

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

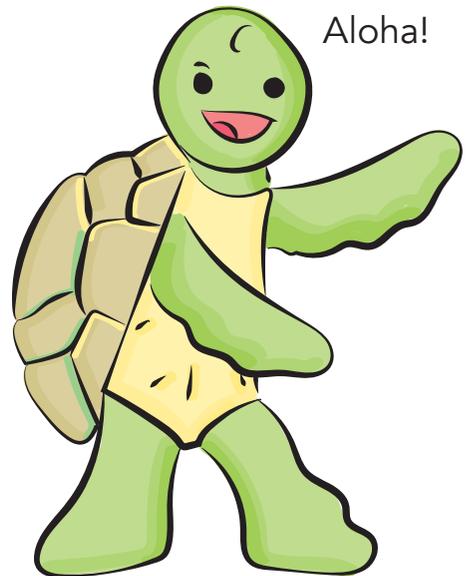
By Jake Hunter, Toben Hunter and Aysha Imtiaz

Illustrated by Toby, Bella, Lilly and Beth Hunter





Made with
recyclable paper
(Not ceramic coated)



Aloha!

Copyright © STEM Taught MMXXII

Published by STEM Taught, California

Copyright STEM Taught. All rights reserved. No part of this publication may be reproduced or distributed in any form, by any means, graphic, electronic, or mechanical, including photocopying, taping, and recording, or posting electronically in any location, any database or memory device without the prior written consent from STEM Taught.

Subscribing STEM Taught schools and teachers may reproduce and distribute STEM Taught material for use with their students.

The Next Generation Science Standards (NGSS) are reproduced with permission from the Department of Education.

Written by Jake Hunter, Toben Hunter, and Aysha Imtiaz.

Illustrations by Bella Hunter, watercolors by Lilly Hunter.

Teacher Edition

ISBN 978-1-952346-56-9

Student Edition

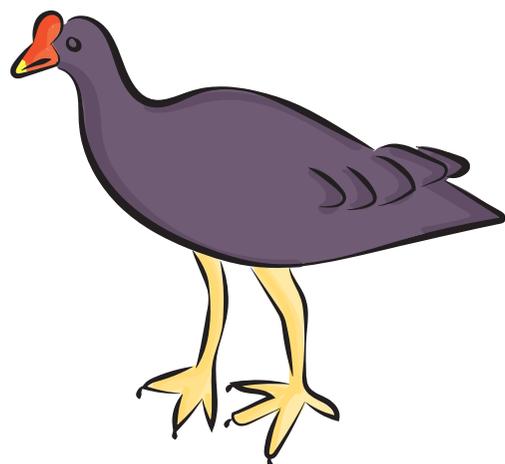
ISBN 978-1-952346-43-9



STEM Taught® Grade 2 Next Generation Science

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.



Toby Tee's Super-Duper Slip 'N Slide Shoes

By Jake Hunter, Toben Hunter and Aysha Imtiaz

Illustrated by Toby, Bella, Lilly and Beth Hunter

Introduction:

Who needs skates when you could just slide all around town? Roller skates? Scooters? Skateboards? No, pooh! Toby Tee wants to slide all around town with slip 'n slide shoes!

But wait! Toby has never made slip 'n slide shoes before.

Have you?

Before Toby can make his invention he needs your assistance! We can figure it out together, with a little persistence!

What does it mean to slip n' slide?





Part 1:

Good ideas don't just come from nowhere!

Let me start by telling you how Toby Tee got his most magnificent idea ever!

Everything Toby Tee ever did was a grand adventure. Toby Tee was an expert at having fun wherever he went.

But, ... it was shopping day and even though Toby wanted to play with his new, home-made gummy bear blaster, it was time to go to the store with his mother.



"Can I look at the list?" Toby asked excitedly.

"We're going to the market to get taro, mangoes, rice and cheese? ..."

"... But wait, Mom! There are no treats on this list!" Toby smiled his sweetest smile. For a moment, he truly looked like a little angel. "May I add cheese puffs to the list, please?"

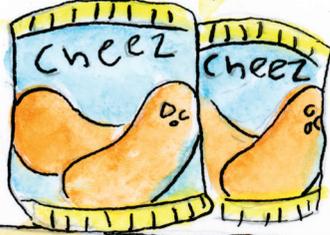
"Only healthy foods today," said Mom.

'This is going to be the worst shopping trip ever,' Toby thought to himself.

They walked down the aisles and Toby's mom put food into the cart.

Grocery Land

It's great in the 808



Bomb-Balloon



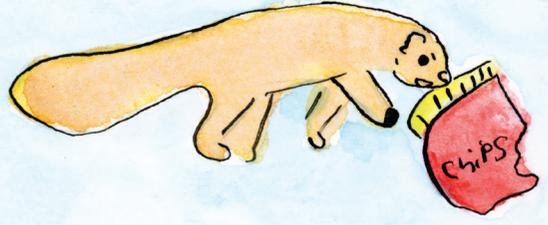
Spam



rice



sea weed



With a little toss, in went the taro, the mangoes and then the cheese.

"Please! No icky cold cheese," Toby begged. "I don't like cheese... Well, I only like it when it's melted on a pizza like hot, bubbly, molten lava. And, I like cheese puffs too, of course!" said Toby.

Toby was riding on the shopping cart while he talked and his mother pushed.

"Mom, can you push a little faster, please? I want to drag my feet to slip and slide along the floor like a"

And *that* was the moment when Toby had the most awesomest idea ever!

"Ladies and gentlemen," Toby proudly announced. "Now, I will slip and slide across the grocery store floor!"

What makes something
slippery or not?





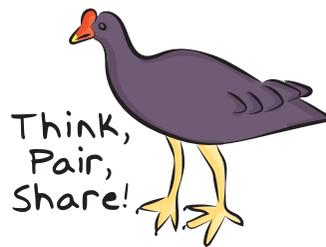
He jumped down from the cart to try the best slide of his life!

"This is going to be the most magnificent slide of the year!" he announced. Or, of the century... Or of forever!"

He started to run down the isle, then, 'grrr-rrr-raaaate' his flippers did not slide as well as he had expected. Instead of sliding, he fell on the ground with a great thud.

"Well, I know," He said as he got back up. "It wasn't that great. It could be better! But, Mom! Now, I can't wait to go home to find slippery materials to make slip 'n slide shoes!"

