

Building a Better Bandage-Engineering

Adapted from Science Scope, Everyday Engineering, "It's Stuck on You" by Richard H. Moyer and Susan A. Everett

Part A: EXPLORE: How do different bandages compare?

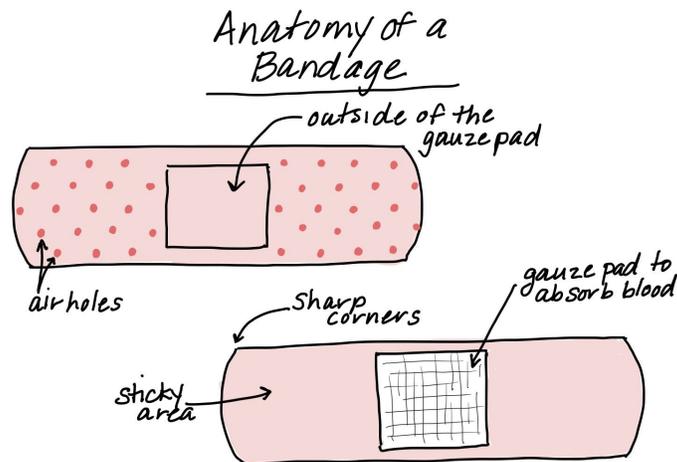
Here's what each camper will need:

One of each type of bandage
(*plastic, fabric, "waterproof"... and any others you find interesting and want to test. Do NOT use the knuckle bandages, we will be using them in Part C.*)

Testing materials for campers to share:

1. A bowl
2. ½ cup of dark liquid (room temperature coffee OR room temperature cola)
3. Dirt or cocoa powder
4. Hand soap
5. Water

In order to make a good bandage design, you first need to examine the designs of bandages and decide what features are the most important. What are the features that make the best bandage? You will be testing them out! Remember, a scientific investigation ensures that the test for each bandage is EXACTLY THE SAME. Apply the same criteria to each bandage. This ensures that our results are reliable so that you can trust your results.



Read through the list below. Choose the features you want to test and come up with some of your own. If you have the boxes for the bandages, test the claims that are on the boxes.

OVERALL SHAPE

MATERIAL USED FOR TAPE

PROTECTION FROM DIRT

STICKIEST LOCATIONS

SIZE OF GAUZE

STRETCHINESS

STICKINESS OF TAPE

ABSORBANCY OF GAUZE

AIR FLOW

WATERPROOFING

DURABILITY

TEXTURE

Use one data chart for each bandage you test and write the features in the space provided in your data chart. If you are making your own data chart, you can use the suggested design to help you.

Bandage Brand and Type	Feature	Observations of Feature	Rating 1-worst 5-best	Explain why you gave it the rating
Evaluate: What are the best design features for this bandage?				
Evaluate: What improvements does it need?				

Observations:

Many features will need you to observe. How do you do this? You use your senses.

- You may **TOUCH**.
- Maybe you will simply **LOOK** at it.
- Some features will need to be **SMELLED**.
- Can you think of a feature that you will **LISTEN** to?
- But.....**NO TASTING** please!

Apply the bandage on the back of your hand. Inspect the bandage. Record your observations and rating.

Rating Scale:

You will be judging each of the bandages using a scale from 1 to 5.

A rating of 1 means that the feature has a terrible design. It makes the bandage a **BAD** choice.

A rating of 5 means that it has a terrific design. This is the **BEST** design for this feature.

Using a rating scale can be tricky. **All of you** will have to agree on which rating you will give each type of bandage. You should also explain **WHY** you have chosen the rating.

Some features need to be tested. Here are some testing suggestions, but you can design your own!

To test waterproofing: (Save your materials)

Put ½ cup of dark liquid in a bowl. Dunk or soak the hand with the bandage in the bowl. Think about how long you should hold your hand in the liquid. Should you move it around? How do you remove the bandage so that it is a fair test? Inspect the condition of the bandage. If the gauze is tinted brown, it is not waterproof. Record your observations and rating.

To test stickiness:

Wash the hand with the bandage for 20 seconds using hand soap. After drying, remove the bandage. How do you remove the bandage so that it is a fair test? Inspect the condition of the bandage. Record your observations and rating.

To test absorbency:

Add water, one drop at a time, to the gauze. Count how many drops of liquid are absorbed into the gauze before it stops holding all of the liquid.

To test protection from dirt:

Get some dirt or cocoa powder. Rub the hand with the bandage with the material. How do you remove the bandage so that it is a fair test? Inspect the condition of the bandage. Record your observations and rating.

Part B: ENGINEER - Design and make a waterproof bandage that WORKS!

Here's what each camper will need:

1. Gauze
2. Medical Tape
3. Waxed Paper
4. Plastic Bag
5. Scissors
6. Paper

**Testing materials for campers to share:
(Reuse materials from Part A)**

1. A bowl
2. ½ cup of dark liquid: room temperature coffee OR room temperature cola
3. Dirt or cocoa powder
4. Hand soap
5. Water

DESIGN:

1. Use what you have learned to design a waterproof bandage to use on the back of your hand.
2. Make a design plan and sketch of your design for the waterproof bandage.
3. If you are making your own design plan, you can use the suggested design to help you.



DESIGN PLAN	
<p>Ask: What is the problem you need to solve?</p> 	<p>Plan: What will your design look like? Draw a labeled diagram and write down your materials with the amount you need:</p>
<p>Imagine: What are your ideas for solving this problem?</p> <p>1.</p> <p>2.</p> <p>3.</p>	

BUILD: Use the materials to build your design.

TEST:

1. Make a new data chart for your bandage design.
2. Test your design, using the SAME Features and rating scale that you used for Part A.
3. If you did not test waterproofing in Part A, add it to your testing procedure. Test your bandage for waterproofing.

Your Bandage Design	Feature	Observations of Feature	Rating 1-worst 5-best	Explain why you gave it the rating
Evaluate: What are the best design features for this bandage?				
Evaluate: What improvements does it need?				

Part C: ENGINEER IMPROVEMENTS -

Redesign your waterproof bandage for a KNUCKLE!

Here's what each camper will need:

1. Gauze
2. Medical Tape
3. Waxed Paper
4. Plastic Bag
5. Scissors
6. Paper

Testing materials for campers to share:

(Reuse materials from Part A)

1. A bowl
2. ½ cup of dark liquid: room temperature coffee OR room temperature cola
3. Dirt or cocoa powder
4. Hand soap
5. Water

DESIGN:

1. Use what you have learned to design a waterproof bandage to use on the middle knuckle of your index finger.
2. Make a new design plan and sketch of your design for the waterproof bandage.



DESIGN PLAN

Ask: What is the problem you need to solve?

Plan: What will your design look like? Draw a labeled diagram and write down your materials with the amount you need:

Imagine: What are your ideas for solving this problem?

- 1.
- 2.
- 3.

BUILD: Use the materials to build your revised design.

TEST:

4. Make a new data chart for your bandage design.
5. Test your design, using the SAME Features and rating scale that you used for Part A.
6. If you did not test waterproofing in Part A, add it to your testing procedure. Test your bandage for waterproofing.

Your Bandage Design	Feature	Observations of Feature	Rating 1-worst 5-best	Explain why you gave it the rating
Evaluate: What are the best design features for this bandage?				
Evaluate: What improvements does it need?				