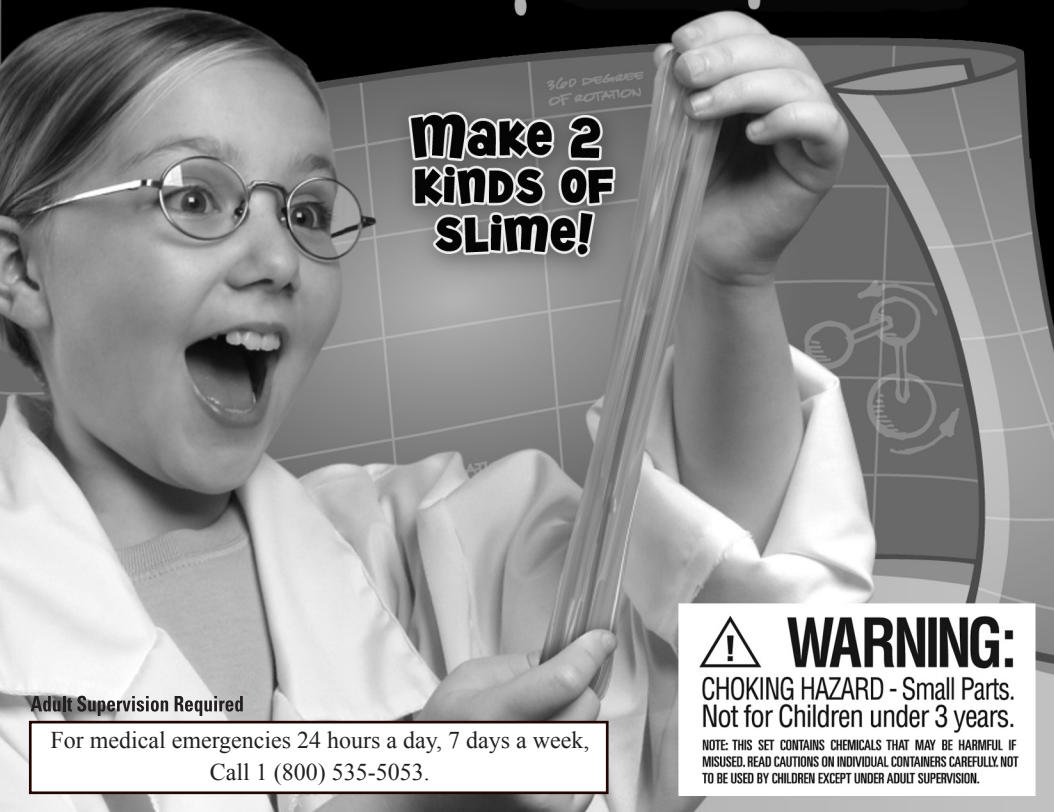




# POWER PUTTY SLIMES™

8+



360 DEGREES  
OF ROTATION

**Make 2  
KINDS OF  
SLIME!**

Adult Supervision Required

For medical emergencies 24 hours a day, 7 days a week,  
Call 1 (800) 535-5053.



**WARNING:**

**CHOKING HAZARD - Small Parts.  
Not for Children under 3 years.**

NOTE: THIS SET CONTAINS CHEMICALS THAT MAY BE HARMFUL IF MISUSED. READ CAUTIONS ON INDIVIDUAL CONTAINERS CAREFULLY. NOT TO BE USED BY CHILDREN EXCEPT UNDER ADULT SUPERVISION.

# What is in your kit?

1 measuring spoon (1 tablespoon and 1/4 teaspoon)

Borax (sodium tetraborate)

Liquid starch

White glue



# Welcome to the lab!

Congratulations! You are about to create things...Slimy things. Things that ooze in the night. Things you wouldn't want to meet in a dark sewer. But you won't be making these slimy things with a hammer and nails. You will be creating with chemistry-using science to make changes in substances, sometimes very big changes!

With this great power comes responsibility. The chemicals you will use and make are safe, but you must use care and common sense in handling them. Two rules stand out above all:

- Keep your chemicals and slimes out of the reach of young children!
- Keep your chemicals and slimes away from cloth or furniture - they may stain! Also, don't pour chemicals or slimes down drains - they may clog.