Why do you think
Toby fell down?





Jam Pack
Lil'koi Guava

The Big
G PACK *

Canned F

Ramen

Sauces/Dressing

Peanut Butter

Bowl

6 PACKS
Ramen!

Wonton

Mayo

Jam

Mayo

Canned Peaches

Sauce Dressing

Canned Peaches

Sauce Dressing

Part 2:

Friction, you took the slip right out of my slide!

The next day Toby was telling his cousin about what happened. "I need something to reduce friction so I can slide!" Toby said.

"What is friction?" his cousin asked.

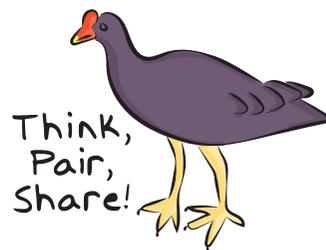
"Let me teach you about friction," Toby said.

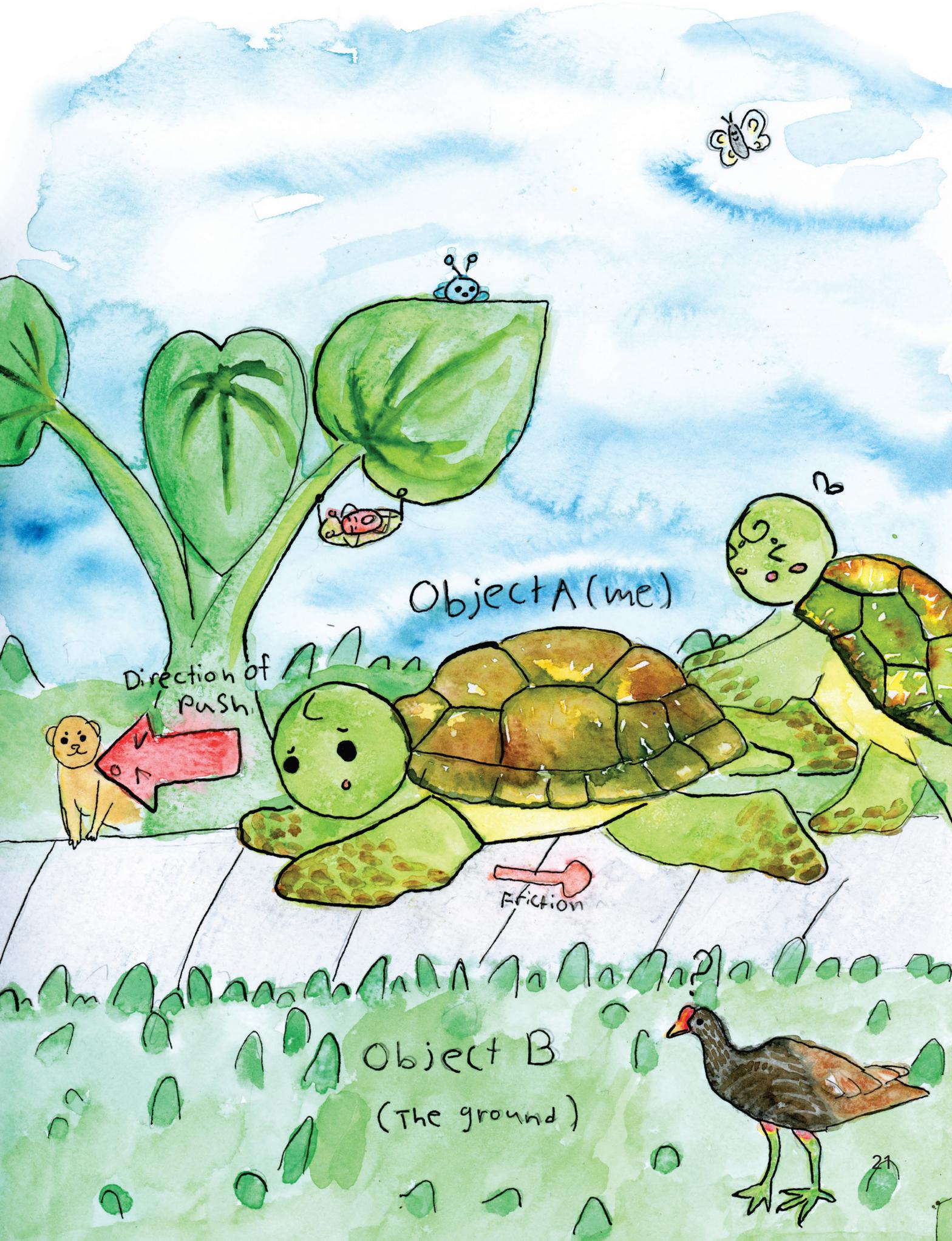
"Friction is when two objects rub against each other and slow each other down. Let me show you. I'll be object A and the ground is object B. Push me and see how this grumpy-fuss friction is stopping me from slipping and sliding all around."

Toby felt his shell rubbing across the ground.

"Oh yes, friction! I feel you!" he said. "I am going to get rid of all friction!" Toby said. "We need to find something slippery so the new slip n' slide shoes will work."

Where have you seen or
felt friction happen?





Object A (me)

Direction of Push

Friction

Object B
(The ground)

Part 3:

How to measure friction

"How slippery is something? That is the question we need to answer. To find the answer we can use another amazing invention of mine! It's my very own, handy dandy slip-o-meter!"

