

Family Workshop Manual: STEM



Introduction

Children's Learning Institute, in partnership with the Children's Museum Houston, has created six themed workshops to encourage STEM development. During each workshop, families are presented with strategies that develop early STEM skills. Children and families engage in an interactive learning experience through a book read-aloud, followed by hands-on activity stations. In addition, families receive an informational handout with practical ideas of how to apply the learned strategies.

The workshops can be delivered by teachers, family facilitators, organizations, community volunteers, or community advocates to meet young learner's early STEM needs. They can be given in sequential order or by theme, and can be delivered over a series of weeks or months. What is exceptionally different about the workshops is that we are not isolating the parents or adults from the child, but are using the interactions between the child and the parent as a component of the workshop to encourage learning.

These materials were created and produced by the Children's Learning Institute (CLI) and the Children's Museum Houston (CMH). Please acknowledge CLI and CMH accordingly.

Workshop Themes

What's the Big Idea?
Let's Figure It Out
Math Rules!
Show What You Know
Dream It, Build It!
Picture This!

Cover art by JT O'Neal
Activity station art by Sarah Pilkinton

What's the Big Idea?



Overview: What's the Big Idea?

Objective

Parents will learn how to unlock their children's curiosity about the world by asking questions and teaching big words.

Strategies



Ask Instead of Telling



Teach Big Words

Key Messages

- As parents or caregivers, our natural instinct is to answer every question children make. But if we want to stimulate their curiosity, we can answer these questions with other questions, like, 'What do you think?'
- Avoid explaining too much; instead, ask your child to describe what he or she is observing. Talk to your children about what they see, feel, smell, taste, or hear. Exploring the senses in a scientific way helps kids begin to build STEM skills like making observations and drawing conclusions.
- Children can learn and understand big words. Don't be afraid to use science and math words with your child. You can teach your child new words with a simple explanation and by using them over and over.

Workshop Timing

Minutes	Activity	Notes
2	Welcome and ice breaker	Question on screen
4	Video	Pause at Turn & Talk
2	Turn & Talk	Engage and practice strategies
10-12	Read-aloud	Model strategies while reading
35	Activity stations	Finish video
5	Reminder about end of workshop	
60	Total	

Talking Points: What's the Big Idea?

Setting
Whole group

Materials
Book: Mouse Paint by Ellen Walsh

Preparation

- Become familiar with the video strategies to be presented.
- Become familiar with the stopping points during the read aloud.
- Practice reading the book aloud using the strategies before the workshop.

Introduction to Workshop

Hello everyone! Thank you for joining us. My name is _____. Today's workshop is 'What's the Big Idea?'. This workshop has been developed in partnership with the Children's Learning Institute and The Children's Museum Houston. This session is part of a series of workshops that will guide you and your children to explore science and math ideas in a safe and fun environment.

Housekeeping

Please be sure to sign in and pick up a handout. Let's remember to show respect for others' ideas and opinions shared during this workshop. Parents, please monitor your child's behavior and tend to your child's needs so that everyone can have a positive experience. Restrooms are located at _____.

Agenda

We'll start by watching a video, then we'll read a book together, and, finally, we'll have activities you can do with your child.

Introduction

How many of you have heard of the word STEM? STEM stands for Science, Technology, Engineering, and Math. STEM can refer to the subjects individually or two or more working together. STEM is about exploring the world around us, asking questions about how or why something works and solving problems. Did you know that we are all scientists? Every time you cook something for your family you are using STEM skills such as creativity, problem solving, collaboration, or critical thinking. What happens if you miss an ingredient? Or add too much? You can fix your food by developing one or more of these STEM skills right in the kitchen. The main purpose of STEM learning is to apply knowledge to real-life situations and find solutions to real-world problems.

Continued on next page.

Objective

Today we are going to be introducing two strategies you can use to unlock your child's curiosity around STEM . The first strategy is to ask instead of telling. The second strategy is to teach big words.

Handout

In this handout, you can find more alternatives for developing STEM skills in different environments, like in the Children's Museum Houston, the Library, in the park, and at home where you can scan the QR (Quick Response) Code to get online activities through the CLI Engage Activity Collection.

Video

To better understand these two strategies let's watch the video on What's the Big Idea?

Summarize Strategies

Parents, remember that asking instead of telling will stimulate their curiosity, we can answer these questions with other questions, like, 'What do you think?' Avoid explaining too much; instead, ask your child to describe what he or she is observing. Talk to your children about what they see, feel, smell, taste, or hear. Exploring the senses in a scientific way helps kids begin to build STEM skills of making observations and drawing a conclusion. Don't be afraid to use science and math words with your child. You can teach your child new words with a simple explanation and by using them over and over.

Importance of Reading Together

A great way to stimulate your child's curiosity for science is through reading. We are now ready to move on to storytime. Parents, this is a time when you can sit close to your child. Make yourself comfortable. We invite you to have your child sit on your lap or you can sit on the floor with your child.

Continued on next page.

Read-Aloud Engagement

In today's story, you will see me ask questions about what is happening on each page, as well as ask children what they think is going to happen next.

Today's book is. Mouse Paint by Ellen Walsh

*Remember to praise the parent and the child for their responses or participation.

Activity Stations

Parents, now you will have the opportunity to rotate from station to station and do the activities with your child. The activities were designed to practice the strategies we have learned today, stimulate your child's curiosity, and introduce scientific vocabulary in a fun way. If you make something, you can take it with you. Otherwise, please leave the materials at the table for the next family to enjoy.

*Optional

- Offer raffles and giveaways at the end of the workshop. Thank you for coming to the workshop. Your name will go into today's raffle. You must be present to win.
- Call attention to the book list at the Investigating Books station. Please feel free to take a book list with you for more books to read related to this topic.

Five Minute Warning

We have five minutes before the end of the workshop. Please finish up your activities.

Closing

Thank you for joining us! We hope that you have learned useful strategies that will encourage more STEM in your everyday activities. Your feedback is important! Please help us by filling out a survey, we would love to get your input on today's workshop..

Our next workshop will be _____. See you next time!

Notes: What's The Big Idea?

Lined area for notes with a large circular graphic containing a stylized white pen and a wavy line.

Preparation for All Stations

- Refill supplies (estimate 25 participants)
- Clean and disinfect kit materials
- Print instructions on cardstock, put in a sheet protector, stand up on a bookend

What Is Magnetic?

Supplies	Preparation
Magnetic wand	
Paper clips	
Buttons	
Sorting Sheet	Draw 3 circles labeled: Magnetic, Non-Magnetic, and Not Sure
Plastic shapes	

Water Drop Art

Supplies	Preparation
Food coloring	
Plastic cups	
Water	Mix food coloring into cup with water
Wax paper	
Construction paper	
Dropper	

Does Your Nose Know?

Supplies	Preparation
Metal shaker container (6)	Fill each shaker with different aromatic item
"Does Your Nose Know?" checklist	Print on white cardstock and laminate
Marker	

Invent-A-Color

Supplies	
Assorted paint bottles (5)	Fill each squeeze bottle with a different color: Blue, Red, Yellow, Black, White
Popsicle sticks	
Paper cups	
Invent-A-Color Formula Tracker	Print onto white cardstock
Pencil	

Nature Detective

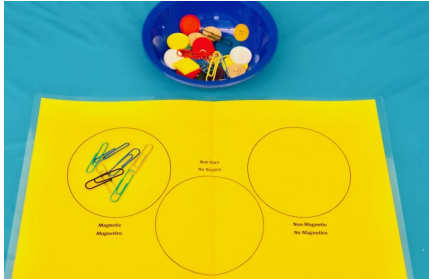
Supplies	Preparation
Scissors	
Paper plates	Cut inner circle out of plates
Markers	
Stickers	
Transparent paper	Cut into shape of paper plate
Stapler	
Pencil	
Plastic bugs	
Critter chart	

What Is Magnetic?

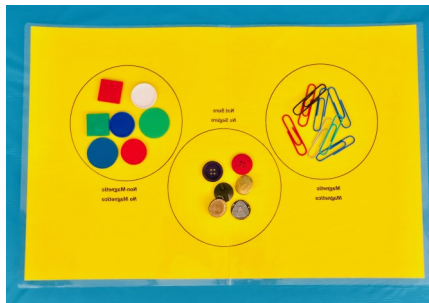
What's the Big Idea?

Find objects that a magnetic wand can pick up.

What to do



1. Look at the objects in front of you and separate the ones that you think will be picked up by the magnetic wand into one pile.



2. Put the objects you **do not think** or you are **not sure** will be picked up in two different piles.



3. Use the magnetic wand to test which objects are magnetic and which are not? Did you guess correctly?

Did You Know?

A magnet is surrounded by a magnetic field. You cannot see it, but this field is where the magnetic force is found. Each magnet has a north pole and a south pole. The force is always strongest at the poles. There is a select group of metals—such as nickel, iron, and steel,—that respond to magnetic fields. The makeup of these metals allows them to cling to the magnet. Non-metallic objects like plastic are not attracted to a magnet.

Water Drop Art

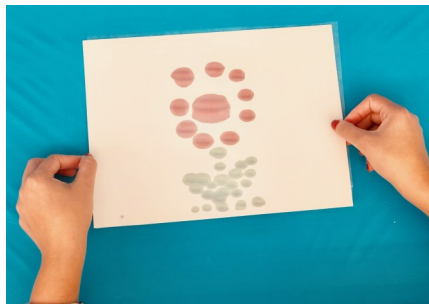
What's the Big Idea?

Learn about surface tension by creating a picture using drops of colored water.

What to do



1. Using a dropper and colored water, gently release color drops onto wax paper to create a shape or picture of your preference.



2. When your masterpiece is finished, lay a sheet of construction paper directly on top.



3. Wait about 20 seconds to allow the paper to absorb the colors and see what happens when the water hits the construction paper.

Did You Know?

Adhesion and cohesion are important water properties that affects how water works everywhere, from plant leaves to your own body. Have you ever seen little balls of water on pieces of grass? The water drop is composed of water molecules that like to stick together, an example of the property of cohesion and the water drop is stuck to the grass which is an example of the property of adhesion. Cohesion makes a water drop a drop.

Nature Detective

What's the Big Idea?

Make a magnifying glass to explore the natural world around you.

What to do



1. Take two paper circle frames and decorate them using markers and stickers.



2. Place two transparency sheets between both circle frames, staple them together, and insert a popsicle stick.



3. With your magnifying glass explore the bugs and arachnids, and use the critter chart to record how many you find.

Did You Know?

Children enjoy being outdoors and learn through exploring and observing nature. Encourage your child to become a nature detective by using their senses while they explore. For example they can use their sense of smell with flowers, their sense of hearing with bird sounds, sense of touch to feel how soft or rough a leaf or a rock might be, and sense of sight to spy the smallest bug.

What's the Big Idea?

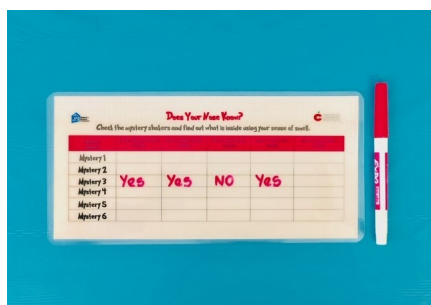
Does Your Nose Know?

Solve the mystery inside the shakers using just your sense of smell.

What to do



1. Take the Mystery Shaker and try to find out what is inside using just your sense of smell.



2. Using the “Does Your Nose Know” check list, answer questions of what you smell inside the Mystery Shaker.



3. Write down what you think is in the shaker and compare your guess with the right answer placed on the bottom of the shaker.

Did You Know?

Humans being intuitively use their five senses (sight, smell, touch, hearing, and taste) to gather and respond to information about their environment which aids their survival. Exploring the senses in a scientific way helps kids begin to build skills of making observations and drawing conclusions. The sense of smell helps enjoy flowers, warns of dangers, and sharpens the awareness of surroundings. Humans have a sense of smell less developed than most animals, but they are very sensitive to odors.

Invent - A - Color

What's the Big Idea?

Experiment how to make a new color and name it as you prefer.

What to do



1. Use the different paint bottles to add drops of paint into an empty cup and keep track of how many drops of each color you use.



2. Mix the paint with a stick until you don't see any swirls of the original colors.



3. Name your new color and paint a picture with it. Talk about the color you created. If you want make another new color.

