

Nikolette McAndrew - lesson plan

3-PS2-2: Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.

CCC: Patterns – Different objects have different motion as they move down a ramp that has different slopes

SEP: Engaging in an argument from evidence. Analyze and Interpret Data.

Learning Target: I can identify patterns in motions. I can make predictions on an object's motion

Materials:

- Stopwatch
- Measuring tape
- Ramps or wedges that can be used as ramps
- Science journals or printed out charts
- Different objects – balls, rock, dice, pencil, marble
- Book for interactive read aloud! – Personal favorite: *Ricky, the Rock that couldn't Roll*
- Pumpkin launcher - popsicle sticks, bottle caps, and rubber bands
- Dominos
- Balloon races - balloons, straws, string, tape

Vocabulary for this lesson (most will have already been reviewed BEFORE teaching this lesson)

- Force
- Roll
- Push
- Pull
- Motion
- Interactions

Introduction / Engagement

"Hello class! Today we are going to be expanding our knowledge on force and motion!

"Have you ever wondered why an object started to move or stopped moving?"

– ask the class if they can think of any examples of a time that they have wondered about the motion of an object!

EXAMPLES TO SHOW: Pushing a cart kicking a ball

- After allowing time for discussion, separate students into small groups and give them various objects to engage and explore with. Ask them to experiment how different forces will make different objects move or not move. Also encourage students to record their findings in their journal!

Some questions to ask students while working –

“How much force did you have to apply to the object to get it to move?”

“Why do you think the object stopped moving?”

“Why do you think the object kept moving?”

“Do you notice any similarities in the objects that require more force to move? In the objects that move with little force?”

Exploration

Ramp Stations!

- Set up multiple stations for students with a ramp and various objects for them to experiment with. Give students various objects to roll down the ramps!
- Before students roll the objects down the ramps – have them log in their journal whether they think the object will roll fast / slow / or not move it all when placed on the ramp.
- Alongside the ramp will be measuring tape (The actual masking tape that has a ruler on it!) This will allow the students to measure how far each object traveled and record it in their journal!
- Students will also be given a stopwatch to time how long the object is in motion and they will also record this data in their journal!

Questions to ask –

“What objects do you think will roll down the ramp easily?”

“What objects might have a harder time rolling down the ramp?”

“Is the motion of the object the same at the top of the ramp vs. when it is off the ramp?”

“Are there any objects that you might need to push down the ramp in order for them to move?”

Example of the Prediction table!

How did it roll? —>	Fast	Slow	No movement
Marble			
Rock			
Dice			
Bouncy Ball			
Pencil			
Golf Ball			

Example of what the chart could look like:

How did it roll? —>	Fast	Slow	No movement	How far did it travel?	How fast did it travel?
Marble					
Rock					
Dice					
Bouncy Ball					
Pencil					
Golf Ball					

^^^To make this more challenging – change variables! Examples: using different textures on the ramp for the objects to roll down or changing the slope of the ramp

Explanation:

Have students engage in a group discussion to look at patterns they have observed through this experiment. Have them see if their classmates had the same findings as they did. While having this class discussion, bring in the concept of using the patterns that we have found to predict future motion!

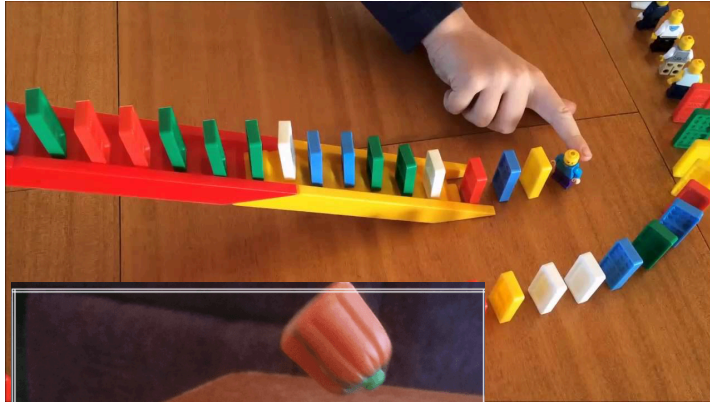
Also ask students if they have seen any patterns in motion in the real world!

Also allow students to justify why they think their prediction/ finding was correct! –This implements the SEP of engaging in an argument from evidence and Analyzing + interpreting data!

Elaboration:

Stations with real life examples that students see/ know!!

Set up multiple stations for students to experiment and collaborate with!



#1 Dominos

Have students set up dominos and then push them down! This is always a very fun activity but through this, we are also showing them cause and effect!



#2 Pumpkin launcher

Students can use the catapult to launch the pumpkin and measure how far it

travels!

This can show patterns by showing the students the further you pull down on the launcher – the higher the pumpkin will go!

Or vice versa – if you pull the pumpkin down only a little bit, it will not go very far!

^^^^^^These can also be made very easily for a fun

activity!



#3 Balloon Races

Set up a string between two sets of chairs with a straw on the string. The balloons can be attached to the straw on the string to be blown up and let go. Students can race to see which balloon finishes first!

Pattern – more air put into the balloon the further it will go



#4 Newtons cradle

This can also take part in the whole elaboration process and students can make their very own newton's cradle! This demonstrates momentum and transferring energy!

Evaluation:

Have students use their science journals to write the patterns that they notice throughout the Elaboration process! This is a great way to have them reflect on what they have learned and show us what they have learned in a low stress way!

“Okay class, now that we have explored our lesson further, let's reflect on what we have learned!”

“What type of patterns did we notice with each of our stations?”

