

STEM KIT

PARENT GUIDE BOOK



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Introduction to Early Learning STEM Kit

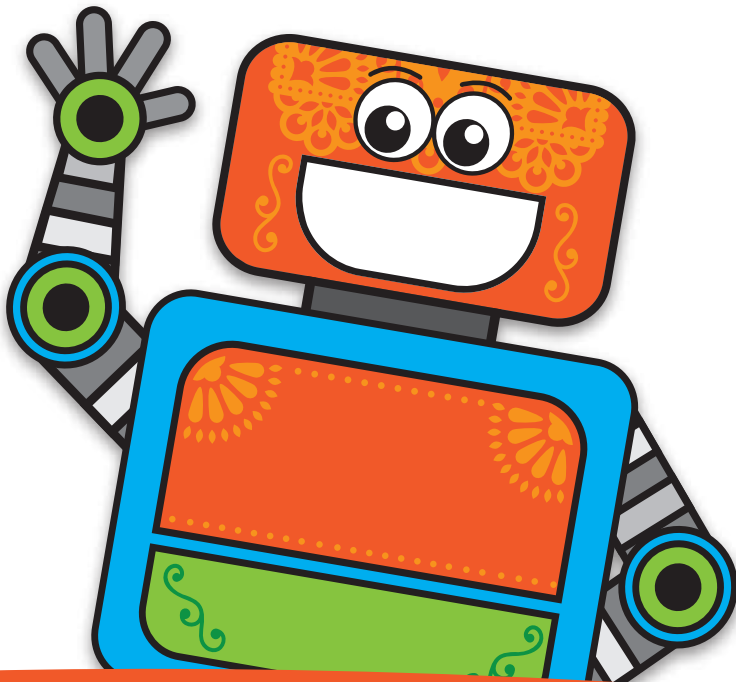
A Message for Parents and Caregivers

You may have heard about the importance of teaching and learning STEM so that our children will be prepared for the future. STEM stands for Science, Technology, Engineering and Math. You may not realize it, but you already use STEM every day. It is all around us!

STEM is a way of looking at the world, asking questions, using tools, building things, and solving problems. You don't need to be a scientist, engineer or math genius to have fun with STEM. You just need to **be curious**, like young children naturally are!

Throughout the STEM activities in this kit, you'll notice speech bubbles like this: These are suggestions of the kinds of questions you and your child can practice asking. If your child asks you a question, instead of answering right away, try asking them a question in response. Asking questions is an important skill, and helps your child learn language too!

Hello!



Explore

Why is it important to explore?


Children learn about the world around them through their five senses: seeing, touching, hearing, smelling and tasting.


Below, you'll find ideas for how to get started with exploring. You can change the activities to best fit your family and your child.

What you can do...

Make ice cubes.

- Ask your child: What do you think will happen when we put this water into the freezer?
- After some time has gone by, check on your ice cube tray.

 **0-2:** Tell your child about what you see.

 **3-5:** Ask your child to tell you what they see.

- Here are some other tests you can try with the frozen ice cubes:
 - What happens to the ice cube when you put it outside?
 - What happens to the ice cube when you put it in water?
 - How else could you make the ice cube melt?

Does it float or sink?

Anytime you are around water you can test objects to see if they will sink or float.

- During bath time, provide plastic containers and cups, combs, blocks, spoons, sponges, or anything else your child chooses to explore.

 **0-2:** Talk to your child about what happens when you drop objects in the water.


 **3-5:** Ask your child: What will happen when you drop this in the water?


- Will it sink or float?
 - Try dropping a cup that's empty into the water, and then fill it with water and drop it again to see what happens. What other tests can you try?
 - In the kitchen, give your child a bowl to help you wash fruits.
 - Ask your child: What will happen when you drop this in the water? Will it sink or float?
 - Try taking the peel off of the fruit you are using. Ask: What do you think will happen when you drop the peel in the water? Now try it. What happened?

Explore

Explore and talk about ways that objects can move.


→ The next time you are on a walk with your child, have them move their bodies to imitate moving objects that they see. For example: sway like a tree in the wind, flap their “wings” like a bird, start and stop like a bus.

