



Engineering Adventure

Plan 4

TK-3RD GRADE

GAME TIME

(20 min)

Materials:

- Blindfold



PLAY TOBY TEE MARCO POLO

Say: **Today we get to play a fun game. You might have played Marco Polo before. This game is played just like that, but instead of shouting "Marco!" I will shout "Toby!" and the everyone will answer "Tee!" One blindfolded student will try to tag you.**

How to play:

Choose an open space to play. Choose a student to be the tagger. The tagger will be blind folded. Have the tagger go to the center of the playing field and then put the blind fold on them, then have the players enter the playing field and spread out. The STEM coach will be the caller. Loudly call out "Toby," and all of the players will respond with "Tee". They may take only **one** step from the space they are to get away from the tagger. The tagger will walk, not run, and try to find players to tag. The STEM coach keeps calling out "Toby". When the tagger tags a player, that player is out. After about 2 to 5 minutes, switch taggers and play again.

READING TIME

(20 min)

READ TOBY TEE'S SUPER-DUPER SLIP 'N SLIDE SHOES

Read the first 9 pages of the story. Stop at page 9, where Toby takes out his block and ramp.

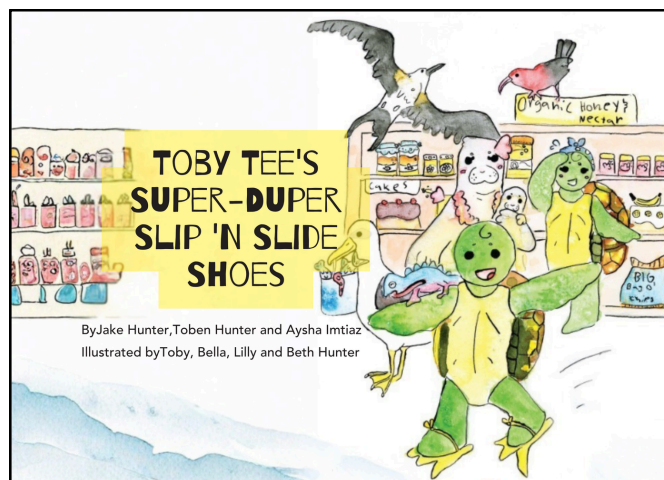
Ask: **What does Toby want to do?** Example: **He wants to slip and slide!**

Ask: **What happened when he tried to slide across the store?**

Example: **The friction slowed him down.**

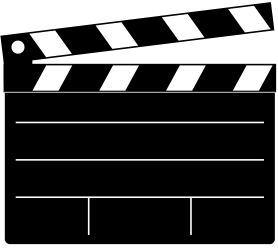
Ask: **Can anyone remember what friction is?**

Explain: **Friction is a force that happens when two things rub against each other. It helps you stop from slipping, but can also make you slow down or stop.**



STEM MEDIA DISCUSSION

(20 minutes)



HOW DOES SLIDING WORK?

Say: **Let's explore how slides work! Do you have any ideas about what forces help you slide down a slide?** Watch this video with your students.

CBeebies | Do You Know? | How Slides Work

<https://www.youtube.com/watch?v=JUZletMy3Yk>

Say: **Things like what the slide is made out of also affect how slippery it is. But what if we wanted to slow down or stop on a slide? Let's watch closely to see what Bingo does!**

Bluey | Slide

<https://www.youtube.com/watch?v=SstAKgNOsxc>

Ask: **What do you think helped Bingo and her friend stop on the slide?**

Example: **Friction!** Ask: **Why did they want to stop?** Example: **So they wouldn't squish the bug.** Ask: **Why was it hard to stop?** Example: **The slide looks slippery and like it's made of plastic. There was also water, which makes it more slippery.** Ask: **Can you think of any other things that are slippery to walk on?** Example: **Ice, banana peels, wet tiles.**

STEM TIME

(40 minutes)



EXPLORE ANGLES OUTDOORS

Say: **Toby talked about measuring how slippery or not slippery different things are. Today, we get to go outside and investigate angles in nature! Angles are where two things meet or cross. Corners and V shapes are angles. We can see angles in everything around us!**

Teacher prep:

You as the the teacher can watch this video to get an idea of how to introduce tree branch angles to your learners.