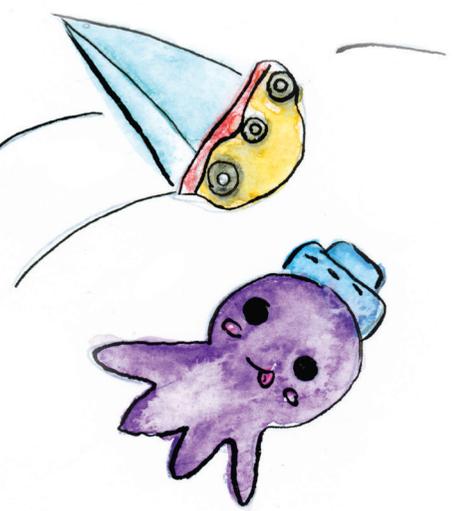
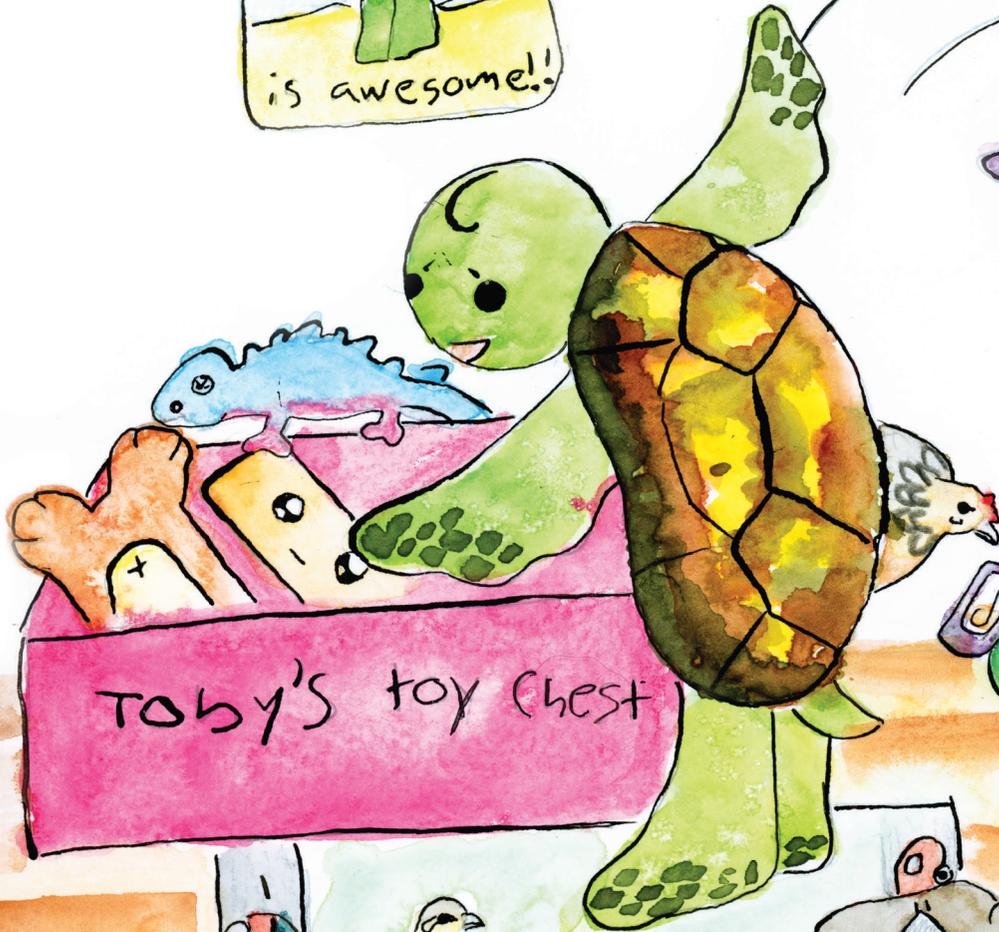
Toby raced to his toy bin and found Roxy ramp and Blocky, his two favorite toys. For everyone out there reading this right now, you can make your very own slip-o-meter too. You will need:

- Blocky (a wooden block or something flat to slide).
- Roxy ramp (a ramp or something flat that you can tilt).
- A protractor to measure the angle of slip.

You can find a protractor on the back cover of your book.

How can you tell how much friction something has?



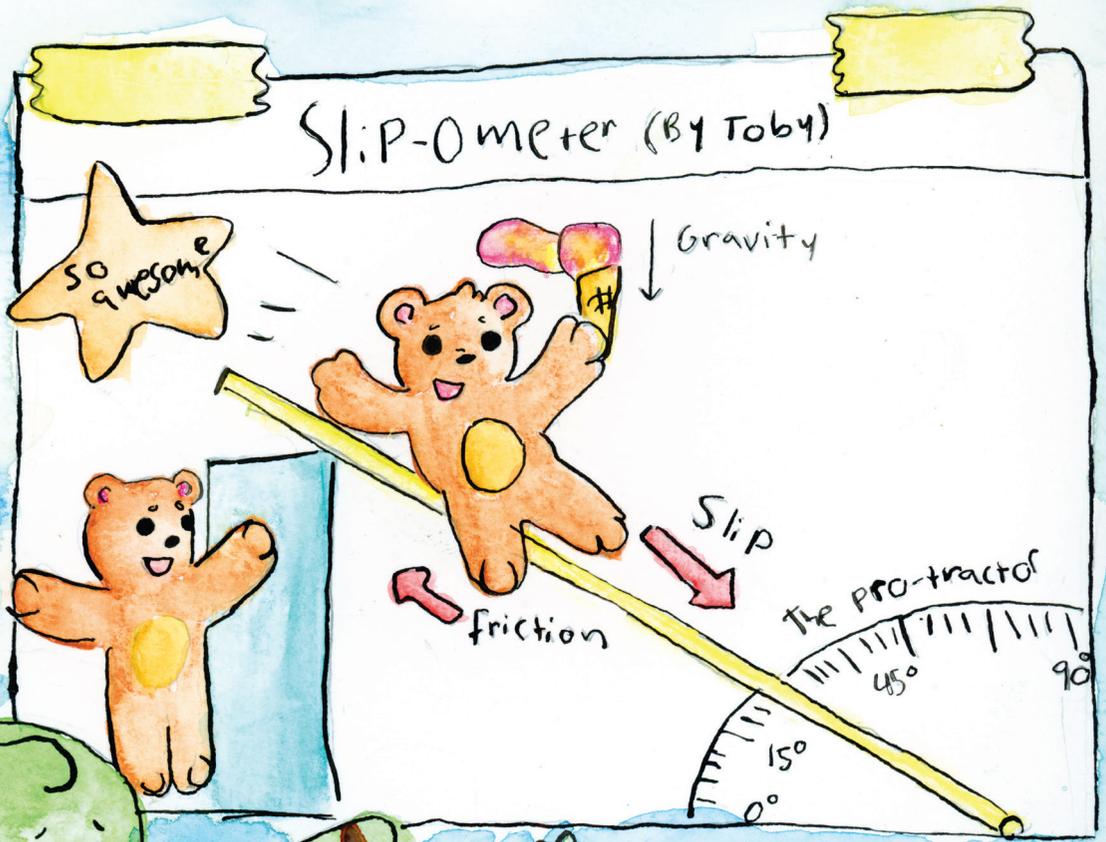


By experimenting with different materials to observe how slippery or not slippery they are, you can help design the best slip 'n slide shoes ever!