 **0-2:** Tell your child: “Let’s pretend to be ___!” Talk about what’s happening while you move in different ways together.

 **3-5:** Play a guessing game. Your child can move like something that they see, and you have to guess what it is!

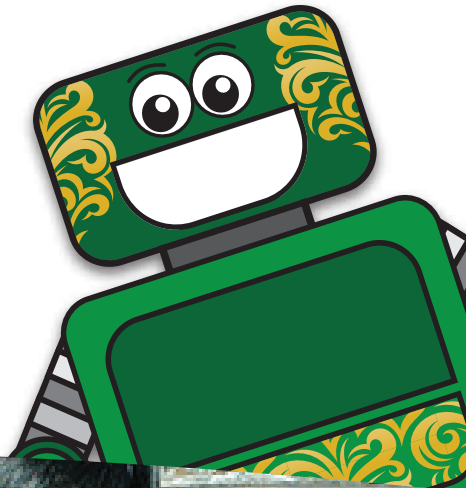
→ Using books and a piece of cardboard (see photo), make a ramp. Choose some objects to send down the ramp. Try a pebble, acorn, ball, toy car, pinecone, or something else your child chooses to try.

 **0-2:** Talk to your child about what you think will happen.

 **3-5:** Ask your child: What will happen when you let it go? Will it roll, or slide, or stay in the same place? Why do you think so?



**What will happen
when you let it go?**



Did you know?

Did you know about Dr. Scottie Henderson? She is a marine biologist, or a scientist who studies life in the ocean. Dr. Henderson explores the ocean and the shore to find tiny animals in the water. Dr. Henderson is Diné and didn't always see other people like her in science. She hopes to be a mentor to other Native American women who want to be scientists. She says, “You should be proud of your identity. You know who you are, and you are strong.”

Can you explore tiny things with your magnifying lens?



Compare

Why is it important to compare?


Comparing, describing and placing objects into categories helps children make sense of the world and develop skills in language, math and science.


Below, you'll find ideas to get started with comparing. You can change the activities to best fit your family and your child.

What you can do...

Fold and compare laundry together.


→ Your child can name and help put all the like items in piles (shirts, pants, etc.) as well as match up socks and gloves. You can sort by color, size, texture, and more.


 **0-2:** You can talk to your children about how you are putting the laundry into different piles. For example, "I'm putting these clothes together because they are all shirts. These go together because they are all pants."

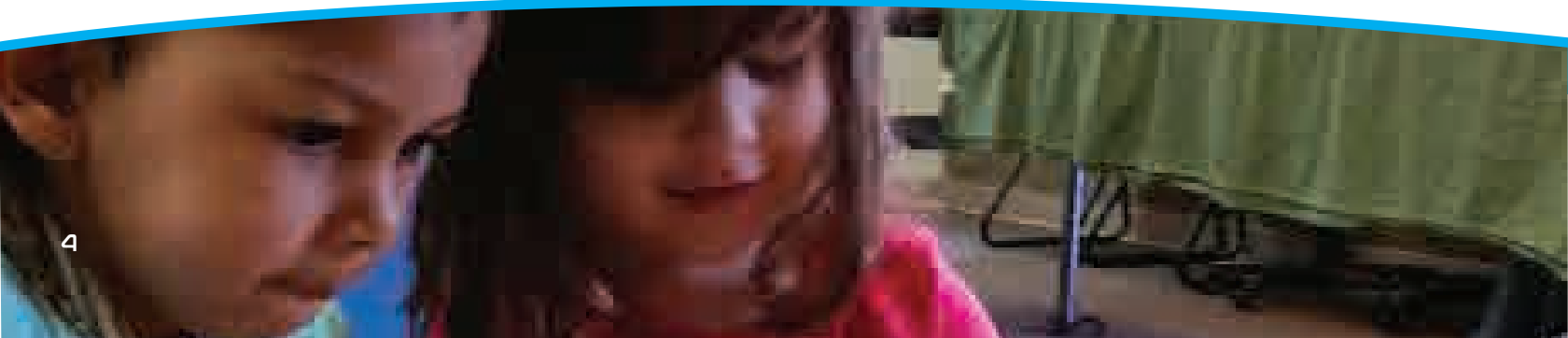
 **3-5:** Try questions such as, "Can you find a sock that is the same size as this one?" or "I notice that this shirt is bigger and this one is smaller. Whose shirt is the bigger one? How can we tell?"