# Here are some other rules to follow to keep your slime science fun and safe:

- Set up your laboratory where you will have a clear surface to work.
- Lay out newspaper to make cleaning up spills easier.
- Keep your projects away from food.
- Label your chemicals clearly so they won't be mistaken for something else.
- Wash your hands and any tools you've used (like spoons, cups, or bowls) thoroughly with warm, soapy water.
- Put all of your chemicals and tools away when you have finished using them.

# Getting Started

What do you think of when you think of slime? You might think of classic horror movie slime. Imagine how it feels-moist and sticky. Pick it up, and it slowly oozes out through your fingers. These facts-how it feels and how it moves-are a few of the properties of the slime. With this kit, you will be able to make two different slimes, each with special properties that you will find useful and fun. You may wish to keep a Lab Notebook handy to keep track of the special properties of each slime and the effects of a change in their recipes.

When you are done with each slime, seal it in a reclosable bag. Label the bag and store it in the refrigerator. Each slime will keep for a different period of time. Most will last for at least a few days before becoming moldy or unusable. That's another property you might want to keep track of!

# Wiggly Wonder

The two main ingredients in this slime are glue and borax. When these simple ingredients combine they form a slime that almost seems to have a life of its own!

***You need from your kit:***

white glue, borax and measuring spoon

***You need from home:***

cold water, reclosable bag, mixing bowls, stirrer and green food color (optional)

1. Measure 6 **tablespoons** of water into a mixing bowl. Stir in 1 **teaspoon** of borax and mix thoroughly.\*
2. Measure 1 **tablespoon** of glue into a second mixing bowl. Try to scrape as much of the glue as possible off the spoon and into the bowl!
3. Add 1 **tablespoon** of water to the glue. Stir well.

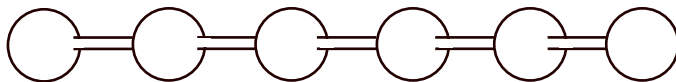
What have you made? What happens as you hold the Wiggly Wonder? Try rolling it into a ball and holding it in your hand. How long will it keep its shape? Bounce or jiggle it from hand to hand. Does it feel a little like a water balloon-jiggling even after you stop moving it? Stretch it slowly. What happens? Now pull it quickly. Lay it on a piece of newspaper for a moment. What happens when you pick it up? The slightest motion sends the whole thing shaking. Wiggly Wonder still isn't solid, though. Leave it alone for a few minutes-it will flow and puddle.

*\* a tiny drop of green food color (optional) will make your slime even creepier.*

# Polymers on Parade

So what exactly is slime? Well, scientists call what slime is made of polymers-which is Greek for “many parts”. A polymer is a big group of smaller parts, called molecules, all hooked together like a chain of paper clips, or a bicycle chain. Lots and lots of the things you see around you are polymers, including plastics, rubber, and spider silk! Even wood is a combination of polymers with different properties.

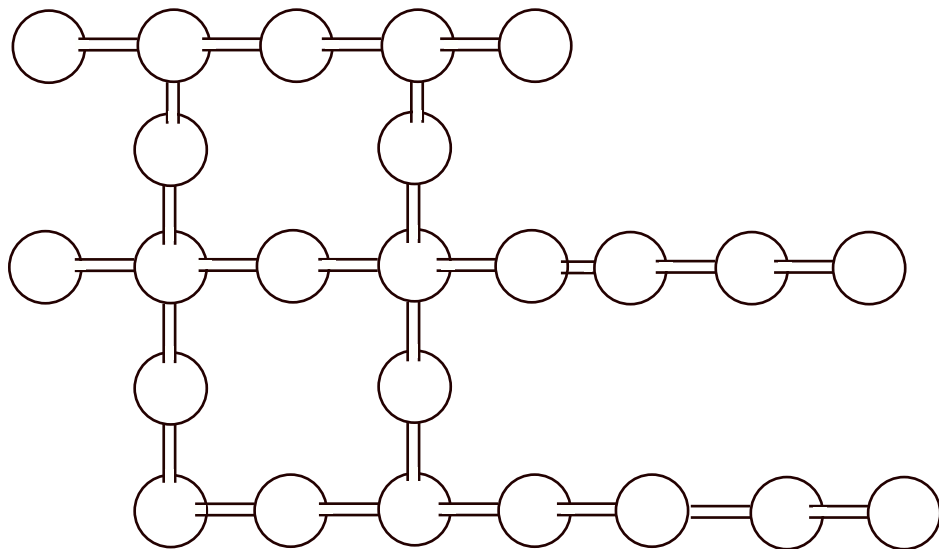
One polymer, by itself, looks kind of like Figure 1-a long chain. Plain white glue contains a polymer called polyvinyl acetate. All of those long chains of polyvinyl acetate are tangles up together like a big plate of spaghetti!