Investigating Angles - Nature Days outdoor learning resources

<https://www.youtube.com/watch?v=P9iuduDUcjU>

What you'll do:

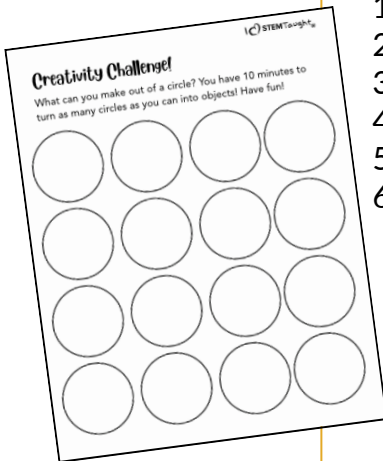
1. Show students how to hold up their index and thumb in an L shape.
2. Bring your fingers closer together. Say: **This angle is smaller than that one. Angles can be small, big or medium.**
3. Students go outside and look for angles. Look at playground equipment, branches, asphalt markings, corners, windows, door frames, and shadows! You will be surprised at how many angles they can find. Tree branches, especially in winter, will have lots of angles to explore.
4. Optional: Challenge students to make an angle with their elbow or knee.

STEM ART

(20 min)

Materials:

- Printable
- Coloring utensils
- Timer on your phone



DO A CREATIVITY CHALLENGE

Say: **Can anyone tell me what shape Toby Tee's shell is?**

Example: **It's kind of like a circle or oval.**

Ask: **What else do you know that is a circle?**

Example: **Balls, the Sun, Earth, a smiley face, wheels, pumpkins etc.**

Say: **Today you will do a creativity challenge! I will give you a sheet with circles on it, and you have 10 minutes to turn as many circles as you can into a recognizable shape! Are you ready? Remember, the drawing doesn't have to be perfect—just be creative!**

1. Each student gets a sheet and crayons.
2. Set a timer for 10 minutes on your phone.
3. Students draw.
4. When 10 minutes are up, invite students to share their art.
5. Students color their creations.
6. Say: **Today, you were thinking like engineers. Engineers look at simple shapes and materials and imagine what they could become. A circle can become a wheel, a window, a planet, or part of a machine. Engineers use creativity to solve problems and design new things.**

STEM TIME

(40 min)

Materials:

- Popsicle sticks

MAKE A FLYING POPSICLE STICK BUTTERFLY!

Say: **Engineers love making things that move. Did you see any other animals in the island in the story? Let's engineer an exploding popsicle stick butterfly.**

What you'll do:

- Students get 5 popsicle sticks each.
- Step 1: Lay 2 sticks in an 'X'.
- Step 2: Place one stick straight across on top of the other two.
- Step 3: Tuck the last 2 sticks on the side under X, but over the third stick, like a window.
- Voila! Your butterfly is ready. Take it out to play. Throw it hard and see what happens. Note: Make sure you collect and bring back all your craft sticks because we will use them for a craft tomorrow.



Explain: When you throw your butterfly, the sticks quickly pop apart because they were bent and holding stored energy, like a spring that is suddenly released.

ENGINEERING CHALLENGE

(60 min)

Materials:

-  Building barbs
-  Straw

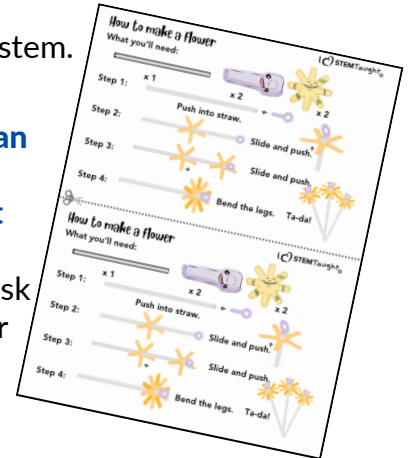


MAKE FLOWERS FOR TOBY TEE'S MOM

Say: **Toby Tee is really creative! He loves his Mom very much. Can you help him make flowers for her using your amazing barbs and straws?**

Instructions:

1. Students get building barbs, straws, and their instruction sheet.
2. Say: **Engineers know how important it is to follow step-by-step instructions. When they build a rocket, a bridge, or a robot, every step matters. Following a plan carefully helps make sure everything works exactly the way it should.**
3. Students follow the instructions to build a flower stem.
4. Challenge them: **Good job following those instructions, engineers! Now, do you think you can build a whole bouquet for Toby's Mom? What about a leaf? Can you make a flower vase? I can't wait to see your creations!**
5. Optional: On the back of their instruction sheet, ask students to draw and label a diagram to build their own invention.



