

# Ames Public Library @HOME Activities

## Slime!

Slime! What is it, other than a fun craze that has resulted in the occasional shortage of school glue and is the feature of many Internet videos? Slime isn't a solid; you can't hold it in your hand without the slime losing its shape. It's not really a liquid like water, either, because you can hold even the ooziest slime in your hand without a container. So what is this gelatinous, mucus-y substance, really? Scientists call it non-Newtonian, a term named after—you guessed it—the famous scientist Isaac Newton.

### Books and Media:

Title	Author / Performer	Call Number:
<i>Mason Jar Science: 40 Slimy, Squishy, Super-cool Experiments</i>	Adolph, Jonathan	J 507.8 ADO
<i>Karina Garcia's DIY Slime</i>	Garcia, Karina	J 620.112 GAR
<i>The Slime Book</i>	Dorling Kindersley, Inc.	J 745.5028 SLI

### Websites:

URL	Notes
<a href="https://www.scientificamerican.com/article/slime-is-it-a-solid-liquid-or-both/">https://www.scientificamerican.com/article/slime-is-it-a-solid-liquid-or-both/</a>	<i>Scientific American</i> article "Slime: Is It a Solid, Liquid-- or Both"
<a href="https://www.nytimes.com/2019/06/28/arts/slime-asmr-thwock-satisfying.html">https://www.nytimes.com/2019/06/28/arts/slime-asmr-thwock-satisfying.html</a>	<i>New York Times</i> article "It's Slime. And It's Satisfying." (Note: anyone with an Ames Public Library account can access the <i>New York Times</i> for free via amespl.org.)

## Vocabulary

Atoms—The smallest units of matter.

Chemical reaction—When substances undergo a change to form new substances.

Matter—Any substance that has mass and takes up space.

Molecules—Two or more atoms bonded together.

Non-Newtonian fluids—Fluids whose ability to flow changes depending on the forces applied to them.

Polymers—Large molecules made up of repeating units.

(Vocabulary taken from *Amazing Makerspace: Slippery Slime* by Cody Crane (J 745.5028 CRA))



## So what is a non-Newtonian fluid?

Matter usually comes in one of three forms: solid, liquid, or gas. As mentioned earlier, slime isn't a true solid or liquid (and it's certainly not a gas!) but is instead known as a non-Newtonian fluid. This means that slime is a form of matter that's affected by the force that's applied to it. If you use your hands, you can shape slime into a solid form, like a ball. But if you let slime sit in your hand without applying any force to it, then what? The particles in slime flow more like a liquid. Non-Newtonian fluids can be affected by all kinds of forces, including squeezing and stirring.

## Why do such a random assortment of ingredients combine to form slime?

You can buy the ingredients for most kinds of slime in just about any grocery store. But how do they all combine to form this non-Newtonian fluid? Slime is the result of a chemical reaction.

The glue in slime is a liquid made up of long strands of molecules called polymers. These polymers slide over each other when you pour glue out of a bottle. Adding baking soda and saline solution (which contains borax) to the glue makes those polymers cross-link or create bonds between large molecules to make even larger molecules that don't slide over one another very well. These large molecules all tangle together. That tangle = slime!



## Slime take-away kit

*The kit contains*

- 1 tbsp. contact lens solution
- 4 oz. white school glue
- ½ tsp baking soda
- Food coloring

1. Find a bowl to mix your slime in.
2. Pour the entire bottle of glue into the bowl.
3. Add the baking soda and mix.
4. After mixing, add your food coloring. Add more food coloring until you get the color you want.
5. Add the contact lens solution. Mix until slime forms and begin kneading with your hands.
6. If needed, add an extra ¼ tbsp of contact lens solution to make your slime less sticky.

Optional: To keep your slime soft, store it in an airtight container or Ziploc bag.

*Slime recipe from <https://abcnews.go.com/Lifestyle/parenting-hack-make-homemade-slime-kids/story?id=46595844>*

## Slime: Solid or Liquid?!

- Squeeze your slime into an oval and use both hands to pull it apart quickly. Does it tear or elongate?
- Do it again but more slowly! Does it tear or elongate? How thin can you get it?
- Work your slime with your hands to form a ball. Try to poke your finger into it forcefully. How deep does your finger go? Does it feel like you poked your finger into something solid or something liquid?
- Squeeze your slime into a ball again and put it in a container. What do you think will happen if you leave it there for a while? Will it stay in a ball shape like a solid would? Or will it relax into a puddle and take the form of the container like a liquid would?

## It's Neither!

As we learned, slime isn't truly a solid or liquid. It's non-Newtonian, which is why it's affected in different ways depending on which force is applied to it (your hand vs a container). For more information on slime, check out the resources above!

