



Curiosity Guide #501

Polymers

Accompanies Curious Crew, Season 5, Episode 1 (#501)

Diaper Diagnostics

Investigation #6

Description

Can you guess how much water a diaper will hold? Let's find out!

Materials

- Diapers
- Digital scale
- Pitcher of water
- Empty container

Procedure

- 1) Weigh the diaper in grams.
- 2) Add water to the diaper until it is saturated.
- 3) Pour off any excess water into the empty container.
- 4) Weigh the saturated diaper.

My Results

Explanation

Sodium polyacrylate is a polymer that can hold a lot of water. If we could magnify it, the polymer powder would look like long chains of molecules. Water that is added is drawn into the center of each of the molecules. The water will continue to absorb into the powder until there is an equal concentration of liquid both inside and outside the polymer. This is a physical reaction. Each additional gram in weight is equal to 1 millimeter of water. If a baby's diaper begins to leak, the diaper is either fully saturated or the urine is more concentrated with salts that cannot be absorbed into the polymer, so the diaper starts to leak.

Think about this! Sodium polyacrylate is a man-made polymer. Chemists figured out how to polymerize two chemicals, sodium acrylate and acrylic acid. The result are long chains of carbon bonded to sodium atoms in the center of each molecule. Did you notice how the gel you made with sodium polyacrylate powder and water resembled snow? Sodium polyacrylate is often used to make fake snow. If you add more water to this polymer, the gel will get slushier. Because of all the water, the polymer already feels cool, but you can also put it in the refrigerator to get your fake snow even colder! Brrr, that sure is a cool polymer!

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