Comparing containers.

→ Collect some empty food containers, and practice comparing how much water they can hold. This is a great game to play in the bath!

 **0-2:** Practice pouring water from one container into another with your child. This is a great time to practice their motor skills!


 **3-5:** You can ask your child to guess which container will hold more water. If your child makes a guess that doesn't seem right, ask them to test it by pouring the water from one container to the other, and see what happens!




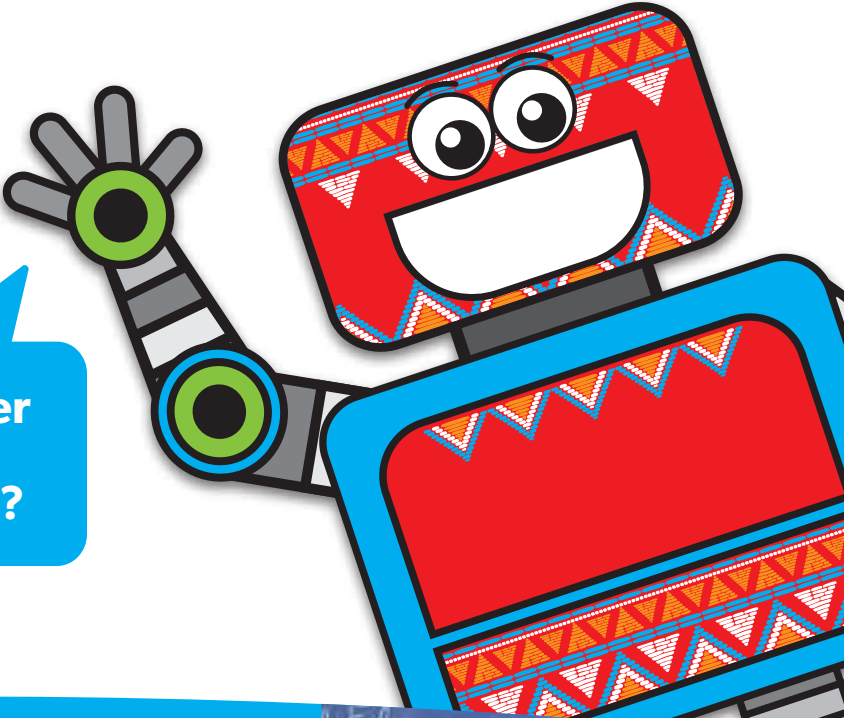
Compare

Play "I have, do you see?"

→ Practice comparing objects that are the same.

 **0-2:** Show children two objects that are the same or similar, and tell them about how they are the same. Example: "This fork goes with the other forks in our silverware drawer. I know this because they all have four points at the end."

 **3-5:** You can tell your children: "I have something that is soft. Do you feel something else that is soft?" "I have a leaf with curves around the edges. Do you see another leaf with curves around the edges?"

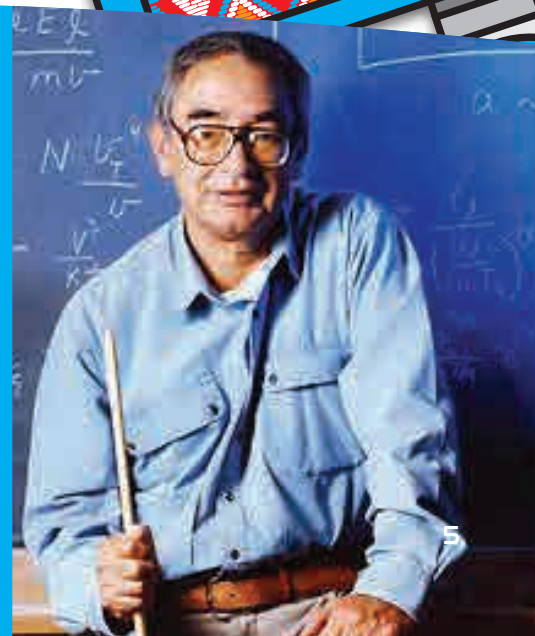


Do you see another
leaf with curves
around the edges?

