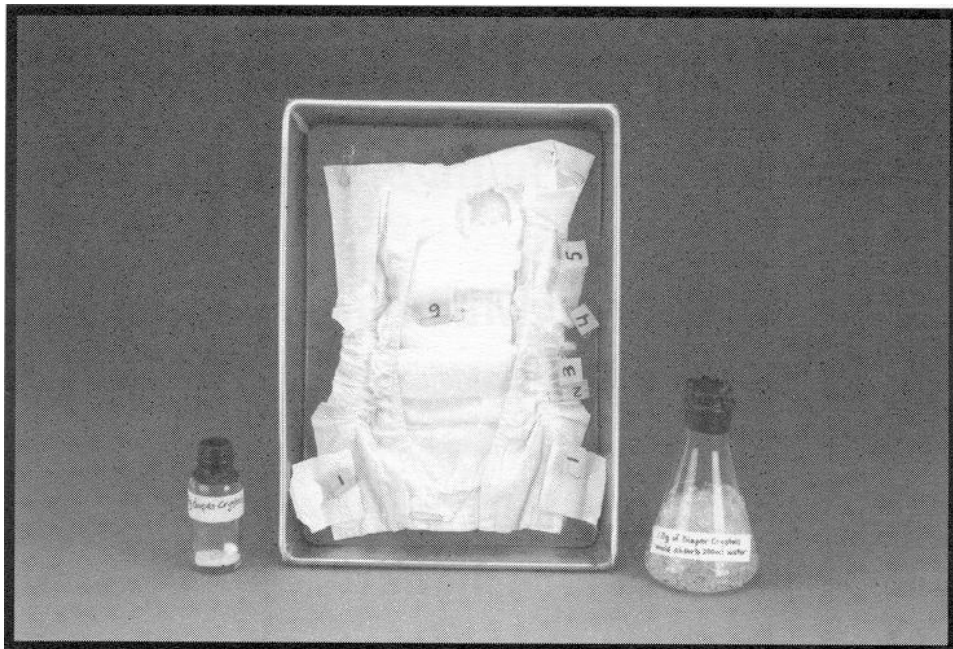


Diaper Dissection

Visitors observe a dissected and labeled disposable diaper. They also observe superabsorbent crystals that have been soaked with water.



OBJECTIVES:

Visitors learn how the combination of superabsorbent crystals and layers of different filtering materials is used in disposable diapers to retain moisture while maintaining a dry surface.

SCIENCE TOPICS

Polymers
Absorbency

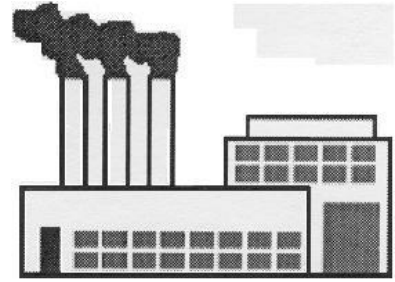
PROCESS SKILLS

Observing

VOCABULARY

Crystal

Diaper Dissection

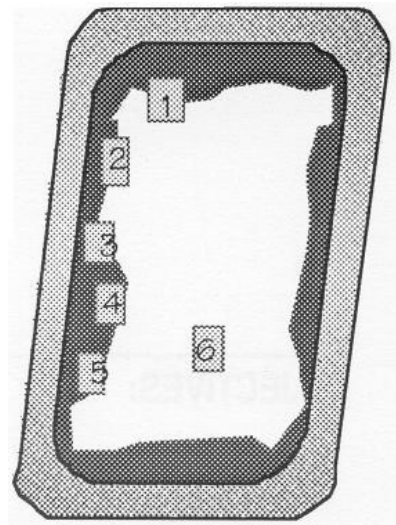


To do and notice:

Match the six numbered areas with the descriptions:

- inner core with superabsorbent crystals
- sticky tabs
- outer liner
- moisture leak barrier
- inner colored liner
- dry weave layer

(Answers: 6, 1, 3, 2, 5, 4)



What is going on?

The diaper's inner core contains small superabsorbent crystals of polyacrylate. Some of these crystals have been dyed red to make them easier to see. These superabsorbent crystals can hold up to 60 times their weight in urine. These crystals and the five outer layers work together to keep babies dry and comfortable.

MATERIALS**(with amounts to have on hand)**

- One 250-ml Erlenmeyer flask with stopper
- One small clear glass bottle with lid
- One dissection pan
- Ten dissection pins or paper clips
- dH₂O (deionized water) (keep 300 ml on hand)
- Electrician's tape
- Four overnight or superabsorbent diapers
- 0.5 g Sodium polyacrylate (optional)
- Heavy-duty clear plastic sheeting (enough to cover the dissection pan)

Setup/Takedown Procedures**ORIGINAL SETUP**

- Cut three superabsorbent or overnight diapers apart and separate out the small absorbent crystals from the padding.

To prepare wet diaper crystals from diapers:

- Put 1.0 g absorbent crystals into a 250-ml flask.
- Add as much dH₂O (deionized water) as the crystals will hold (approximately 200 ml water).
- Stopper and seal the flask with the tape.
- Label the flask "1.0 g Crystals Will Hold _____ ml of Water." (Fill in the blank with the amount of water added.)
- NOTE: You may substitute for diaper crystals with 0.5 g sodium polyacrylate.

To prepare dry diaper crystals:

- Put 1.0 g absorbent crystals in a small bottle labeled "1.0 g Diaper Crystals."
- Close and seal the bottle.

To prepare paper-clip pin assembly:

- Bend the long end of a paper clip to form a 45° angle. Wrap a piece of labeling tape around the curved part of the clip to create a tag. Make six bent clips and number the tags "1" through "6."

To prepare dissection pan:

- Cut away sections of the fourth diaper so that the different layers are exposed. Place the diaper in the dissection pan and use the pins (see paper-clip pin assembly above) to secure the diaper and to point out the layers. Identify the layers as follows:

sticky tabs	“1”
moisture leak barrier	“2”
outer liner	“3”
dry weave layer	“4”
inner colored liner	“5”
inner core with crystals	“6”
- Cover the pan with the plastic sheeting. Secure the sheeting with tape.

WEEKLY SETUP

- Set out the following on the counter:
 - Labeled flask
 - Labeled bottle
 - Numbered dissection pan
 - Public copy in a Plexiglas holder

DAILY SETUP

- Make sure the display items are in good condition.

WEEKLY TAKEDOWN

- Return the display items to Unit 5 display storage.



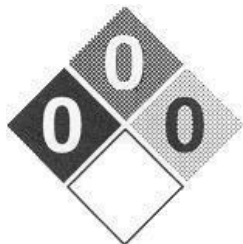
RUNNING SUGGESTIONS

- ◇ This display is similar to the Unit 5 demo “Superabsorbent Polymers.”
- ◇ The wet crystals from the diaper will lose liquid after 1 to 2 weeks. Crystals prepared by the alternative method (sodium polyacrylate) should last many months.

**EXTENSIONS**

The design of a diaper is similar to that of adult bladder-control garments such as “Depends™.”

SAFETY & DISPOSAL



No special precautions are required; follow standard lab safety procedures.

