



Engineering Adventure

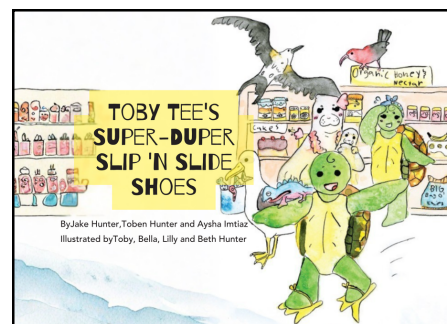
Plan 5

TK-3RD GRADE

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

(10 min)

Read the rest of Toby Tee's story. Ask students to make predictions and share their ideas about how slippery or not slippery each material is.



STEM CRAFT

(60 min)

Materials:

- Yarn
- Popsicle sticks
- Scissors
- Glue+ Marker

MAKE TOBY TEE!

Say: **We will test out friction and slippery materials today. Let's make our buddy, Toby, to take along on our adventure!**

Teacher prep beforehand:

Gather glue (or glue gun if you are using it), yarn, and scissors.
Optional: Students can paint their sticks.

What you'll do:

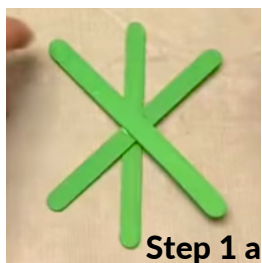
Step 1 (a): Arrange two popsicle sticks forming an 'X', then add one more across. Glue with a dot, tape or the STEM Coach uses a glue gun.

Step 1 (b): Students draw a face and toes.

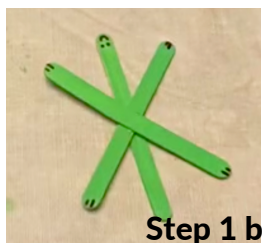
Step 2: The STEM Coach helps tie a knot in the middle. Students start wrapping around each section like an asterisk 3 times to build the base.

Step 3: Switch colors here if you like by tying on the second color of yarn to the first knot. Now students start weaving over and around each popsicle stick (like a spider web).

Step 4: Students keep going until the shell is as big as they want. Finish with a knot and trim off the excess.



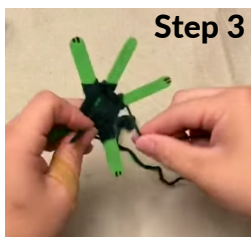
Step 1 a



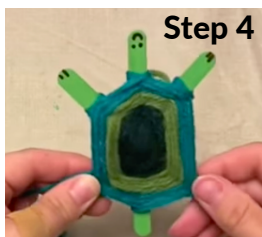
Step 1 b



Step 2



Step 3



Step 4

Watch this reference video to follow along:

Popsicle Stick Sea Turtle Craft

https://www.youtube.com/watch?v=msd1_DFdIO8

STEM TIME

(60 min)

Materials:

- Turtle charms
- Popsicle sticks
- Ramp
- Foil
- Plastic
- Cardboard (from the material box)



ENGINEERING CHALLENGE

(40 min)

- Building barbs
- Straw
- Printable

TEST AND GRAPH SLIPPERY MATERIALS

Say: **To help Toby make his slip-n-slide shoes, we need to figure out which materials are slippery. Like engineers, we will carefully measure and graph all our findings.**

What you'll do:

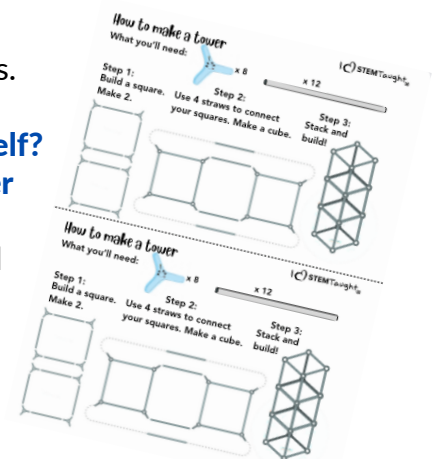
1. Cut up foil, plastic and the material box for cardboard. Use leftover popsicle sticks to test wood.
2. Students place their turtle on the edge of a ramp. You can use a book, clipboard or anything flat that they can tilt.
3. They carefully raise the ramp and notice when the turtle starts slipping. Ask: **Did you raise your ramp a big amount, a medium amount, or just a little bit before Toby Tee started sliding down? This is your baseline.**
4. Students wrap their turtle in each of the materials and test, one by one. Ask: **Did you have to raise your ramp more, less or equal to how much you raised it when Toby Tee was unwrapped?**
5. Record your findings together as a class. Ask: **What material is the most slippery? What is the least? What do we think Toby Tee should use for his slip-n-slide shoes?**

ENGINEER A TOWER!