Did you know?

Did you know about Dr. Fred Begay? Dr. Begay, also called Fred Young and Clever Fox, was a Diné and Ute scientist who compared different ways to make energy, which is how we heat our homes, and what makes our cars and buses go. He grew up on the Diné reservation and spoke Diné and Ute until he attended a Bureau of Indian Affairs school at the age of 10. Despite not having a high school diploma, Dr. Begay became a nuclear physicist. He won many awards for his work. Towards the end of his life, Dr. Begay made many important comparisons between Diné traditions and science.

What kinds of energy warms your home? What kind of energy makes your car go?



Count

Why is it important to count?

Teaching our children to count will help them to make sense of the world around them. The skill of counting objects, and eventually connecting amounts with written numbers, will give children a solid math foundation that they will build upon when they enter school.


You can practice different ways to count the right amount, like sliding objects from the “uncounted” pile to the “counted” pile while saying the numbers out loud.


Below, you’ll find ideas to get started with counting. You can change the activities to best fit your family and your child.

What you can do...

Nature walk.


→ Take a walk or simply step outside your home and count the number of anything you see, 1-10. You can count trees, birds, or cars driving by. The world is full of colorful things to count!


 **0-2:** You can point and count while your child watches and listens. “I see one, two ladybugs on this bush!”

 **3-5:** Ask your child to help you count. Ask: “How many houses are on this block? Let’s count together!”

The clean up game.

→ Take the chore out of chores! Count the items as you put them away with your child. Blocks, socks and toys all need to be put away and can be counted as you go. Have fun!

 **0-2:** Try counting out loud as you clean up your child’s toys together.

 **3-5:** You can try counting backwards as you put away toys. Example: “We have six toys here. I put one away, and now there’s five left! How many will there be when I put one more away?”





Count

Food as learning.

Everyone has to eat, so why not make it a learning activity?


→ Count the forks at the table. Count the food as you place it on your child's plate. How many did everyone get altogether?

 **0-2:** You can count the number of bites as you feed your child. "One bite of rice. Two bites of rice."

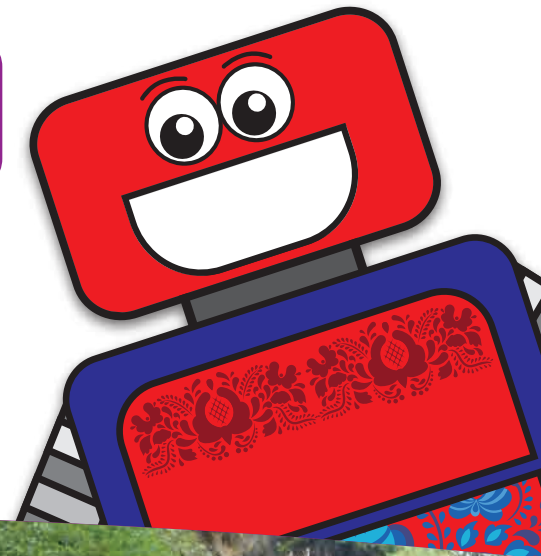
 **3-5:** Ask your child to count how many pieces of food they have throughout the meal. They will start to notice that their plate has less and less - this is early subtraction practice!

→ At the grocery store, talk to your child about what is needed for the week.

 **0-2:** Count how many items you put into the cart while your child listens.

 **3-5:** Ask your child: "How many days of lunches do we need to make? How many pieces of bread will we need to make our lunches? How many pieces of fruit?"

How many pieces
do we need ?



Did you know?

Did you know that counting is an important part of salmon conservation? The Columbia River Inter-Tribal Fish Commission (CRTIFC) combines "traditional wisdom with cutting-edge science" to restore salmon runs in the Columbia River for generations to come. This means that biologists (scientists who study plants and animals) count the number of salmon each year, and tribal elders share knowledge about how many salmon came in the past, and when, in order to make decisions about how to best protect the salmon in the future.