Now that you have your stuff, here's what you'll do:

1. Put the material to be tested onto the bottom of Blocky.
2. Partner 1 places Blocky on Roxy ramp and slowly lifts one end of the ramp. Watch for the moment that Blocky starts to slip. When you see it start to slip, hold the ramp in place.
3. Partner 2 uses the protractor to measure the angle that Blocky starts to slip.





- What you'll do:
1. Put stuff on the ramp
 2. Lift the end of the ramp
 3. Measure the angle of slip

Part 4:

The great slip-o-meter experiment:

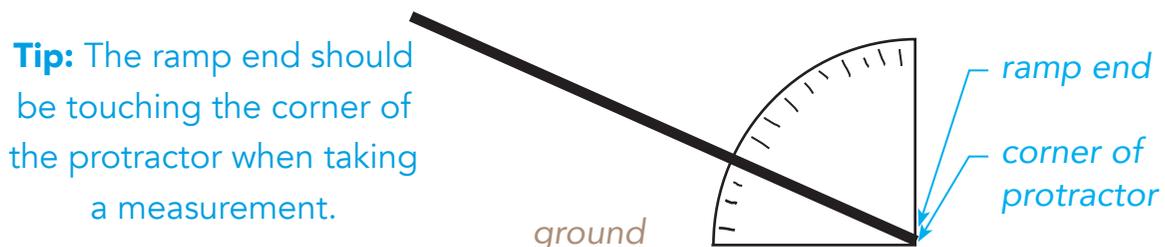
Testing wood

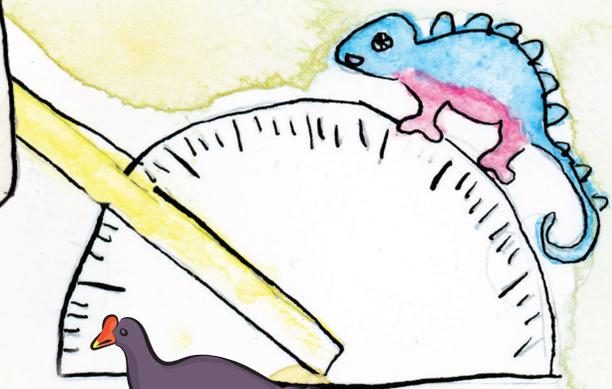
Toby Tee was ready to test his first material. He would test Blocky. Blocky was made of wood.

"How slippery or not slippery is a piece of wood? That is the question I need to answer with my very own slip-o-meter!" Toby said as he placed Blocky on Roxy ramp. He slowly began to lift one end of the ramp.

Oh, the suspense! What will the angle of slip turn out to be?!

And then, 'phhhsssss-ssshhhh'—slip. When he saw Blocky begin to slip, he held the ramp frozen in place as he measured the ramp's angle with his handy dandy protractor.





What does a high angle of slip measurement mean for slipperiness?

Think, Pair, Share!

Part 5:

The great slip-o-meter experiment:

Testing cardboard

Now Toby wanted to try another material. He went to his kitchen to find the perfect thing, and there it was sitting on the counter—a cereal box!

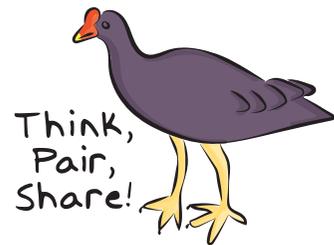
"How slippery or not slippery is cardboard from a cereal box? That is the question I need to answer," Toby said.

He cut a piece of cardboard and taped it to the bottom of Blocky. He set Blocky down and slowly began to lift one end of the ramp.

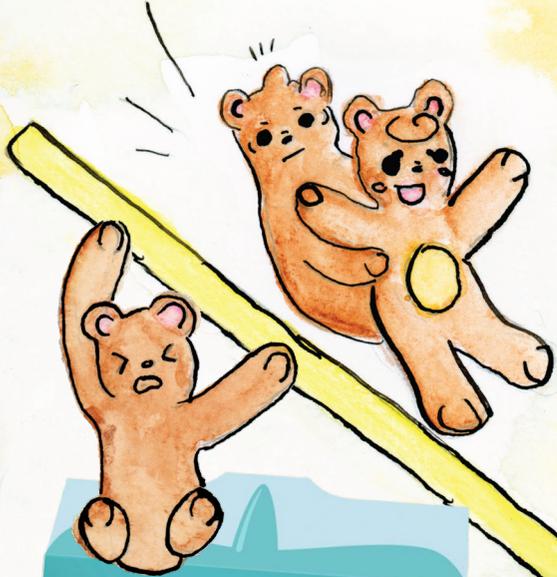
Wait for it... Wait for it... And then, 'phhhsssss-ssshhhh'—slip.

Toby was the master at measuring! He wrote down the angle in his journal.

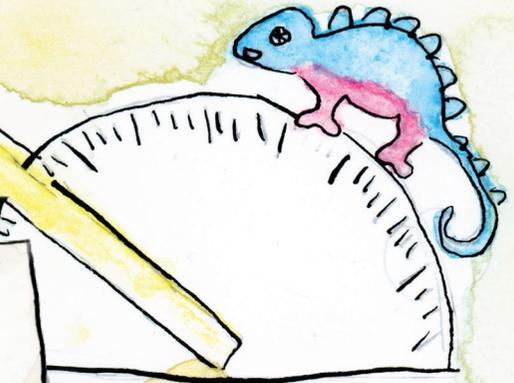
Is your cereal box more slippery or less slippery than the wood?



**GLOSSY
CARDBOARD**



Write angle
of slip here:



Part 6:

The great slip-o-meter experiment:

Testing tin foil

The cardboard was fun but now Toby wanted to try something else. Toby searched through his kitchen until he found a piece of shiny tin foil. The tin foil felt smooth just like a playground slide.

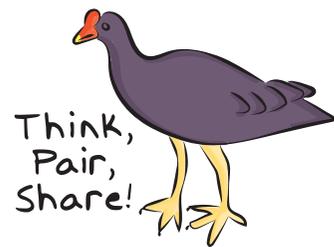
"How slippery is tin foil? That is the question!" Toby said as he cut a piece of tin foil and wrapped it around Blocky.

