Building Blocks
Engineering Our Community

STEM Activities for Kids Ages 10–13
Unit 3: How an Innovation Functions

BOYS & GIRLS CLUBS
OF AMERICA

Activity 8: How can we show how innovative designs work?

Get Prepared

What kids will do: Create flowcharts to show how their innovations will work and how people in their community will use them

Time needed: 45 minutes, plus one additional 45-minute session (*optional*)

What you will need:

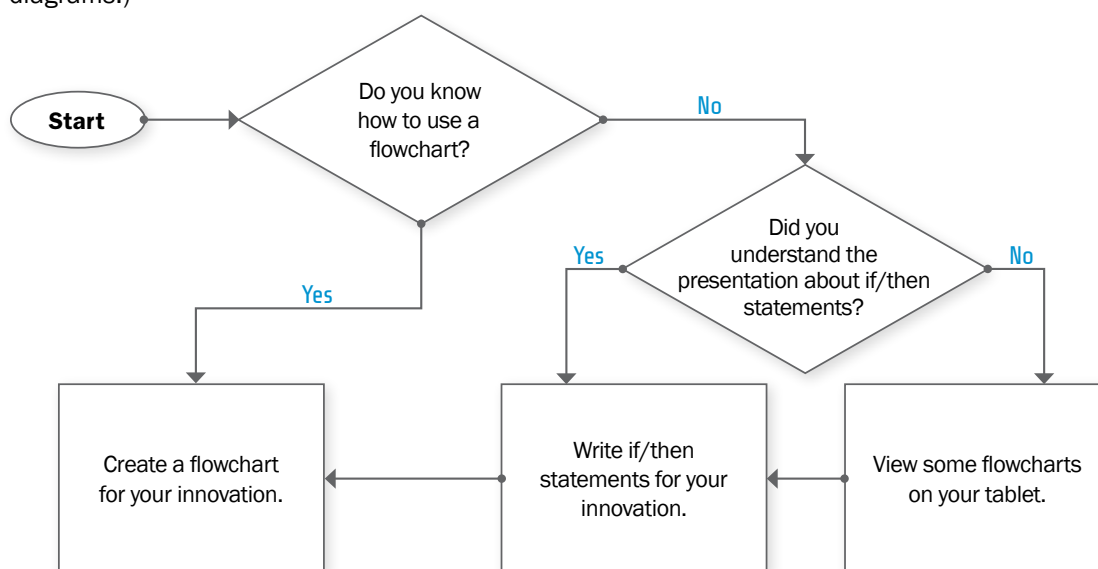| Printouts	Materials
• Activity Sheet I: Set the Scene	• paper
	• pencils
	• markers or colored pencils (*optional*)
	• glue or tape (*optional*)
	• poster board (*optional*)

Engineering in the Community 5 minutes

Session 1

1. Explain that engineers have many tools to help decide exactly how an innovation will function. Ask kids: *What are some ways that engineers could show the community how an innovation will work?* (Answers might include: creating models, graphs, charts, computer simulations, drawings, and diagrams.)

2. Explain that a flowchart is one tool engineers use to show how an innovation will function. A flowchart is a diagram that uses boxes and arrows to show the steps involved in a process, the order in which the steps occur, and the possible outcomes of each step.

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Activity 8: How can we show how innovative designs work? (continued)

Use the Tablets! 40 minutes

1. Show kids an image of a flowchart on your tablet: **bit.ly/1qYGJcP**. Point out that flowcharts show a series of actions and reactions that could be difficult to explain in words alone. Because flowcharts outline how steps connect, they can be used to show how an innovation will work.

2. Have kids access the **Simple Flow Chart app** on their tablets. Explain that they will use it to create flowcharts for their innovations. Tell them that this chart will detail how their innovations will function and how residents in their community would use them.

3. Discuss the importance of if/then statements when devising a flowchart. An if/then statement states: If _____ step happens, then it causes _____ step to happen next. If/then statements allow people to plan out exactly how an innovation will work and react to the person using it. Tell kids that these statements will help them keep track of all the steps in a process.

4. Instruct kids to use the **Simple Flow Chart app** to create if/then statements for their innovations. As they record each interaction from the innovations on their flowcharts, they will think more deeply about what happens during each step of their innovations in action.

STEM Challenge! (optional) 45 minutes

Session 2

1. If you would like to add a session, prepare your kids to do more! Let them know that a flowchart may reveal how an innovation will function, but it has a downside. It's so technical it doesn't give a good overall picture of the innovation at work. A more visual way to show an innovation in action is with a storyboard. A storyboard is a type of graphic organizer that shows a sequence of illustrations acting out a scene, sometimes with explanatory text or dialogue.

2. Use your tablet to show kids the storyboard examples at: **www.scholastic.com/teachers/article/what-are-storyboards**. Ask kids what they notice about how the storyboards are organized.

3. Hand out **Activity Sheet I: Set the Scene**. It will guide kids through the steps necessary to plan and draw storyboards of their own, choosing the best sequence of illustrations to represent community residents using their innovations.

BOYS & GIRLS CLUBS
OF AMERICA

NAME: _____

Set the Scene

A flowchart may reveal how an innovation will work, but it doesn't give the whole picture. To really show your innovation in action, you're going to create a storyboard by following the steps below. It will show, in a series of images, how people in your neighborhood will use your innovation.

1. **Plan Your Panels:** Jot down some ideas for a series of illustrations that will show residents of your community using your innovation. You will use six sheets of paper as your six storyboard panels. The panels should tell a visual story like a scene in a movie. Make sure the scene unfolds panel by panel in a logical order so that anyone who views it will understand the steps of how your innovation works.

2. **Ready, Set, Draw:** Begin drawing rough pencil illustrations for each panel in the storyboard template below. Work together as a team to decide whether or not the sketches are effective. Make revisions to be sure you're presenting your innovation in the best way possible. When done, add final details, outlines, and color to the panels.

3. **Mount Your Storyboard:** Arrange the panels in order on a piece of poster board in two rows of three. Give your storyboard a title and add text or dialogue underneath each panel to help explain what's happening in each. Make sure you make any text on the poster large enough for an audience to see.