**Think of something that is important to you.
Can you count it?**



Shapes

Why is it important to know about shapes?

Encouraging your child to recognize and name shapes is one way to help them understand the world around them. Knowing how to recognize shapes will help your child describe different objects. A knowledge of shapes will even help your child recognize letters and numbers as they learn to read!


Below, you'll find ideas to get started with learning about shapes. You can change the activities to best fit your family and your child.


What you can do...

Go on a shape walk.

On a walk, point out simple shapes (circles, rectangles, squares and triangles) to your children and ask them what shapes they see.

→ Try cutting a shape out of paper or cardboard and carrying it with you. You can compare the shape to what you find on your walk.


 **0-2:** Talk about the shapes you see while you walk with your child.

 **3-5:** Ask your child, "Do you see this circle? Can you find another circle around us?" Try playing I Spy: "I spy something that is a circle."

Create shape art.

You can talk with your child about what makes shapes different from one another.


→ Draw shapes with your children and name the shapes as you draw. You can use a stick in the dirt, or pen on paper.

 **0-2:** Have your child watch as you draw the shapes. They can practice scribbling and holding a pen or pencil.


 **3-5:** Help your child practice drawing their own shapes.


→ Help your child color and cut out different shapes.

 **0-2:** Move the shapes around together to create new pictures with them.

 **3-5:** Ask your child: Can you make an animal? How about a person? What else can you make with shapes?

→ Use chalk to draw shapes on the sidewalk.

 **0-2:** Practice walking on each shape and saying the name together.


 **3-5:** Can you find objects outside that are the same shape as the chalk shapes?


Shapes

Feeling shapes.

Usually we think about using our sense of sight to learn about shapes, but our sense of touch can tell us a lot about them, too!

→ Explore the shapes of household items you use every day.

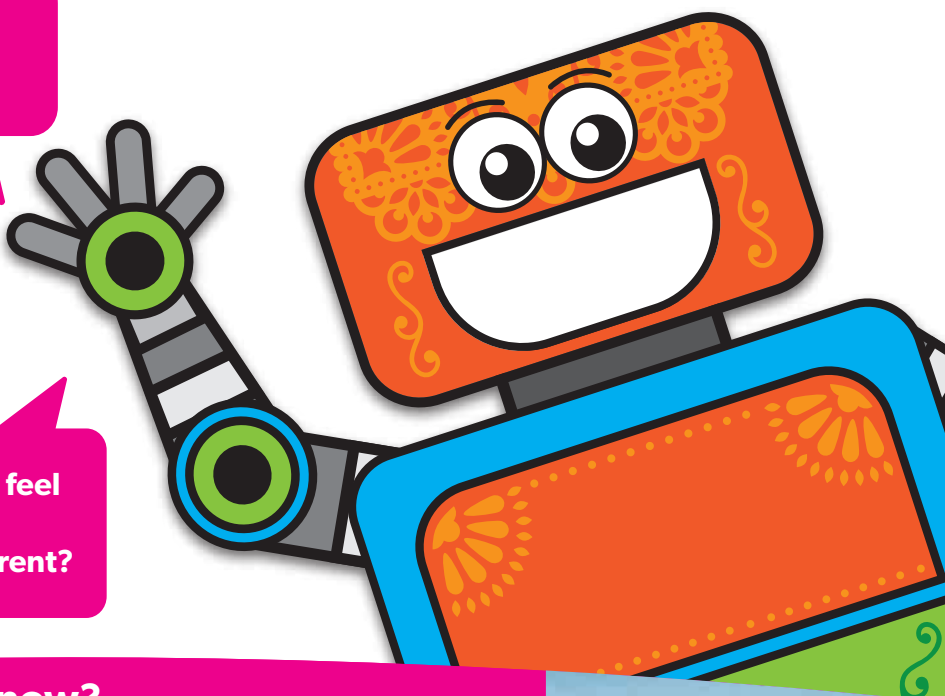
 **0-2:** Gather differently-shaped items from around the house, like a ball, block, or paper towel tube, and hand them to your child to hold. Ask: “How does it feel?”