Toby used his best pilot voice, "Ladies and gentlemen, this is Captain Tee speaking. We are ready for takeoff."

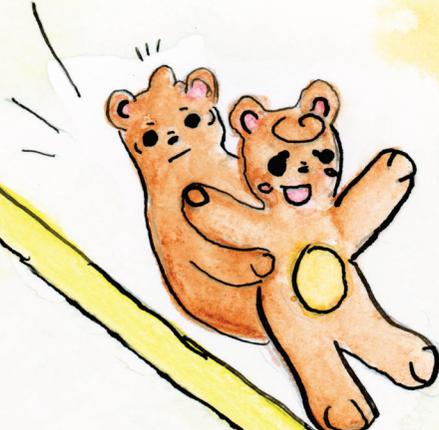
'Da da da da da da da,' (Drum roll)

Toby lifted the ramp higher and higher, and then 'sssssssss'—slip. 'Wheeeeeee-e!' The slide!

How long do you think tin foil would last on the bottom of your shoes? Why?



TIN FOIL



Write angle of slip here:



Part 7:

The great slip-o-meter experiment: Plastic

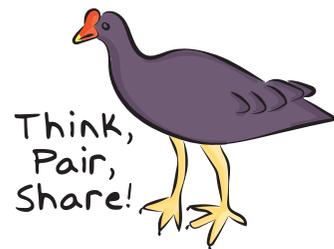
Toby was searching for the next material to test. Before long he found it—plastic! The plastic felt smooth to touch, but also seemed very tough. Toby was sure that plastic was his anti-friction material. This was going to be amazing!

"How slippery or not slippery is plastic? That is the question. To find the answer, I will use my very own slip-o-meter!"

Toby cut a piece of plastic and wrapped it around Blocky. He carefully lifted one end of Roxy ramp. Before long he saw Blocky slip!

Yesssss! That measurement seemed pretty good. Finally, he felt like he was making progress!

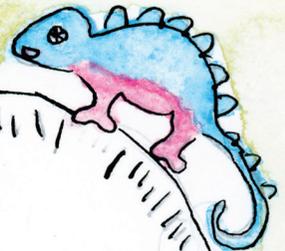
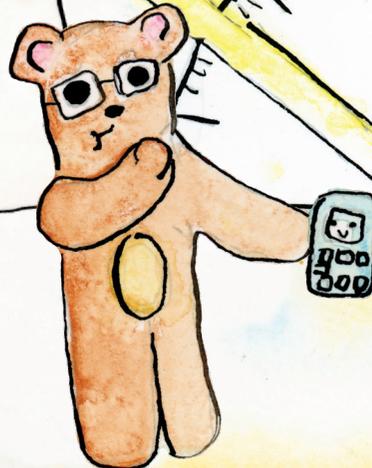
What types of plastic materials could you test?



PLASTIC



Write angle
of slip here:



Part 8:

The best material that I know

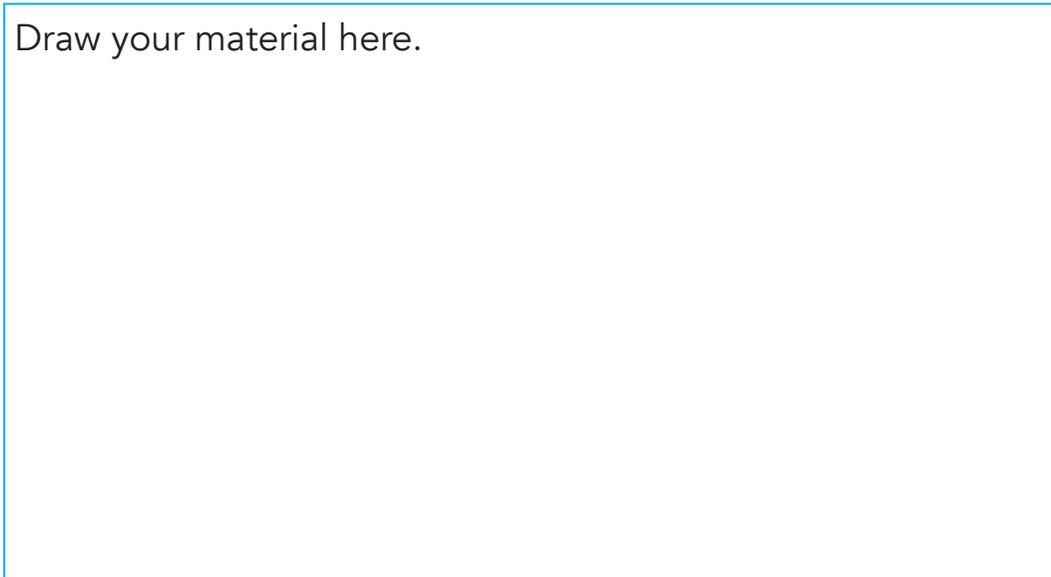
'I need these shoes to be so slippery and fast,' Toby thought. Inventors know that to find the best option, we must try, and try again.

Toby searched all around for the best material to test. Guess what material he found!

