

Grades 6–8

# Day 2 Narrowing Down Your Invention Problem

50~60 minutes (hands-on activity)

## Activity Overview

In this activity, students will develop their hands-on invention skills by creating a multi-purpose digital device holder using cardboard. They will practice using drawings or Scratch to tell stories about their experience in designing a stand for digital devices. Students will also narrow down and select an invention problem they would like to solve at home, solicit feedback from potential users, and create comic strips about why this problem is important to them (and other users).

## Activity Summary

### Getting Started (5 minutes)

1. Review materials in the invention box; make sure that it includes cardboard, heavy stock paper, tapes, and tools (knife and scissors) to work with cardboard and stock paper.
2. Review concepts related to invention.

### Activity 1: Stand for Digital Device Design Challenge (30 minutes)

3. Create a low-cost multi-purpose stand for digital devices.
4. Practice creating a storyboard to show the design.

### Activity 2: Identifying your Invention Problems and Storytelling (20 minutes)

5. Communicate with other users about their needs. Finalize the invention problem.
6. Create comics to tell the invention needs.

### Wrap-up (5 minutes)

7. Brainstorm what the solution may look like and what materials will be needed.

## Objectives

### The students will:

- ✓ Learn about hands-on skills of working safely with cardboard and stock paper
- ✓ Learn about using stock paper and cardboard for invention prototyping
- ✓ Practice understanding the needs of invention users and invention storytelling

## Activity Guide

## Materials, Resources, and Prep

- Heavy stock paper (or cardboard), knife, scissors, packaging tape
- Graph paper and printed worksheet
- Colored pencils or pens

## Getting started (5 minutes)

- In this activity you'll start by examining materials and tools in your invention box. As an inventor, you'll need to be familiar with your box: know what materials and tools you have.
- Next, do you remember anything related to invention we learned yesterday? Should all inventions make radical changes to our society? No, most inventions do not make radical changes. Instead, the most important goal of invention is to help people. Inventions can make people's lives easier, healthier, and more convenient. If you don't remember, review [the video you saw on Day 1](#).

## Activity 1: Digital Device Holder Design Challenge (30 minutes)

- You probably know that inventors have lots of hands-on skills, meaning that they can work with different materials to build things. In this activity, you'll learn and sharpen your skills of working with stock paper by completing a design challenge.
- Read the following design challenge:

*Do you ever get annoyed by your phone or tablet not being able to stand up on its own for over two hours? Your challenge is to invent a low-cost stand using recycled materials like cardboard and packaging tape or scotch tape.*

*Your invention should be flexible so that (1) devices of various sizes can easily fit into the stand, (2) it does not block the speaker of the device, and (3) it allows for a portrait or landscape view of the screen.*

- Now, take 10~15 minutes and use only stock paper (or cardboard) and tape to create your stand. Before you start, read [these general safety rules](#).

## GENERAL SAFETY RULES

- If you are in doubt about how to use a tool, ask!
- Have a plan for what you are going to do with the tool.
- Be mindful of others who might enter into your

workspace accidentally.

- Secure the workpiece.
- Have a balanced stance while using a tool.
- Remove all jewelry, watches, and loose clothing before working with machinery.
- Pin up long hair and wear closed-toe footwear.
- Never work when you are tired or unfocused.
- Leave the workspace cleaner than when you found it.

- Inventing is fun ... but only if it is safe. Make sure that you know all these safety rules before starting the design work.
- Don't know how to work with cardboard? You can watch [Josh Ramos' Cardboard Videos](#) to learn some cardboard-cutting tips and tricks.
- Having difficulty coming up with your own design? You can check out [Josh Ramos' Cardboard Phone Stand](#) for inspiration.
- When you finish your stand, evaluate your own design using the following questions:
  - Does your stand fulfill the requirement of the challenge?
  - What do you like about the stand you made?
- Great! Now you've created your stand. Draw your stand using graph paper or using the graph [paper template](#).
- Don't know how to draw? Check out some examples from the [Visual communication guide](#).
- Congratulations on finishing an invention: your digital device stand! This week, you will create an invention prototype for a problem you want to solve, using materials like cardboard and heavy stock paper. You can invent with materials available to you at home!

## Activity 2: Identifying your Invention Problems and Storytelling (20 minutes)

- Review the 5 problems that you want to solve at home (from Day 1). This week we will only have time to work on one problem. Choose one problem that you think you can create a prototype solution for by using materials in your invention box.
- Before you finalize the problem you want to solve, ask for other people's opinions. Remember, invention is all about trying to help people!
- Think about other people who will likely benefit if you solve this invention problem. Ask for their suggestions by using the three questions below. Record their responses using [this Ideation Feedback form](#).
  - *This is a problem that bothers me a lot (describe the problem to the user). Does this also bother you?*

- *Why does it bother you?*
- *Now I am going to think about some solutions, any suggestions that you'd like to give me?*
- You will need to ask for at least two users' opinions (one potential user could be you, another user could be your parents, grandparents, siblings, etc.).
- Revise the problem based on the feedback, if needed.
- Now that you have finalized your invention problem, let's start creating your story by working on the first page of your invention comic book or your digital invention story. First, you'll need to use drawings or pictures to explain why this is a problem that bothers you and other people. You can find an example drawing in the left column of [this comic strip about 6-pack rings](#).
- Your task is to create Chapter 1 of your comic book or digital story about your invention. Use this [worksheet to work on Chapter 1](#).

**Wrap-up** (5 minutes)

- Take a few minutes to start thinking about potential solutions to your invention problem and materials that you'll need.  
*What are some potential solutions? Which ones can be done using the materials and tools that you have?*