*Fig. 1*



What about the borax? Its job is to take individual chains of polyvinyl acetate and hook them together. Scientists call this cross-linking. But you don't get one really long chain, you get a net of connected chains, like Figure 2. The more borax you add, the more connected the chains of polyvinyl acetate become, and the thicker the slime becomes!



*Fig. 2*

# A Polymer Demonstration

*You need from home:*  
a sheet of newspaper

1. Open up your sheet of newspaper. Tear partway down the page. Does the paper rip straight down between your hands or does it pull to the left or right?
2. Turn the paper sideways. That is, if the top of the sheet had been pointing to 12 o'clock, turn it so the top points either to 3 or 9 o'clock. Hold and rip the page again. Does the paper rip straight down or pull to one side?



*Fig. 3*

What happened? Most of the time you should get a clean, straight tear one way, but a jagged tear the other. Why does this happen? Newspaper is made from a polymer called cellulose. When it is made, it is rolled out and pressed. That forces all the polymer chains to line up in the same direction. If you tear the sheet one way, you are ripping across many chains. That makes it very hard to get a straight tear. If you tear the other way, you are ripping between chains, making a straight tear much easier!



*Fig. 4*

# Power Putty

Scientists often experiment with the recipes for the things they make. Small changes can affect the final product quite a bit. If the first attempt doesn't have quite the properties they are looking for, they change the recipe. Let's make a change to Wiggly Wonder and see what happens. All we need to do is use liquid starch instead of the plain borax and water mixture.

***You need from your kit:***

white glue, liquid starch and measuring spoons

***You need from home:***

cold water, reclosable bag, mixing bowls, stirrer and green food coloring (optional)

1. Mix 1 tablespoon of liquid starch with 1/2 tablespoon water in a mixing bowl\*
2. Add 1 tablespoon of white glue to the starch and water mixture. Try to scrape all the glue off the spoon. Mix well for about one minute.

3. Add another tablespoon of white glue to the mixture. Mix well for another minute.

4. Let stand for several minutes to thicken. Don't worry if it is very sticky at first. You may need to squeeze and roll the Power Putty around for a few minutes to dry it off.

Compare the Power Putty to the Wiggly Wonder. Do they look the same? Do they feel the same? Roll each one in a ball shape and hold one in each hand-what happens? Stretch out the Power Putty, slowly, then try pulling it quickly. Bounce it from hand to hand. Does it jiggle the way Wiggly Wonder does? Lay it on a sheet of newspaper. Does it pick up the ink?

*\* a tiny drop of green food color (optional) will make your slime even creepier.*

# New Slimes

You should have enough guar gum, and corn starch left to do additional experiments. Based on what you now know, you should be able to make educated guesses about the effects of changing the recipes. What do you think will happen if you:

- Add more (or less) water to the mixture?
- Add more (or less) borax to the borax solution?
- Add more (or less) liquid starch?

Work like a real scientist. Write down your educated guesses about the results, and why you think things should happen that way. This is called a hypothesis. Then do an experiment to test your hypothesis. Follow your new formula and compare the results to your guess. If you guessed wrong, can you figure out what happened?

For example, let's say you think that adding 1/4 tablespoon of liquid starch to Power Putty should it less bouncy. Write down that hypothesis. Then, mix up a new batch of Power Putty, changing the amount of liquid starch. Compare your original sample to the new batch. Hold them from the same height and let go. Which one bounces higher?

# Lab Notes



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