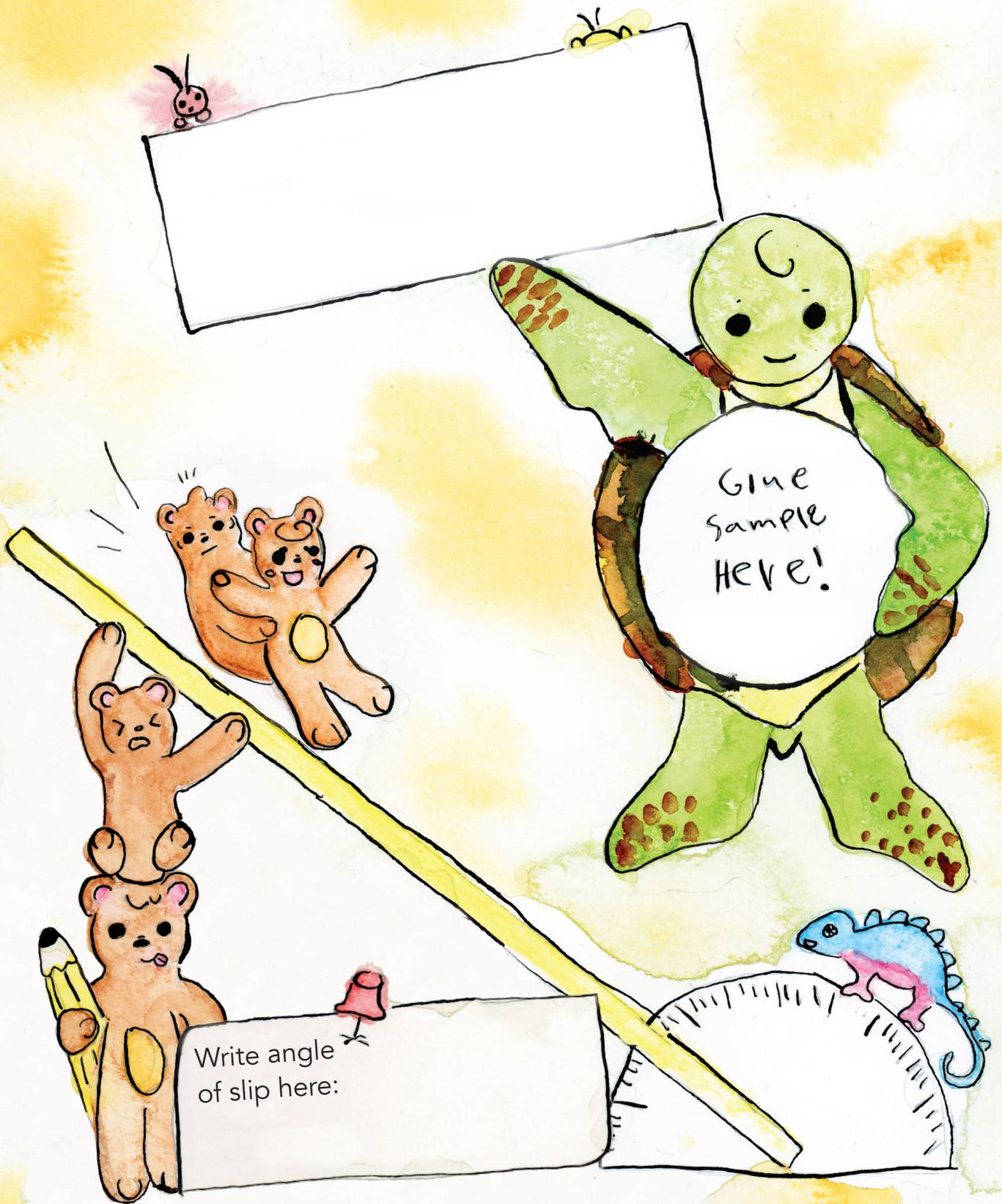
What material did you find?

Choose a material that you want to test.

Draw your material here.



Why do you think your material will work well.



Part 9:

And the winner is ...

Now, after your amazing experimenting we will choose the best material tested so far! Remember all those slip-o-meter measurements you collected? That is called data. Data is only helpful when you organize it, otherwise it's just a bunch of numbers.

Organize your data below and then plot each number on the graph.



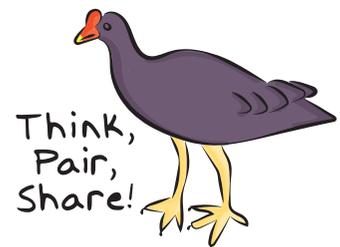
List your angle of slip measurements from smallest to largest.

	Material Tested	Angle of Slip
1.		
2.		
3.		
4.		
5.		

small #

large #

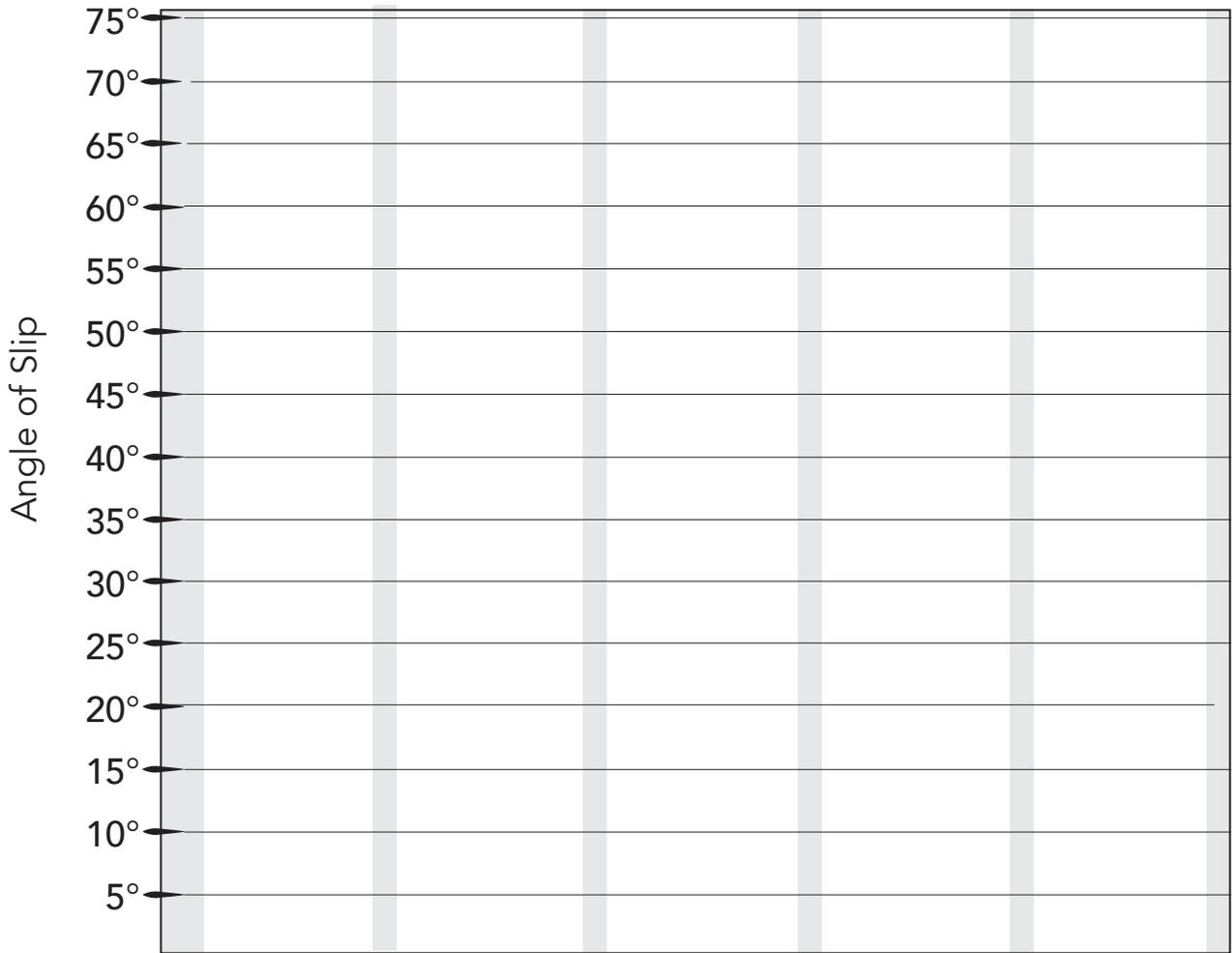
Why is it a good idea to sort your measurements and list them in order?