Did You Know?

While many familiar inventions are mechanical, some are artistic. Art requires the same creativity, problem solving, and critical thinking that are used in the engineering and technology related fields. With color mixing activities children use mathematical concepts such as more and less, and devise ways to measure how much paint they add. Also they experiment the cause and effect of color mixing.

What's the Big Idea?

Parent strategies: Unlock your child's curiosity about the world by asking questions and teaching big words.



Ask Instead of Telling

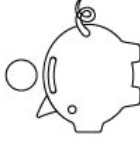
WHAT

When you ask **inquiry questions**, you encourage your child to become a curious thinker. Inquiry questions include words like **why, how, when, what, if?** When your child asks about something, say "That's a great question. Let's find out more together," so you avoid giving all the facts until your child has time to answer.

WHY

HOW

- When your child wonders **how something works** say, "Good question! What do you think?"
- Pay attention to **what interests your child** during play and ask, "What do you notice...?" or "How did you do that?"
- Observe **animals and insects** and ask your child. "Why do you think it did ...?"
- Encourage your child to notice **details outdoors or in the kitchen** with questions like "What does it look/smell/feel/sound/taste like?"



Teach Big Words

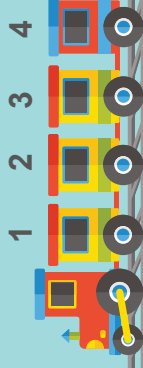
WHAT

Children in early childhood are not too young to learn and **understand big words**. Don't be afraid to use science and math words with your child. Teach your child new words with a **simple explanation** and by using them over and over. This fills your child's **word bank** and helps him or her learn the power of words.

WHY

HOW

- Children can learn big words when you **explain in simple terms**. For example, say: "When we collect data, we just write down or draw what happened."
- Don't be afraid to use **technical words** - kids can learn them with repetition. Try saying "investigate" instead of "play."
- **Pretend you are a scientist** and use the word "experiment" as you cook something new or differently in the kitchen.



In Your Community

At Home

Children's Museum

- **FlowWorks:** dive into the forces and properties of water through waves, vortices and rapids, exploring the fascinating concept of hydropower!
- **Cyberchase:** throughout the exhibit's adventurous plots, children will not only "do" math but will be able to experience it firsthand through interactive concepts involving place value, algebra, geometry, fractions and probability.

Library

- *Mouse Paint* by Ellen Walsh
- *Bugs! Bugs!* by Bob Barner
- *Magnets Pull, Magnets Push* by David A. Adler
- *Smell - El olfato* by Erdem Secmen

Park

- Go on a nature walk and ask questions about what you see: "How does a bird build its nest?"
- Use big words to label animals and objects at the park, for instance: insect, watertower, fertilizer, or tireswing.
- Ask your child: "What do you notice about ____?" when playing in the sand or grass together.



CLI Engage Activity Collection

<https://cliengagefamily.org>

Bug Photo Hunt

Walk around a park, your neighborhood, or your backyard, talking about and taking pictures of bugs you find.



Sensory Popcorn

Practice using and talking about all five senses (i.e., seeing, hearing, smelling, tasting, and touching) through an observation of popcorn.



Let's Figure It Out



Overview: Let's Figure It Out

Objective

Parents will learn how to expose their children to science everywhere they go by planning simple investigations and making predictions about what will happen.

Strategies



Describe and Predict



Plan Your Investigation

Key Messages

- Parents can teach their children how to notice and report details like a scientist by using rich language to describe how something works, or how it looks, feels, smells, or sounds. Children also learn about science by making predictions -or smart guesses about what will happen next.
- Parents can also help children with the reasoning needed for school success by planning simple investigations or experiments. It's great practice thinking like a scientist when you consider: what they might try, what they think will happen, and what they will do if something goes wrong

Workshop Timing

Minutes	Activity	Notes
2	Welcome and ice breaker	Question on screen
4	Video	Pause at Turn & Talk
2	Turn & Talk	Engage and practice strategies
10-12	Read-aloud	Model strategies while reading
35	Activity stations	Finish video
5	Reminder about end of workshop	
60	Total	

Talking Points: Let's Figure It Out

Setting

Whole group

Materials

Book: A Balloon for Isabel by Deborah Underwood

Preparation

- Become familiar with the video strategies to be presented.
- Become familiar with the stopping points during the read aloud.
- Practice reading the book aloud using the strategies before the workshop.

Introduction to Workshop

Welcome to Teaching Together STEM. My name is _____. Today's workshop is "Let's Figure It Out" This workshop has been developed in partnership with the Children's Learning Institute and The Children's Museum Houston. This session is part of a series of workshops that will guide you and your children to explore science and math ideas in a safe and fun environment.

Housekeeping

Please be sure to sign in and pick up a handout. Let's remember to show respect for others' ideas and opinions shared during this workshop. Parents, please monitor your child's behavior and tend to your child's needs so that everyone can have a positive experience. Restrooms are located at _____.

Agenda

We'll start by watching a video, then we'll read a book together, and, finally, we'll have activities you can do with your child.

Introduction

Let's start with a question, how many of you have heard of the word STEM? Do you know what STEM means? ...Yes STEM stands for Science, Technology Engineering, and Math. STEM is about exploring the world around us and asking questions about why something works. And the main purpose of STEM learning is to apply knowledge to real-life situations and even find solutions to real-world problems. For example, while cooking we develop creativity and problem-solving skills, and we need our technology skills to set the oven to prepare our meals. Now, what kind of skills do we need at the grocery store? Math skills. During playtime, children can practice their engineering skills by building with blocks. When you are outside, children have the opportunity to explore their surroundings when observing like a scientist and even predict the weather. As you can see, STEM is everywhere and today want to share with you some strategies and ideas that can help your children to develop early STEM skills.

Continued on next page.

Objective

Today we are going to be introducing two strategies you can use to expose you child to science everywhere they go. The first strategy is to describe and predict. The second strategy is to plan their investigation.

: S` Vagf

;` fZ[eZS` Vagf kag US` X` V _ adWSfVd Sf[hvXadVWab` Y EF7? e] [^e[V[XWVf
Wh[da` _ Wfd` T] W` fZW5Z[VdVie? geVg_ : agefa` fZW>[Tcdk[fZWbSd] fS` V Sf Za_ W
i ZWkag US` eUS` fZWCD/Cg[U] DWba` eW5aVWfa YWfa` Z` WSU[hf[VefZdagYZ fZW5>;
7` YSYW3Uf[h[fk 5a^Wf[a` ž

Video

Fa TWVdg` VWfS` V fZVWfi a efSWVVe Wyei SfUZ fZW[VW a` >Wye8YgdVf Agf` You can use the handout to follow along or take notes during the video. Does anyone still need a handout?

Summarize Strategies

Remember, the objective is to expose your child to science everywhere you go by planning simple investigations and making predictions about what will happen. Using rich language to describe how something works, or how it looks, feels, smells, or sounds; teaches your child to notice and report details like a scientist. Children also learn about science by making predictions -or smart guesses about what will happen next. Planning simple investigations or experiments helps children with the reasoning needed for school success. It's great practice thinking like a scientist when you consider: what they might try, what they think will happen, and what they will do if something goes wrong.

Importance of Reading Together

A fantastic way to expose your children to science is through reading. We are now ready to move on to storytime. Parents, this is a time when you can sit close to your child. Make yourself comfortable. We invite you to have your child sit on your lap or you can sit on the floor with your child.

Continued on next page.

Read-Aloud Engagement

In today's story, you will see me ask questions about what is happening on each page, as well as ask children what they think is going to happen next.

Today's book is. A Balloon for Isabel by Deborah Underwood

*Remember to praise the parent and the child for their responses or participation.

Activity Stations

Parents, now you will have the opportunity to rotate from station to station and do the activities with your child. The activities were designed to practice the strategies we have learned today, making observations and predictions and encouraging your children to test their predictions by doing simple experiments in a fun way. If you make something, you can take it with you. Otherwise, please leave the materials at the table for the next family to enjoy.

*Optional

- Offer raffles and giveaways at the end of the workshop. Thank you for coming to the workshop. Your name will go into today's raffle. You must be present to win.
- Call attention to the book list at the Investigating Books station. Please feel free to take a book list with you for more books to read related to this topic.


Five Minute Warning

We have five minutes before the end of the workshop. Please finish up your activities.

Closing

Thank you for joining us! We hope that you have learned useful strategies that will encourage more STEM in your everyday activities. Our next workshop will be _____. See you next time!

Notes: Let's Figure It Out



A series of horizontal lines for taking notes, overlaid on a large, light gray circular graphic. The graphic contains a white outline of a pen and a wavy line, suggesting a drawing or writing activity.

Preparation for All Stations

- Refill supplies (estimate 25 participants)
- Clean and disinfect kit materials
- Print instructions on cardstock, put in a sheet protector, stand up on a bookend

Boats Afloat

Supplies	Preparation
Contruction paper	
Aluminum foil	
Popsicle sticks	
Playdough	
Tape	
Plastic container	Fill container halfway with water
Water	

Snake Charmer

Supplies	Preparation
Tissue paper	Draw outline of a snake
Scissors	
Aluminum pan	
Balloon	Blow balloon up
Fabric cutout	

Sticky Situations

Supplies	Preparation
Masking tape	
Painter's tape	
Duct tape	
Scissors	
Yarn	
Paper plate	
Plastic cup	
Metal washers	
Record sheet	
Writing utensil	

Morning Metal

Supplies	
Paper plate	
Markers	
Bowls	
Cereal	Crush cereal
Magnet	
Popsicle stick	
Tape	

Domino Chain Reaction

Supplies	Preparation
Dominoes	
Assorted household materials	
Toys	

Boats Afloat

Design and build a boat that floats.

What to do



1. Choose materials to design a boat. Think about which material could sink or float.



2. Build a boat using one of the materials.



3. Place the boat in the water to see if it floats. If your boat does not float, redesign it using different materials or shapes.

Did You Know?

The objects behave differently in the water. Some float; some do not. It depends mainly on two factors: density (the amount of matter an object has) and buoyancy (the power to float in a fluid). By testing a boat until it sinks, and watching closely, children can see where the design can be improved using their own ideas and experiences to find solutions to problems. Trial and error are very important in the design process. Often, engineers test a design until it fails in order to see where improvements are needed.

Snake Charmer

Learn how you can lift up a snake by generating static electricity.

What to do



1. Cut out the snake draw in the tissue paper and place it in the aluminum pan.



2. Rub the balloon repeatedly with fabric (You can choose between different types) to “charge” the balloon and create static electricity.



3. Approach the balloon to the head of the snake and when it rises it, begins to separate the balloon slowly until the body of the snake has risen.

Did You Know?

There are different types of electricity, and one of them is called static electricity. A static charge happens when two surfaces touch each other and the electrons move from one object to another. One of the objects will have a positive charge and the other a negative charge. If you rub an object quickly, like a balloon, or your feet on the carpet, these will build-up a rather large charge. If your hair sticks straight up, this means that your hair has been charged.

Sticky Situations

Find out which tape has the best adhesive by testing how many washers can hold.

What to do



1. Watch carefully the different tapes and record your prediction about which one will stick the best.



2. Choose one type of tape and cut a piece to use. Tape the center of the yarn handle of your "Tape Tester" to the bottom of the paper plate.



3. Add one washer at a time to the paper cup until the tape comes off the paper plate and the cup drops. Record the number of washers the tape tester held before falling.

Did You Know?

Prediction and verification are important keys for science. A prediction is a guess what might happen based on observation or prior knowledge. Verification is to test through an experiment how good is a prediction. For children, predict and verify small everyday events are helpful tools to find patterns and consider consequences. For example, when you are in the grocery store, you can say to your child: "There is a lot of food in the bag. Do you think it's too heavy?" and then let him/her hold it to check".

Morning Metal

Check if there is iron in your breakfast cereal.

What to do



1. Use a marker to divide a paper plate into three sections. Label each section with each one of the cereals present.



2. Run the magnet through one of the bowls with the crushed cereal and check the magnet to see how much cereal is stuck.



3. Use the popsicle stick to scrape the iron off the magnet onto the labeled section of the paper plate and add tape to lock in the iron. Repeat step 2 and 3 for the other cereals to compare results.

Did You Know?

