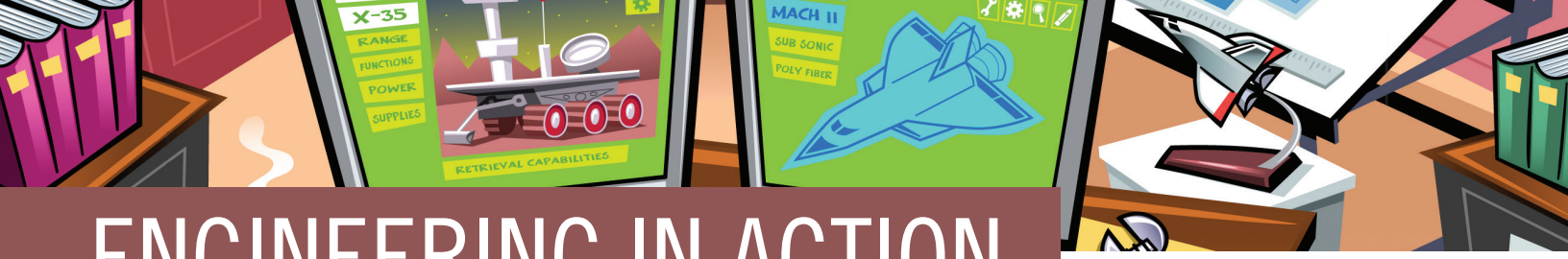
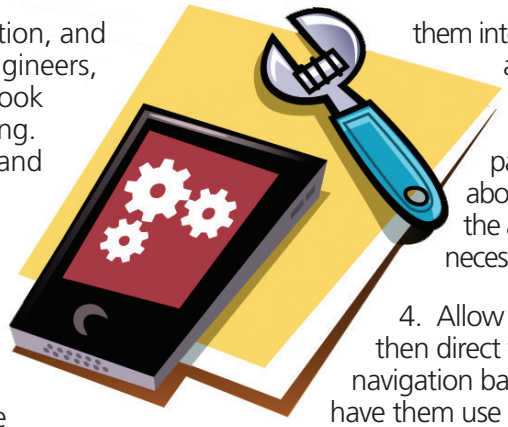


ENGINEERING IN ACTION

Teacher's Guide

This activity builds on the video content provided by the free *Engineering.com* app available in the Engineering section of **STEM Mobile Labs**.



Engineering.com provides news, information, and resources for the global community of engineers, and can provide students with an inside look into the wide-ranging world of engineering. The app features dozens of video shows and channels, including:

- *This Week in Engineering* — offers an upbeat look at what's new in the world of engineering.
- *Learning Series* — spotlights some of the top engineering achievements and business leaders of today.
- *Product Design Show* — investigates the engineering behind consumer and industrial products.
- *Some Assembly Required* — takes viewers step-by-step through the engineering design process as the show's host builds sometimes-wacky and interesting things.
- *Engineering How-To's* — provides an engineering perspective on projects ranging from folding a T-shirt to building a metal detector.

All these videos can provide students with a fresh perspective on engineering and the many pathways open to them if they pursue a career in engineering.

1. Begin by distributing copies of the activity sheet to your students. If they have not installed **STEM Mobile Labs** already, have them scan the QR code on the sheet or use their app store's search feature to download **STEM Mobile Labs** onto a smartphone or tablet.

2. Have students open the Engineering section of **STEM Mobile Labs**, and take a moment to review the free apps listed there. (Note: The selection of apps is slightly different for Apple and Android devices.) Discuss the different branches of engineering represented by these apps, asking students to give examples of engineering projects for each one. Discuss also how different engineering disciplines intersect — for example, how aerospace and mechanical engineers would likely collaborate on a space project — and how every engineering discipline connects to science, technology, and math.

