ENGINEERING TEACHER TOOLKIT

Grades K–8

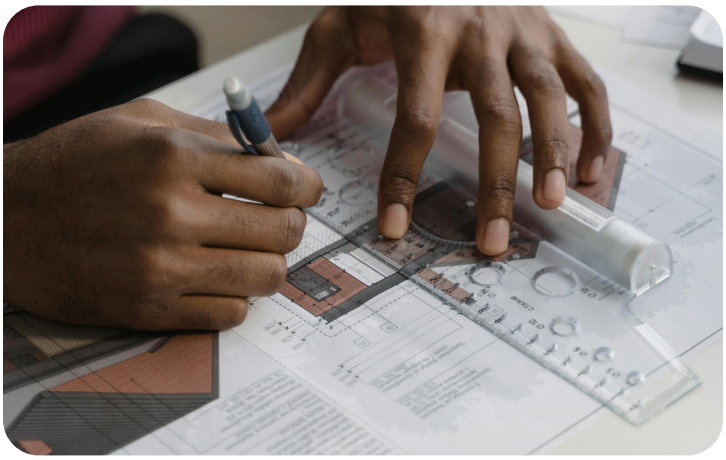
Dear teachers,

Thank you for welcoming Pacific Science Center's Science on Wheels Engineering program into your school! Please enjoy these additional resources that can be used in your class or sent home with families to help students continue to build on the themes addressed during their Science on Wheels day.

AFTER YOUR SCIENCE ON WHEELS VISIT

DISCUSSION PROMPTS

Lead a 5–10 minute group discussion after your Science on Wheels visit.



- What did you like best about the Science on Wheels Engineering program?
- What part(s) were most challenging for you?
- Engineers design solutions to problems, test a prototype or first draft, and then redesign their solutions based on what did and didn't work. Why do you think engineers redesign their work over multiple drafts? Can you remember a time when you made a first draft or prototype of something and then improved it after testing or feedback?
- Social Emotional Learning connection: Often in engineering, our first draft designs don't work the way we want. This is normal and OK, but it can be frustrating! What are some strategies you can use to help yourself cope with that feeling of frustration?

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ADD ON A DIGITAL DISCOVERY WORKSHOP*

We recommend adding the paired Digital Discovery Workshop Think Like an Engineer to deepen the impact of your students' Science on Wheels experience. Focusing on social-emotional skills and Next Generation Science Standard ETS2.B Influence of engineering, technology, and science on society and the natural world, this specially designed virtual program helps learners reflect on key themes from the Science on Wheels day.

- Digital Discovery Workshops are included for low-income groups, and $200 for general groups. Receive a 10% discount when you book three or more Digital Discovery Workshops.
- 40-minute live, virtual programs for up to 50 students. Book as many Digital Discovery Workshops needed to reach every participating student.
- Use the **Think Like an Engineer Scheduling Link** to select a date and time* for your classroom's digital workshop.

Think Like an Engineer Digital Discovery Workshop: What do bakers, astronauts, and accountants have in common? They all need to think like engineers! In fact, we all do sometimes. Connect to your Science on Wheels experience while building important skills in empathy, reflection, and collaboration. Can you think like an engineer to use these skills in a design challenge—making the perfect sweater?

**Note: while the scheduling page recommends booking the digital workshop prior to your Science on Wheels day, we are more than happy to accommodate groups attending after their Science on Wheel experience.*

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Show us how you're being curious! Share your results with us.

PACIFIC SCIENCE CENTER

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ACTIVITY GUIDES AND VIDEOS

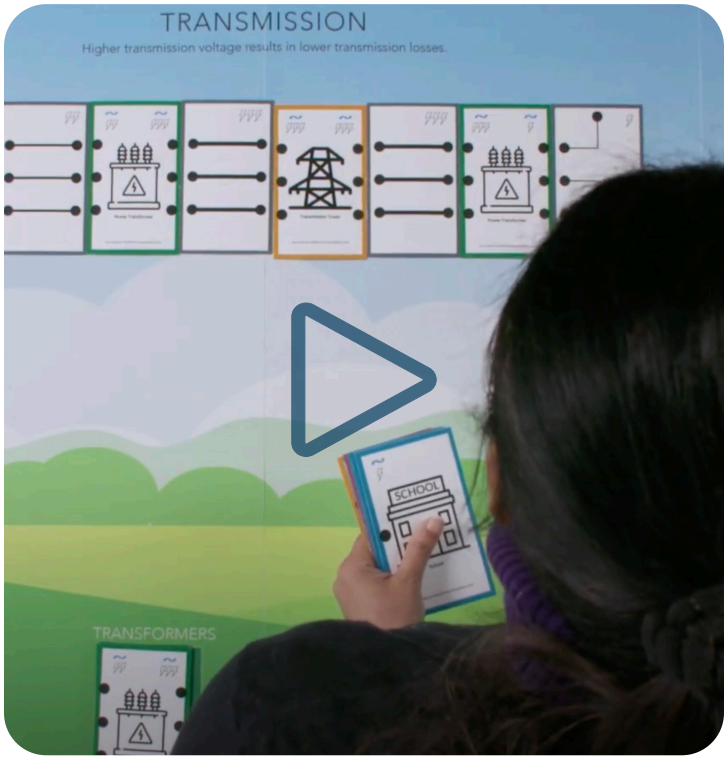
These optional extension resources help students enhance their observation skills and connect to their Science on Wheels experience. These can be used within the learning space or shared with students to do at home with their families.