Through simple experiments we can test which are the properties that our food contains and so we can choose which ones bring us the greatest benefits to our body. With *Morning Metal* you check how the cereal sticks to the magnet because of the iron it contains. The human body requires iron for the production of special molecules, known as hemoglobin, in red blood cells. It is the iron in the hemoglobin that attracts the oxygen, allowing the blood cells to carry the oxygen to the rest of the body.

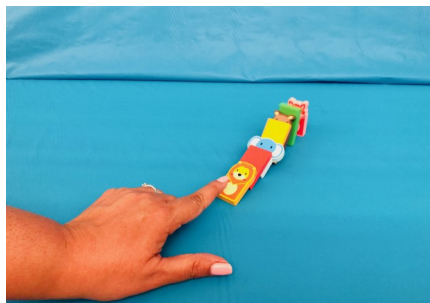
Domino Chain Reaction

Build a chain reaction using dominoes and other household materials.

What to do



1. Take, at least, five dominoes and stand them on end, close together, one after another.



2. Push the first domino towards the others, and a chain reaction should start causing all the others to fall.



3. Redesign your chain reaction if your first one was not successful, or if you want to make it more challenge by adding obstacles like household materials or toys.

Did You Know?

A chain reaction happens when the action of one object causes a similar action or reaction in other objects. With domino runs, the momentum (forward push) of one domino as it tips over causes the next domino to fall. This chain reaction continues down the line all the way to the end of the domino run. Creating a chain reaction requires that you design, build, test, and redesign to assure that your reaction will continue from the start to finish.

Let's Figure It Out

Parent strategies: Expose your child to science everywhere you go by planning simple investigations and making predictions about what will happen.

WHAT



Describe and Predict

WHY

Using rich language to describe how something works, or how it **looks, feels, smells, and sounds**. This teaches your child to notice and report details like a scientist. Children also learn about science by **making predictions** - or smart guesses about what will happen next. This kind of reasoning is important for success in school.

HOW

- **Describe details of toys** and objects with specific terms: rough or smooth, larger or smaller, round, square, or blue.
- Take time to notice details about the **weather or seasons** by saying, "What patterns do you notice?"
- **Respond to your child's interests**. "You found a brown and green leaf. What color do you think this tree's leaves will turn next?"
- Wait for your child to investigate his/her environment. "You found an orange and black butterfly?" Then help your child **make a prediction**. "What do you think the butterfly will do next?"

WHAT



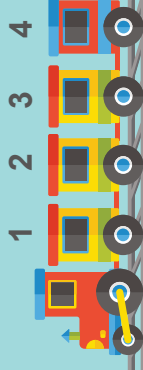
Plan Your Investigation

WHY

Planning **simple investigations or experiments** helps children with reasoning needed for school success. It's great practice **thinking like a scientist** when you consider: what they might try, what they think will happen, and what they will do if something goes wrong.

HOW

- **Race toy cars** together. Then ask your child, "How could you make it go faster?" and help him/her build simple ramps.
- **In the kitchen** bake something two different ways. Ask your child, "What do you think will happen if we bake these muffins for 15 minutes and these for 20?"
- Create **homemade slime or playdough**. Plan what ingredients you will use and ask, "What if we use 1 cup of glue in this slime, but only ½ a cup in this batch?"



In Your Community

At Home

Children's Museum

- **Science Station:** predict what will happen as you test new theories and ideas behind these eye-catching, brain-igniting experiments in physical science.
- **Power Science Lab:** use your senses of observation to move through these scientific investigations delving into reactions related to the human body.

Library

- *How to Catch a Star* by Oliver Jeffers
- *Float* by Daniel Miyares
- *Interstellar Cinderella* by Deborah Underwood
- *A Balloon For Isabel* by Deborah Underwood

Park

- Pretend you are a scientist or a botanist and describe the parts of a flower. You could say, "Let's take the flower apart carefully to get a better look."
- Predict where plants could grow best around the park. Discuss the similarities and differences of each location.

CLI Engage Activity Collection

<https://cliengagefamily.org>



Magnetic Sensory Bin

Explore with magnets to predict if an item is magnetic.



Sink or Float

Use predictions and observations to determine whether objects will sink or float when placed in water.



Math Rules!



Overview: Math Rules!

Objective

Parents will learn how to help their children develop his or her math skills by counting, grouping, and comparing objects and items during everyday routines and activities.

Strategies



Count Together



Group and Compare

Key Messages

- Counting and recognizing numbers are some of the first early math skills your child needs to learn. Counting allows children to explore important ideas like how many, more, less, and equal.
- Grouping and comparing items help your child understand patterns and relationships, which are important for math. Young children begin to learn ideas and language like big, medium, small, long, same, and different.

Workshop Timing

Minutes	Activity	Notes
2	Welcome and ice breaker	Question on screen
4	Video	Pause at Turn & Talk
2	Turn & Talk	Engage and practice strategies
10-12	Read-aloud	Model strategies while reading
35	Activity stations	Finish video
5	Reminder about end of workshop	
60	Total	

Talking Points: Math Rules!

Setting
Whole group

Materials
Book: Little Quack by Lauren Thompson

Preparation

- Become familiar with the video strategies to be presented.
- Become familiar with the stopping points during the read aloud.
- Practice reading the book aloud using the strategies before the workshop.

Introduction to Workshop

Welcome to Teaching Together STEM. My name is _____. Today's workshop is "Math Rules" This workshop has been developed in partnership with the Children's Learning Institute and The Children's Museum Houston. This session is part of a series of workshops that will guide you and your children in exploring science and math ideas in a safe and fun environment.

Housekeeping

Please be sure to sign in and pick up a handout. Let's remember to show respect for others' ideas and opinions shared during this workshop. Parents, please monitor your child's behavior and tend to your child's needs so that everyone can have a positive experience. Restrooms are located at _____.

Agenda

We'll start by watching a video, then we'll read a book together, and, finally, we'll have activities you can do with your child.

Introduction

Let's start with a question, how many of you have heard of the word STEM? Do you know what STEM means? ...Yes STEM stands for Science, Technology Engineering, and Math. STEM is about exploring the world around us and asking questions about why something works. And the main purpose of STEM learning is to apply knowledge to real-life situations and even find solutions to real-world problems. For example, while cooking we develop creativity and problem-solving skills, and we need our technology skills to set the oven to prepare our meals. Now, what kind of skills do we need at the grocery store? Math skills. During playtime, children can practice their engineering skills by building with blocks. When you are outside, children have the opportunity to explore their surroundings when observing like a scientist and even predict the weather. As you can see, STEM is everywhere and today want to share with you some strategies and ideas that can help your children to develop early STEM skills.

Continued on next page.

Objective

Today we are going to be introducing two strategies you can use to help your child develop his or her math skills. These strategies are counting, grouping, and comparing objects and items during everyday routines and activities.

Handout

In this handout, you can find more alternatives for developing STEM skills in different environments, like in the Children's Museum Houston, the Library, in the park, and at home where you can scan the QR (Quick Response) Code to get on-line activities through the CLI Engage Activity Collection.

Video

To better understand these strategies let's watch the video on Math Rules! You can use the handout to follow along or take notes during the video. Does anyone still need a handout?

Summarize Strategies

Today we learned that the objective is to help your child develop his or her math skills by counting, grouping, and comparing objects and items during everyday routines and activities. Counting and recognizing numbers are some of the first early math skills your child needs to learn. Counting allows children to explore important ideas like how many, more, less, and equal. For example, when you are in the grocery store you can ask your child how many items you are buying or in the park, encourage her/him to count how many swings are there. Grouping and comparing items help your child understand patterns and relationships, which are important for math. Young children begin to learn ideas and language like big, medium, small, long, same, and different. During playtime, you can encourage your child to group toy colors or classify them into categories such as cars, action figures, blocks, or animals.

Importance of Reading Together

A fun way to introduce math concepts to our children is through reading. We are now ready to move on to storytime. Parents, this is a time when you can sit close to your child. Make yourself comfortable. We invite you to have your child sit on your lap or you can sit on the floor with your child.

Read-Aloud Engagement

In today's story, you will see me counting and asking questions about what is happening on each page, as well as ask children what they think is going to happen next.

Today's book is Little Quack by Lauren Thompson

*Remember to praise the parent and the child for their responses or participation.

Continued on next page.

Activity Stations

Parents, now you will have the opportunity to rotate from station to station and do the activities with your child. The activities were designed to practice the strategies we have learned today, and develop math skills by counting, grouping, and comparing in a fun way. If you make something, you can take it with you. Otherwise, please leave the materials at the table for the next family to enjoy.

*Optional

- Offer raffles and giveaways at the end of the workshop. Thank you for coming to the workshop. Your name will go into today's raffle. You must be present to win.
- Call attention to the book list at the Investigating Books station. Please feel free to take a book list with you for more books to read related to this topic.

Five Minute Warning

We have five minutes before the end of the workshop. Please finish up your activities.

Closing

Thank you for joining us! We hope that you have learned useful strategies that will encourage more STEM in your everyday activities. Our next workshop will be _____. See you next time!

Notes: Math Rules!

Lined area for notes with a large circular graphic containing a pencil and a squiggle.

Preparation for All Stations

- Refill supplies (estimate 25 participants)
- Clean and disinfect kit materials
- Print instructions on cardstock, put in a sheet protector, stand up on a bookend

Cookie Solution

Supplies	Preparation
Paper plates	
Markers	
Crayons	Fill quart-size bag with face shapes
Scissors	

How Do You Measure Up?

Supplies	Preparation
Chart	Print and cut out
Pencil	
Cord	
Scissors	
Measuring tape	

Pattern Bracelets

Supplies	Preparation
Index cards	
Markers	
Cereal (Fruit Loops)	
Pipe cleaners	

Pom-Pom Toss

Supplies	
Yarn	Cut a piece, tie ends together, and form into circle
Pom-poms	
Record sheet	
Markers or crayons	
Pencils	

The Right Fit

Supplies	Preparation
Construction paper	
Markers	
Beans	
Glue	

Math Rules!

Parent strategies: Help your child develop his or her math skills by counting, grouping, and comparing objects and items during everyday routines and activities.

WHAT



Count Together

WHY

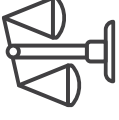
Counting and **recognizing numbers** are some of the first early math skills your child needs to learn. **Counting** allows children to explore important ideas like: *how many*, *more*, *less*, and *equal*. The more your child counts, the easier it will become.

HOW

Count items during everyday routines!

- Count **toys** as you put them away. "Let's see how many dolls/cars/blocks you have."
- Count **vehicles** on your way to school. "I see two school buses!"
- Discuss how much money you need to pay at the store. "We need three dimes. Can you count out three?"

WHAT



Group and Compare

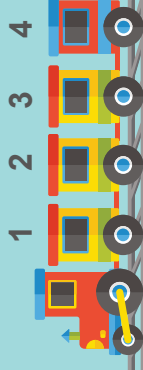
WHY

Grouping and **comparing** items helps your child understand **patterns and relationships**, which are important for math. Young children begin to learn ideas and language like: *big*, *medium*, *small*, *long*, *longer*, *longest*, *same*, and *different*.

HOW

Help your child begin to notice and group together items that are similar.

- Group **food objects**. "Which ones are fruits and which are vegetables?"
- **Compare** items: "I put these socks together because they are all white. Can you sort the blue ones next?"
- Look for and create **patterns**: "I have two grapes, three bananas, two grapes, three bananas. What would come next?"



In Your Community

At Home

Children's Museum Exhibit: How Does It Work?

- *Amazing Airways*: count how many seconds it takes for your object to come out of the machine.
- *Kid Lift*: compare which pulleys lift you more easily.

Library

- *Little Quack* by Lauren Thompson
- *Quack and Count* by Keith Baker
- *The Doorbell Rang* by Pat Hutchins
- *Sam Sorts* by Marthe Jocelyn
- *Sorting at the Market* by Tracey Steffora

Park

- Count how many rings are on the monkey bars or the number of swings.
- Ask is there are *more/fewer* benches or trees.
- Compare the shapes and sizes of the slides or steps.
- Gather, group, and compare different leaves, flowers, or plants.



CLI Engage Activity Collection

<https://cliengagefamily.org>

Number Cups

Use cereal, snacks, or other small items to practice counting and matching to written numbers.



