



# BUILDING A PROTOTYPE

## Overview, Objectives, Inquiry Questions, and Planning

### THINGS TO CONSIDER FOR MILESTONE #2

- Your students will need LEGO® pieces to build their prototypes. You can find a full list of the necessary materials on page 3 of the Teaching Guide.

### LEARNING OBJECTIVES FOR MILESTONE #2

At the conclusion of this milestone, students will be able to:

- Explain why inventors build prototypes before mass producing a new product.
- Build a prototype of their fidget spinner and explain the challenges they faced and how they overcame them.
- Determine the time and money that goes into creating their fidget spinner and set a price for it.

### EXTENSIONS AND ENHANCEMENTS FOR MILESTONE #2

- Could you have your students perform tests on the fidget spinners they brought from home? You could number the fidget spinners and put them on display on a table. The students could take turns trying them and evaluating which one is their favorite. They could write down the features of their favorite fidget spinners, like their colors, designs, and special features. Have your students record their answers on the “My Favorite Fidget Spinner” printable on page 9 of the Student Pack.

### STUDENT INQUIRY QUESTIONS FOR MILESTONE #2

- How can I use LEGO® pieces to create a prototype of my fidget spinner?
- How can I set a price for my fidget spinner by using the time it takes to build it and the cost of the materials?
- Why is it important to build a prototype before creating a large amount of a new product?

### ASSESSMENT FOR MILESTONE #2

- **Formative Assessment for Individual Activity:** Check each student’s “Time and Cost of Materials” printable on page 12 of the Student Pack.
- **Formative Assessment for Group Activity:** As the groups finish their prototypes, meet with them to discuss the challenges they faced and how they overcame them.

- **Summative Assessment:** Have the students complete the response printable on page 12 of the Student Pack for the Inquiry Question, “Why is it important to build a prototype before creating a large amount of a new product?”

### Student Pack

- Page 10
- Page 11
- Page 12

## Project Activities for Milestone #2: Building a Prototype

### PREPARE (Bell-ringer/opener activity)

If students brought in fidget spinners, have them do a little show and tell. This may inspire ideas for others in class. Have them point out any special features.

### PRESENT (Lecture/model)

Tell the students that today they will work on step 3 of the “Fidget Spinner Project Guidelines”. Tell them that they will be building a prototype, or first model, of their new fidget spinner. Show the students the “[Prototyping and Testing - Physical Products](#)” video. Have them turn and talk about why inventors build prototypes before creating the actual product.

Show the students the LEGO® pieces they can use to build their spinners.

### PARTICIPATE (Student/group share, group activity)

Give the students the “Building a Prototype” printable on page 10 of the Student Pack. Have them meet with their groups, get the LEGO® pieces they need, and start building their prototypes. They should answer the questions about it as they work.

As the groups finish their prototypes, give them the “Time and Cost of Materials” printable on page 11 of the Student Pack. They should follow the directions to determine how much to charge for their fidget spinner.

**Formative Assessment:** As the groups finish their prototypes, meet with them to discuss the challenges they faced and how they overcame them.

### PRACTICE (Homework/independent work/extensions)

Give each student the writing response template on page 12 of the Student Pack and ask them to write an answer to the inquiry question for this Milestone: “Why is it important to build a prototype before creating a large amount of a new product?”

### ASSESSMENT

**Formative Assessment for Individual Activity:** Check each student’s “Time and Cost of Materials” printable on page 11 of the Student Pack.

**Formative Assessment for Group Activity:** As the groups finish their prototypes, meet with them to discuss the challenges they faced and how they overcame them.

**Summative Assessment:** Have the students complete the response printable on page 12 of the Student Pack for the Inquiry Question, “Why is it important to build a prototype before creating a large amount of a new product?”