

Lesson 1 | SUPERHERO ENGINEERING DESIGN

Leverage students' excitement about superheroes to inspire a hands-on engineering design challenge.

OBJECTIVE

Students will design, build, and improve a superhero eye mask using the engineering design process.

STANDARDS

NGSS

Grades 1–2

ETS1-1. Define a problem

ETS1-2. Illustrate how an object's shape helps it solve a problem

Grade 3

ETS1-1. Define a problem

ETS1-2. Brainstorm multiple solutions

TIME

60 minutes

MATERIALS

- *Superhero Tools and Functions* nonfiction reading passage
- Make a Superhero Eye Mask activity sheet
- Art supplies for masks (e.g., construction paper, cardboard, chenille stems, yarn, etc.)



Remote Ready

1 News flash! Avengers Campus is calling all heroes to develop their superpowers! Tell students that they are being recruited to find their inner hero. Training begins now!

2 Ask them to think about reasons people wear all kinds of masks.

- Who wears masks and why? (For example: face masks to avoid spreading germs, ski masks to protect from the cold, eye masks to block out light, etc.)
- Why do superheroes often wear masks? (For example: to disguise their identity, to protect their faces, to give them better vision, etc.)

3 Explain that masks are made differently based on their function (what they will be used for). For example, a ski mask might be made of cozy wool because it is meant to keep people warm. Iron Man's mask is made of strong metal and covers his entire head because he uses it for protection.

4 Share the *Superhero Tools and Functions* nonfiction reading passage to show how a tool's shape (structure) connects to its function. Depending on students' needs, read the passage out loud as a class, or allow students to read independently.

5 Ask students how they can create an eye mask to showcase their inner hero. Distribute the Make a Superhero Eye Mask activity sheet to guide students

through imagining, designing, and building an inventive superhero mask using basic art supplies.

Remote tip: Encourage students to use materials available in their homes (dry-food boxes, cotton balls, etc.).

To increase the challenge: Add additional constraints. For example, a mask must be made from a single piece of material, or students cannot use tape or glue in their design and must determine an alternate means of attaching things (e.g., folding).

6 Engage students in testing and improving their masks. For example, they may need to check that they can see through the mask's eye holes, adjust the mask for a more comfortable fit, or make sure that any 3D elements stay fastened.

7 Congratulate students on completing the first step of the hero recruitment process! Hold a superhero eye mask parade in the schoolyard and have kids explain their masks.

Remote tips: Have students draw diagrams of their masks, add a short description, and send it back with completed schoolwork. Collate the drawings into a *We're Superheroes!* book to be photocopied for each student.

If internet is limited, have students email **photos of their superhero masks**. Collate the photos and share a PDF or Google Drive folder with the class.

Hold small-group or whole-class **video sessions** so students can share their work.

Name _____

MAKE A SUPERHERO EYE MASK

Super Heroes like Black Panther and Captain Marvel wear masks. It's part of their identity! What is your superhero identity? Follow the steps below to create your own superhero eye mask.



1 Ask and Think

- ★ What kind of superhero do you want to be?
- ★ What does your mask need to do? (Examples: hide your face OR make it easy for people who need help to find you)
- ★ List your ideas for how to meet this goal.

2 Make a Plan

Pick one of your ideas. Draw your plan for how to make your mask on separate paper. Add labels and measurements.

3 Build Your Mask

You can make changes as you build!

4 Test

- | | | | |
|---|------------------------------|----------------------------------|-----------------------------|
| Does your mask meet your goal from question #1? | <input type="checkbox"/> Yes | <input type="checkbox"/> Sort of | <input type="checkbox"/> No |
| Does it fit and stay on your head? | <input type="checkbox"/> Yes | <input type="checkbox"/> Sort of | <input type="checkbox"/> No |
| Can you see through it? | <input type="checkbox"/> Yes | <input type="checkbox"/> Sort of | <input type="checkbox"/> No |
| Is it comfortable? | <input type="checkbox"/> Yes | <input type="checkbox"/> Sort of | <input type="checkbox"/> No |
| Did anything fall off? | <input type="checkbox"/> Yes | <input type="checkbox"/> Sort of | <input type="checkbox"/> No |

5 Improve

- ★ What parts of your mask worked well?
- ★ What parts of your mask will you change?
- ★ Now improve your mask!