Count and Match

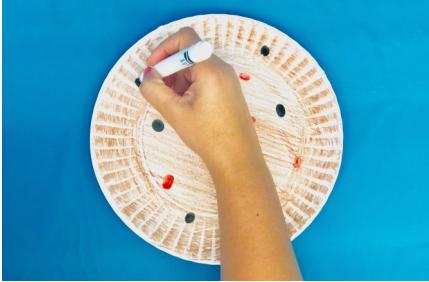
Practice recognizing written numbers and use one-to-one correspondence to count out the correct number of items while grouping them.



Cookie Solution

With the help of mathematics we can find a way to share a cookie among family members.

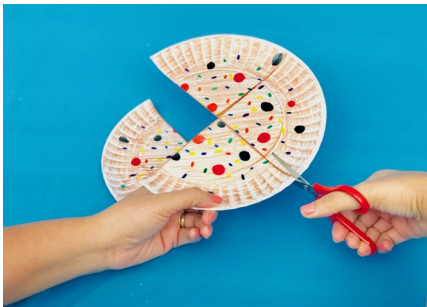
What to do



1. Make a large cookie with a paper plate and use crayons or markers to decorate it.



2. The cookie is for sharing with your family. How many pieces would you need to make? What should you do? Cut it into squares, circles, rectangles, or triangles?



3. Cut out the cookie in the shape that you considered would be the best way to divide the cookie in equal parts.

Did You Know?

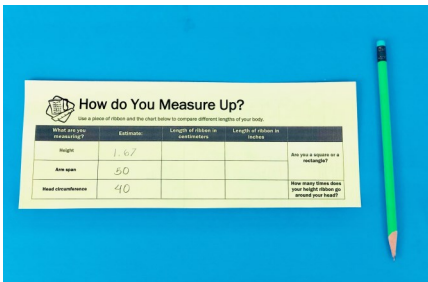
Children need to be exposed to everyday situations where they can develop their problem solving skills and build their logical-mathematical thinking. Dividing things into equal parts can look like a big challenge for small kids but when we ask them to split a cookie in fair shares, they are beginning to learn division concepts with a concrete example and a real life situation.

How Do You Measure Up?

Math Rules!

Compare lengths of different parts of your body by using a nonstandard tool for measuring.

What to do



1. Make estimations about the lengths of your height, arm span and head circumference and write them down in the chart.



2. Use cord to measure the lengths of these body parts and cut it according to the length of the measured part.



3. Use measuring tape to measure the pieces of the cords and compare the results with your estimations.

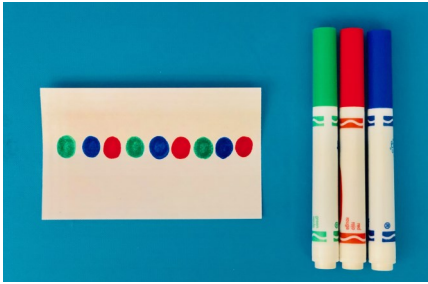
Did You Know?

The process of measurement can be taught at an early age using nonstandard tools like cords or ribbons. By using non-standard units like hand span, you can teach the basic concept of measurement that will form the foundation for understanding the use of conventional tools such as: rulers, measuring tapes, yard sticks or meter sticks. This can work as an introduction for learning standard units like centimeters and meters.

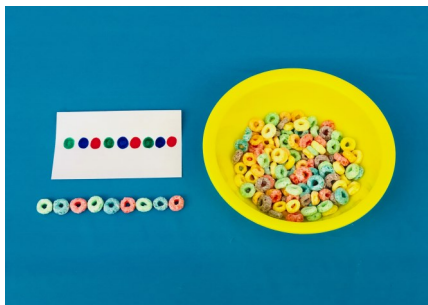
Pattern Bracelets

Make a fun ornament with cereal for practicing color pattern and counting.

What to do



1. Using markers draw a dot or ring pattern on your index card.



2. Choose the same number and color of cereal to duplicate the pattern you made on the card.



3. Make a bracelet using cereal and pipe cleaners.

Did You Know?

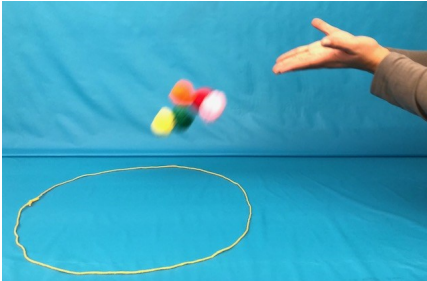
The world is made up of patterns, for example, zebras have black and white stripes. Many patterns can be found in the fabric used to create clothing. Stripes, prints, and plaids often repeat themselves. A pattern is only a pattern if it is repeated at least twice. Making patterns and classifying comes before learning about numeration. Understanding patterns help prepare children for learning complex number concepts and mathematical operations.

Pom-Pom Toss

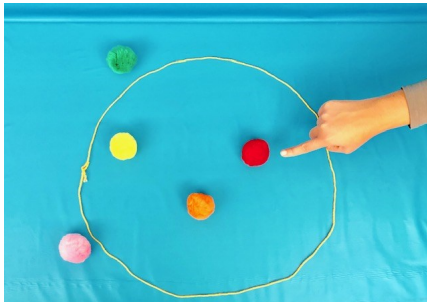
Math Rules!

Play a game that practices recording skills and see how the numbers 0 through 5 are related.

What to do



1. Pick out five pom-poms and toss them all at once into the circle.



2. Count how many pom-poms landed inside the circle and outside the circle.



3. Record the results: Draw where each pom-pom has landed on your record sheet. Repeat steps 1 and 2 until your record sheet is full.

Did You Know?

Knowing the relationships between numbers helps with mental calculations needed in everyday activities like shopping and figuring out quantities needed for work, home or play. Counting and recognizing numbers are some of the first early math skills your child needs to learn. Counting allows children to explore important concepts like how many, more, less, and equal.

The Right Fit

Estimate the number of beans it will take to cover your traced handprint.

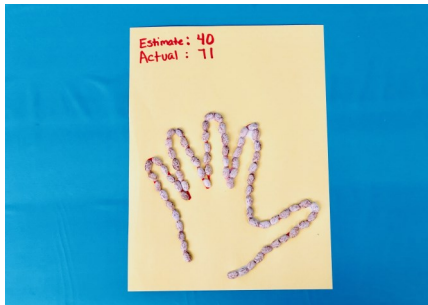
What to do



1. Trace your hand onto a sheet of paper and estimate how many beans will fit onto the outline of your hand and write it down.



2. Glue the beans end to end onto the outline of your hand.



3. Count the total number of beans you used and compare the result with your estimate.

Did You Know?

We use estimation every day of our lives in order to prevent us from having to count and measure everything. Guessing is good enough when estimating the amount of groceries in your basket or when guessing if you have enough flour to bake the cookies. Your child can be good at estimating by practicing getting as close as you can with a good guess. Estimation is an important math skill also known as a “best guess”.

Show What You Know



Overview: Show What You Know

Objective

Parents will learn how to start teaching children how to gather and interpret information as they explore. This will help them understand how and why things work or happen.

Strategies



Gather and Record Data



Understand Your Findings

Key Messages

- A simple and practical way through which scientists gather information about things or events by using different tools such as graphs, charts, or tables.
- Scientists need to analyze and understand the data they gather to draw conclusions about their investigations and make decisions based on scientific data, not just their thoughts or feelings on the topic. You are supporting your child's interest in sciences when you take time to explain or talk about the data that you both collected after doing an experiment or investigation.

Workshop Timing

Minutes	Activity	Notes
2	Welcome and ice breaker	Question on screen
4	Video	Pause at Turn & Talk
2	Turn & Talk	Engage and practice strategies
10-12	Read-aloud	Model strategies while reading
35	Activity stations	Finish video
5	Reminder about end of workshop	
60	Total	

Talking Points: Show What You Know

Setting
Whole group

Materials
Book: 1, 2, 3, To the Zoo by Eric Carle.

Preparation

- Become familiar with the video strategies to be presented.
- Become familiar with the stopping points during the read aloud.
- Practice reading the book aloud using the strategies before the workshop.

Introduction to Workshop

Welcome to Teaching Together STEM, a series of workshops that will guide you and your children to explore science and math ideas in a safe and fun environment. These fun*shops have been developed in partnership with the Children's Learning Institute and The Children's Museum Houston. My name is _____, and I'm excited about leading this fun*shop titled "Show What You Know."

Housekeeping

Please be sure to sign in and pick up a handout. Let's remember to show respect for others' ideas and opinions shared during this workshop. Parents, please monitor your child's behavior and tend to your child's needs so that everyone can have a positive experience. Restrooms are located at _____.

Agenda

We'll start by watching a video, then we'll read a book together, and, finally, we'll have activities you can do with your child.

Introduction

Let's start with a question, how many of you have heard of the word STEM? Do you know what STEM means? ...Yes STEM stands for Science, Technology Engineering, and Math. STEM is about exploring the world around us and asking questions about why something works. And the main purpose of STEM learning is to apply knowledge to real-life situations and even find solutions to real-world problems. For example, while cooking we develop creativity and problem-solving skills, and we need our technology skills to set the oven to prepare our meals. Now, what kind of skills Do we need at the grocery store? Math skills. During playtime, children can practice their engineering skills by building with blocks. Can anyone say another daily activity that involves STEM skills or knowledge?...Also, when you are outside, children have the opportunity to explore their surroundings when observing like a scientist and even predict the weather. As you can see, STEM is everywhere and today want to share with you some strategies and ideas that can help your children to develop early STEM skills.

Continued on next page.

Objective

Today we are going to be introducing two strategies you can use to start teaching children how to gather and interpret information as they explore. This will help them understand how and why things work or happen.

Handout

In this handout, you can find more alternatives for developing STEM skills in different environments, like in the Children's Museum Houston, the Library, in the park, and at home where you can scan the QR (Quick Response) Code to get on-line activities through the CLI Engage Activity Collection.

Video

To better understand these strategies let's watch the video on Show What You Know! You can use the handout to follow along or take notes during the video. Does anyone still need a handout?

Summarize Strategies

Just as we want to encourage children to explore their surroundings and ask questions about how and why things happen, it is important that they learn to collect information and interpret their findings while doing experiments in the same way that scientists do. As we learned with these strategies, collecting information about quantities using instruments such as graphs, tables, or charts, and analyzing these data or results, will help your little scientist in order to draw conclusions or make decisions based on reliable information and not on feelings or thoughts on the subject. For example: How many of you have measured your child's growth on the wall? This is a way of gathering data like a scientist. Then, when for example, you talk about what year he/she grew more, you are helping your children to understand the data you both have been collecting.

Importance of Reading Together

Another great way to stimulate your children's curiosity about the world around them is through reading. We are now ready to move on to story time. Parents, this is a time when you can sit close to your child. Make yourself comfortable. We invite you to have your child sit on your lap or you can sit on the floor with your child.

Continued on next page.

Read-Aloud Engagement

Today's story is a book that provides an opportunity to practice math skills. As I read it, you will see me ask questions like how many are there? and encourage children to count and compare quantities or data.

Today's book is 1, 2, 3, To the Zoo by Eric Carle.

*Remember to praise the parent and the child for their responses or participation.

Activity Stations

Parents, now you will have the opportunity to rotate from station to station and do the activities with your child. The activities were designed to practice the strategies we have learned today, gathering information and data interpretation in a fun way. If you make something, you can take it with you. Otherwise, please leave the materials at the table for the next family to enjoy.

*Optional

- Offer raffles and giveaways at the end of the workshop. Thank you for coming to the workshop. Your name will go into today's raffle. You must be present to win.
- Call attention to the book list at the Investigating Books station. Please feel free to take a book list with you for more books to read related to this topic.