MUSIC TIME

(20 min)

PLAY THE ECHO GAME

Say: **Wow! You are all becoming such fabulous engineers! Another thing engineers do is teach machines and robots how to follow commands. Today, we're going to play a game. I'll make a sound, and you'll echo it. Just like programming a robot, you're following instructions!**

What you'll do:

- Sing this song to your students: **"I have an echo, you can't see. Wherever I go it follows me."**
- Then make a sound and cup your hands around your ears for students to echo the sound back.
- Example sounds: **Yoo-hoo, how are you? Tick-tick. Meow. Whee!**
- Use varying pitch, tone and expressions.
- Here is a reference video to help get more ideas and hear the tone.

Music Echo Games for Pre K, K and 1st grade (Watch until 1:30)

<https://www.youtube.com/watch?v=c7W57Whgp3U&list=PLvbWsNY-K7WgG4Jp0apNvpJsLRgflwWKR&index=15>

- Try a wide range of sounds and make them as silly as you like! Have fun!





GAME TIME

STEM STORY

EXPLORE ANGLES AND SLIDES

POPSICLE STICK BUTTERFLY

BUILDING BARB FLOWERS

MUSIC TIME

METRIC

Foundation 1.7 Gross Motor Manipulative Skills

Show gross motor manipulative skills that involve using arms, hands, and feet to interact with objects.

K-2-ETS1-1.

Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

Matter and Its Interactions 2-PS1-2:

Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.

K-PS2-1.

Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object. (Students are gaining foundational knowledge for their upcoming investigation).

Science Foundation 1.1 Making Observations

Observe and actively explore objects and events using their senses and describe their observations.

Foundation 1.6 Planning and Carrying Out Investigations

Carry out simple experiments or investigations, on their own or in collaboration with peers and adults, to test their ideas about their observations.

Science Foundation 2.5 Energy

Demonstrate awareness, with adult support, that things (living and nonliving) need sources of energy to function.

K-2-ETS1-2. + K-2-ETS1-1.

Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

Approaches to Learning Foundation 3.1 Planning

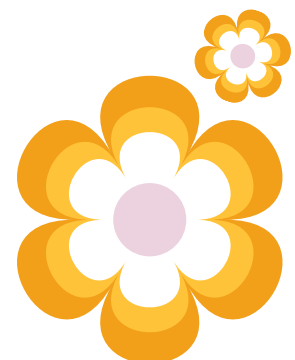
Demonstrate ability to set and carry out more complex plans (for example, two- to three-step plans and goals), with less adult support.

Science Foundation 1.4 Defining Problems

Identify problems during play and everyday interactions and try multistep solutions on their own or in collaboration with peers and adults.

