



Museum of Science.

EiE

Families
and STEM Events



Engineering at Home: **Keep It Watered!** Activity Book



Try engineering as a family!

Luis and his mom, Guadalupe, have a problem. They have been growing tomato seedlings to plant in their neighborhood community garden. The seedlings need to be kept moist at all times. But the family is planning a trip to visit relatives. Thankfully, Luis and his mom 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!

Keep It Watered! challenges you to design a way to keep plants watered while you are away from home. What will you design? A drip system that continuously delivers a small amount of water? A setup that uses soaked materials to deliver water? Here's what you'll need to get started:

- **Materials** – You'll need to gather some materials that your family can use to create your design. Inexpensive, non-breakable items such as recyclables work well. Think about objects that hold water, absorb water, or release water. The more materials you gather, the more creative you can be!
- **Testing Station** – In the story, Luis needs to keep his seedlings watered while he's away. To test your solution, use a house plant you already have or find an empty container and fill it with soil. A recycled plastic container or an old milk carton with the top cut off will work well. Poke some holes in the bottom so water can drain out and place the container in a bucket to catch the water. Remember, your challenge is to keep the soil moist throughout the container.



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 it to you!

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



Turn the page to help Luis find a way to keep his plants watered while the family is away.

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

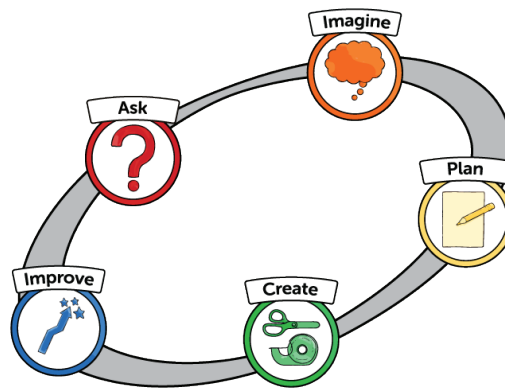
They break the problem down into steps that are easy to follow. First, they **ask** questions about the problem . . .



. . . 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 something that keeps our plants watered while we're at Tía Camila's!



We can work together! Let's start by **asking** questions.





Hmm . . . what do we need to get started?

Let's think about the plants. Do they need a lot of water or just a little? Will they survive sitting in a bowl of water, or do they need the water to drain out?



What should we use to test our idea? We could use a potted plant. A pot with just soil would also work. Our idea needs to keep the soil moist for a week. . . .