Make a graph to show the slipperiness of your materials. Color in the white area up to the angle of slip you measured for each material.

How Slippery My Materials Are



Write your materials here.

Material Type

Great work making a graph! Graphs are a way to draw a picture using numbers! Graphs can help us see patterns in the data we collect.

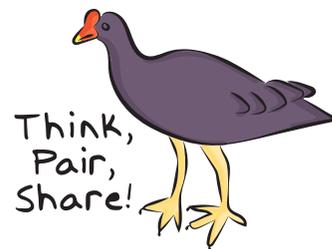
Now is the moment for the big reveal!

Ready? Drum roll—'Da da da da da da!'

And, the winner for the slipperiest material is _____! (write the winning material here.)

Hooray! We will put plenty of that on the bottom of Toby's slip 'n slide shoes!

How did you decide what material to use?





Part 10:

Aaaand....Wheeeee! They work!

Thank you so much for your help experimenting with different materials. Guess what? It's grocery shopping day again. It's time to test out the new slip 'n slide shoes.

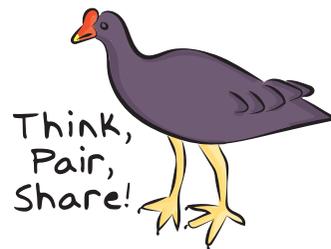
Toby ran into the grocery store with his new shoes and announced, "Look here, everyone! This is going to be epic! Legendary! The most magnificent slide of the year!"

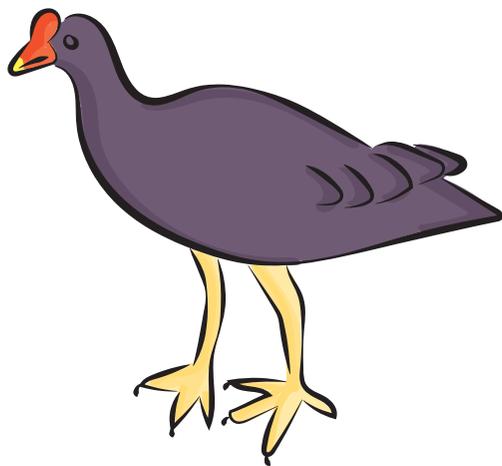
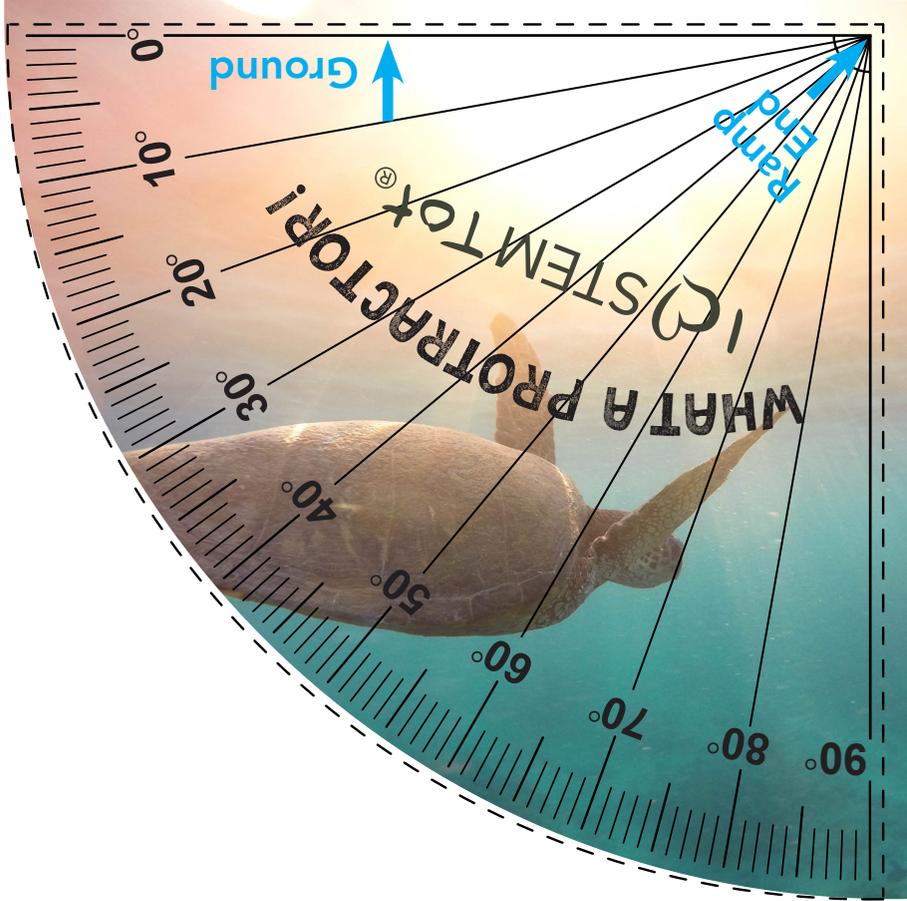
"Aaaand....Wheeeee!"

"They work!"