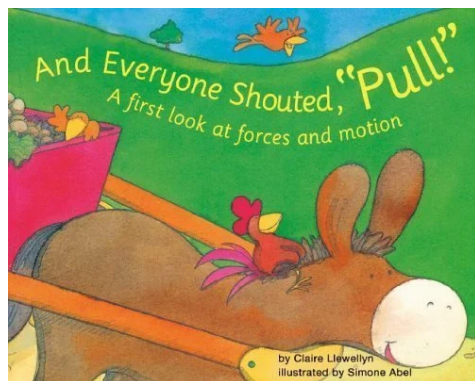
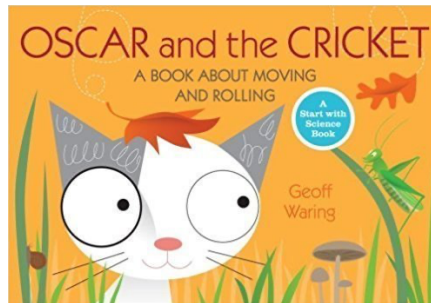
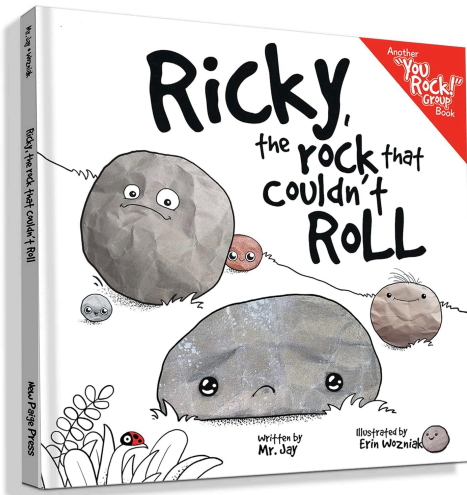
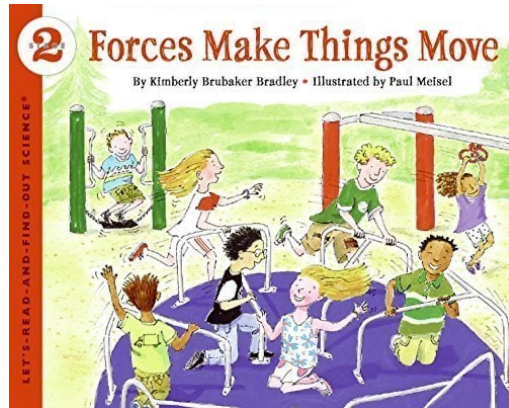
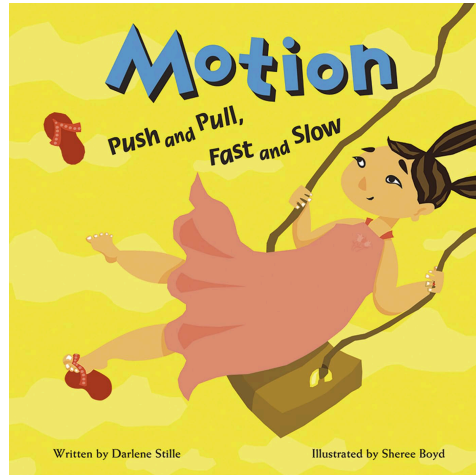
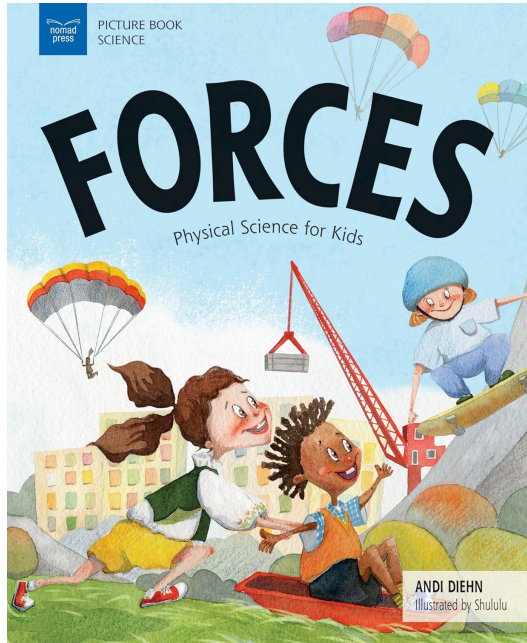
“You can talk with your group to brainstorm some ideas!”

“Did you have any predictions prior to performing our experiments at the stations?”

Example of what the chart could look like in their science journals:

Station:	Reflection: What patterns did you notice? Did you have any predictions before you started your experiment?
Dominos	
Pumpkin launcher	
Balloon races	
Newton's Cradle	

BOOKS



OTHER FUN RESOURCES:

Patterns in Motion

A force is a pull or push on an object

Some things have a **PATTERN** in their motion...

A pendulum is a weight it hangs from a fixed point

FRICTION is a force that ... Slows things down.

GRAVITY is a force that pulls things DOWN to Earth.

Patterns in Motion
whatihavelearnedteaching.com

On the PLAYGROUND: Motion

Motion is when something is moving or changing places.
Position is a place where someone or something is located

Trace on the dotted lines to see how the kids and objects are moving.

▶ Check all the pictures that show straight motion.

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Forces

can be balanced or UNbalanced!

A force is a ... Push or Pull on an object

More than one force can act on an object!

Unbalanced forces make objects move... and Balanced forces make objects sit still

FRICTION Slows an object down... and **GRAVITY** is a force that pulls things down to Earth

Balanced & Unbalanced Forces
whatihavelearnedteaching.com