ACTIVITY GUIDES

- **Design a Solution** | **Diseña una Solución**: Use your engineering skills to design new inventions that can solve problems, using natural and renewable resources. Activity time: 15–30 minutes.
- **Wind Powered Cars** | **Vehículos Impulsados Por El Viento**: Design a vehicle that is powered by the wind, test your invention, and redesign it to make it even better. Activity time: 30–60 minutes.
- **Keeping it Cool** | **Manteniéndolo Fresco**: Become a materials engineer as you test different materials to find out which trap heat and which keep things cool. Activity time: 20 minutes.
- **Cricket Wicket Knockdown: 2020 Engineering Challenge**: Can you build a simple machine to quickly and repeatedly knock down a wicket? How many knockdowns can you make in three minutes? Written instructions for this challenge and all the annual Science Buddies Engineering Challenges can be found **here**. Activity time: 30+ minutes.

CAREER VIDEOS

- **Engineering: Exploring the Power Grid with Malini Ghosal**: Learn more about one of the engineers featured in the live assembly: Malini Ghosal. Discover how electricity flows through the power grid to make our lives possible and hear Malini answer student questions about what it's like to be a power systems engineer, how electricity travels long distances, and more! Video length: 8 minutes.
- **Engineering: Baking Outside The Box With Jacob Swiezy**: Meet Jacob Swiezy, an electrical engineer and bakineer! Hear Jacob answer student questions about what got him interested in engineering, and about his experience combining baking and engineering as a bakineer on Netflix's show Baking Impossible. Video length: 5 minutes.



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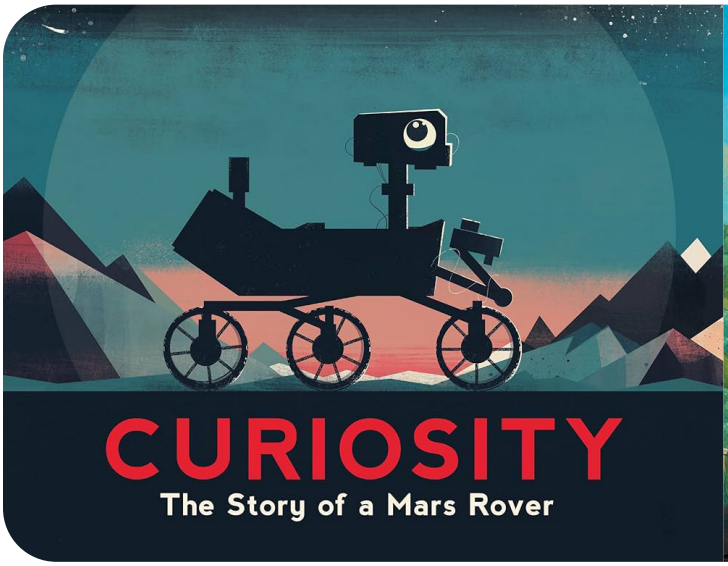
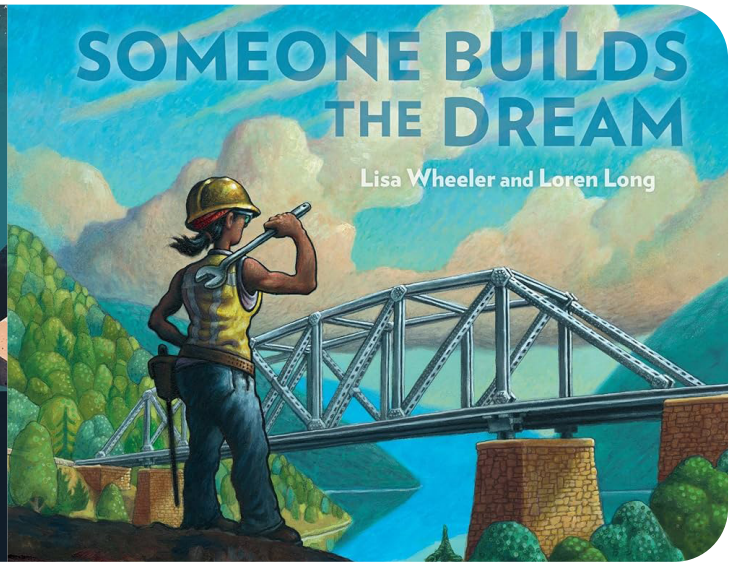
READING LIST

- Check out the **Science on Wheels: Engineering reading list** for STEAM books related to the program themes.





For more activities with simple materials, check out the **Curiosity at Home** / **Curiosidad en Casa** *web page. Explore activity sheets by age group and topic in both English and Spanish.*