



## **Mystery of the Red Cups: Extension Activity**

New uses for Waterlock are being developed every year. Have students brainstorm additional ways that Waterlock could be utilized to improve our communities. An extension activity has students experiment with a disposable diaper to see how much water it can absorb and at what rate. It provides them hands-on experience with experimental techniques, predictions, and measurements. The handout for this activity is provided. Distilled water works better than tap water for the activity, but tap water can suffice. As an optional touch, you can color the water yellow with food coloring. A typical disposable diaper can hold a liter or more liquid, so your student's results should fall out somewhere around 1,000 ml, plus or minus a few hundred milliliters.

Give each student group the same type of diaper, preferably from the same batch. Observe the different student groups as they conduct the activity, noting differences in how each group follows the stated directions. Some will measure water carefully, others won't. Some groups will pour the water slowly, others fast. Some will spread the water out evenly across the diaper, others will pour it in one spot. See if all the groups wait the required 10 seconds before assessing the outside of the diaper for liquid.

When the activity is complete and all groups have turned in their results, ask the class to propose reasons for the differences in the results, given that all the diapers should be fairly similar (at least one group will usually have very different results from the rest of the class due to sloppy experimental procedures).



## Mystery of the Red Cups: Extension Activity

We learned in our story that disposable diapers contain Waterlock - a substance that has an amazing ability to absorb water. But even with the Waterlock, these diapers can only hold so much water before they begin to leak. In this activity, your task is to find out how much water a disposable diaper can absorb before it begins to leak.

### Procedure:

(1.) Predict how many milliliters of water you think a diaper can hold before it starts to drip. To aid your prediction, consider that a can of soda is about 350 milliliters in volume. Record your prediction below.

Predicted amount of water that the diaper will hold \_\_\_\_\_

(2.) You will now begin slowly adding water to the diaper in measured amounts and find the point at which it cannot hold any additional liquid. Measure out 100 milliliters of water and pour it *very slowly* into the inside of the diaper, being sure to spread it out over the whole surface. Wait 10 seconds and examine the outside of the diaper for leaks. Record your observations each time in the table below and then repeat the procedure for an additional 100 milliliters. When you are nearing the point at which you think the diaper is becoming saturated, add only 20 milliliters at a time. Stop when the diaper starts to drip on the table.

Water Addition	Total Volume Added (ml)	Observations
1		
2		
3		
4		
5		
6		

Essential Questions:

1. What was the total volume of water that was added before your diaper started to leak?

Total amount of water actually added \_\_\_\_\_

2. Did you overestimate or underestimate how much liquid the diaper could hold?

3. Are you surprised by the amount of liquid the diaper could absorb? Explain why or why not.

4. Compare the amount of water you added to the amount of water added by other groups. Write down the amount of water added by at least three other groups.

Group 1 \_\_\_\_\_ Group 2 \_\_\_\_\_ Group 3 \_\_\_\_\_

5. Explain why you think the values differed for each group when you all used the same type of diaper.

6. Describe another experiment that you would like to do with diapers that could help us to discover something important about them.