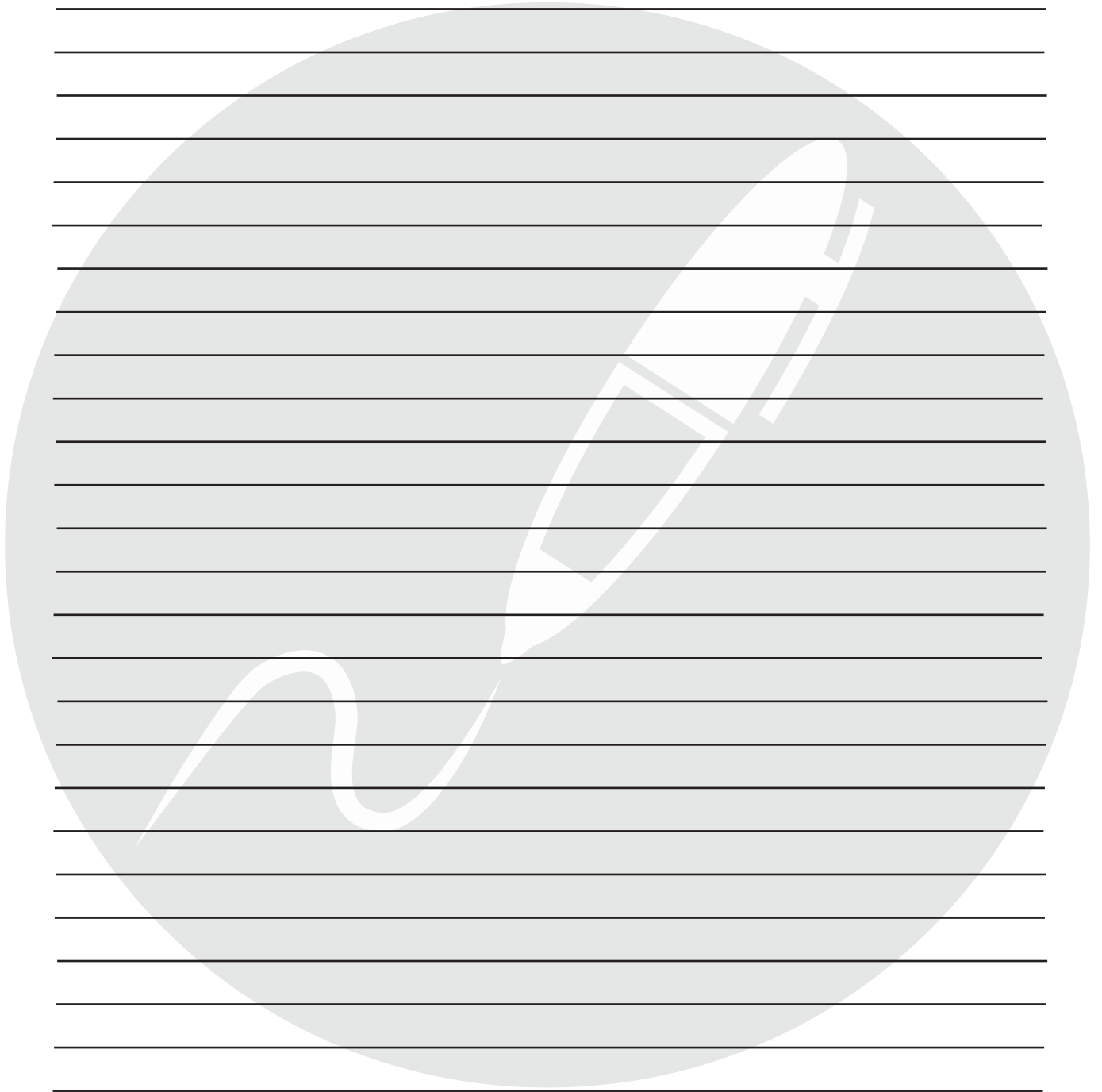
Five Minute Warning

We have five minutes before the end of the workshop. Please finish up your activities.

Closing

Thank you for joining us! We hope that you have learned useful strategies that will encourage more STEM in your everyday activities. Our next workshop will be _____. See you next time!

Notes: Show What You Know



Preparation for All Stations

- Refill supplies (estimate 25 participants)
- Clean and disinfect kit materials
- Print instructions on cardstock, put in a sheet protector, stand up on a bookend

Test Flight

Supplies	Preparation
Newspaper	
Construction paper	
Regular white paper	
Measuring tape	
Graph	Print out on white cardstock and cut evenly
Pencil	
Scissors	

Dr. Vet

Supplies	Preparation
Various stuffed animals	
Doctor kit (stethoscope, thermometer, ear scope...)	
Clipboard	
Pen	
Record sheet	Print out and attach to clipboard

Animal Hatchlings

Supplies	Preparation
Plastic eggs	
Assorted plastic animals (arachnids, insects, birds, reptiles, fish)	Insert one animal into each egg
Basket	Place eggs in basket
Sorting chart	Print on white cardstock and laminate

Catapult

Supplies	
Clipboard	
Ruler	Attach ruler to clipboard and secure with rubber band
Plastic spoon	Attach to end of ruler and secure with rubber band
Rubber band	
Assorted objects	
Measuring tape	
Data table	Print out
Pen	

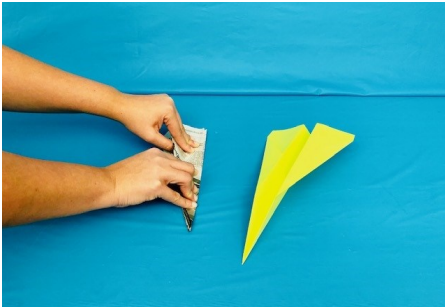
Starburst Graph

Supplies	Preparation
Plastic bowl	
Starburst candy	
Starburst graph	Print out
Crayons	Pick out colors that match each starburst

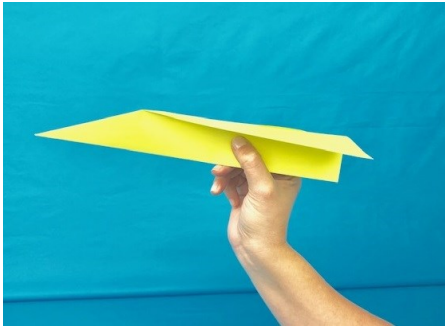
Test Flight

Assemble paper airplanes and test them to determine which goes farthest.

What to do



1. Make two airplane designs. You can create them with different types of paper.



2. Standing on the starting line, gently throw your paper airplane so it can fly straight.



- 3 Measure how far your airplane flew (with measuring tape) and record the result on the graph. Repeat the steps with your second airplane.

Did You Know?

Explore with paper airplanes as you try different materials such as newspaper, construction paper or regular paper, and see how it affects the flight of the airplane. Record the results in the table to know which of your designs work best.

**Show what
you Know!**

Dr. Vet

Pretend you are a veterinarian. Part of your job is to make sure the animals in your care are healthy.

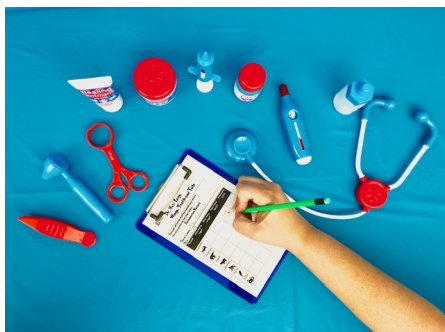
What to do



1. As Dr. Vet, inspect the legs, wings, teeth and tails, of each animal for any signs of sickness.



2. Count the body parts of each animal you examine.



3. Record how many legs, wings, teeth and tails, each animal has.

Did You Know?

Children need experience counting, recording and collecting data to compare results between one object and another. For example comparing the numbers of teeth between the animals.

Animal Hatchlings

**Show what
you Know!**

Discover which animals come from eggs and sort them into animals groups such insects, birds, reptiles, arachnids, and fish.

What to do



1. Pick five plastic eggs from the basket.



2. Open the eggs to reveal the animal inside. *What animal did you find in the egg?*



3 Place the animals on the sorting chart according to what animal group they are from. Such as: insects, birds, reptiles, arachnids, and fish.

Did You Know?

Grouping animals in charts according to their class, is a way to introduce children in math and science concepts. Children may have their own ideas of how these animals are related, like classifying them by physical characteristics.

Catapult

Launch objects across the room and compare how far they travel.

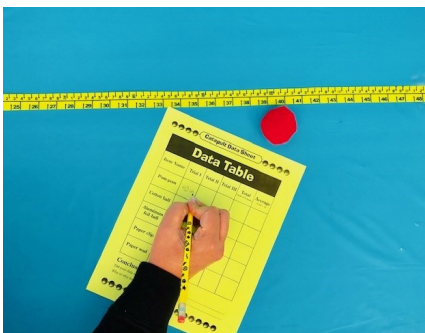
What to do



1. Place an object on the spoon. With one hand, hold the clipboard steady on the table. Use the other hand to bend the spoon- ruler launcher back as far as you can.



2. Quickly let go of the ruler but keep holding the clipboard to launch items from the spoon as far as you can.



3. Measure the distance from the clipboard to where the object landed and record the results on the data sheet. Repeat the process with each item two times.

Did You Know?

The amount of tension created and the weight of the object determine the distance that it can be launched. Based on your data, you can know which objects launched the farthest and which launched the shortest.

**Show what
you Know!**

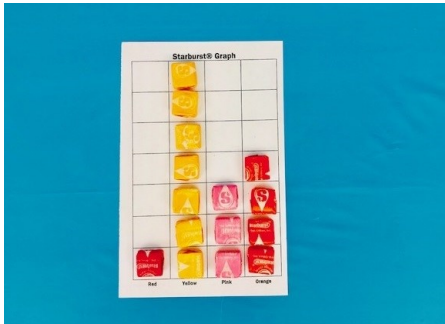
Starburst Graph

Sort, classify, and graph candies.

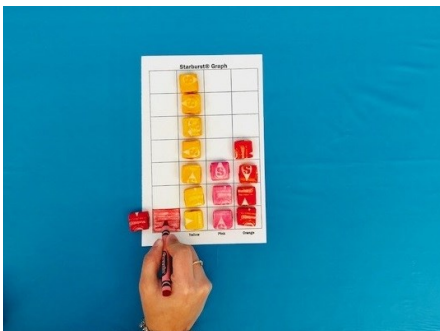
What to do



1. Pull out a handful of candy and sort the candy by colors.



2. Place the candy on the one inch graph in columns, starting from the bottom.



3. Count the number of candies on each column and color the squares under each candy with the matching color.

Did You Know?

Knowing how to gather, sort, chart and analyze data is a life skill that every person needs to know. Medical charts, report cards, growth charts, food pyramids, and inventory charts, are all graphs we use every day to interpret data.

Parent strategies: Help your child build tools for doing science by thinking about how and why things work and gathering information as you explore.

WHAT

Gather and Record Data



There's ways to **collect data** all through out your day. When you ask, "How much, how many" those **numbers are data!** You can capture data by writing notes, keeping tallies, or making charts. Recording simple data can help your child want to learn more.

WHY

HOW

- **Measure your child's growth** on a chart. Discuss, "How much have you grown since our last measure?"
- At clean-up time group toys or kitchen **objects into categories**. Ask, "How many of each object do we have?"
- **Tally how many insects** you find outdoors. Say "Let's keep a list of how many bugs we find."
- Get out a **clipboard and timer** and pretend you are scientist. Say, "Let's see how long it takes us to do ____ (routines - dishes, bathing; or games - puzzle, race)."

WHAT

Understand Your Findings

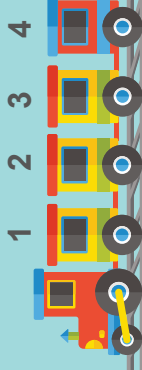


Exploring our world and collecting data are the keys to science! You are supporting your child's interest in science when you **take time to explain your data**. Discuss how and why things happened the way they did.

WHY

HOW

- After you measure your child's growth, **talk about patterns**: "When have you grown more quickly/slowly?"
- Think about how to **sort and organize** toys or kitchen objects: "How can we best organize these into groups?"
- Consider different **types and features of insects** you count. "How many of these bugs fly/walk? How many bugs are safe/unsafe?"
- After you **set a timer**, think about how to do an event more quickly. "How can we do that faster?"



In Your Community

At Home

Children's Museum

- **Eco-Station:** explore environmental issues by visiting a native plant garden, woodland area pond and a research pavilion dedicated to local flora and fauna!
- **How Does It Work?:** discover answers to your own science questions through hands-on exploration of kinetic energy, simple machines, electricity and pneumatic tube systems!

