

Forces and Magnetism

A Cross-Curricular Approach
A BEN Workshop presented by
J'ree Burgess and Kelly Rodday, March 7th, 2023



BERMUDA EDUCATION NETWORK



J'Ree Burgess

My name is J'Ree Burgess. I am a teacher within the Bermuda Public School System (BPSS). I have taught primary two for four years. Currently, this is my first year teaching primary three. I have taught at Paget Primary School for all five years.

I am the mathematics teacher leader at Paget Primary School. I have recently joined as a BEN network teacher due to my love of cross curricular teaching and high interests in teaching science and social studies.



Kelly Rodday



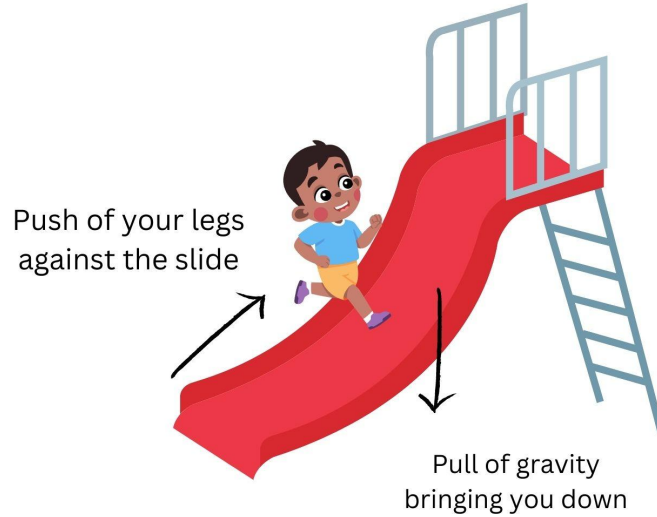
I am a Bermudian mother of two, ages 8 and 13. I have been teaching for 20 years in both private and public education. I am currently working in the Lower Primary Division at Somersfield Academy. I worked in the Ministry for 10 years at St. George's Prep. I have a Master's Degree in Organizational Management in Education from Endicott College.

I have provided professional development for the B.U.T.'s Annual Conferences, Somersfield Academy and the ICAN Math Program.

I am also the director of the Horizon's Summer Learning Program and the Content Designer at BEN.

Lesson 1:	Introduction and discussion	Main Activity	Plenary/ Reflections
<p>The Slide Experiment</p> <p>WALT: We are learning that that friction is a force created between surfaces when they move against each other and it makes this movement harder.</p>	<p>Activity: Take students outside to the playground with a slide. Challenge the students to run up the slide one at a time. Students can not use their hands. Once everyone has had a turn, challenge them to try it again without their shoes on.</p> <p><i>Check out this video to see how it went last year.</i> Forces and friction</p>	<p>Discuss the results. How did you get up the slide? Running is the force off your legs pushing you forward. Pushes and pulls are examples of forces.</p> <p>Why was it easier to run up the slide with shoes on? Discuss Friction: <i>Friction is the resistance of motion when one object rubs against another. Anytime two objects rub against each other, they cause friction. Friction works against the motion and acts in the opposite direction.</i> Did the shoes provide friction? What force was pulling you down? What is gravity? <i>Gravity is the force of attraction between two objects. It is what makes things fall and what keeps us from floating off into space. Gravity is a fundamental force of nature.</i></p>	<p>Draw diagrams of your experiment.</p> <p>Be sure to include arrows showing the force in use.</p> <p>Explain how the shoes provided friction.</p> <p>Share diagrams with the class.</p> <p>See sample diagrams and follow up questions below.</p>

Slide Experiment

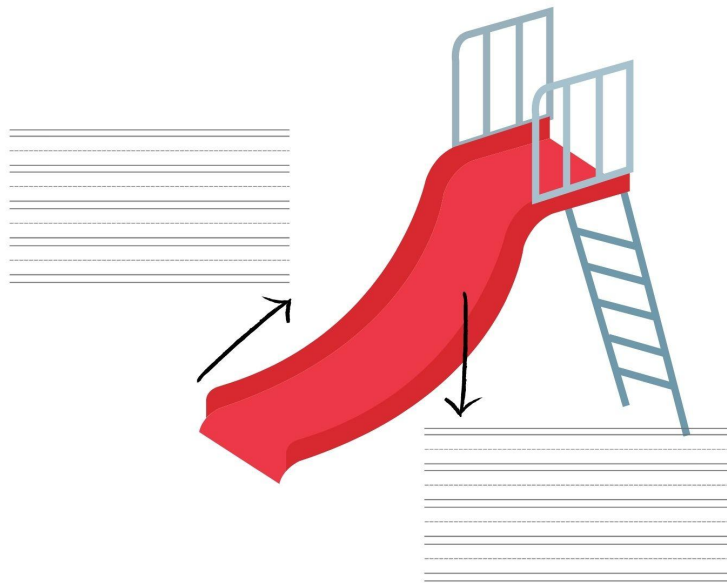


Rubber soles on the bottom of your shoes create friction and help you climb the smooth surface of the slide.