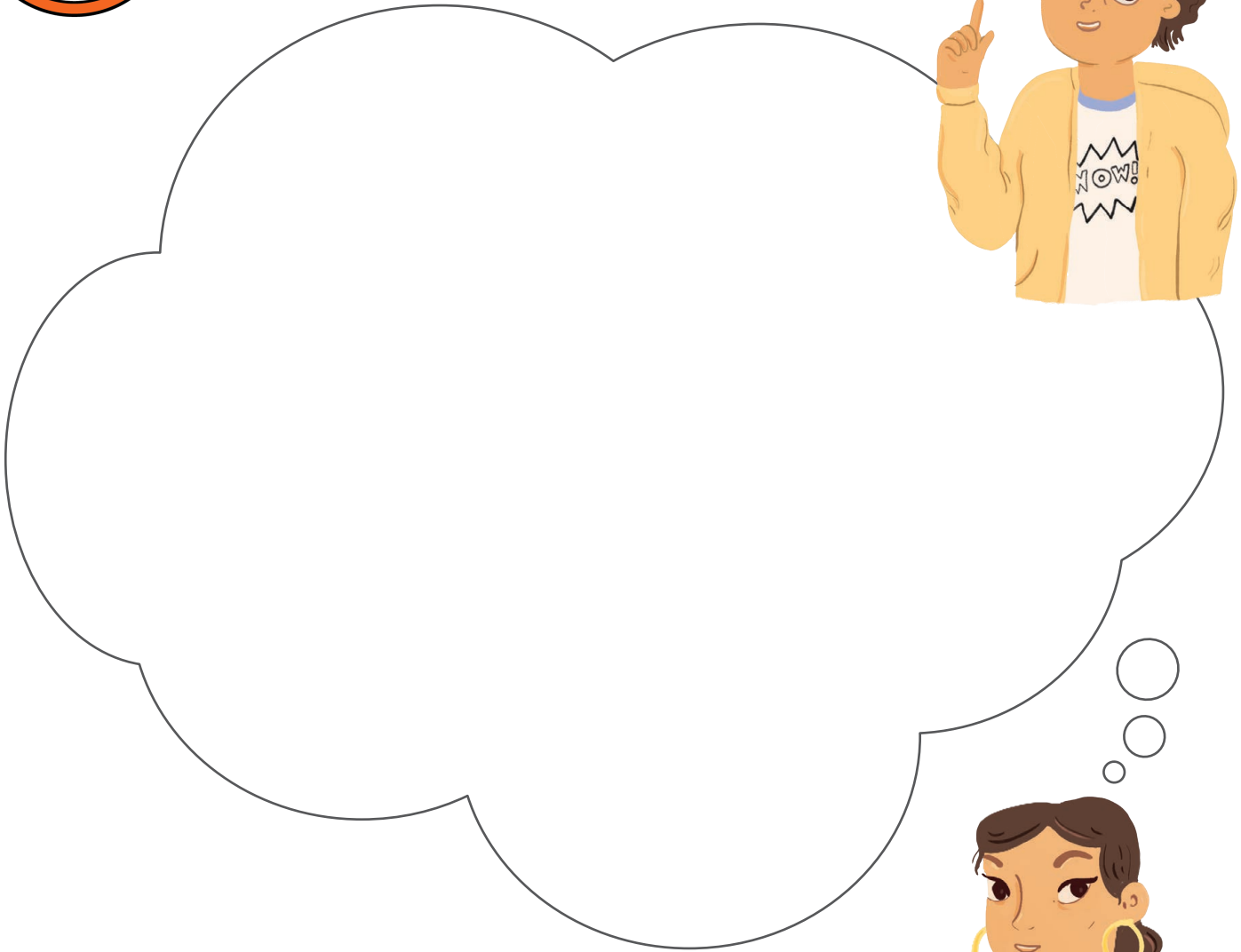


Where will you test your idea?
How will you test it—on a house plant, a garden plant, a pot of soil, or something else?

How will you know if it works?



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



Hmm, what are some ways of getting water to plants when no one is home to water them?



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 it.



What will your design look like?
Draw a picture of your plan!

Before we build,
we need a
plan.

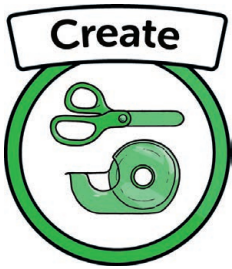


Drawing a picture of our design helps us
remember how all the parts fit together.

List your materials here.

_____	_____
_____	_____
_____	_____





Create



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

We're so excited
to see if it works!



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



Improve



If it doesn't work, that's okay.
We can always **improve**!



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



How can you make your design even better?

Talk about it together or
draw a picture of your new idea.
Then create and test it 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!

We did it! We used
engineering to keep our plants
watered while visiting
Tía Camila.



Engineering activities like *Keep It Watered!* 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 design. You can take photos or videos to show them how it works.
- 2. Do you like to create?** Find different materials and create a whole new design to help Luis keep his plants watered!
- 3. Do you want a challenge?** Grow your own plants. If you have dry beans, other seeds, or kernels of popcorn (un-popped, of course!), plant them and design a way to keep the soil watered. Keep a journal and record your findings after a week, two weeks, or even a month.
- 4. Do you like to draw?** Draw your own picture or comic to show how Luis and his mom solved the problem.
- 5. Do you like to explore your community?** Do research to learn if there is a community garden in or near your neighborhood. Visit the garden and find out what tools or designs they use to help solve problems, such as watering when members are away. Share what you find.
- 6. 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 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!
Tag us on social media.
Twitter & Instagram: @eie_org #eiefamilies
Facebook: @eie-mos #eiefamilies



Illustrations by Melissa Chaib, Mexico