Library

- *Tally O'Malley* by Stuart J. Murphy
- *I Use Math At The Doctor's* by Joanne Mattern
- *The Best Vacation Ever* by Stuart J. Murphy
- *The Great Graph Contest* by Loreen Leedy
- *Bar Graphs* by Vijaya Khisty Bodach

Park

- Ask "What causes branches or leaves to fall?"
- Ask "How does a swing work?"
- Count, group and compare rocks.
- Gather, group, and compare different leaves, flowers, or plants.



CLI Engage Activity Collection

<https://cliengagefamily.org>



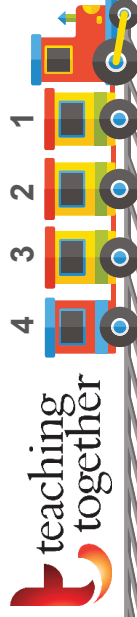
Shape Similarities

Identify shapes and use their features to sort them into "like" categories.



Line Up Snakes!

Use pieces of yarn as "snakes" to compare lengths of objects and arrange them in order.



Dream It, Build It!



Overview: Dream It, Build It!

Objective

Parents will learn how to help their children become a young engineer by tinkering with objects and coming up with creative solutions to problems at home and in their world.

Strategies



Take on a Challenge



Test and Repeat

Key Messages

- Thinking as an engineer teaches us that it's normal and good to look for many ways to solve problems. It's important for kids to see they can solve complex and challenging problems if they keep trying new ideas
- It's important for children to see that things do not always go as expected in the first attempt and don't turn out the same way every time we try them. We can learn more by repeating the same test over and over again to see what happens.

Workshop Timing

Minutes	Activity	Notes
2	Welcome and ice breaker	Question on screen
4	Video	Pause at Turn & Talk
2	Turn & Talk	Engage and practice strategies
10-12	Read-aloud	Model strategies while reading
35	Activity stations	Finish video
5	Reminder about end of workshop	
60	Total	

Talking Points: Dream It, Build It!

Setting
Whole group

Materials
Book: Three Little Pigs and the Somewhat Bad Wolf by Mark Teague

Preparation

- Become familiar with the video strategies to be presented.
- Become familiar with the stopping points during the read aloud.
- Practice reading the book aloud using the strategies before the workshop.

Introduction to Workshop

Welcome to Teaching Together STEM. My name is _____. Today's workshop is 'Dream It, Build It.' This workshop has been developed in partnership with the Children's Learning Institute and The Children's Museum Houston. This session is part of a series of workshops that will guide you and your children to explore science and math ideas in a safe and fun environment.

Housekeeping

Please be sure to sign in and pick up a handout. Let's remember to show respect for others' ideas and opinions shared during this workshop. Parents, please monitor your child's behavior and tend to your child's needs so that everyone can have a positive experience. Restrooms are located at _____.

Agenda

We'll start by watching a video, then we'll read a book together, and, finally, we'll have activities you can do with your child.

Continued on next page.

Introduction

Let's start with a question, how many of you have heard of the word STEM? Do you know what STEM means? Yes STEM stands for Science, Technology Engineering, and Math. STEM is about exploring the world around us and asking questions about why something works. And the main purpose of STEM learning is to apply knowledge to real-life situations and even find solutions to real-world problems. For example, while cooking we develop creativity and problem-solving skills, and we need our technology skills to set the oven to prepare our meals. Now, what kind of skills Do we need at the grocery store? Math skills. During playtime, children can practice their engendering skills by building with blocks. Can anyone say another daily activity that involves STEM skills or knowledge?...Also, when you are outside, children have the opportunity to explore their surroundings when observing like a scientist and even predict the weather. As you can see, STEM is everywhere and today want to share with you some strategies and ideas that can help your children to develop early STEM skills.

Objective

Today we are going to be introducing two strategies you can use is to help your child become a young engineer by tinkering with objects and coming up with creative solutions to problems at home and in their world. The first strategy is to take on a challenge. The second strategy is to test and repeat.

Handout

In this handout, you can find more alternatives for developing STEM skills in different environments, like in the Children's Museum Houston, the Library, in the park, and at home where you can scan the QR (Quick Response) Code to get on-line activities through the CLI Engage Activity Collection.

Video

To better understand these strategies let's watch the video on Dream It, Build It! You can use the handout to follow along or take notes during the video. Does anyone still need a handout?

Summarize Strategies

Whether it's building a fort or a castle using blankets, chairs, and blankets, children are creatively curious and are inclined to come up with solutions to problems. While coming up with solutions to problems, it is important for children to face trial and error. Testing and repeating allows children to develop critical thinking skills while remaining curious until the end. Through these strategies Take on a Challenge and Test and Repeat, we will take another step in the scientific method. In addition to observing and analyzing the world and its events, we want to encourage your children to create: creating through imagination and creating by doing.

Continued on next page.

Importance of Reading Together

A great way to stimulate your child's curiosity and imagination to create and build something is through reading. We are now ready to move on to story time. Parents, this is a time when you can sit close to your child. Make yourself comfortable. We invite you to have your child sit on your lap or you can sit on the floor with your child.

Read-Aloud Engagement

Today's book is a funny version of the popular story about three constructors' pigs. As I read, you will see me asking questions about what the protagonists of our story are doing. Feel free to go ahead and answer some of the questions out loud

Today's book is *Three Little Pigs and the Somewhat Bad Wolf* by Mark Teague.

*Remember to praise the parent and the child for their responses or participation.

Activity Stations

Parents, now you will have the opportunity to rotate from station to station and do the activities with your child. The activities were designed to practice the strategies we have learned today, take on a challenge to build something, and if the first try doesn't results as planned, you can try to improve your design or try out new ideas in a fun way. If you make something, you can take it with you. Otherwise, please leave the materials at the table for the next family to enjoy.

*Optional

- Offer raffles and giveaways at the end of the workshop. Thank you for coming to the workshop. Your name will go into today's raffle. You must be present to win.
- Call attention to the book list at the Investigating Books station. Please feel free to take a book list with you for more books to read related to this topic.

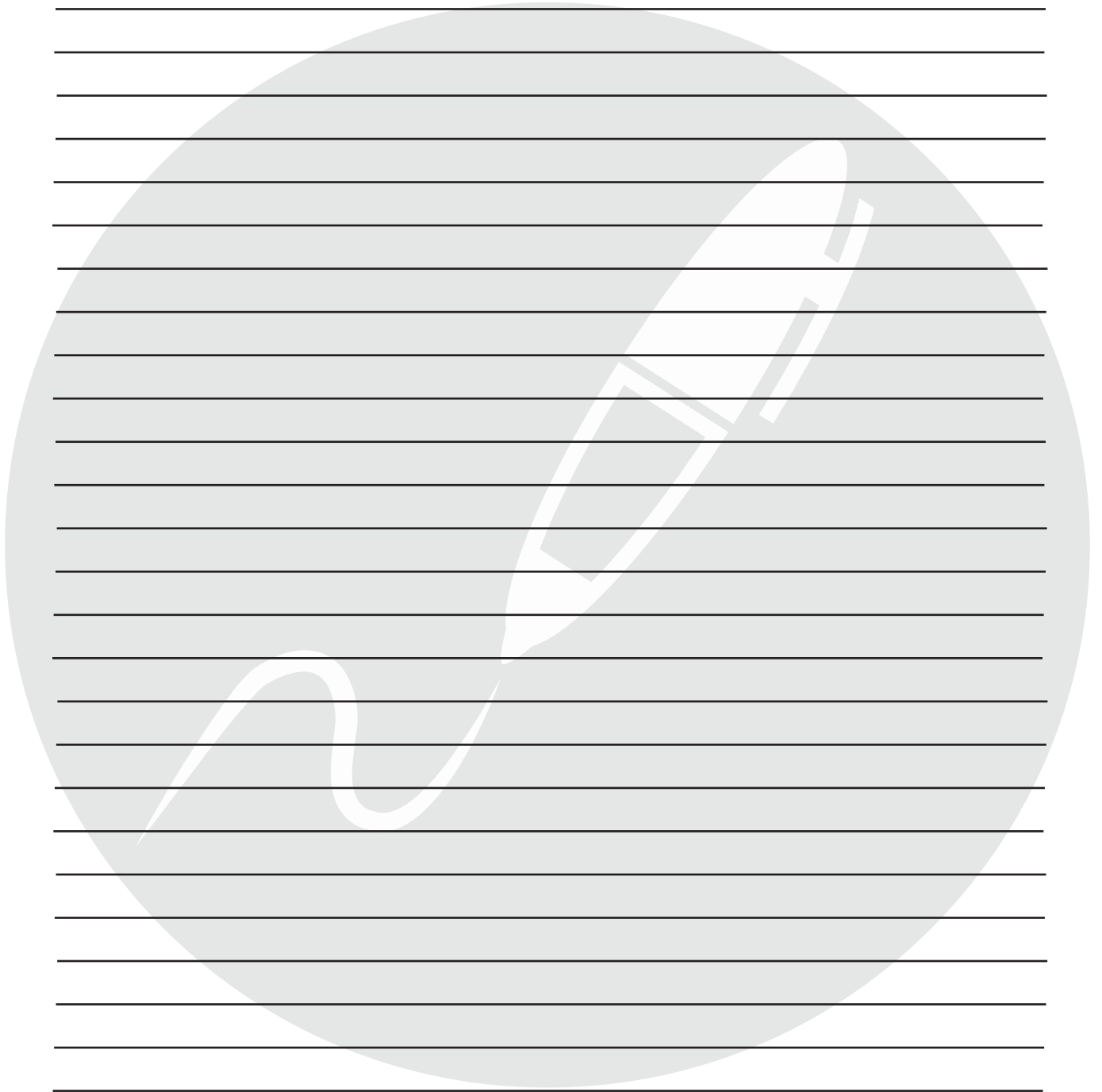
Five Minute Warning

We have five minutes before the end of the workshop. Please finish up your activities.

Closing

Thank you for joining us! We hope that you have learned useful strategies that will encourage more STEM in your everyday activities. Our next workshop will be _____. See you next time!

Notes: Dream It, Build It!



Preparation for All Stations

- Refill supplies (estimate 25 participants)
- Clean and disinfect kit materials
- Print instructions on cardstock, put in a sheet protector, and stand up on a bookend

Material Mix-Up

Supplies	Preparation
Split pin	
Paper clips	
Spinner template	Print out on white cardstock and laminate, push split pin through middle and attach paper clip
Playdough	
Aluminum foil	
Cotton balls	
Masking tape	
Construction paper	

Bridge Builders

Supplies	Preparation
Paper cups	
Wooden blocks	
Masking tape	
Construction paper	
Toy car	

Hoop Gliders

Supplies	Preparation
Paper strips	Cut one shorter and one longer out of construction paper
Tape	
Straw	

Invent-A-Tool

Supplies	Preparation
Masking tape	
Straws	
Sponge	
Rollers	
Plastic spoon	
Pipe cleaners	
Painting paper	
Assorted paint colors	

Lego Dog House

Supplies
Assorted legos
Toy dog

Material Mix-Up

Play a game to find the best material for the job.

What to do



1. Spin both spinners.



2. Take only the material indicated by the material spinner.



3. Make the item that the object spinner landed on.

Did You Know?

A material's properties, or characteristics, make it good for some purposes and bad for others. Ever wonder why we don't wear clothes made out of aluminum foil, or ride bicycles made out of foam? A designer or engineer needs to understand all of the material's properties in order to select appropriate materials for creating useful items.

Bridge Builders

Use different materials to build a bridge.

What to do



1. Pick which materials would best to build a bridge. Which would be strong enough to hold a toy car? Or which could you connect to make the longest bridge?
2. Build your bridge with the material you chose.
3. Use small toys to test how your bridge holds up and if it is necessary make any changes to improve your bridge.

Did You Know?

Constructive play helps children develop engineering skills. Children who create small-scale structures during play, deal with similar challenges that engineers face to build bridges. There is also evidence that very young children develop better language, math, and problem-solving skills when they engage in regular block play.

Hoop Gliders

Make an object that glides.

What to do



1. Make two hoops out of paper strips (one small and the other bigger) by placing the ends of the strips together and taping them.



2. Tape both hoops to the ends of the straw.



3. To use it, hold the hoop glider in the middle of the straw with the small hoop in front. Throw it gently like a dart.

Did You Know?

The paper hoops on the Hoop Glider act like wings. The shape of the hoops allows the air flowing around them to create **lift**, a force that pushes the glider up. The force you give by throwing it, called **thrust**, allows the air to flow around the hoops, creating the lift and allowing the glider to soar. For a plane to fly, the lift must be stronger than the **weight**.