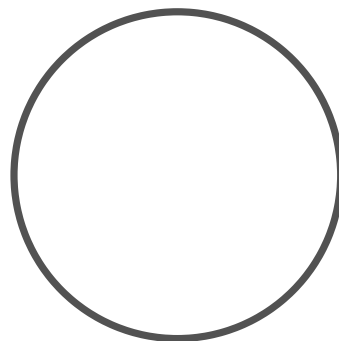
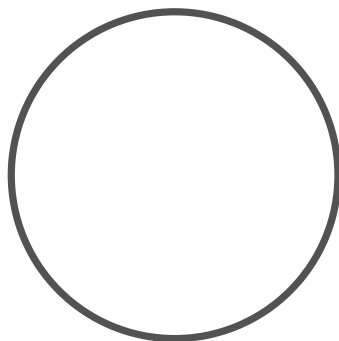
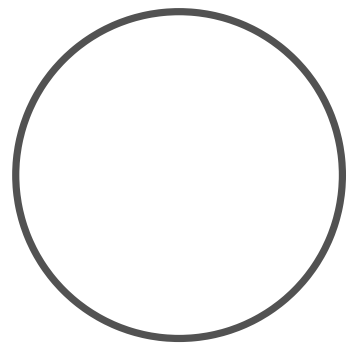
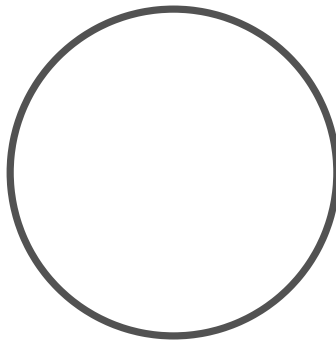
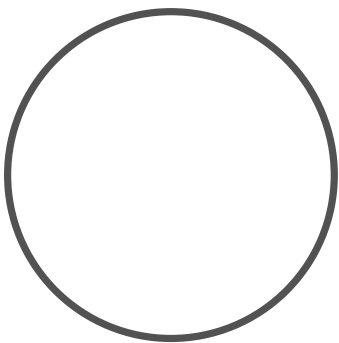
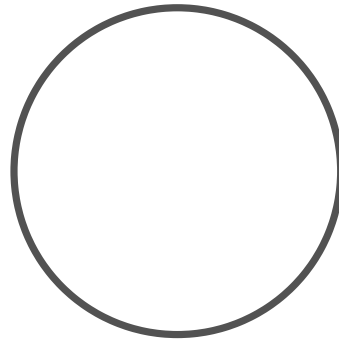
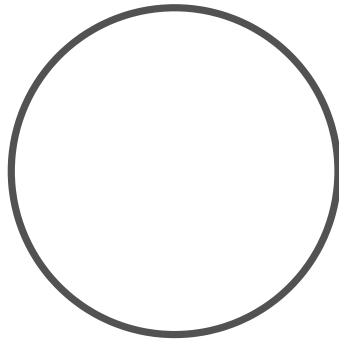
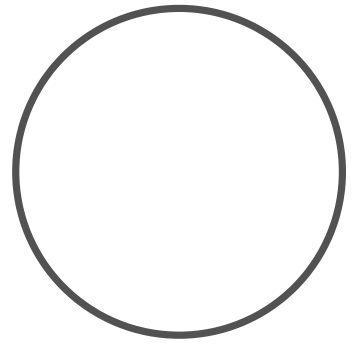
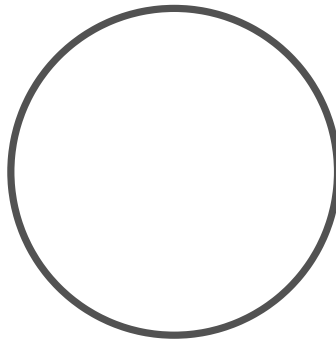
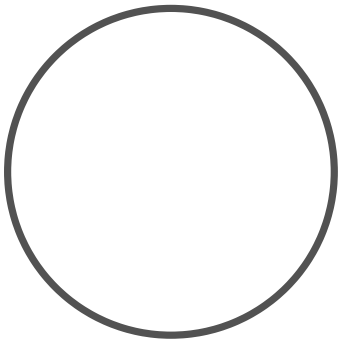
Performing Arts Foundation 2.7 Producing or Improvising Melodies and Rhythms

Use vocal skills, instruments, and other tools to produce short melodies, chants, or songs using simple rhythms and tones, by themselves or with others.



Creativity Challenge!

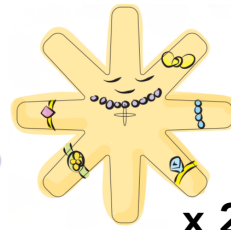
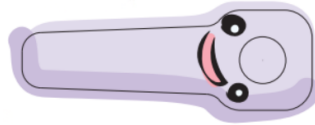
What can you make out of a circle? You have 10 minutes to turn as many circles as you can into objects! Have fun!



How to make a flower

1C STEM Taught®

What you'll need:



Step 1: Push into straw.

Step 2: Slide and push.

Step 3: Slide and push.

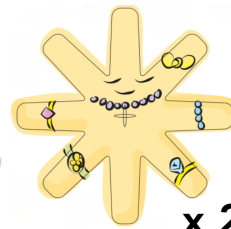
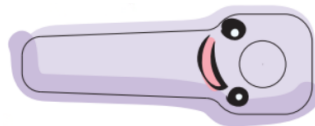
Step 4: Bend the legs. Ta-da!



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