 **3-5:** Place the different objects in a paper bag. Have your child reach in the bag (no peeking!) and try to guess which shape they are touching. Ask your child, “How does it feel?”

**What shapes
can you find?**

**What can you
make with shapes?**

**How do these shapes feel
the same?
How do they feel different?**



Did you know?

Did you know about the beautiful shapes that are a part of traditional basket weaving? This basket, or wapaa, was made by Pat Courtney Gold, a Wasco tribal member. The pictures woven into the basket tells a story of ancestors (the people) and the next generation (the babies). Many generations of people passed down the wisdom of how to make a basket like this. Pat Gold is working to make sure that wisdom isn't lost. She explains, “When I weave a basket, it's an emotional and rewarding experience, because I know it is not just for my personal development—it is for the generations that missed it, and it's also for the generations that are coming after me. This is a spiritual and very beautiful experience for me.”

What stories can you tell with shapes?



Create

Why is it important to create things?

Creating things helps your children figure out how to take things apart, and how to put things together. While your child is creating, they are developing fine motor skills and solving problems. Creating things is an important first step towards engineering.


Engineers are people who design solutions to problems. Everything we interact with in the human-built world was designed by an engineer and built by people or machines. This includes chairs we sit in, sunglasses, and crayons, as well as computers, cars and smartphones. The world of the future will need many engineers to design solutions to problems we haven't even thought of yet!


Below, you'll find ideas for how to get started with creating. You can change the activities to best fit your family and your child. If something your child tries doesn't work, ask, "Is there another way we could try it?"

What you can do...

Build a tower.


→ Use plastic food containers, boxes, or blocks to build a tower.


 **0-2:** You can build a tower for your child to knock down! As your baby grows they will learn to build their own.

 **3-5:** Ask your child: How high can you make your tower? Can your tower hold a toy on top? Try different challenges. Knock it down and build it again!

Make a hiding place.

→ Try using chairs, blankets, big boxes, pillows, tables, and/or other furniture. If you have a park nearby, you could use branches and sticks to build an outdoor hiding place.

 **0-2:** Build a hiding place for your child to play in. While you are building, you can tell your child about what you're doing and why.


 **3-5:** Ask your child to build their own hiding place. You can ask: How small can you make your hiding place? How large? How dark? What will you do in your hiding place?

Create

Play music with jars.

→ Put different amounts of water into glasses or empty food jars.

 **0-2:** Show your child how to tap the sides gently with a metal object. Ask: Can you make different sounds?

 **3-5:** Ask your child: What happens when you change the amount of water? What happens when you use a different item to play? Can you play a song?

How high can you
make your tower?

How can you build a fort?

What can you create?

How can you make
different sounds?



Did you know?

Mary Golda Ross was one of the first women and first Native American engineer to work for the Lockheed Aircraft Corporation during the Space Race. The great great granddaughter of a Cherokee chief, Mary Ross always loved math and science, even though she was often the only girl in her classes. Through her love of math, she helped create rockets that went to space. The work that Mary Ross did was so important that much of it is still kept a secret today! Mary Ross said she was so successful as an engineer because of her rich Cherokee heritage and the belief within her tribe that boys and girls should have equal educations.

What kinds of machines can you create?



Want to keep exploring STEM with your family?

Check out these resources!

1. Open the camera on your phone or tablet
2. Point the camera at the QR codes below
3. The website will automatically open on your devices!



The Fab Lab: <https://www.youtube.com/user/CrazyAuntLindsey>

Have you met Crazy Aunt Lindsey yet? This fun, dynamic Portlander takes kids on science, engineering and technology adventures in her fun videos. These videos are best suited for older children. English only.



Sesame Street STEM: <https://www.sesamestreet.org/toolkits/stem>

Sesame Street's STEM toolkit is full of fun videos that explain many STEM concepts in preschool friendly language. A parent guide is also available. English only.



US Department of Education

This document from the US Department of Education has ideas for STEM activities with preschool-aged children and links to many other resources. English only.