ENGINEERING HERO TIP

You can use string to measure the length of the curve around your head.

ENGINEERING HERO TIP

Heroes run into problems all the time! Then they do their best to fix them.

SUPERHERO TOOLS AND FUNCTIONS

Attention, heroes-in-training! It's time to explore your favorite superheroes' tools before you design your own.

Every tool—including a superhero's suit—has a **structure**. That means the tool's shape and its parts. How do you decide which parts a tool needs? That depends on the tool's **function**—what the tool will help you do. The way a tool is made needs to match what it is used for.

Did you know the suits below did not always look this way? Scientists test new superhero suits and make lots of changes until the suits work!

Captain Marvel's suit is made of **flexible leather** so she can move easily when she flies.



Ant-Man's helmet is made of **thick metal** to protect his head.



Black Panther wears **special sneakers** that absorb sound. That way, he can move silently.

Lesson 2 | ENGINEERING A SAFETY NET

In this superhero-inspired lesson, students use teamwork and engineering skills by building a safety net strong enough to hold an object.

OBJECTIVE

Students will work with a team to design a safety net using the engineering design process, following group norms.

STANDARDS

NGSS

Grades 1–2

ETS1-1. Define a problem

ETS1-2. Illustrate how an object's shape helps it solve a problem

ETS1-3. Compare data from testing solutions

Grade 3

ETS1-1. Define a problem

ETS1-2. Brainstorm multiple solutions

ETS1-3. Test solution to improve the design

CASEL (SEL)

Relationship Skills: Practicing teamwork and collaborative problem-solving

Self-Awareness: Having a growth mindset

TIME

60 minutes

MATERIALS

- Team Up for the Safety Net Challenge activity sheet
- Meet Your Inner Hero at Avengers Campus activity sheet
- Materials for engineering challenge (suggested: yarn, masking tape, paper)



Remote Ready

1 Teamwork on campus! At Avengers Campus, heroes learn how to work together. Tell students that they are ready for the next step in the hero recruitment process—solving a challenge as a team.

2 Invite students to share times when they had to work with others to solve a problem. Share characters such as the Avengers, who have unique strengths but are stronger and more successful as a team than when they work alone.

3 Explain that students will work in teams to solve a design challenge. Teams will build a net that's strong enough to catch an object dropped onto it. After all—even superheroes need safety nets!

4 As a class, determine the **success criteria**—how will students know their design works? (For example, the net must support a book dropped from two feet above.) List these on an anchor chart.

As a class, determine the **constraints**—what materials will they be able to use? How much time will they have to design and build their safety net? How heavy should the dropped object be? Add these to the anchor chart.

5 Before dividing into groups, create a list of what teamwork should look and sound like. (For example, teamwork looks like sharing supplies such as scissors and looking at the person who is talking. Teamwork sounds like, “What do you think of this idea?” and “I can help you with...”).



6 Distribute the **Team Up for the Safety Net Challenge** activity sheet. Have students work in teams to brainstorm, design, test, and improve their safety nets.

Remote tip: Students can observe the teacher building and testing the safety net (based on the students' plan) during a video conferencing session. Students can provide suggestions for improvement during and after the demonstration.

7 Have students use the activity sheet to record results and reflect on teamwork. How did their team of heroes help each other be even more heroic?

8 Distribute the Meet Your Inner Hero at Avengers Campus activity sheet for a family conversation activity plus a chance to win a trip for four to Avengers Campus from Scholastic.

FOR FAMILIES Chance to win a trip for four to Avengers Campus at *Disney California Adventure*® Park!

