



Engineering at Home:
Sounds of Celebration
Activity Book



Try engineering as a family!

Purna and Ved have a problem. They want to play music for their grandparents, who are coming from India to visit them, but they don't have any instruments. Thankfully, they know how to think like engineers. **Engineers are people who figure out how to make things that solve problems.** Try this activity as a family and you'll be thinking like engineers, too!

This activity challenges you to design instruments to play together for a special celebration. What do you want to celebrate? What kind of music will you play? Here's what you'll need to get started:

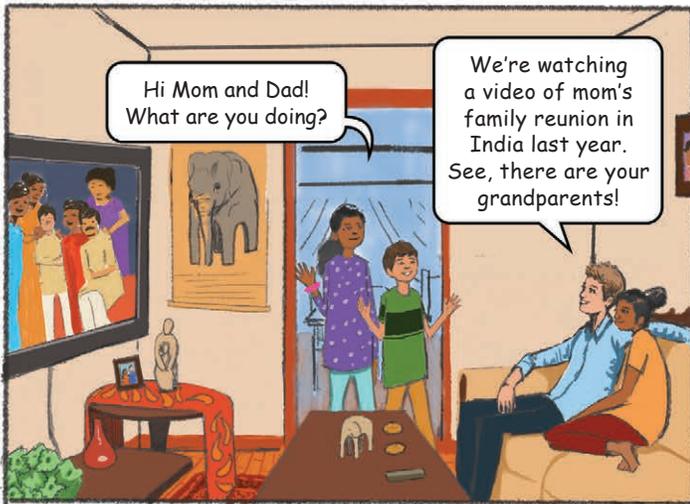
- **The Celebration** – You'll need to choose a special person, event, or occasion to celebrate together as a family. It can be a birthday, wedding, holiday, family reunion, or cultural tradition. The possibilities are endless!
- **The Sounds** – Think about the music that you want to play for your special celebration. What kinds of sounds will you hear? What instruments will you create to make those sounds? A string instrument like a guitar? A percussion instrument like a drum? A wind instrument like a flute?
- **The Materials** – You'll need to gather some materials that your family can use to create your instruments. Consider materials such as rubber bands, craft sticks, and pencils. Inexpensive, recyclable, or non-breakable items work well, especially ones that make different kinds of sounds. The more materials you gather, the more sounds you can make, and the more creative you can be!



Engineers use a variety of skills when they design solutions to problems. This activity supports the development of critical thinking, communication, creativity, and persistence among children. Best of all, it's a fun way to connect as a family!

Children as young as four can participate, though they may need a bit more support. You can read this activity book with your child, or, if they're ready, let them read to you!

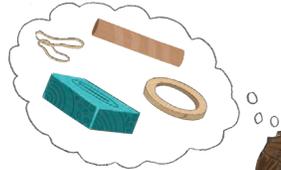
For more engineering resources, visit www.eie.org/families.



Turn the page to help Purna and Ved make musical instruments to play for their grandparents.

Engineers are people who figure out how to make things that solve problems.

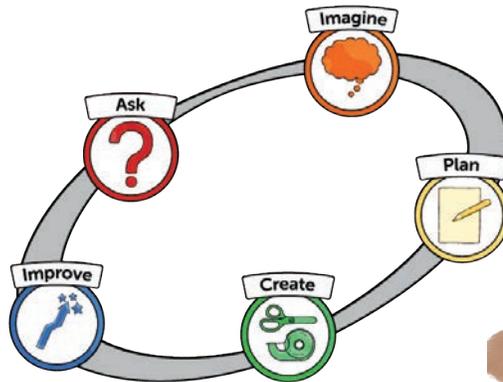
They break the problem down into steps that are easy to follow. First, they **ask** questions about the problem . . .



. . . then, they **imagine** possible solutions.



Next, engineers make a **plan** . . .



. . . then, they **create** and **test** their solution. Finally, they **improve** it to make it better!

Let's think like engineers! We'll follow these steps to make our own musical instruments!



We can work together! Let's start by **asking** questions. What do we need to know to get started?



What kind of instruments should we make?