Say: **Toby Tee has done such a great job designing his slip-n-slide shoes—and so have you! Teamwork is very important in engineering. Let's work together and see if we can build a super tall tower.**

What you'll do:

1. Students get their building barbs, straws and printable. Say: **When you are following a build guide, it is a good idea to find all the pieces you need first. Count them and lay them out.**
2. Students follow the instructions to make a cube. They can make more than one.
3. Students work together to stack their cubes.
4. Challenge the students: **Can you work together to make ea tower as tall as yourself? As tall as me? Taller? Can you build another shape with your stacking cubes?**
5. Disassemble and put the building barbs and straws away.



STEM TIME

(40 minutes)

Materials:

- Optional:
Recycled paper



GAME TIME

(20 minutes)

Materials:

- A ball (any ball will work)



MAKE A TURTLE NEST

What you'll do:

Show students this video about a turtle laying eggs.

Turtle Mother Lays Hundreds of Eggs | A Perfect Planet | BBC Earth

<https://www.youtube.com/watch?v=L3oufLMLysQ>

Ask: **Why do you think the sand bar was only there for a limited time?**

Example: **Because when the river floods, it will go underwater again.**

Ask: **What does the mommy turtle need for her nest?**

Example: **She needs space and warm, clean sand to dig a hole in the sand.**

Ask: **Why do you think the turtles had to climb above the tide line?**

Example: **So the eggs don't get washed away.**

1. Take students outside, or you can use a tub and some sand if available. The STEMTaught Discovery Shel also has kinetic sand.
2. Students use twigs or any leftover popsicle sticks to dig a round shaped hole, about a palm deep for the eggs to stay covered and protected.
3. Use pebbles, crumpled recycled paper, or find other natural materials to fill the nest with pretend eggs.
4. Students camouflage their nest. Say: **Can you make your nest blend in with the surroundings so that the eggs stay safe?** Example: **Students can add grass, twigs or sprinkle torn up dried leaves.**

PLAY 'RUN, HIDE, HATCH!'

How to Play

1. Choose one player to be the seeker, a predator looking for turtle nests.
2. The other players are Turtle Eggs. They hide while the seeker counts to 100. Younger students can count to 10 slowly, 5 times.
3. When counting is finished, the seeker searches for the hidden eggs.
4. When the seeker finds a player, they gently pass the ball to that player. This means the egg has hatched.
5. The player who receives the ball now becomes the new seeker and continues the search to find other hidden eggs.
6. The game continues with the ball being passed from seeker to seeker.
7. When the timer ends, whoever is holding the ball becomes the next counter and first seeker for the next round.

Explain: **Baby turtles stay hidden in the sand until they hatch. When they do, they move quickly toward the water to stay safe from predators. Bright city lights are dangerous to baby turtles because they follow light to find the water. At night, the ocean looks bright because the moon shines on it. When there are bright city lights, baby turtles get confused. They may crawl toward the lights instead of the ocean, which can be unsafe.**

ENGINEERING & MUSIC

(20–30 min)

FIND A DRUMMING SURFACE AND DRUM ALONG

Say: Engineers pay attention to the way materials behave. When you knock, tap or drum on different surfaces around you, how do they sound?

What you'll do:

1. Students test out knocking or tapping on various surfaces around them (their desk, the ramp, a backpack or water bottle, etc.) and choose their favorite sound.
2. Watch this video until the 1:07 mark for reference, then lead students through a set of simple drumming instructions.

MIMkids: Mini Music Makers Drum-along

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

You drum and you drum and you drum and you stop.

Freeze!

2 fingers: You drum and you drum and you drum and you stop.

Freeze!

2 hands: You drum and you drum and you drum and you stop.

Freeze!

Knocking: You knock and you knock and you knock and you knock.

Freeze!

2 fingers: You drum and you drum and you drum and you stop.

Freeze!

Rubbing: You rub and you rub and you rub and you rub.

Freeze!

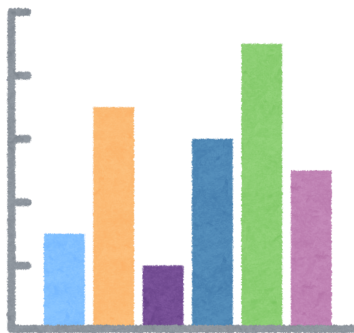
(Repeat and jumble up as desired. Make up more patterns and rhythms to add if you like.)





STEM CRAFT

TEST AND GRAPH



TURTLE NEST + GAME

ENGINEER A TOWER

MUSIC TIME

METRIC

Visual Arts Foundation 1.9 Creating Two-Dimensional and Three-Dimensional Representations

Create two-dimensional and three-dimensional pieces of visual art that are intended to represent objects, figures, people, or experiences.

