Polymer Activity from the: POLYMER AMBASSADORS

How absorbent are the pads in bandages?

Grades: middle school

Science Standards: Content Standard A: Science as Inquiry; Content Standard B: Physical Science; Content Standard E: Science and Technology

Background: The pads are present to absorb fluids from a wound and to maintain a moisture balance for healing. Wounds that dry out tend to develop scabs. If a scab forms, new smooth skin cells have to form under the scab.

Purpose: To investigate the absorbency of adhesive bandage pads.

Hypothesis: Look at the selection of bandages and their names. Which one, of the bandage pads that you are studying today, will absorb the most drops of water? _____ least drops of water? _____.
Give two reasons for your predictions_____
_____
_____

Materials: (working with a partner and a calculator)

5 to 7 types and/or brands of adhesive bandages (Each strip must be labeled since not all packages of individual strips have their names on them.)

Scissors
Plastic pipet
Cup of distilled water or tap water
Small ruler
Magnifying glass

Procedure:

1. Select one adhesive bandage strip and take off the wrapper. Record the name of the bandage in the data table. Cut the ends of the strip off, save the pad for study. Try not to touch the pad as the oils on fingers might influence your results.
2. Measure the length and width of the pad in centimeters and record in the data table.
3. Calculate the area of the pad in square centimeters and record.
4. Place the pad on top of a paper towel so that the pad is flat on the table.
5. Fill the pipet with distilled or tap water.
6. Hold the plastic pipet in a vertical position (so that the drops will be the same size), and count the number of drops needed to completely saturate the pad without it leaking onto the paper towel. If drops of water begin to sit on the wet pad, you are over the absorption limit. If the drops form a "dome or bubble" on top of a dry pad, surface tension is preventing the water from penetrating the pad. Gently break the surface tension by rubbing the tip of the pipet over the pad. Record to drops needed to just saturate the pad.
7. How fast did the pad absorb water? (fast, medium, slow, not at all) Record.

8. Take another bandage and repeat the procedure.
9. Once you are finished recording the laboratory data (except for the last column), clean up your area.

Data Table:

Name of adhesive bandage	Length of pad in cm.	Width of pad in cm.	Area of pad in cm^2	Number of drops of water absorbed.	How fast did the pad absorb water?	Absorbency is drops/cm^2

Conclusions:

1. In order to compare the absorbency of different pads, one needs to calculate the number of drops of water per one square centimeter of pad. Fill in the table column with those calculations.

2. Based on your observations and calculations, which pad(s) had the most drops of water per area absorbed? _____

3. Which pad(s) had the <u>least</u> drops of water absorbed? _____

_____

4. Check your hypothesis and comment on your predictions. _____

_____
_____

5. Look carefully (with a magnifying glass) at the most and least absorbent pads. Sketch a diagram of their surfaces. How do they feel and look?

_____
_____
_____

Most Absorbent	Least Absorbent

Teacher notes on How absorbent are the pads in bandages?

Name of adhesive bandage	Length of pad in cm.	Width of pad in cm.	Area of pad in cm^2	Number of drops of water absorbed.	How fast did the pad absorb water?	Absorbency in drops/cm^2
Nexcare™ Comfort Fabric	2.5	1.5	3.75	7	slow	1.9
Walgreens® Flexible Fabric	2.6	1.4	3.64	6	slow	1.6
Band-Aid® Sheer Comfort-Flex	2.2	1.8	3.96	8	fast	2.0
Band-Aid® Flexible Fabric	2.3	1.8	4.14	9	fast	1.6
Band-Aid® Tough-Strips	2.2	2.5	5.5	9	fast	1.6
Nexcare™ Active Sport	2.5	1	2.5	8	medium	3.2
Nexcare™ Clear Waterproof	2.9	0.8 at narrow end	2.32	10	medium	4.3? (not a rectangle)
Walgreens® Crayon Bandages	2.6	1.2	3.12	5	fast	1.6

The Nexcare™ Active sport and Nexcare™ Clear Waterproof had the largest number of drops/cm^2 so they were the most absorbent.

The Walgreens® Fexible Fabric, Band-Aid® Flexible Fabric, Band-Aid® Tough-Strips and Walgreens® Crayon Bandages were the least absorbent.

Drop size is very important since only a few drops are needed per pad. Groups may not agree due to differences in drop sizes. This is all part of experimental science and students need to recognize that technique is a variable to be considered in any experimental design. It is not essential that all groups agree nor that they agree with the data above. It is more important that students learn to gather data and interpret their results.

As an extension to this activity, it might be interesting to have students compare prices of the adhesive strips to absorbency. The prices were (as of 9/07):

Name of adhesive bandage	**Absorbency in drops/cm^2**	**Cost per package**	**Cost per strip**
Nexcare™ Comfort Fabric	1.9	$3.99/35	$0.114
Walgreens® Flexible Fabric	1.6	$2.99/36	$0.0831
Band-Aid® Sheer Comfort-Flex	2.0	$3.29/40	$0.0823
Band-Aid® Flexible Fabric	1.6	$3.99/30	$0.133
Band-Aid® Tough-Strips	1.6	$3.99/20	$0.200
Nexcare™ Active Sport	3.2	$4.79/30	$0.160
Nexcare™ Clear Waterproof	4.3? (not a rectangle)	$4.79/20	$0.240
Walgreens® Crayon Bandages	1.6	$1.99/30	$0.0663

The least expensive bandage was Walgreens® Crayon Bandages and they tied for the least absorbent. The most expensive was Nexcare™ Clear Waterproof and they were one of the most absorbent.

Contributed by Mary Harris, Missouri Polymer Ambassador 2008

Polymer Ambassador Web Site: www.polymerambassadors.org