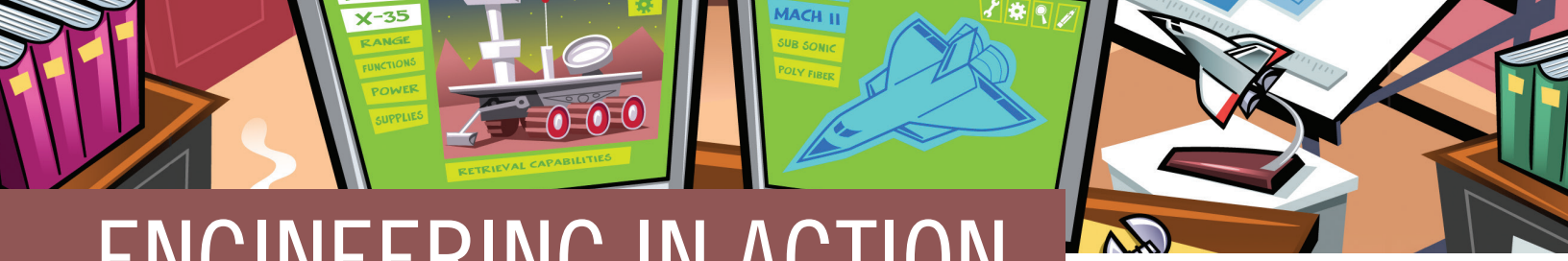
3. Tell students that they will be using the *Engineering.com* app to undertake an engineering project of their own. Have students download and install the app, then divide them into small groups to complete the activity. Group students who do not have a smartphone or tablet with those who do, so that everyone can participate. You should also ask students about their data plans and have them use the app on your school's Wi-Fi network, if necessary, to avoid unexpected charges.

4. Allow students time to explore the app, then direct them to the Videos tab in the navigation bar at the bottom of the screen, and have them use the Channels button to see all the video series available through *Engineering.com*. (Note: You may wish to stagger student viewing of videos to avoid overloading your school's wireless network.) Tell students to review the *Some Assembly Required* and *Engineering How-To's* channels for a project their group can complete together. Remind them that an important consideration for any engineering project is recognizing constraints, such as available time and resources, and guide them toward projects that fit the constraints of your classroom.

5. Have students use the chart on the activity sheet to record how they followed the engineering design process in completing their project. When the projects are complete, have each group demonstrate and explain its project to the class.

6. For Part 3 of the activity, distribute copies of the activity sheet and have each group use the engineering design process chart to develop and complete an original project, similar to those shown on *Engineering.com*. As they work on their projects, have students use their mobile devices to keep a video record of their progress, which they can edit into a how-to video like the ones on *Engineering.com*.

7. To extend the learning, you and your students can explore other examples of how mobile technology is providing engineers with new tools and resources. Use the search feature at your app store to discover a variety of levels, measuring devices, gauges, calculators, guides, and other mobile apps that help engineers on the job. Ask students to brainstorm projects where an engineer might use these apps, and encourage them to suggest new engineering app ideas of their own.



ENGINEERING IN ACTION

Reproducible Master

Engineers are the masterminds behind mobile technology. All the sensors, satellites, cellular networks, and digital systems that power your smartphone or tablet were designed and built by engineers. And now, thanks to mobile technology, you can test your own talents for engineering by exploring all the many ways engineers have shaped our world.

PART ONE Download **STEM Mobile Labs** to your smartphone or tablet by scanning the QR code on this activity sheet or using the search feature at your app store. Touch the Engineering door on the **STEM Mobile Labs** homescreen to find some of the best free apps available for all branches of engineering. Talk about how these different branches cooperate on engineering projects, and how mobile devices can help engineers with different specialties work together.

PART TWO Now use **STEM Mobile Labs** to download the free *Engineering.com* app, which includes dozens of videos that give you an insider's look at the world of engineering. Work in small groups to explore this app, then look through the videos on the *Some Assembly Required* and *Engineering How-To's* channels for a project you can complete with your group. As you work on the project, use the chart to track your progress through each stage of the engineering design process.

Video Title:	
1. Define the Problem	
• Project objective	
• Requirements and constraints (time and materials)	
2. Develop Solutions	
• Design idea	
• Design procedure	
3. Optimize Results	
• Evaluation (did it work?)	
• Ideas for improvement	

PART THREE Ready to try engineering on your own? Work with your group to brainstorm ideas for a project like the ones featured on the *Engineering.com* app. Then use a fresh copy of the engineering design process chart to organize your project. As you work on the project, use your mobile devices to keep a video record of your progress, so you can create your own how-to engineering video!

NOTE: Standard data rates apply. If necessary, download and use these apps on a Wi-Fi network to avoid unexpected charges.

The Wireless Foundation

Want to see more amazing Science, Technology, Engineering, and Math apps? Explore the rest of the STEM Mobile Labs app to find innovative ways to use your mobile device for classwork, homework, and test prep. Available for Apple and Android smartphones and tablets.