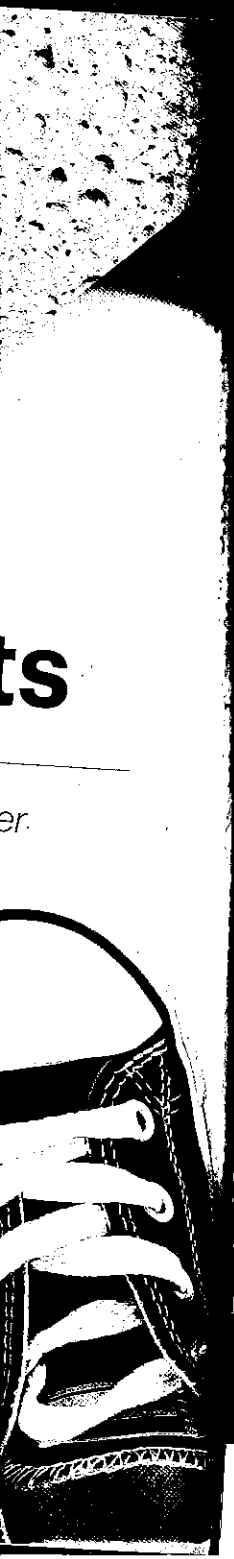


If the Shoe Fits

LET'S LOOK AT THE PROBLEM

One day, the shoemaker has only enough leather for one pair of shoes. He cuts it, and in the middle of the night elves use it to make a pair of shoes. Each night the shoemaker leaves more and more leather on the workbench, and the elves make more and more shoes. The elves leave after the shoemaker and his wife make clothes for them.

What other tools and materials could the elves use to make shoes? What tools and materials would you use to make a pair of shoes?

MATERIALS

- ☐ Reusable resources such as heavy paper, cardstock, cardboard, string, yarn, fabric, felt, foil, plastic wrap, sponges, bubble wrap, foam, and shoelaces
- ☐ Connectors such as tape, glue, a low-temperature glue gun, and Velcro fasteners
- ☐ Tools such as scissors, measuring tapes, rulers, dull darning needles, and mesh plastic canvases
- ☐ Old shoes to take apart such as light-up sneakers, tap shoes, fluffy slippers, or shoes with roller skates; an old sneaker cut lengthwise so the layers are visible (optional)
- ☐ Items for decorating the shoes such as buttons, fabric markers, feathers, pom-poms, glitter, and embroidery floss
- ☐ Paper and markers, crayons, or pencils

TINKER WITH THE MATERIALS

Place the materials on a table. Which materials are good for making shoes? Why? Trace around your shoes (or ask for help to trace around your shoes) on cardboard, cardstock, or heavy paper and cut them out. Decorate your shoes any way you choose.

Take apart old shoes to see how they are made. Save the parts and create a new style by mixing and matching parts and pieces.

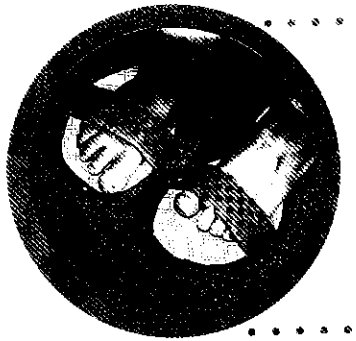
Tinker with an old pair of light-up sneakers. How do they work? Where is the battery? How and when do they light up?

Take apart and find out what's inside other old shoes with special features, such as roller skates, squeaky toddler shoes, fluffy slippers, or tap shoes.

STEM CONCEPTS

geometry / life sciences (human body) / measurement / number concepts / patterns / properties of materials / scientific inquiry / structural engineering / symmetry

If the Shoe Fits



THE DESIGN CHALLENGE

Making Design and create a pair of shoes for the shoemaker.

Engineering Pick an activity or a sport. Design and make a pair of shoes to use for that activity or sport (for example, shoes to wear in the rain, shoes to play basketball in, or shoes to jump in).

WORKING ON THE DESIGN CHALLENGE

- **Think about it.** Look around at the different shoes you and your classmates are wearing. What will you need to do first? Draw or sketch your ideas.

  Engineering. Look at different types of shoes (hiking boots, snow or rain boots, sneakers, ballet shoes) to determine how the construction of certain shoes supports their purpose. Decide what kind of shoes you will make and what activity you will use them for.

- **Build or create it.** Gather your materials and make your shoes.

  Engineering. What materials will you use to help make the shoes comfortable? flexible? What material will you use to help prevent slipping?

- **Try it.** Try them on. Do they fit? Do they stay on your feet when you walk? What happens if you run or jump in them?

  Engineering. Do the shoes you made help you perform better?

- **Revise or make it better.** If the shoes don't work, what can you change to make them better?

- **Share.** Tell someone else about how you made your shoes. Ask them for their ideas about what they would do differently or how they would improve them.

  Engineering. Compare the shoes you created with manufactured shoes. What do you notice?

If the Shoe Fits

QUESTIONS AND COMMENTS

I wonder what would happen if you ____.

Tell me what you are doing.

How would you change the shoes so they fit someone with big feet?

What kind of shoes would you make for someone who likes to go outside in cold weather?

Tell me how you made your shoes stay on your feet.

Why do some shoes have smoother soles than others?

BACK TO THE PROBLEM IN THE BOOK

Are you using the same tools to make your shoes as the ones the elves use in the story? What do you think the elves would say about the shoes you created?

GOING DEEPER

- Look at the difference between a shoe for a left foot and one for a right foot. What is the same; what is different? How do you need to modify your design so you can make a pair of shoes (one for the left foot and one for the right)?
- Make a pair of shoes with shoelaces. Did it work out? Why or why not?
- Make shoes using different materials, such as paper, fabric, vinyl, cardboard, plastic, or leather. What tools would you use for the different materials?
- How could you add lights to your shoes?
- Using a foot measurer or ruler, design and create a custom pair of shoes for your teacher or a friend. Interview them to find their favorite color, fabric, and style. Sketch the shoes and get input from your "customer" before making them.
- Watch a video of athletes playing their sport. Pay careful attention to how their feet move. Do they jump, kick, slide, grip, or run? How would your shoe design change based on these actions?

OTHER BOOKS TO USE

Pete the Cat: I Love My White Shoes / Eric Litwin, illustrated by James Dean

Shoes for Me! / Sue Fliess, illustrated by Mike Laughead

Shoes, Shoes, Shoes / Ann Morris