Math Foundation 3.4 Representing Data

Use objects, tally marks, or pictographs to represent data in two or more groups.

Demonstrate understanding that each object, tally mark, or picture represents one data point.

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 4.4 Earth and Human Activity

Notice, with adult prompting and support, how humans' actions and use of resources impact the environment and their community, participate in activities related to caring for the environment.

Foundation 3.1 Identifying and Including Members of Peer Groups

Identify members of their peer groups (for example, members of their classroom, team, or activity group), and include them in collaborative play and learning activities.

Foundation 4.2 Identifying Three-Dimensional Shapes

Identify a few familiar three-dimensional shapes such as sphere, cube, and cylinder.

Foundation 4.4 Composing Shapes

Combine different two- or three-dimensional shapes to create a picture or design.

Performing Arts Foundation 4.3 Responding to Tempo

Respond to tempo (speed) and timing through movement with increased accuracy and skill.



How to make a tower

What you'll need:



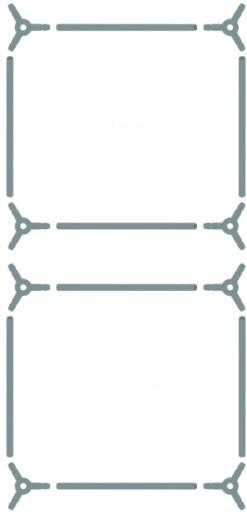
x 8

x 12



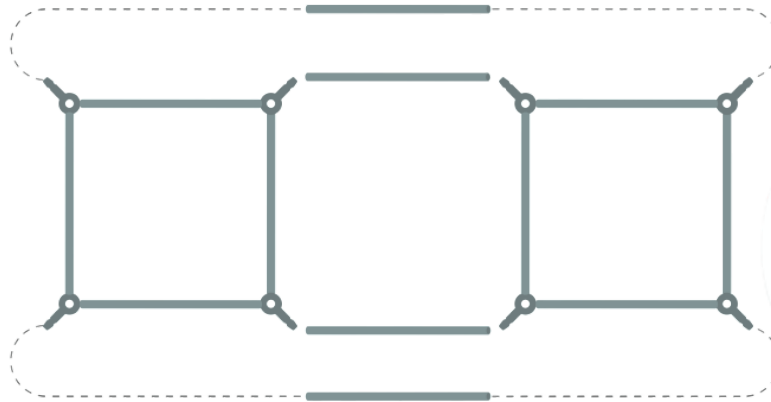
Step 1:

Build a square.
Make 2.



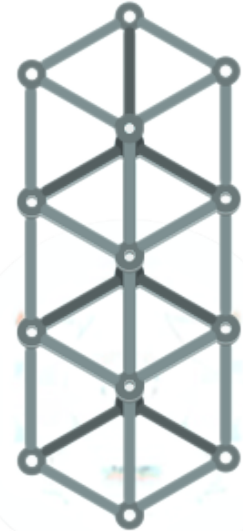
Step 2:

Use 4 straws to connect
your squares. Make a cube.



Step 3:

Stack and
build!



How to make a tower

What you'll need:



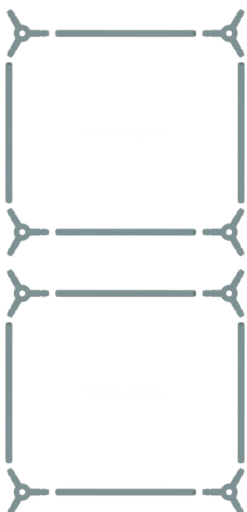
x 8

x 12



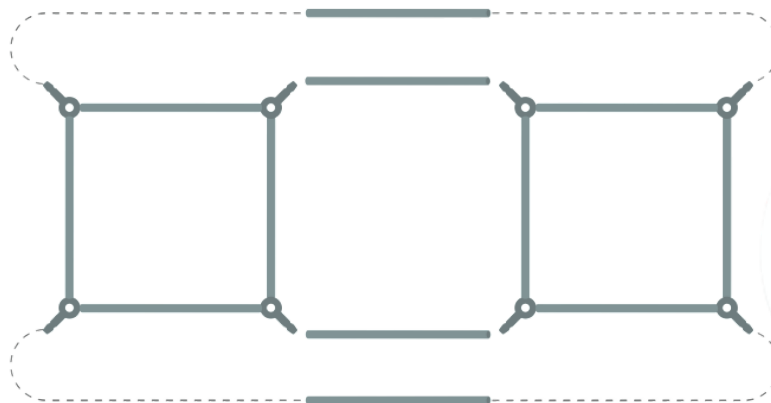
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