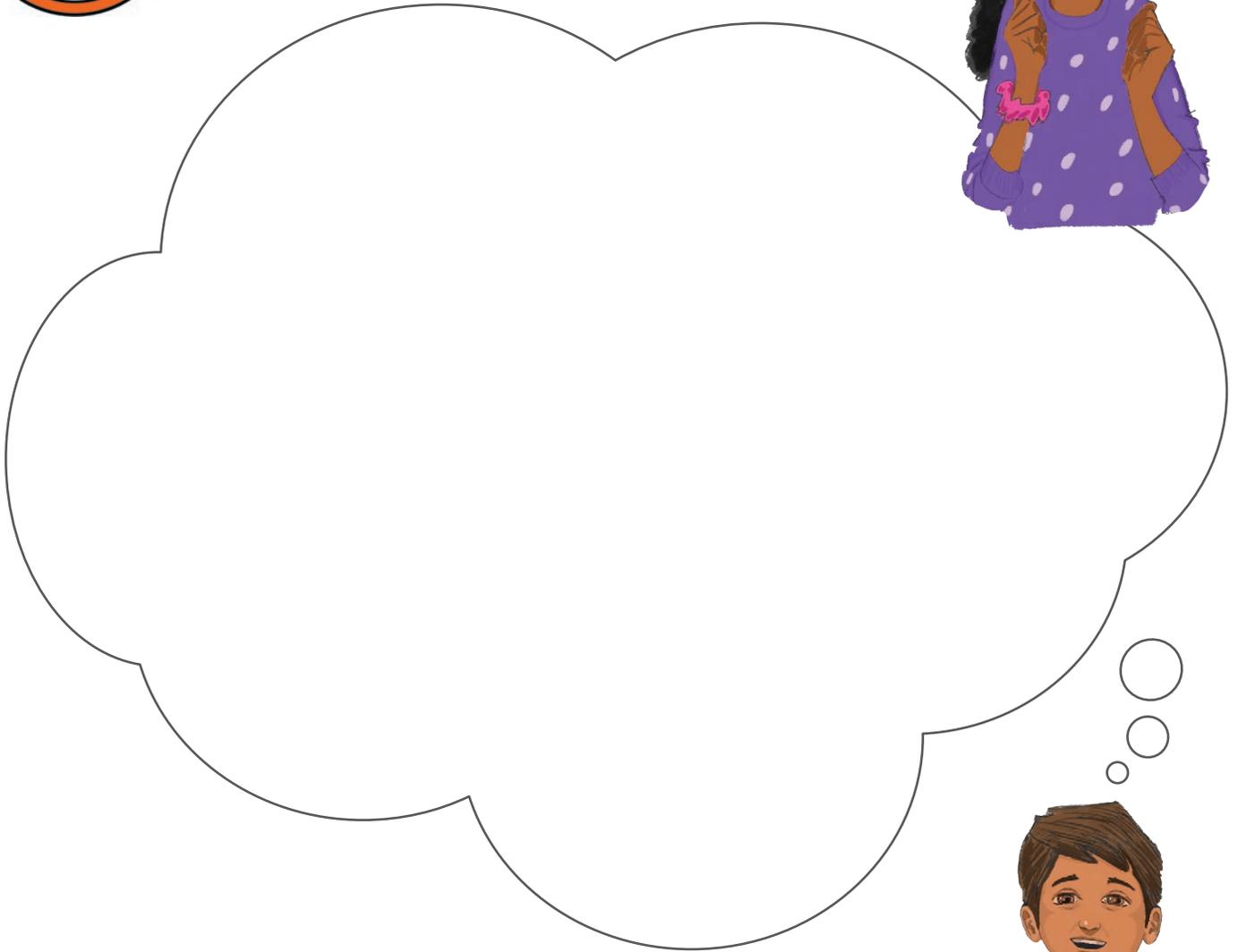


Let's think about different sounds that we want to hear. Then we can make some music of our own!

**What kind of instruments will you be creating?
What kind of sounds will you be making?
Find things that you could use to make different sounds.**



I know what's next! Engineers **imagine** many creative ideas to solve the problem before they pick one.



Hmm . . . what are some ways to make different kinds of sounds?



What ideas do you have? Write or draw them above.

Talk as a family about what you want to try.
Find some materials you can use to build your instruments.



Plan

**What will your designs look like?
Draw pictures of your designs.**

We're almost ready to build, but first we need a **plan**.



Drawing pictures of our designs helps us remember how all of the parts fit together.

List your materials here.

_____	_____
_____	_____
_____	_____



Create



It's time to **create** our designs!

We're so excited to find out if they work!



Create and test your designs! Did they work?
Talk as a family about how your designs worked.
What worked well?
What didn't work well?



Improve



Engineers LOVE to **improve**.
They learn from their mistakes and
make their designs even better!

If they don't work, that's okay.
We can always **improve** them.





How can you make your designs even better?

Talk about it together or have each family member draw a picture of a new idea. Then create and test your instruments again!

It can take many tries to make a design work. We've got to keep at it!



Congratulations!

You followed the steps of the engineering design process and solved a problem!



Engineering activities like *Sounds of Celebration* are a great way to develop useful skills like critical thinking, communication, creativity, and persistence. They're also a lot of fun! Here are a few ways that you can extend the activity and continue the fun as a family.

- 1. Do you like to share your ideas?** Tell friends or other family members about your designs. You can play music for them or send them pictures and videos to show how your designs work.
- 2. Do you like to create?** Use your imagination to create an all-in-one instrument that uses wind, strings, and percussion to play a variety of sounds. Can you change how loud or quiet it sounds? Can you change how high or low it sounds? You can become your own one-person band!
- 3. Do you want a challenge?** Choose a specific song for your family to play together using the set of instruments that you create. Practice playing a few simple tunes together before moving on to a more complicated song.
- 4. Do you want to learn more about traditions and musical instruments?** Interview members of your family, such as grandparents, aunts, or uncles. Ask them about your family traditions and cultural celebrations. What kinds of music are played there? Consider playing your instruments at one of these events.
- 5. Do you like solving problems?** Think about a new problem you can solve using engineering.
 - What's the problem?
 - What could you create to solve it?
 - What materials will you need?
 - How will you test your design?

What engineering problem will we solve together next?!



Keep engineering together!

Visit www.eie.org/families for more free engineering activities from the Museum of Science, Boston.

Families: Share your designs with us!

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