

Super Slurper

Outcome: This material changes as it absorbs water. It changes again as the water it has absorbed evaporates.

Materials in the kit: slurper crystals (sodium polyacrylimide), food coloring, skewers, hard plastic cups, 3"x5" reclosable bags for storing the chemical after the activity

Materials to find or create: hot water, clock, ruler

Procedure:

Put approximately one-quarter teaspoon of the chemical into each cup. Ask the class to observe the chemical and record words to describe it.

Brainstorm the identity of the crystals. (*Suggestions vary: bath crystals, salt crystals, sugar, raw sugar, kosher salt, etc.*). What would happen to the crystals if hot water is added? (*If the crystals were bath salts, sugar, or salt the crystals would dissolve. This is an opportunity to review the idea of melt—changing from a solid to a liquid and dissolve—a solid breaking into smaller pieces in a liquid.*)

Ask each group to choose a color and add three drops of that color to the crystals. The color will not mix in completely, some crystals will be dark, other crystals will be unchanged.

Half fill each cup with hot water. (It can be very hot because you are using hard plastic cups. Then, the reaction works more quickly. Choose the temperature you are comfortable with and that fits the needs of your students.)

Start counting the minutes. At the end of each half-minute, call time and have students record the height of the crystals in the container. Stir the contents of the cup with a skewer to mix water into thoroughly.

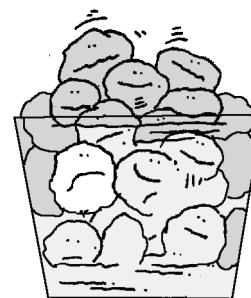
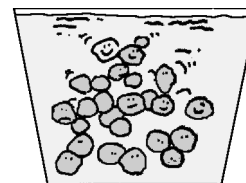
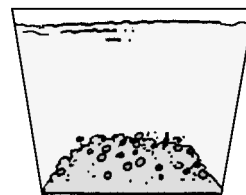


Continue recording each half minute for five minutes.

Option: After five minutes, cover each cup with a larger cup to avoid the class continuing to watch the experiment. Take time to talk about what was observed in the cup.

Discuss what the chemical will look like in fifteen minutes. How might it be changing under the cup? Can it absorb unlimited quantities of water?

Lift the cups to observe the experiment results.



Often, the chemical has pushed out the top of the cup and fallen onto the table. This gives it a chance to cool slightly and the class can touch it safely. Mash the chemical between your fingers. Does it feel the way you thought it would?

Inquiry Suggestion: Make one change in the experiment—hotter or colder water, more or less crystals, differently sized container.

Teacher Background

The crystals are a product called Soil Moist™. It is a polymer that absorbs water like a sponge.

From www.soilmoist.com: Soil Moist has been developed to reduce the amount of water needed to maintain vigorous plants and other green goods. When mixed in the soil, the crystals will soften and swell as water is added and absorbed. When the potting system dries, the polymer will release its water to the plant. Soil Moist acts as a water reservoir—even during periods of drought the stored water is released to the plant. The expansion and retraction of the polymer during the watering cycle helps soil aeration, which is important to all plants.

Soil moisteners are generally a polyacrylamide. They "absorb" water in a reaction known as hydrogen bonding. The water molecules are loosely held by electrostatic forces on the outside of the molecule. In the case of sodium polyacrylate, the mechanism of absorption is primarily by osmotic pressure.

Polyacrylamides were tested for use as the absorbent material in early disposable diapers, but were soon abandoned. They absorbed very well, but, if you weren't careful, you could end up with a diaper almost as big as the baby!

Option: Each group can brainstorm what this chemical might be used for. Each person can brainstorm a list on his/her worksheet. Answers can be shared in class.

Option: What happens if the material is left to dehydrate? How might the crystals change if they are put into the freezer? If it is left in direct sunshine? Small bags are included in the kit to store the material after it has dehydrated. Students may ask to take samples home to share with families.

Inquiry: Leave the slurper in a flat bowl or plate in warm sunlight. Observe how it changes throughout one day. What happens if the crystals are placed under a heat lamp?

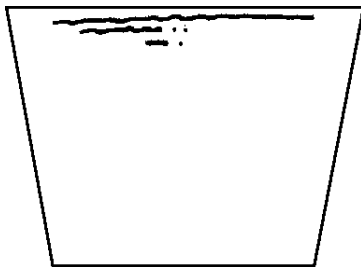
Compare the results of the experiment using temperature as a variable: use hot, lukewarm, and cold water instead of just hot water.

