

Praxis “Making Science Fun”

Space Slime

Plastics are all around us. There are many different kinds, with a wide range of properties. Some are hard, others are soft. Some are transparent, others are opaque. Most plastics are made in factories, but here's one you can make at home.



What you'll need:

- 1 teaspoon (5 cm³) laundry borax
- 1 tablespoon (15 mL) white glue (e.g., Elmer's Glue-All)
- food colouring (optional)
- two cups
- paper towels (just in case)
- spoon
- water
- Measuring spoons

Procedure (In Science these are the instructions):

1. In one of the cups, dissolve 1 teaspoon of laundry borax in 5 tablespoons (75 mL) of water. You will need to stir this for a while to get it to dissolve. (If a tiny bit does not dissolve, that is OK.)
2. In the other cup, combine 1 tablespoon of water and 1 tablespoon of white glue. If you wish, you may colour the mixture with a couple drops of food colouring but this can get messy. With a clean spoon, stir the mixture thoroughly until it is uniform.
3. Put 2 teaspoons of the borax solution from the first cup into the glue mixture in the second cup. Stir the mixture; watch as the reaction takes place! It will stiffen into a soft lump.
4. After the lump has formed, take it from the cup and knead it in your hand for a couple minutes.

The Experiment:

Try changing the amount of Borax (2 then 3 then 4 teaspoons and so on) but keep the amount of water and white glue the same to see if you can get better results. Changing only one thing in an experiment is a very important scientific process. Keep track of your results by writing down each time what you see happening so if you decide to make another one to show off to other people you will know which amount works best.

Project Extension:

The material you have made is called Gluep but we'll pretend it's “Space Slime”, and it is ready for you to examine:

- Roll the Space Slime into a ball and let it rest. Does the ball maintain its shape?
- Drop a Space Slime ball onto a table top. What does the ball do?

- Flatten the Space Slime into a thin strip. Hold up the strip by one end. What happens to the strip?
- Roll the Space Slime into a cylinder and pull the ends slowly. What happens to the cylinder?
- Roll the Space Slime into a cylinder and pull the ends quickly. What happens to the cylinder?

What's happening?

The materials we call plastics are made of large molecules whose structure is like a chain. These molecules are composed of many small repeating units, like the links in a chain. Like a chain, the molecules of a polymer are long and narrow.

White glue is a mixture of water with a polymer. The polymer molecules are shaped like very tiny pieces of spaghetti. The tangled molecules make glue thick and viscous rather than thin and runny. When glue is exposed to air, the water evaporates, leaving the tangled polymer molecules. The tangled molecules stick to the surfaces on which they dried, and hold the surfaces together.

Borax solution contains borate ions. These ions can form links between the long, thin polymer molecules in the glue, turning it more like a solid than the plain liquid glue. This Gluep, what we are calling Space Slime. The network holds its shape for a short time, and as long as it is not strained. When Gluep rests, the flexible network gradually relaxes, and the Gluep flattens. When Gluep is stretched quickly, the links between molecules break, and the Gluep snaps apart into pieces.

Gluep contains a lot of water trapped in the network of linked polymer molecules. This water contributes to the liquid-like properties to Gluep. If the Gluep is left exposed to open air, the water will evaporate, and the Gluep will gradually stiffen. To preserve the Gluep, store it in an air-tight plastic bag.

This evening at 7:00 p.m. the Astronomy Club is hosting a Sky Party for the general public at their Sunridge Observatory just a few kilometres West of Medicine Hat on the Number 3 Highway. Praxis will be there with an activity table. Please come and join us and make your own "Space Slime."

Lorne Cooper, Regional Executive Director

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