



Super Duper Diapers



Experimenting for the Environment



New Jersey 4-H

National Science Experiment Day

Name _____ Date _____

Materials:

- Disposable diaper
- Measuring cup and measuring spoons
- Water
- Scissors
- Ziploc bag; 1-gallon size
- Newspaper
- 9 oz. plastic cup

Directions:

1. Hypothesize (or predict) how much water the diaper will hold until it is saturated (starts to leak when turned upside down). Write down your predictions.

I think it will hold _____ . I think this because
(unit)



Wait for directions from an adult before continuing!

2. Open the diaper so it is spread out on the newspaper on the table.
3. Take turns adding ½ cup water to the diaper at a time.
4. After each ½ cup is added, put a tally mark on your paper. One tally mark is equal to ½ cup water.
5. **After ½ cup of water is added, wait about 10 seconds,** and then turn the diaper upside down to see if water drips out.
6. Continue to repeat steps 3, 4, and 5 **until the diaper leaks water when upside down.**
7. Record your final count and calculate (add up) how many cups of water the diaper held.
8. Why do you think the diaper held so much water?

9. Gently push on the saturated (filled) diaper. What happens?



Wait for directions from an adult before continuing!

Experiment #2

You will now be dissecting (taking apart) a diaper to see what causes it to hold so much liquid. Put the saturated (filled) diaper to the side, and put down fresh newspaper on the table.

1. Place a new diaper on the piece of newspaper. Carefully cut off the legs, and cut through the inside lining and remove all the cotton-like material. Put all the stuffing material and plastic lining into a clean, 1-gallon zipper-lock bag.
2. Scoop up any of the powdery material that may have spilled onto the paper and pour it into the bag with the stuffing. Blow a little air into the bag to make it puff up like a pillow, then seal the bag.
3. Shake the bag for a few minutes to remove the powdery stuff from the stuffing. Notice how much powder falls to the bottom of the bag. (This powdery stuff is the hydrogel polymer).
4. Carefully remove the stuffing and the plastic lining from the bag, and measure out the powdery polymer left in the bag. Place that powdery material into a 9 oz. plastic cup.
5. Place the diaper back into the bag and repeat steps 3 and 4 with the same diaper until you get 1 teaspoon of the hydrogel powder in the cup.
6. Now it's time to mix the powder with water to see what happens. Pour $\frac{1}{2}$ cup of water into the 9 oz. plastic cup with the 1 teaspoon of hydrogel powder.
7. After about 30 seconds, observe that the water has changed — it's no longer a liquid... it's a gooey solid!
8. Take a closer look at the gel by scooping up some of the gel with your fingers. You can poke holes in it and even tear it into smaller pieces. This hydrogel is safe and non-toxic, so you can touch it, but remember: even safe chemicals never go into your mouth, ears, eyes, or nose!

9. Take some of the cotton stuffing and place it in a child's hand. It has some of the powdery hydrogel still in it. Slowly add water. You will notice it absorbs water and the child's hand does not get wet.

10. Watch as an adult takes some of the cotton stuffing and places it in a student's hand. It has some of the powdery hydrogel still in it. Watch as water is slowly added. Does the student's hand get wet?

11. Gently cut open your filled diaper. What does it look like?

Answer the following questions.

a) Was there a lot of powder in the diaper?

b) How much water did the powder hold?

c) What conclusions can you make about the powdery hydrogel?

d) Besides diapers, how else do you think this powder could be used?