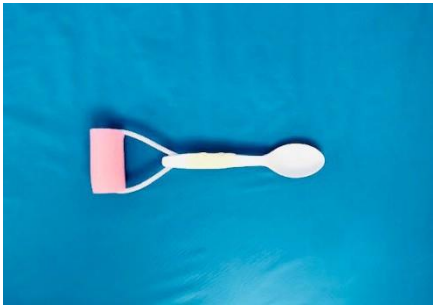
Invent-a-Tool

Invent a tool for painting in place of a paintbrush.

What to do



1. Gather household items like rollers, sponges, straws or anything else that you might want to use to make your tool.



2. Put your items together and create a tool for painting different creative marks.



3. Test your tool by using paint and marking it on paper. If it didn't turn out how you expected, think about how you can change your tool to make the mark you want.

Did You Know?

Artists are inventors. They use a variety of tools, traditional and homemade, to transform the creations they imagine into reality. Sometimes an artist wants to create a mark or create an effect that traditional tools just cannot make, so the artist will invent a new tool or use an old tool in a new way, like your child can do it through this activity.

Lego Dog House

Build a suitable house for a toy pet.

What to do



1. Gather the amount of Legos you think necessary to make a house with the right size for the toy dog.



2. Let your imagination fly and build a dog house with the pieces of Legos you chose.



3. Place the dog inside the house to see if it is the right size. If the house is too small or too big for the toy you can try a new construction.

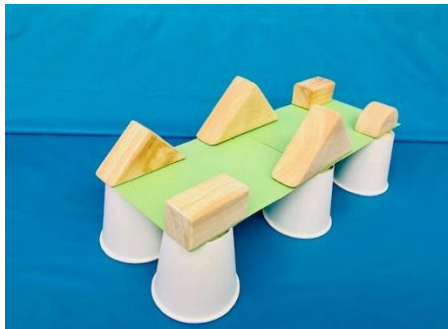
Did You Know?

Before developing a construction project, architects and engineers follow two very important steps. First step is to **identify the necessities**, what is necessary to build something, and the second is **imagination**, which leads them to figure out how they will build it. With this activity, your child can explore both creative steps into **the building process**.

Constructores de puentes

Utiliza diferentes materiales para construir un puente.

Qué hacer



1. Elige qué materiales serían los mejores para construir tu puente. ¿Cuáles lo harían suficientemente fuerte para sostener un carro de juguete? O ¿cuáles podrías conectar para hacerlo más largo?
2. Construye tu puente con el material que elegiste.
3. Usa juguetes pequeños para probar cómo se sostiene tu puente y, si es necesario, realiza cambios para mejorar tu puente.

¿Sabías?

El juego constructivo ayuda a los niños a desarrollar habilidades de ingeniería. Los niños que crean estructuras a pequeña escala durante el juego, enfrentan desafíos similares a los que enfrentan los ingenieros al construir puentes. También hay evidencia de que los niños pequeños desarrollan mejores habilidades de lenguaje, matemáticas y de resolución de problemas, cuando participan en juegos de bloques regulares.

Parent strategies: Help your child become a young engineer by tinkering with objects and coming up with creative solutions to problems at home and in their world.



WHAT

Take on a Challenge

WHY

Things don't always work the first time we try them. Thinking like an **engineer** teaches us that it's normal and good to look for many ways to **solve problems**. It's important for kids to see they can **solve** complex and challenging **problems** if they keep trying new ideas.

HOW

- **Design a solution** to a problem at your house. For example ask, "How can we fix this broken object?"
- Help your child select materials to **build a fort**. Say, "Let's see if we can make a cozy space to read under using chairs and blankets."
- Play with **puzzles** for a challenge. Say, "This is tricky. How should we start with the edges or a part of the picture?"
- Pretend you're an engineer. Try to build a tall **sturdy building** with blocks or Legos. "How can we make this building stronger so it won't fall in an earthquake/tornado/etc..."



WHAT

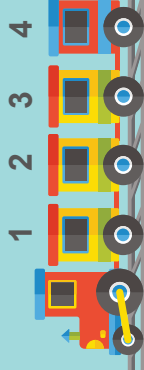
Test and Repeat

WHY

It's important for children to see that things don't turn out the same way every time we try them. We can learn more by **repeating** the same test over and over again to see what happens. This helps your child learn to stay engaged and **curious** until the end!

HOW

- Challenge your child with an **obstacle** course. Set up materials and say, "I'm going to see how fast you can hula hoop, then jump over an object, and walk with a pillow on your head." Then ask your child to repeat the obstacles and think of ways to do it more quickly.
- Praise your child for solving **real world problems**. Say, "Wow, you came up with a creative way to clean up that spill!"
- Use **toy cars and ramps** and see how you can make them move farther. Ask, "What can we do to make this doll's car go all the way across the carpet?"



In Your Community

At Home

Children's Museum

- **Invention Convention:** dream-up and design in a workshop filled with half-finished contraptions, bins of spare parts, project tables, schematics and various instruments from floor to ceiling.
- **Inventors' Workshop:** visitors learn that inventors learn by doing, mistakes will happen and are necessary to the invention process.

Library

- *Builder Brothers Big Plans* by Jonathan and Drew Scott
- *Dreaming Up: A Celebration of Building* by Christy Hale
- *Jack the Builder* by Stuart J. Murphy
- *Iggy Peck Architect* by Andrea Beaty
- *How a Bridge Is Built* by Sam Aloian
- *The Three Little Pigs and the Somewhat Bad Wolf* by Mark Teague
- *One Big Building: A Counting Book About Construction* by Michael Dahl

Park

- Play with sand and dirt. Try out different ways to make tunnels/mountains/castles that won't fall down.
- Ask your child to come up with a creative way to get from one side of the monkey bars to the other.
- Help your child dream up a new playground for the park and have your child draw and label his/her idea.

CLI Engage Activity Collection



<https://cliengagefamily.org>

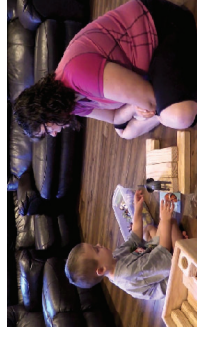
Build It Like Me

Use building blocks to build a structure together and recognize shapes.



Build a Bridge

Use household items to build a bridge that is strong enough to hold up a toy animal.



Picture This!



Overview: Picture This!

Objective

Parents will learn how to encourage their children to act like a scientist or engineer by explaining parts of a whole and how systems work using close observations or models.

Strategies



Explain Parts of a Whole



Explore How Systems Work

Key Messages

- When children know that things are made up of smaller parts, they start to develop math and science knowledge and increase their understanding of the world around them.
- To better understand complex systems or actions, people started building simplified models of these systems that are easier to understand. They began to create models that allow us to visualize or represent in a simpler way how systems or processes work.

Workshop Timing

Minutes	Activity	Notes
2	Welcome and ice breaker	Question on screen
4	Video	Pause at Turn & Talk
2	Turn & Talk	Engage and practice strategies
10-12	Read-aloud	Model strategies while reading
35	Activity stations	Finish video
5	Reminder about end of workshop	
60	Total	

Talking Points: Picture This!

Setting
Whole group

Materials
Book: "Moon" by Britta Teckentrup

Preparation

- Become familiar with the video strategies to be presented.
- Become familiar with the stopping points during the read aloud.
- Practice reading the book aloud using the strategies before the workshop.

Introduction to Workshop

Welcome to Teaching Together STEM. My name is _____. Today's workshop is "Picture This" This workshop has been developed in partnership with the Children's Learning Institute and The Children's Museum Houston. This session is part of a series of six workshops that will guide you and your children while exploring science and math ideas in a safe and fun environment.

Housekeeping

Please be sure to sign in and pick up a handout. Let's remember to show respect for others' ideas and opinions shared during this workshop. Parents, please monitor your child's behavior and tend to your child's needs so that everyone can have a positive experience. Restrooms are located at _____.

Agenda

We'll start by watching a video, then we'll read a book together, and, finally, we'll have activities you can do with your child.

Continued on next page.

Introduction

Let's start with a question, how many of you have heard of the word STEM? Do you know what STEM means? ...Yes STEM stands for Science, Technology Engineering, and Math. STEM is about exploring the world around us and asking questions about why something works. And the main purpose of STEM learning is to apply knowledge to real-life situations and even find solutions to real-world problems. For example, while cooking we develop creativity and problem-solving skills, and we need our technology skills to set the oven to prepare our meals. Now, what kind of skills Do we need at the grocery store? Math skills. During playtime, children can practice their engendering skills by building with blocks. When you are outside, children have the opportunity to explore their surroundings when observing like a scientist and even predict the weather. Can anyone say another daily activity that involves STEM skills or knowledge?... As you can see, STEM is everywhere and today want to share with you some strategies and ideas that can help your children to develop early STEM skills.

Objective

Today we are going to be introducing two strategies you can use to encourage your child to act like a scientist or engineer by explaining parts of a whole and how systems work using close observations or models.

Handout

In this handout, you can find more alternatives for developing STEM skills in different environments, like in the Children's Museum Houston, the Library, in the park, and at home where you can scan the QR (Quick Response) Code to get on-line activities through the CLI Engage Activity Collection.

Video

To better understand these strategies let's watch the video on Picture This! You can use the handout to follow along or take notes during the video. Does anyone still need a handout?

Summarize Strategies

Parts of a whole exist everywhere around us. We are a part as well as a whole. Just simply by exploring the different body parts, children can develop a better understanding of themselves and the world around them, through concepts such as numeracy and functionality.

Importance of Reading Together

A fantastic way to stimulate your child's curiosity for science is through reading. We are now ready to move on to storytime. Parents, this is a time when you can sit close to your child. Make yourself comfortable. We invite you to have your child sit on your lap or you can sit on the floor with your child.

Continued on next page.

Read-Aloud Engagement

In today's book, you're going to hear big words about some important changes we can observe in the night sky. This story will encourage children to see the moon in a more scientific and fascinating way. .

Today's book is "Moon" by Britta Teckentrup.

*Remember to praise the parent and the child for their responses or participation.

Activity Stations

Parents, now you will have the opportunity to rotate from station to station and do the activities with your child. The activities were designed to practice the strategies we have learned today, understand the world through close observations, and develop models in a fun way. If you make something, you can take it with you. Otherwise, please leave the materials at the table for the next family to enjoy.

*Optional

- Offer raffles and giveaways at the end of the workshop. Thank you for coming to the workshop. Your name will go into today's raffle. You must be present to win.
- Call attention to the book list at the Investigating Books station. Please feel free to take a book list with you for more books to read related to this topic.

