

Slime vs. Asphalt

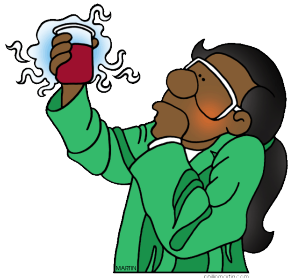
It might seem like a stretch (get it—*stretch*) of the imagination—but **slime** and **PMAC** (Polymer-Modified Asphalt Cement) both use a process called crosslinking to produce a super stretchy material.



Slime

Asphalt

Slime is a thick, jelly-like substance that is so much fun to make and to play with!



Elmer's glue contains a **polymer** called PVA (Polyvinyl Acetate). Using glue in slime helps make the slime stretchy and strong. The glue thickens

the slime so it holds together better.

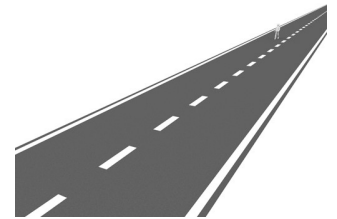
Boron **ions** in the activator (saline solution, borax, etc., anything that contains Boric Acid) **crosslink** with the PVA **molecules** to make a stretchy, web-like material.

Adding other things like glitter, lotion, food coloring, and glow-in-the-dark pigment, can change the texture and stretchiness of the slime.

We can customize our own slime for the characteristics we want. It may take some time to get the right formula, but trying different things will always help us learn!

Asphalt Cement is a base material used for paving roads. It has viscoelastic properties.

Polymer can be added to Asphalt Cement to increase its elasticity and strength. It also makes the Asphalt Cement thicker which helps it hold on to the rocks better when making a road.



Crosslinking with Polymer gives us a strong asphalt with lots of stretch which helps prevent the roads from cracking or rutting—no one likes a bumpy road!

We can add other substances to the mixture to achieve desired characteristics, such as making it softer, harder, or even different colors!

The design of a road may call for a different type of formula than a previous road. Using Math, Science, and Engineering, we can design a road to fit certain needs.

The Science of Slime

Slime Safety:

- * Slime can be made from many different ingredients—glue, borax, saline solution, laundry detergent, etc.
- * Be aware of any allergies that you may have. If you are allergic to any ingredients, do not play with the slime!
- * Never put slime or any of the ingredients into your mouth! If you get the ingredients in your eyes, ask an adult to help you rinse them with cool water for 15 minutes. Seek medical attention if the irritation continues.

Always ask for permission from your parent or guardian before attempting to make slime!

Vocabulary

Slime—Thick, jelly-like substance. Fun to play with.



Asphalt Cement—Material used for paving roads. Usually black or brown in color. Obtained from petroleum distillation.

PMAC—Polymer-Modified Asphalt Cement.

Crosslink—A chemical bond between molecules.

Polymer—A substance that has a large number of similar molecules bonded together.

Molecule—Group of atoms bonded together.

Ion—An atom with a positive or negative charge.

KaCela Slime

- 1-1/2 cups Elmer's Glue
- 1/4 cup water
- 1 teaspoon baking soda
- 1-1/2 tablespoons saline solution

Additives

- Food coloring—add as much or as little as you want!
- 1 tablespoon thin lotion
- 2 tablespoons glitter

Tip: For best results, save the saline solution for last! Mix all of the other ingredients together first, then add the saline solution and mix or knead until it's slime!