Language: Draft a magazine ad to sell this product. Good advertisers get to take home a sample of the product! Discuss what approaches advertisers use to get us to buy their products. What are the attributes of a magazine ad? Short text, bright letters, beautiful pictures??

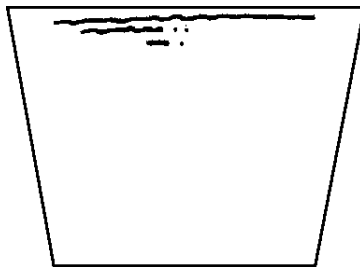
Name: _____

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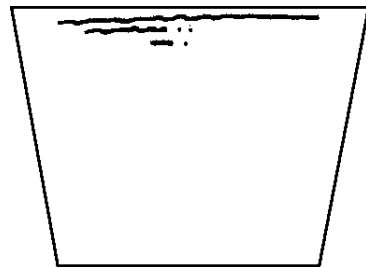
Draw what you see when "time" is called:



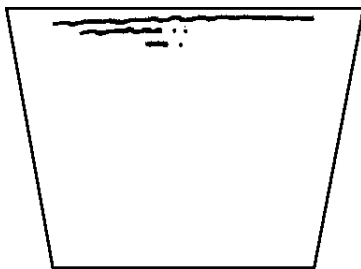
1/2 minute



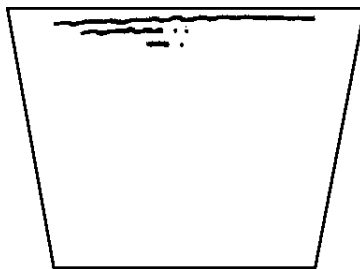
1 minute



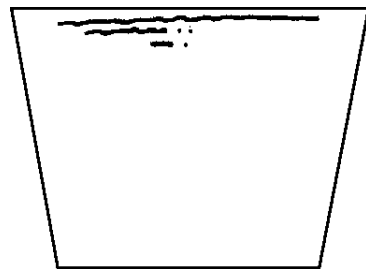
1 1/2 minutes



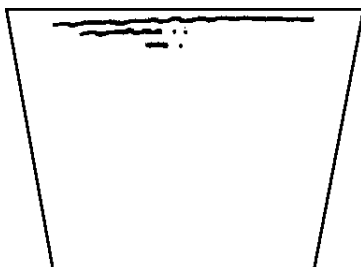
2 minutes



2 1/2 minutes



3 minutes



3 1/2 minutes



4 minutes



4 1/2 minutes

Name: _____ Date: _____

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Time:	Observations: What, do you see?
M :30	
I 1:00	
N 1:30	
U 2:00	
T 2:30	
E 3:00	
S 3:30	
4:00	
4:30	
5:00	

Draw what you think the chemical will look like fifteen minutes into the experiment. Explain here how you made your guess:



Name: _____

Dr. I. M. Entellegunt has come to our law office and wants us to sell a new “discovery”. Unfortunately, there's no description for the potential use for the product. Can you help by making a list of possibilities?

Write a paragraph here explaining the best answer:

Create an advertisement to sell the product:

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FORM

The crystals, Soil Moist, are able to absorb water and become larger. They change from opaque to transparent. When placed in hot water, the change in the crystals can be recorded by measuring the distance between the bottom of the glass and the top of the crystals. When crystals are put into lukewarm water, the height of the crystals is: 30 seconds–1cm, 60 seconds–1.5 cm, 90 seconds–1.7 cm, 120 seconds–2cm, 150 seconds–2.5 cm, 180 seconds–2.5 cm.

What would happen if I used hot water in the container instead of lukewarm water? I think the crystals will absorb water faster. Hot water makes things like tea react faster than tea in warm water.

DESIGN

I am going to:

1. Warm up a glass with warm water and then pour out the water.
2. Add one-half teaspoon of crystals and two drops of food coloring.
3. Fill the warm glass with very hot water.
4. Record the height of the crystals in the glass by holding a ruler next to the glass and measuring from the bottom of the glass to the top level of the crystals every 30 seconds for 3 minutes.

COLLECT

seconds	30	60	90	120	150	180
Warm	1cm	1.5	1.7	2	2.5	2.5
Hot	1.5cm	2.5	3.1	4.5	5	5.2

ANALYZE

My hypothesis was correct. The height of the crystals was nearly twice as high each time I recorded the height if the crystals were in hot water compared to warm water until three minutes. At three minutes, the crystals in hot water were more than twice as high as the crystals that had been in warm water for three minutes.