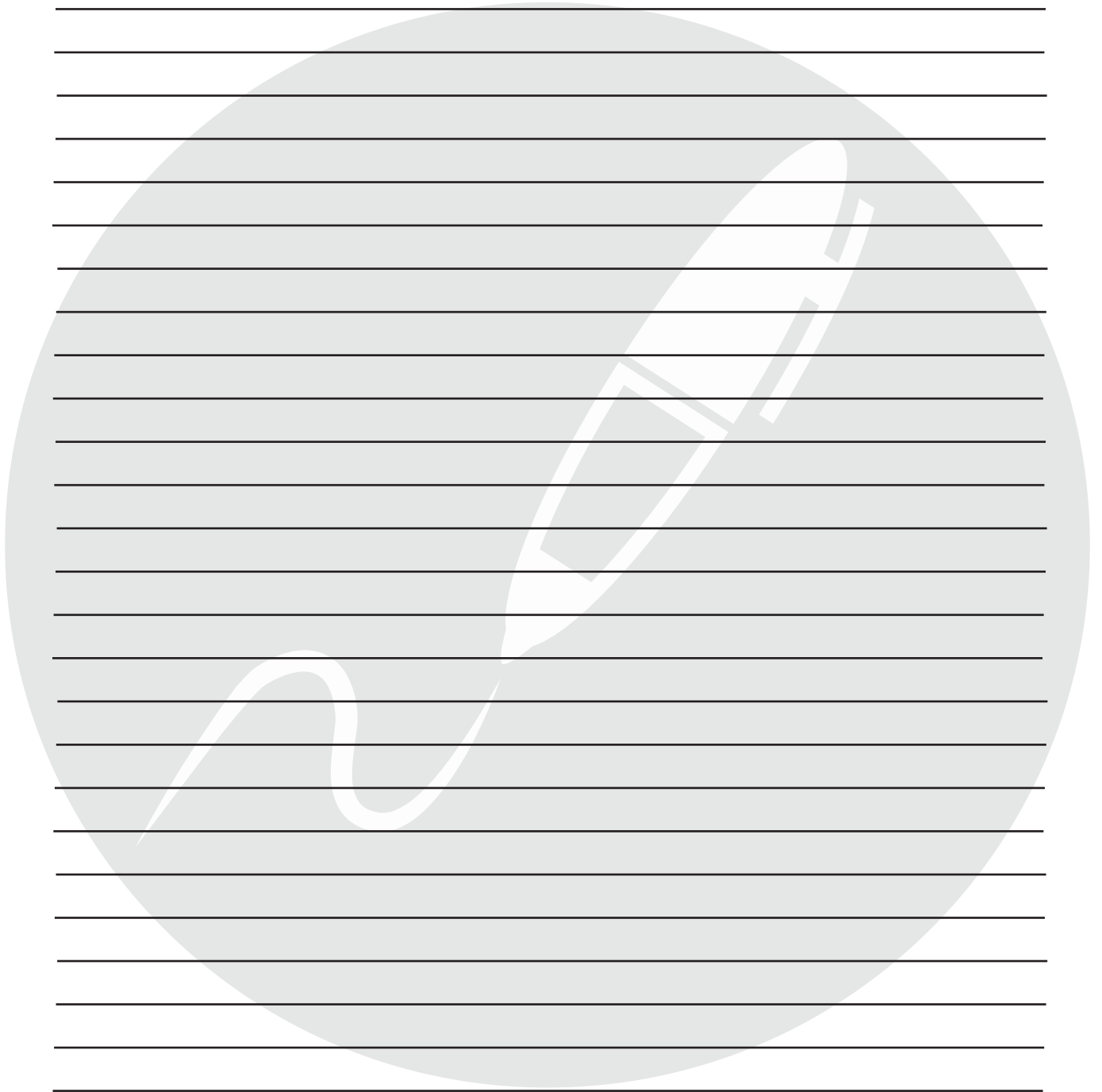
Five Minute Warning

We have five minutes before the end of the workshop. Please finish up your activities.

Closing

Thank you for joining us! We hope you have learned useful strategies today! How will you begin to build trust and cooperation between you and your child? Our next workshop will be _____. See you next time!

Notes: Picture This!



Preparation for All Stations

- Refill supplies (estimate 25 participants)
- Clean and disinfect kit materials
- Print instructions on cardstock, put in a sheet protector, stand up on a bookend

Starry Night

Supplies	Preparation
Craft tube	
Assorted markers	
Star stickers	
Black construction paper	
Rubber band	
Constellation sheet	Print out
Glue stick	
Tack	

Sands of Time

Supplies	Preparation
Black construction paper (4)	Cut into 4 even rectangles
White chalk marker	
Circle template	
Glue sticks	
Sand	
Stapler	

Camouflage Challenge

Supplies	Preparation
Various patterned paper	
Butterfly template	Print out copies
Crayons	
Scissors	
Glue stick	

Life Cycle Wheel

Supplies	Preparation
Paper plates	
Markers	
Beans	
Green pasta	
Cotton balls	
Tissue paper	
Pipe cleaners	
Glue	

Arm Tree

Supplies	
Construction paper in assorted colors	
Markers	
Yarn	
Scissors	
Glue	
Paper squares	Take tissue paper and cut into squares

Picture This

Starry Night

Make a tool to seek and find your constellations in the dark sky.

What to do



1. Decorate a craft tube using the markers and star stickers.



2. Take a sheet of black construction paper, place it over one end of the craft tube and fold the paper over the tube using a rubber band to hold in place.



3. Cut out a constellation and glue it onto the top of the covered end of the craft tube. Using the tack, carefully poke a hole through the black dots. Test your new instrument looking in the night sky.

Did You Know?

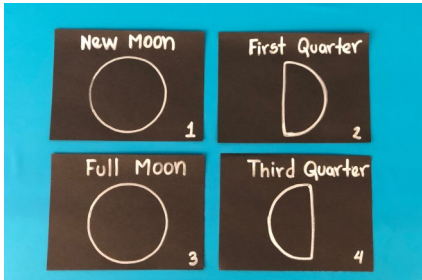
People rely on simplified models to better understand complex systems or actions. Children need lots of concrete examples to understand how their world works around them. The real lesson in this activity is not looking for constellations but giving children a tool to help them understand an important element of the night sky: Stars. Look for more models in your surroundings to explain larger, more complex concepts to your child: maps, globes, toy cars, dolls, animal figures, etc.

Sands of Time

Picture This

Discover the lunar cycle by recreating moon phases.

What to do



1. Take 4 rectangles of black construction paper and trace 4 moon phases like the example (you can use the templates).



2. Spread glue inside each drawing of the moon and sprinkle sand on top.



3. After your work has dried, staple the construction paper lunar moon phases together to make your lunar phase flip book starting with New Moon.

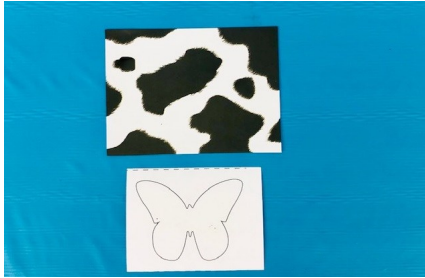
Did You Know?

As the moon orbits, or circles, the Earth the moon phases change. There are 8 major phases in the lunar cycle: New Moon, Waxing Crescent, First Quarter, Waxing Gibbous, Full Moon, Waning Gibbous, Third Quarter and Waning Crescent. People have long used the moon to mark seasons as well as days in the month; a lunar cycle is close to 30 days. (The word "month" actually comes from the word "moon"). Point out the moon in the sky with your child and discuss the changes s/he observes over a few nights.

Camouflage Challenge

Discover how camouflage increases an animal's chance of survival.

What to do



1. Choose a piece of patterned paper and a copy of a butterfly.



2. Color in the butterfly's wings so that it blends in, or camouflages with your patterned paper. Cut out the butterfly.



3. Glue the butterfly somewhere on your patterned paper and challenge a friend to find the butterfly on your patterned paper.

Did You Know?

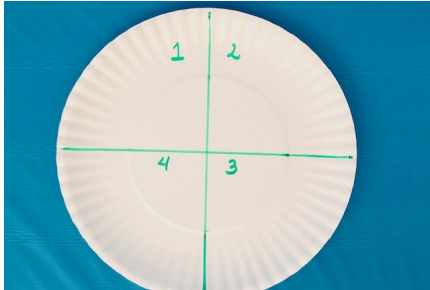
Camouflage is a method that allows animals to go unnoticed by blending with the environment or by looking like something else. Camouflage is used by both predator and prey in Nature. Predators use it to sneak up on their dinner. Prey use their camouflage to remain hidden from predators or to disguise themselves as something very yucky tasting. Point out any animal camouflage with your child when outside (stick bugs on branches, green frogs in grass, dark cats hiding in shadows).

Life Cycle Wheel

Picture This

Creating a colorful diagram to represent the different stages in the life cycle of butterflies.

What to do



1. Divide a paper plate into four sections by folding it into quarters and tracing the lines. Label each section with numbers 1 through 4.



2. Glue the bean onto a leaf (egg stage) in section #1 of the plate. Glue a piece of green pasta in section #2 (caterpillar stage) glue a cotton ball in section #3 (chrysalis stage).



3. Make a butterfly by twisting the pipe cleaner around a square of tissue paper. To represent the butterfly stage, and glue the butterfly in section #4 of the paper plate.

Did You Know?

Butterflies and moths go through a life cycle known as complete metamorphosis. Explain to your child that a metamorphosis is when a creature goes through very large changes like the caterpillar turning into a butterfly. Look for opportunities in pointing out these changes in creatures with your child like a tadpole turning into a frog, larvae turning into flies and wasps. Talk about all of the changes your child has experienced from birth until now and the next big changes they can look forward to.

Arm Tree

Picture This

Create an arm tree and learn about how its different parts work together for a purpose.

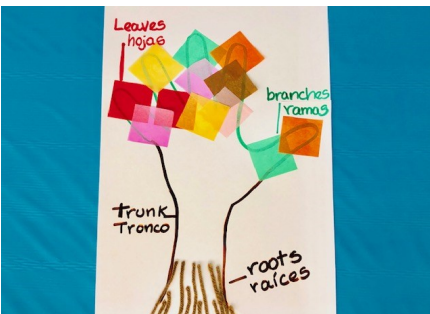
What to do



1. Trace your arm and hand on a piece of paper. Your arm will be the trunk of the tree and your hand will be the branches.



2. Glue small pieces of yarn to the bottom of the trunk to make the roots and glue paper squares to the branches to make the leaves.



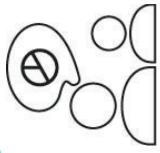
3. Label the roots, trunk, branches and leaves on your tree.

Did You Know?

Trees produce fresh oxygen, food, fuel and building materials. The next time you are outside with your child point out the different parts of trees: trunk, branches, leaves and maybe you can even see a few roots above ground! Discuss how important trees are to the people and animals around them. They are used as homes by birds, squirrels and insects. They give shade to people and animals. Explain how a tree is a living thing that grew from a small sapling just like how people grow.

Picture This!

Parent strategies: Encourage your child to act like a scientist or engineer by explaining parts of objects and how systems work using close observations or models.



WHAT

Explain Parts of a Whole

WHY

In order to understand the world, your child needs to understand that things are **made up of smaller parts**. Talking to your child about **parts and wholes** will help him/her develop both math and science knowledge.

HOW

- Explain and name smaller **parts of household objects**. Then play games to find these parts by asking, "How many handles/levers/buttons/springs/bolts can you find?"
- **Measure** and compare with your child **as you cook** and bake. You could say, "Let's name each ingredient we will put in the tacos/muffins/cookies. Which ingredients do we use the most/least of?"
- Talk about each part of the **human body** and **their functions**. Say, "Show me your elbow/eyebrow/fingernail. Why do you think our body has this part?"



WHAT

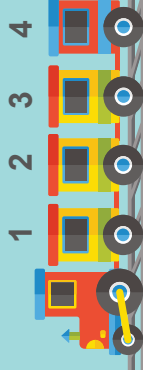
Explore How Systems Work

WHY

Learning about **systems** helps your child see the world in a new way. Children are **curious** about Earth systems like the sun, moon and stars. Talking about weather patterns and life cycles is not too difficult for young children.

HOW

- Talk to your child about the **solar system** using play dough to make a simple model of the sun and earth. Say, "One time every year the earth goes around the sun. Can you show me?"
- Talk about how models help us understand the **weather** around us like strong winds or hot sun. Make a boat that floats and use a fan to move it, and ask "What fan speed is like a gentle wind and which is like a hurricane?"
- Pretend you're **astronauts**. Talk and read books about the stars, planets, or moon. Look at the night sky repeatedly and ask, "What do you notice about how the shape of the moon changed?"



In Your Community

At Home

Children's Museum

- **How Does It Work?:** explore how different mechanical parts come together to create a larger, working system achieving a common goal.
- **FlowWorks:** dive into the forces and properties of water as you manipulate flow and pressure through a simulated flood plain, stream through an aqueduct maze and operate a hydro-switchboard.

Library

- *Caterpillar to Butterfly* by Laura Marsh
- *Animal Disguises* by Belinda Weber
- *Moon* by Britta Teckentrup
- *Solar System* by Samantha Bell
- *All of Mei: A Book of Thanks* by Molly Bang

Park

- Explain how small parts are connected to a larger whole. Say, "How do the roots/leaves/petals help the plant?" or "Why do you think that bird has a pointy beak?"
- Grow a plant together out in the dirt and talk about what helped it grow. Search for an image of a plant life cycle on the web and ask, "How is this like how our plant grew?"



CLI Engage Activity Collection

<https://cliengagefamily.org>



Head in the Clouds

Observe the clouds in the sky and recreate them in a drawing.



A Home for a Bug

Create a bug habitat and learn what a bug needs to live.

