

Grades 6–8

## Day 3 Invention Prototyping

50~60 minutes (hands-on activity)

### Activity Overview

Students will further their invention skills in this activity by iteratively designing and refining their invention solutions using common materials. They will start by finalizing the initial solutions to their invention problem, and then they'll work on the first prototype of the invention solution. They probably will experience failure and frustration, and learn how to embrace and learn from failure during invention. Students will also reinforce their storytelling and drawing skills by drawing or creating digital stories about their invention solution ideas.

### Activity Summary

#### Getting Started (5 minutes)

1. Review the final invention problem that students choose to work on. Review materials and tools in the invention box.

#### Activity 1: Brainstorming and Working on Invention Prototype (30 minutes)

2. Brainstorm and choose a solution to the invention problem that can be accomplished using the invention box.
3. Work on the invention prototype.

#### Activity 2: Telling the Story of your Invention Ideas (20 minutes)

4. Tell the story of the invention solution idea using comic strips or digital stories.

#### Wrap-up (5 minutes)

5. Reflect on the failed experiences and lessons learned.

### Objectives

#### The students will:

- ✓ Learn about hands-on skills of invention prototyping and iterative design
- ✓ Practice how to learn from failure
- ✓ Practice invention storytelling and drawing skills

## Activity Guide

### Materials, Resources, and Prep

- Invention box with common materials and basic tools
- Printed worksheets
- Colored pencils or pens

### Getting started (5 minutes)

Today you'll start creating the first prototype of your invention idea! First, review the invention problem you chose to work on. Also, examine the materials and tools in your invention box to make sure you have enough materials and tools! Remember, when working with the tools, you need to follow the [general safety rules](#).

### Activity 1: Brainstorming and Working on Invention Prototype (30 minutes)

- First, brainstorm potential solutions to your invention problem. The solution should meet the needs of users (you and other family members or friends). You may come up with a few different solutions. Draw or write notes about each solution.
- Do not worry about not knowing the “right” answer! There are countless possibilities. All solutions could be right, as long as they solve problems for the users.
- Choose one solution that can be prototyped using the materials and tools from your invention box. You can add new materials and tools that are available to the invention box, if needed.
- Now, you have an idea of the solution. Start working on your prototype. Ask for help if/when needed.
- Made mistakes? The idea didn't work? These are common when inventors work on prototypes. Experiencing failure is part of the invention process. When a design fails, it is important for the inventor to learn from it so that they can try to avoid similar mistakes in their later designs!
- If you are experiencing failure, do NOT give up. Instead, stay calm and think about reasons:
  - Why did this fail? Is it because something is wrong with the solution idea? Or is it because something was built wrong?
  - If something is wrong with the idea, how are you going to revise the idea?
  - If something was built wrong, what lessons can you learn from it?
- Spend a total of approximately 30 minutes working on the prototype. You will have more time tomorrow to work on the project.

### Activity 2: Telling the Story of your Invention Ideas (20 minutes)

- Next, create a comic story of your invention idea. An important part of the invention

process is to document your thoughts and how they changed so that other people can understand why and how you came up with the invention solution ideas. Now you'll record your story of your invention idea. Draw about how you came up with an idea or multiple ideas to solve your invention problem. It's OK if you tweaked or modified your invention idea during the prototyping.

- Use this [Chapter 2 worksheet](#) to record how you came up with your invention ideas.

### **Wrap-up** (5 minutes)

- Reflect on any failures you experienced during today's prototyping and lessons you learned from them.

*What are some of your failed experiences today? Why didn't they work? What do you think you've learned from them?*