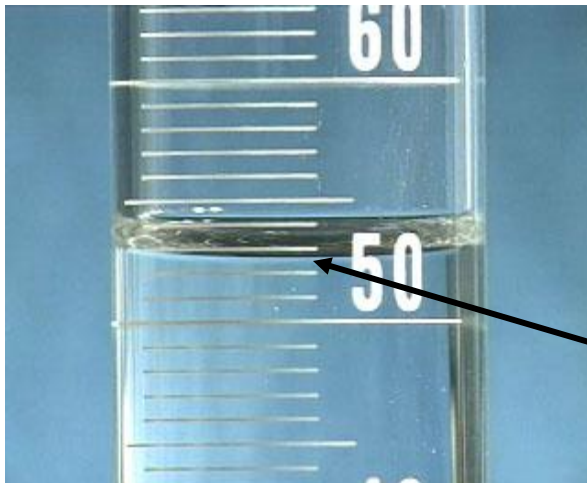
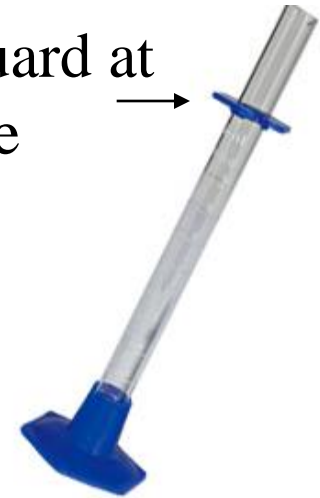


Measuring Volume

Graduated Cylinders

- Instrument used to measure volume
- Marked with a scale in milliliters
- Be sure to check the scale for each cylinder!

Leave the guard at the top of the cylinder!



Meniscus – “Bubble” that forms at the top of the liquid in a graduated cylinder.

Measure from the **BOTTOM** of the meniscus.

Boogers

You will make ONE batch and share it with your partner!

This is a polymer made from white glue and laundry starch.

Laundry starch is a polymer in water, but becomes rigid when it dries. It is used to help fabric resist wrinkling.

This one can be very messy!

1 - Don't dump it out of the cup until you have a good blob that doesn't stick to everything!

2 - Don't allow it to get too stringy when doing the slime tests!

2. Use this chart to keep track of the ingredients used to make each type of slime.

Slime	Ingredients	Slime	Ingredients
Oobleck		Boogers	
<u>Gloop</u>		Super Slime	
Boogers		New Goo	



Don't forget your goggles & an apron!

Goobers

This is a polymer made from guar gum and sodium tetraborate.

Guar gum is used as a thickening agent in many foods and other substances, such as toothpaste, yogurt, and gravies or sauces.

WARNING: This one takes the longest to make and can be quite a mess!

1 - Make sure to keep it on a plate or in your hands!

2 – Give it some time to set up!

3 – You may have to let it sit overnight to “gel” before doing your tests.

2. Use this chart to keep track of the ingredients used to make each type of slime.

Slime	Ingredients	Slime	Ingredients
Oobleck		Goobers	
<u>Gloop</u>		Super Slime	
Boogers		New Goo	

Super Slime

Each person can make ONE batch!

*This is a polymer made from **PVA** (polyvinyl alcohol) solution and **sodium tetraborate** (Borax).*

PVA is used to make artificial sponges, hoses, printing inks, and lubricating solutions for contact lenses. It is also found in glue! We have used the sodium tetraborate for other slimes.

Mix up a batch of Super Slime and see what happens!

2. Use this chart to keep track of the ingredients used to make each type of slime.

Slime	Ingredients	Slime	Ingredients
Oobleck		Boobers	
<u>Gloop</u>		Super Slime	
Boogers		New Goo	



**Don't forget your goggles
& an apron!**

New Goo

Each person can make ONE batch!

*This is a polymer made from **white glue** (with the PVA in it) solution and **Tide laundry detergent**, which contains borax).*

PVA is used to make artificial sponges, hoses, printing inks, and lubricating solutions for contact lenses. The laundry detergent contains borax, which is the same thing used in the borax solution.

Mix up a batch of New Goo and see what happens!

2. Use this chart to keep track of the ingredients used to make each type of slime.

Slime	Ingredients	Slime	Ingredients
Oobleck		Boogers	
<u>Gloop</u>		Super Slime	
Boogers		New Goo	



**Don't forget your goggles
& an apron!**

Test	New Goo
Physical Characteristics Describe its color, texture, odor, and other observations you notice.	
Slime Rating Rate your slime from 1 = not very slimy to 5 = very slimy	
Slow Poke Slowly poke your finger into the slime. What happens?	
Quick Poke Quickly poke your finger into the slime. What happens?	
Slow Pull Slowly pull on the ends of a piece of the slime. What happens?	
Quick Pull Quickly pull on the ends of a piece of the slime. What happens?	
Blob Factor Roll your slime into a ball and let it sit for a minute. What happens?	
Hang Time How long does it take for the slime to reach the table from the top of a ruler?	
Bounceability Roll into a ball and drop it on the table. Rate the bounce – 1 – poor to 5 -great!	

Do your slime tests with the New Goo.

NOTE: If a test doesn't work, write what happened in the box in the chart. Don't leave it blank!

Split your New Goo in half and put into small plastic bags. Use a marker to label your bag of slime.

Put your New Goo in with all your other slimes in a baggie and place in the basket on the back counter.

NOTE: Use a “snack” baggie to keep all your smaller bags together. They are next to the goggle cabinet.

***Do Hour of Code or Santa Tracker
(Do a Google search for it to find the “village”!)***