AVENGERS
CAMPUS

Disney
CALIFORNIA
ADVENTURE

Name _____

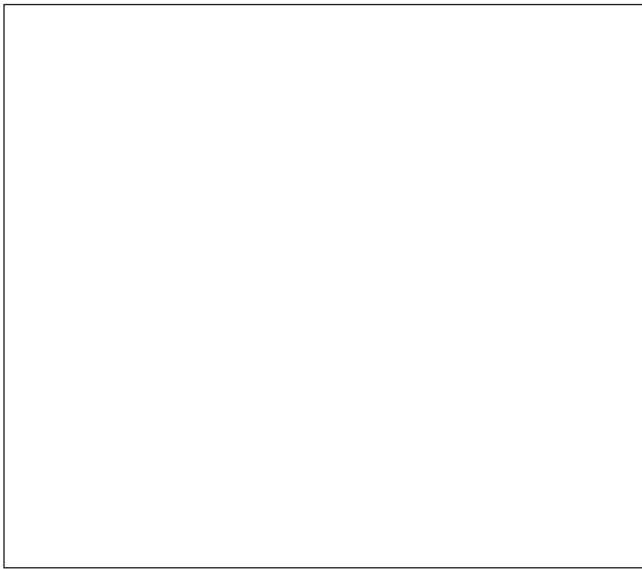
TEAM UP FOR THE SAFETY NET CHALLENGE

At Avengers Campus, Super Heroes practice strong teamwork skills. Show off your teamwork by working with your team to build a safety net that can hold an object that falls on it. Then answer the questions.

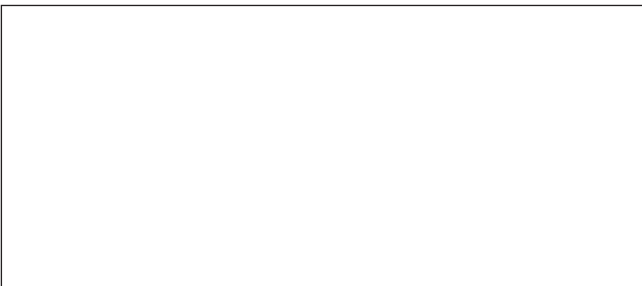
Your Design

1 Look at your building supplies. Talk with your team. Make a plan for your safety net design.

2 Explain your plan below. Draw and label a picture or use sentences.

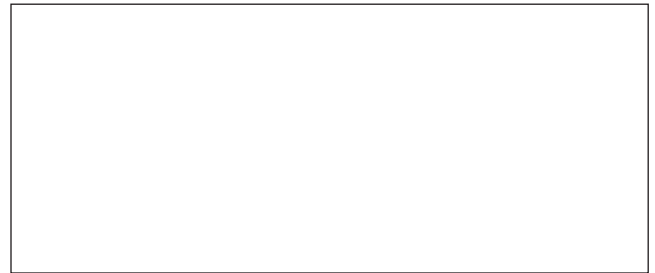


3 Build your safety net. How well did your plan work? What could you fix?

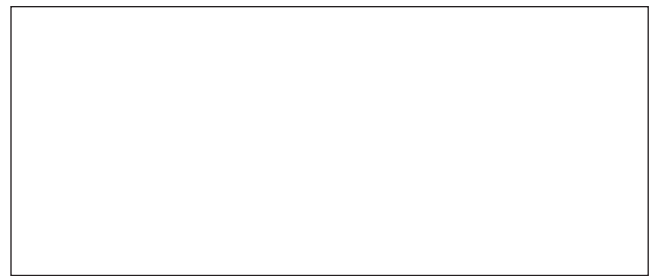


Your Team of Heroes

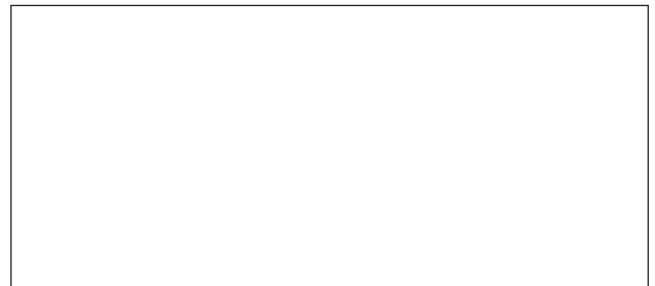
1 How did your teammates support each other?



2 When did a teammate suggest an idea you had not thought of?



3 What is a way your team of heroes could work better together next time?





Lesson 3 | SUPER FUNCTIONALITY

Provide students with a fun introduction to the design process as they invent a functional suit for a new superhero.

OBJECTIVE

Students will design a superhero's suit and explain how the features match the function.

