

# Robot Design Challenge

Teach students about the engineering design process with a fun robot costume project.

## Objective

Students will engage with the engineering process and solve real-world math problems, plus use communication skills to interact with fellow classmates.

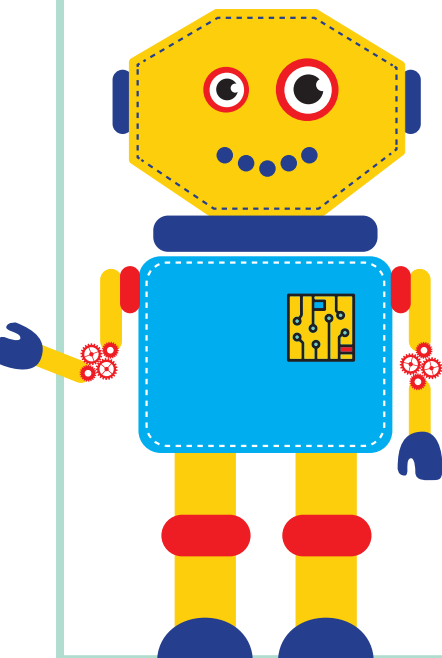
## Time

**Part A:** 40 minutes

**Part B:** 90 minutes (broken into work periods as your classroom schedule allows)

## Materials

- Design a Costume! activity sheet
- All About Me activity sheet
- Rulers, measuring tapes
- Materials for building, such as cardboard, fabric, tape, chenille straws, split brass fasteners
- Graph paper (optional)



## PART A

**1 Initiate** a classroom discussion about robots and their “superpowers.” Explain all the things robots can do, like lift heavy things, visit the bottom of the ocean, and fit into tiny spaces. Ask students which robotic superpowers they would love to have and why.

**2 Distribute** the Design a Costume! activity sheet. Introduce and define the classroom challenge (for item 1 on the activity sheet):

- Design a robot costume that represents you, your interests, and your superpowers.
- Use classroom and recyclable materials to build a design that you can move in.

**3 Review** the steps on the sheet and ask students if they can recognize the engineering design process. Then hand out the All About Me activity sheet and have students reflect on their qualities.

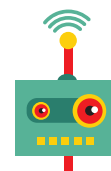
**4 Return** students to the Design a Costume! activity sheet and have them complete the Imagine and Plan sections. Direct them to measure, record, and calculate widths, lengths, and areas for materials and pieces they’ll create. Have them list the materials they will use to build their robot costumes.

## PART B

**1 Have** students complete the Create, Test, and Improve sections of the activity sheet. Circulate to help and encourage them to try on their costumes frequently to evaluate the fit and moveability and make improvements. Let them know that if something isn’t working at first, that’s OK. It’s part of the process. Prompt them to consider swapping materials if the structure isn’t supporting the function. (Tip: Try chenille straws to create bendable elbow joints.)

**2 Invite** students to put on their costumes and mingle at a Robot Party. Get them chatting with these conversation starters:

- How does your design represent you?
- What is your favorite feature and why?
- My favorite part of your costume is \_\_\_\_\_ because \_\_\_\_\_.



## BRAIN BREAK

*Let students channel their inner robots by giving them commands to follow: power down (bend forward), power up (raise arms up), short-circuit (freeze in place), reboot.*

Name \_\_\_\_\_

# ALL ABOUT ME

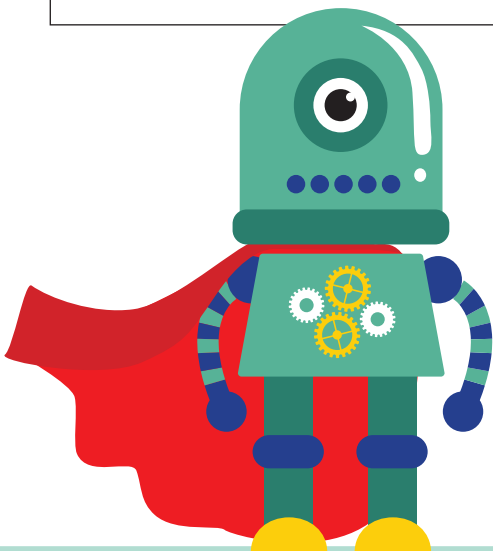
Your robot costume should reflect what makes you unique. Brainstorm with this planner.

**My favorite hobbies**

**My best qualities**

**Three fun facts about me**

**My dream superpowers**



Name \_\_\_\_\_

# DESIGN A COSTUME!

Follow the steps in the checklist to plan and create your own personal robot.

## 1. DEFINE

What is your challenge?

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## 2. RESEARCH

Fill in the All About Me activity sheet to brainstorm costume ideas.

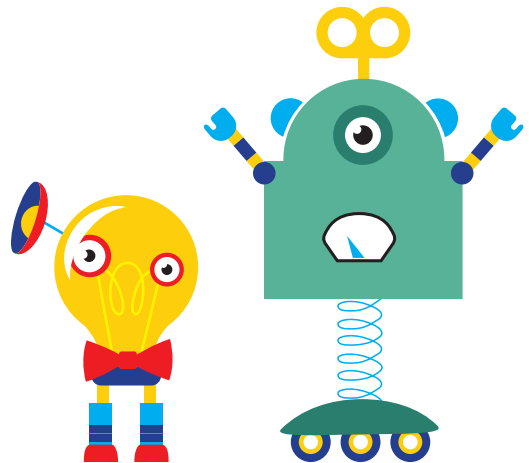
## 3. IMAGINE

Get creative! Use the back of this page to sketch awesome ideas for your costume.

## 4. PLAN

What materials will make your ideas real? Think of materials that fit your needs (like stretchy fabric to go over your knees so you can bend them).

Materials list	How many or how much?



## 5. CREATE

Time to build! Create your costume.

## 6. TEST

Try on your costume as you build it. What is working well?

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What isn't working well?

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## 7. IMPROVE

How can you improve your costume?

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Now do it!