

HOW TO:

Make Magnetic Gak

Items Needed:

1 tsp. Borax (a powdered soap found in the grocery store)
8 oz. of Elmer's Glue
Black iron oxide*
Large mixing bowl
Measuring cup
Paper towel
Plastic cup
Spoon
Water
Ziploc bag

Approximate time to complete: 10 minutes

Skill Level: Intermediate

Budget for materials: \$5.00



Project Instructions:

Empty an 8 oz. bottle of Elmer's glue into the large mixing bowl. Fill the empty bottle with warm water and shake. Add this and the black iron oxide to the bowl and mix it.

Put ½ cup of warm water into the plastic cup. Add 1 tsp. of Borax powder to the water. Stir.

Slowly add the Borax solution to the bowl while stirring the glue. Once you feel the strands of molecules starting to connect you should begin mixing with your hands and continue adding the Borax solution until it is the consistency you want.

Store in a Ziploc bag.

What's Happening:

Gak is created by making long polymer strands when the glue is combined with the Borax. These strands develop when the glue and borax mix making the strands 'sticky' and attach into much longer lengths of the same type of material. This is a non-newtonian material that occasionally acts like a liquid, when the long strands flow in a fluid-like manner. When force is applied quickly, the long strands tend to break easily, and the polymer acts more like a solid. By mixing in the black iron oxide Fe_3O_4 , we are suspending these small powder particles within the polymer mass to create something we call a 'colloidal suspension.'

This material will begin to interact with magnetic fields because of the paramagnetic properties of iron, which is component of the black iron oxide. The suspension will cause the polymer chains to move along with the rest of the iron particles which creates a somewhat-liquid, somewhat-solid mass that reacts to magnetism.