Socks are made with soft, smooth materials that do **not** provide friction against the smooth surface of the slide.

Slide Experiment



Horizontal lines for writing notes.



Horizontal lines for writing notes.

Name: _____

Slide Experiment Follow up Questions

How did you get up the slide?

Why was it easier to run up the slide with shoes on?

What is friction?

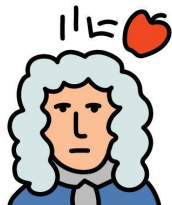
Did the shoes provide friction?

What force was pulling you down?

What is gravity?

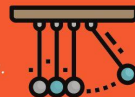
Why do you think you have to wear special socks at the trampoline park?

Lesson 2:	Introduction and discussion	Main Activity	Reflections
<p>Newton and Me read aloud and discussion comparing the story to the real scientist, Sir Isaac Newton.</p> <p>WALT: We are learning to complete a table or diagram to record information drawn from a text.</p>	<p>Recap yesterday's activity on the slide. Discuss how gravity kept pulling you down.</p> <p>Read the Fast Facts on Sir Isaac Newton together. Project on the Smartboard and/or make copies. Students can also add notes to their Science Notebooks.</p>	<p>Read Aloud: Teacher will read the story Read Newton and Me Newton and Me Read Aloud</p> <p>Students will make connections to Sir Isaac Newton and the story in a Venn Diagram.</p>	<p>Share responses.</p> <p>Allow students to explore the bitmoji classroom</p>



ISAAC NEWTON FAST FACTS

Sir Isaac Newton is an English 'natural philosopher' and a key figure in the scientific revolution of the 17th century.



BASIC INFORMATION

Name: Sir Isaac Newton

Birthdate: December 25, 1642

Birthplace: Lincolnshire, England

Notable contributions:

Discovering gravity, inventing calculus, and developing the laws of motion

NEWTON'S METHOD

Also known as the Newton-Raphson Method, this mathematical root-finding algorithm produces a better approximation of roots of a real-valued function.

IMPORTANT FACTS



Newton discovered the laws of motion after surmising that apples fell from trees because a force acted upon them. In relation to this, he also concluded that the moon would fly away from the Earth in a straight line if not for the planet's gravitational pull.

Newton discovered calculus at the age of 24. Calculus is the study of the rate of change and summation of quantities. It is integral to physics, chemistry, biology, economics, all branches of engineering, and more.

Philosophiæ Naturalis Principia Mathematica, Newton's work published in 1687, states the laws of motion and the foundations of classical mechanics, among others.

THE REFLECTING TELESCOPE

Newton invented a telescope that uses mirrors to reflect light and form an image. This type of telescope technology is used today for major astronomy telescopes.

NAME: _____

VENN DIAGRAM

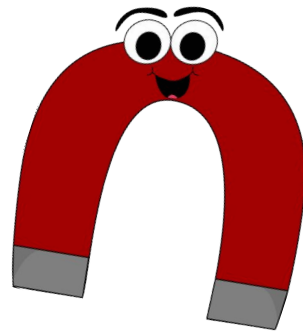
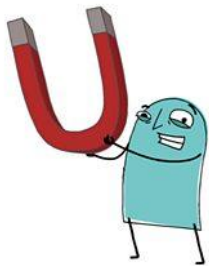
SHOW THE SIMILARITIES AND DIFFERENCES BETWEEN NEWTON AND ME AND SIR ISAAC NEWTON



