

Diapers – The Inside Story 1 of 2

All polymers aren't goopy like putty. The polymer inside some super absorbent diapers looks like a powder. When you add water to this amazing powder you will see why this polymer is used in baby diapers!

Materials:

- Diaper (large, disposable and super-absorbent)
- Zip-closing plastic bag (1 gallon size)
- Water
- Small cup
- Clear plastic cup
- Paper towel
- Food coloring
- Dropper
- Measuring spoons

CAUTION

The powder found in the diaper (sodium polyacrylate) will irritate the nasal membranes if inhaled. Avoid eye contact; if it gets into eyes, they will become dry and irritated. Be sure to wash hands after use.

Procedures:

1. Use a pair of scissors to cut off the paper or plastic edge around the entire diaper. Place the padded middle part of the diaper into the zip-closing plastic bag.



2. Reach into the bag with both hands and separate the cotton, paper, and plastic layers of the diaper. Leave all material in the bag. Seal the bag and shake it for about 1 minute. Look at the bottom of the bag as you tilt it to one side. You should notice white granules collecting in the corner of the bag.



3. Now, without opening the bag, move the cotton, plastic, or other large pieces of material toward the top of the bag. Keep the material up there as you shake the bag again. This will allow the granules to fall down to the bottom without getting picked up by the cotton again.

4. After you have about teaspoon of granules in the corner of the bag, slowly open the bag and remove the large pieces of material. Throw them away. Now, carefully pour the granules into a small cup. Wash you hands.



Diapers – The Inside Story 2 of 2



Place about cup of water into a small cup. Add two or three drops of food coloring and swirl to mix. Place a small amount (about 1/8 teaspoon) of the powder onto the center of a paper towel.

5. Add one drop of the colored water to the granules on the paper towel. Continue adding one drop at a time to the granules and observe. What do the granules appear to be doing? How many drops can you add to the granules before the water spreads out much on the paper towel?



6. Take the rest of your granules and pour them into a clear plastic cup. Predict the number of tablespoons of water the granules can gel. Now try it by adding 1 tablespoon of water at a time. Watch what happens. What do you observe? How close was your prediction?



Think about this ...

When you add some salt to the gel and stir, the gel will turn to a liquid that looks like water. Don't drink or let anyone else drink this liquid! Think of other uses for sodium polyacrylate.

Where's the Chemistry?

The granules on the paper towel can often absorb over 100 drops before spreading much on the paper towel! This amazing powder, scientifically called sodium polyacrylate, is considered to be a super-absorbent polymer because it can absorb hundreds of times its weight in water! As the powder absorbs water, it becomes bigger and gel-like. Exactly how the powder absorbs water to become a gel is not completely understood. Adding salt forces the sodium polyacrylate to release the water.

Normally, water is released slowly from this polymer, so it is sometimes used in outdoor potted plants. There is no need to buy a big bag of diapers if you would like to try it. Gardening stores will often sell small bags of sodium polyacrylate.