Too Small to Fail: <https://www.toosmall.org/lets-talk-about-math>

This website is full of videos designed to help parents and caregivers teach their children about STEM. Some videos show activities found in this kit. Resources are available in English and Spanish.

- **Math Booklets:**

- English: <http://toosmall.org/body/Highlights-TSTF-early-math-guide.pdf>

- Spanish: <http://toosmall.org/body/Highlights-TSTF-early-math-guide-SP.pdf>

- **Everyday Fun with Science:**

- <http://toosmall.org/resources/Everyday-Fun-With-Science.pdf>

- **Let's Talk About the World poster:**

- <http://toosmall.org/community/body/Lets-Talk-about-the-World.pdf>



PBS Kids: <http://www.pbs.org/parents/education/science/games/preschooer-kindergarten/>

This website includes links to watch shows like Sid the Science Kid, as well as STEM resources and games for young children. English only.

Portland Resources

Portland Parks and Rec:



Ladybug Walks (ages 2-6): <https://www.portlandoregon.gov/parks/64625>

Ladybug Walks happen on Thursday and Friday mornings in parks all over Portland. Parents/caregivers attend with their child. The cost to attend is \$3-8 per child, on a sliding scale.



Lil Nature Kids (ages 3-5): <https://www.portlandoregon.gov/parks/article/458866>

Lil Nature Kids is a weekly drop-off class at Mt. Tabor Park. Scholarships are available.



True Nature (ages 4-12): <https://www.portlandoregon.gov/parks/article/650275>

True Nature is a class for children and their parents at Mt. Tabor Park. Scholarships are available.

- Nature-based play areas are playgrounds designed with natural materials to encourage exploration. Portland currently has three nature-based play areas:

- Westmoreland Park:** <https://www.portlandoregon.gov/parks/57822>

- Gateway Green:** <http://www.gatewaygreenpdx.org/activities/natureplay>

- K^hunamokwst Park:** <https://www.portlandoregon.gov/parks/61985>



- Water play (interactive fountains and splash pads) is another way for young children to explore and interact with their environment. Learn more about water play opportunities in Portland: <https://www.portlandoregon.gov/parks/article/578662>

- Portland has many parks that are large enough to include hiking trails. These large parks can provide a total nature experience inside of the city: **Powell Butte, Mt. Tabor, and Forest Park**

Want to keep exploring STEM with your family? Check out these resources!

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3. The website will automatically open on your devices!

Portland Resources

Museums and Zoos:



OMSI: <https://omsi.edu/showing/2-days-at-omsi>

The Oregon Museum of Science and Industry (OMSI) has exhibits that are fun for all ages, and play areas specifically designed for young children. To find out when OMSI will host \$2 days, visit their website.



The Oregon Zoo: <https://www.oregonzoo.org/events/category/discount-days>

The Oregon Zoo is a great environment for children to learn about different kinds of animals. To learn about Oregon Zoo discount days, visit their website.



The Portland Children's Museum: <https://www.portlandcm.org/join/family-access-program>

The Portland Children's Museum includes a makerspace, or space for tinkering and engineering, and a nature play area. To learn more about the Portland Children's Museum Family Access Program, visit their website.

Make your own play dough (recommended for ages 2+)

Use this recipe to make play dough. Your child can practice math skills by helping you measure the ingredients!

Recipe from <https://www.familyeducation.com/fun/playdough/play-doh-recipes>

Materials

- 1 cup water
- 1 tablespoon vegetable oil
- 1/2 cup salt
- 1 tablespoon cream of tartar (this helps to keep the play dough from going bad)
- Food coloring (optional)
- Saucepan
- 1 cup flour

Directions

1. Combine water, oil, salt, cream of tartar, and food coloring in a saucepan and heat until warm.
2. Remove from heat and add flour.
3. Stir, then knead until smooth. The cream of tartar makes this dough last 6 months or longer, so resist the temptation to omit this ingredient if you don't have it on hand.
4. Store this dough in an airtight container or a Ziploc freezer bag. What can you make with your play dough? Try making something that you can see outside your home, like an animal or a house. Draw a picture of what you made.



EARLY LEARNING
MULTNOMAH