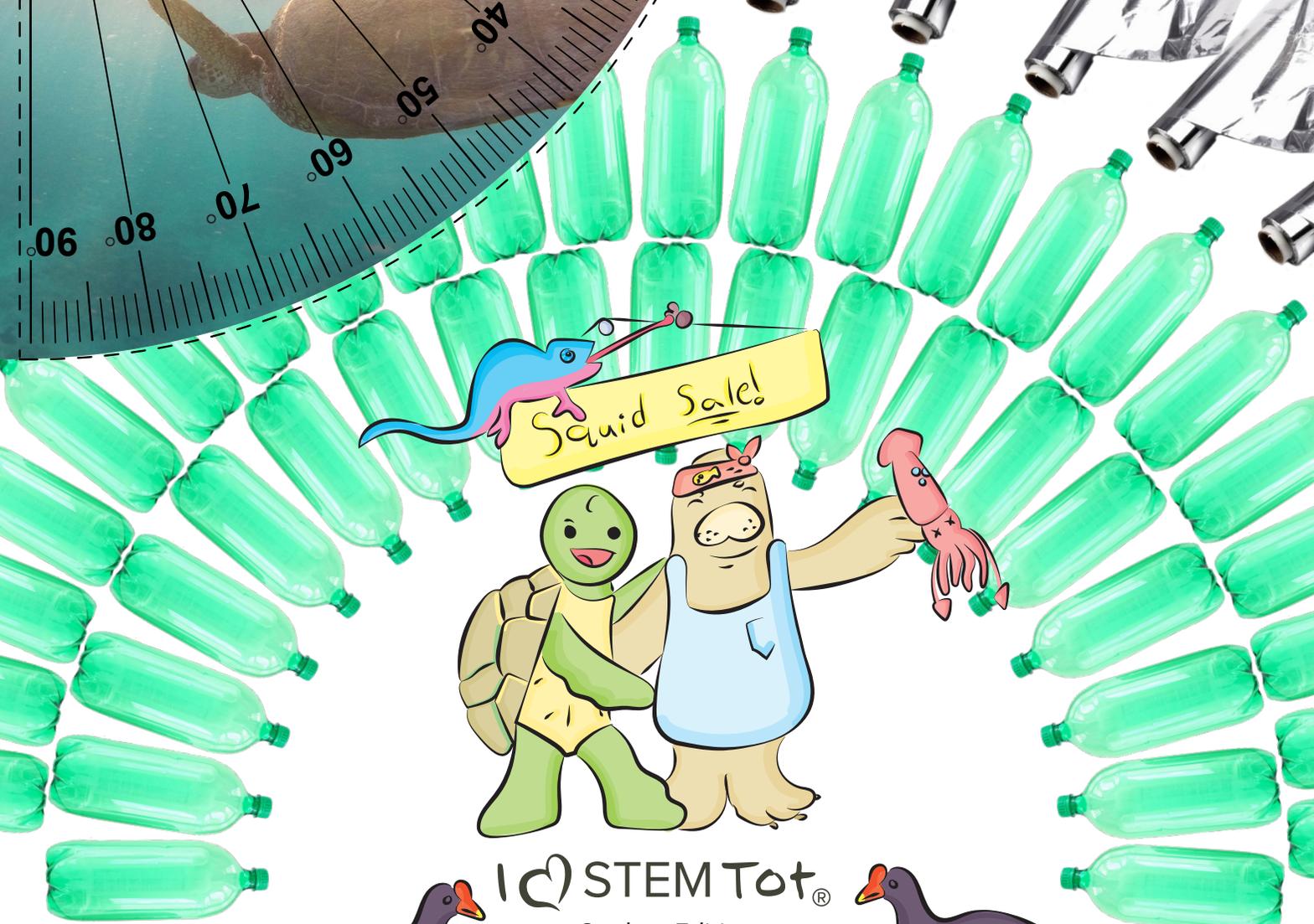
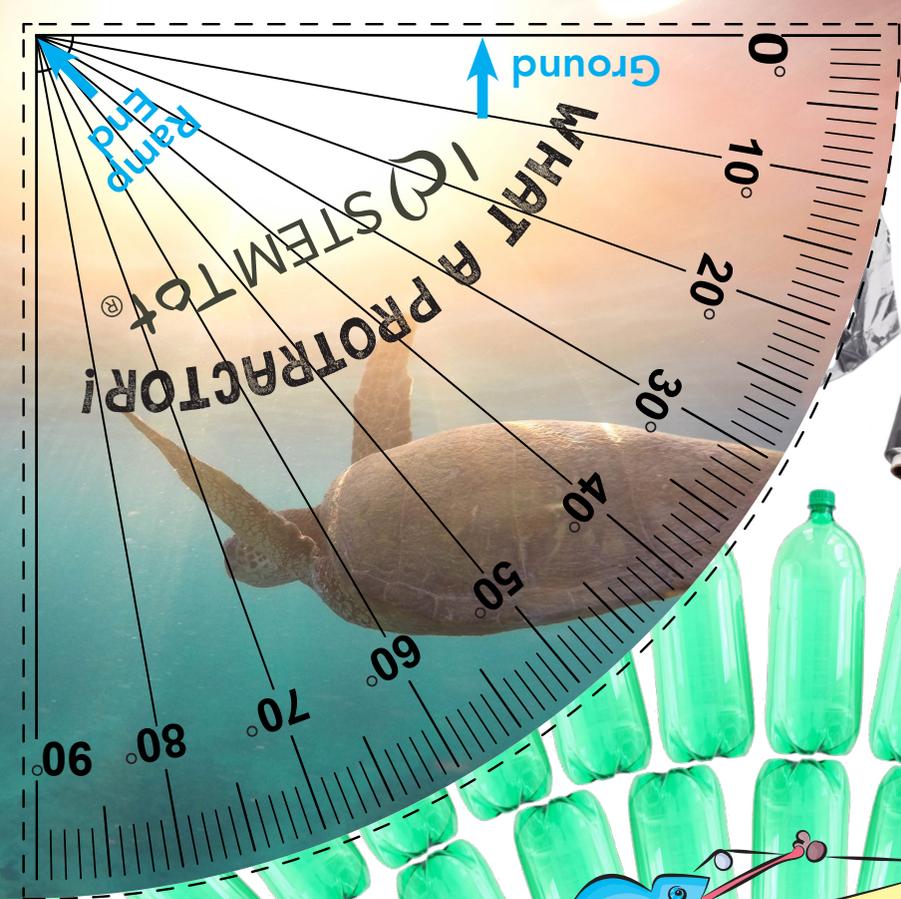
"Mom, I don't mind going to the grocery store anymore. Can we go shopping every day?" Toby asked. "THIS IS SO FUN!"

What other things would you consider when choosing the best material?





I ♡ STEM Tot®



I ❤️ STEM Tot®

Student Edition

ISBN 9781952346439



9 781952 346439

