

Big surprise....it's May in Oregon and it appears to be raining! Rain is great for the lawn and outdoor planting beds, but it can also lead to the loss of precious top soil due to erosion or to muddy landslides. But the hot summer is just around the corner, the kids will be out of school, and you will go on your two week summer vacation. What happens to all your beautiful plants (especially the indoor variety) when you go on vacation. You can ask a friend or neighbor to come water.....or you can use some of these new "*super hydro-absorbent planting soils*" that let you water once and then go away for two weeks with no worries (except if they will actually work!). Rest easy...these soil additives to increase water retention do work and they are non-toxic. And guess what? The technology for the super soaker soils are the same *super absorbent polymers* (SAP) that are responsible for the incredible disposable baby diapers that we talked about one year ago (April 2004) in this column
(<http://enr.oregonstate.edu/momentum/k12/apr04/index.html>)

Now, if you want to prove this to kids and adults of all ages with a very simple experiment that can be done in 10 minutes or extended into a multiple session, week long soils lab, just keep reading.....

A Simple Experiment to look at Super Water Absorbant Soils

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The beauty of this experiment is that it can be a quick and simple (15 min.) mini-lesson or home experiment, or integrated into a multiple session learning module on soils, water retention, erosion, plant growth, etc. This has been tested with 2nd Grade Ashbrook Independent School students as part of their soils and plants module, and with Benson High School students as a 15 min. fun experiment to demonstrate how a technology developed for one application (the disposable baby diaper) can have a significant impact in a completely different areas such as: home gardening; increased crop production in Eastern Oregon; erosion control for prevention of landslides; and even the production of artificial snow for indoor skiing in Japan (that's another lesson for another month!).

NOTE: The Steve Spangler Science link below has a "boat load" of information on these materials and ideas for how to use them, so I'm just going to cover a simple basic experiment below. Visit that site....it's pretty good!

Materials

- Planting soil (or soil from anywhere the kids want to get it)
- Super Absorbant Polymer (SAP): buy a baby diaper, rip it apart and recover the SAP from the cotton batting – see <http://enr.oregonstate.edu/momentum/k12/apr04/index.html> for more details). Contact Dr. Skip if you want a supply of SAP for a larger class or demonstration..
- Cups: two different sizes (small and big) so they can be nestled and you need to be able to poke holes in the bottom (Styrofoam 10 and 12 oz cups work well).
- Optional: Super Water Absorbant Planting Soil (available in most gardening stores for house plants)
- IMAGINATION: find a 2nd grader to help you☺

(not bone dry, but not from outside in May showers either). You can make as many **pairs** of soil samples as you want to test, but they need to be in **pairs**.

2. Poke holes (toothpick works well for Styrofoam cups) in the bottom of **two large cups** (or as many **pairs** as you want to use).
3. Place the cups filled with soil inside the cups with holes, making sure that there is enough space in the nestled cups for water to drain out of the smaller soil filled cup.
4. Mix ½ teaspoon (or less for smaller soil samples) of super absorbent polymer (SAP) into one of the **pair** of soil samples (now you see the reason for the **pair**). Mix in SAP well using a fork, stick or whatever.
5. Add a known amount of water (100 ml works well) to each soil sample pair and let it sit for a few minutes (always hard with 2nd graders!).
6. Separate the two cups and measure the amount of water that has drained through the soil. Compare the soil sample pairs – one normal and one with SAP. What is the observation?
7. Repeat with as many soil samples as you want to test. In the classroom, it is great to have the kids bring in their own soil samples, either from their yards or their parents planting soils. Remember, they need to be relatively dry, otherwise the SAP will “clump” when added.

OBSERVATIONS

1. For typical planting soils from a garden shop, when 100 ml of water is added to the soil sample, approx. 50-70ml will flow right through in a couple of minutes. There should be little or no water that flows through the same soil sample with SAP added. That is a shocking observation for the kids. Where did it go?
2. If you haven't done the diaper lab yet with the kids, you should take the plain SAP and let them add water to that in a cup. They will quickly see what happened to the water in the soil. It turned into a polymer gel (hydrogel) and trapped the water in the soil. That's how it can help prevent erosion or keep soils moist for a long time by the slow release of water from the gel particles as they dry out.
3. If you have time, leave the soils out for a week or two and have the kids monitor *moisture content* as a function of time. This can be done by sticking something into the soil (like their fingers, a popsicle stick, etc.) to check how “wet” it is. You should observe that the soil with SAP added will hold it's moisture for a very long time. If you want to sacrifice a plant, you could also plant something in each cup and watch which one wilts more quickly. This may be cruelty to plants....I'm not sure about that.

For more information or to obtain some super absorbent polymer (SAP) contact:

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Reference Web Sites (there are many others)