STANDARDS

NGSS

Grades 1–2

ETS1-1. Define a problem

ETS1-2. Illustrate how an object solves a problem

Grade 3

ETS1-1. Define a problem

ETS1-2. Brainstorm multiple solutions

CASEL (SEL)

Self-Awareness: Having a growth mindset

TIME

45 minutes

MATERIALS

- Design a Superhero Challenge activity sheet
- *Superhero Tools and Functions* nonfiction reading passage



1 Tell students that in the final step in the hero recruitment process, they will explore superpowers.

2 Ask students to share their favorite superheroes. Invite them to turn and talk to a partner about what the superhero is able to do and what his or her suit looks like.

3 Prompt students to deepen their thinking:

- How do the parts of the suit match what the superhero is able to do (his or her function)? (For example, the suits that Ant-Man and the Wasp wear have a button that allows them to shrink to the size of an insect so they can sneak into places without being noticed.)
- What would happen if the superhero had a different suit? (For example, would Ant-Man be able to do the same things if he was wearing Black Panther's suit?)

For additional support, guide students to refer back to the ***Superhero Tools and Functions*** nonfiction reading passage from Lesson 1.

4 Explain that students will now have a chance to create their own superhero and to design a suit that will reflect and support their abilities.

5 Think aloud as you model creating your own superhero and suit as a demonstration for the class. (For example: The Amazing Olive travels the world to help stop fighting. She needs to be able to speak many languages, so she has a special earpiece that can translate any language.)

6 Distribute the **Design a Superhero** activity sheet. Have students respond to the prompts to create their superhero character and suit.

7 Invite students to share their creations with a partner or with the class.

8 Congratulate students on completing the hero recruitment process. Remind them they can use their heroic problem-solving and teamwork skills every day to help their community!

EXTENSION

Invite students to write a narrative or create a comic strip featuring their superhero. Promote growth mindset by asking students to show how their superhero tries and fails to solve a problem, but learns from the process and eventually succeeds.

Name _____

DESIGN A SUPERHERO CHALLENGE

When Tony Stark designed his Iron Man suit, he made sure that the suit's **shape and parts** matched its **function** (what it could do). Now, you will create your own superhero, plus their suit!

My superhero wants to help by _____.

My superhero's name is _____.

What My Superhero Can Do	How My Superhero's Suit Helps
<i>Example: fly quickly through the air (like Iron Man)</i>	<i>Suit has jet packs to push it through the air</i>

Draw your superhero's suit. Label the suit's parts.

MEET YOUR INNER HERO AT AVENGERS CAMPUS

Is your family brave like Black Panther? Resilient like Captain Marvel? Committed to justice like the Avengers? Discuss what makes your family heroic, then **enter for a chance to win a trip for four from Scholastic to Avengers Campus at Disney California Adventure® Park!**

TALK

Breaking news: The Avengers have come to Earth to recruit families for training at Avengers Campus!

What makes your family heroic?

Discuss with your family:

- ★ How does your family help each other?
- ★ How does your family stand up for issues that are important to you and your community?
- ★ How does your family deal with tough challenges?



ENTER

Sign up for a chance to win a trip for four from Scholastic to Avengers Campus at Disney California Adventure® Park!

★ How to Enter:

1. Go to scholastic.com/superherosweeps.
2. Enter your contact information by October 28, 2021, for your chance to win.

PRIZE

One lucky winner and three guests will win a trip from Scholastic to Avengers Campus, new at Disney California Adventure® Park! The prize includes a 3-Day, 2-Night trip with at least one participating adult. For more details, visit scholastic.com/superherosweeps/rules.

NO PURCHASE NECESSARY TO ENTER OR WIN. Void where prohibited. Eligibility: Open only to parent/legal guardians over 18 (19 in AL or NE) who have a child currently enrolled in grades K-5 in the 50 US (or DC). Entry period: Entries must be submitted between 12:01 a.m. EST on 9/16/21 and 11:59 p.m. EST on 10/28/21. To enter: Eligible Adults must complete a registration form via the online entry portal at scholastic.com/superherosweeps. One (1) randomly selected Winner will receive a vacation package for the Eligible Adult who submitted the entry, and up to three (3) other guests to *Disneyland® Resort* in Anaheim, California, for three (3) days and two (2) nights (ARV: \$3,568). See Official Rules at: scholastic.com/superherosweeps/rules.

DEADLINE
October 28,
2021



AVENGERS
CAMPUS

DISNEY
CALIFORNIA
ADVENTURE