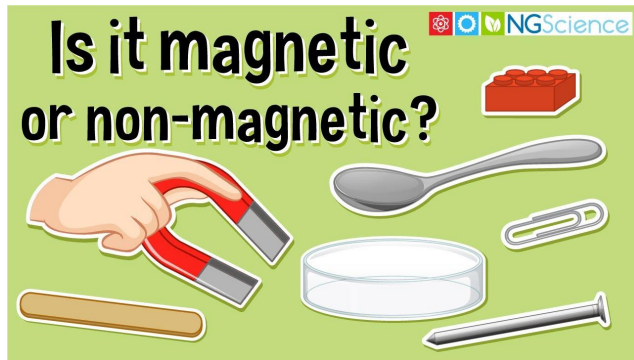
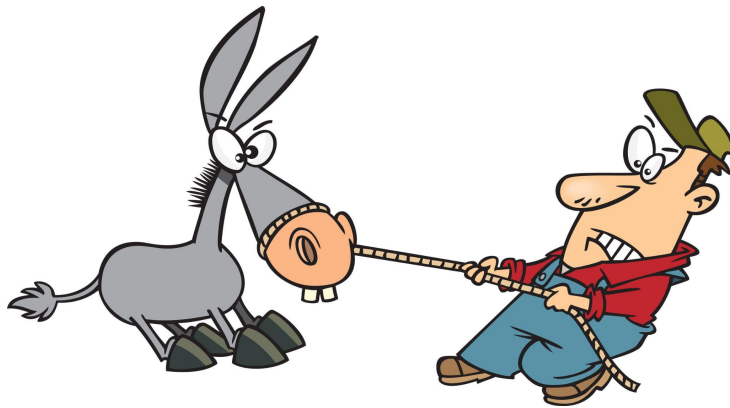
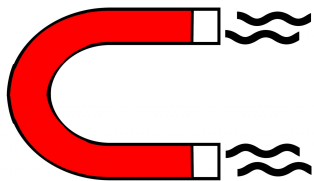
SIR ISAAC NEWTON

NEWTON AND ME

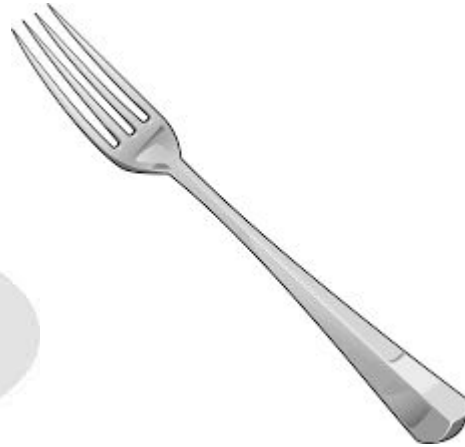




Forces and Magnetism



4 Pictures, One Word



Lesson 3: Forces & Magnetism

Lesson 3:	Introduction and discussion	Main Activity	Reflections
<p>WALT: Investigate how some materials are magnetic but many are not.</p>	<p>Think, Pair, Share: Teacher writes the word magnet on the board. Students think about everything that they know about magnets, share their thoughts in a pair and to the class.</p> <p>Introduction: Teacher will discuss what a magnet is/what a magnetic is attracted and not attracted to</p>	<p>Read Aloud: Teacher will read the story <i>Magnets (Pulling Together, Pushing Apart)</i></p> <p>https://www.youtube.com/watch?v=8PAMOALp5-c</p> <p>Investigate: Students use the items in the goody bag to determine if items are magnetic or not and record findings in worksheet.</p> <p>Ask students questions:</p> <p>What did you notice/observe?</p> <p>What makes an item magnetic?</p> <p>What makes an item not magnetic?</p>	<p>Students will reflect on the question below:</p> <p>Write one thing that you learned from today's lesson about magnets.</p>

Lesson 3: Forces & Magnetism

Magnetic vs Non-Magnetic Metals



Magnetic



Iron



Nickel



Cobalt



Steel



Not Magnetic



Aluminum



Copper



Lead

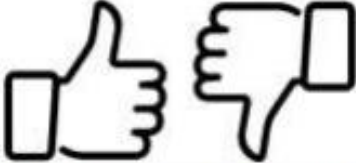
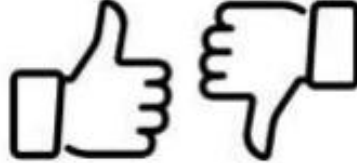
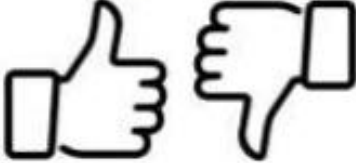
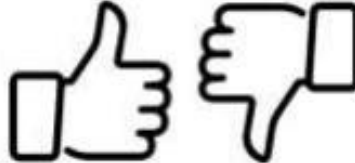




Brass

Lesson 3: Forces & Magnetism

Lab Investiaation Worksheet

Magnets Pulling Together, Pushing Apart

<p>Are <u>paper clips</u> magnetic?</p> 	<p>Are <u>iron nails</u> magnetic?</p> 
<p>Are <u>steel spoons</u> magnetic?</p> 	<p>Are <u>cotton balls</u> magnetic?</p> 
<p>Are <u>rubber balls</u> magnetic?</p> 	<p>Are <u>plastic pens</u> magnetic?</p> 

Lesson 3: Forces & Magnetism

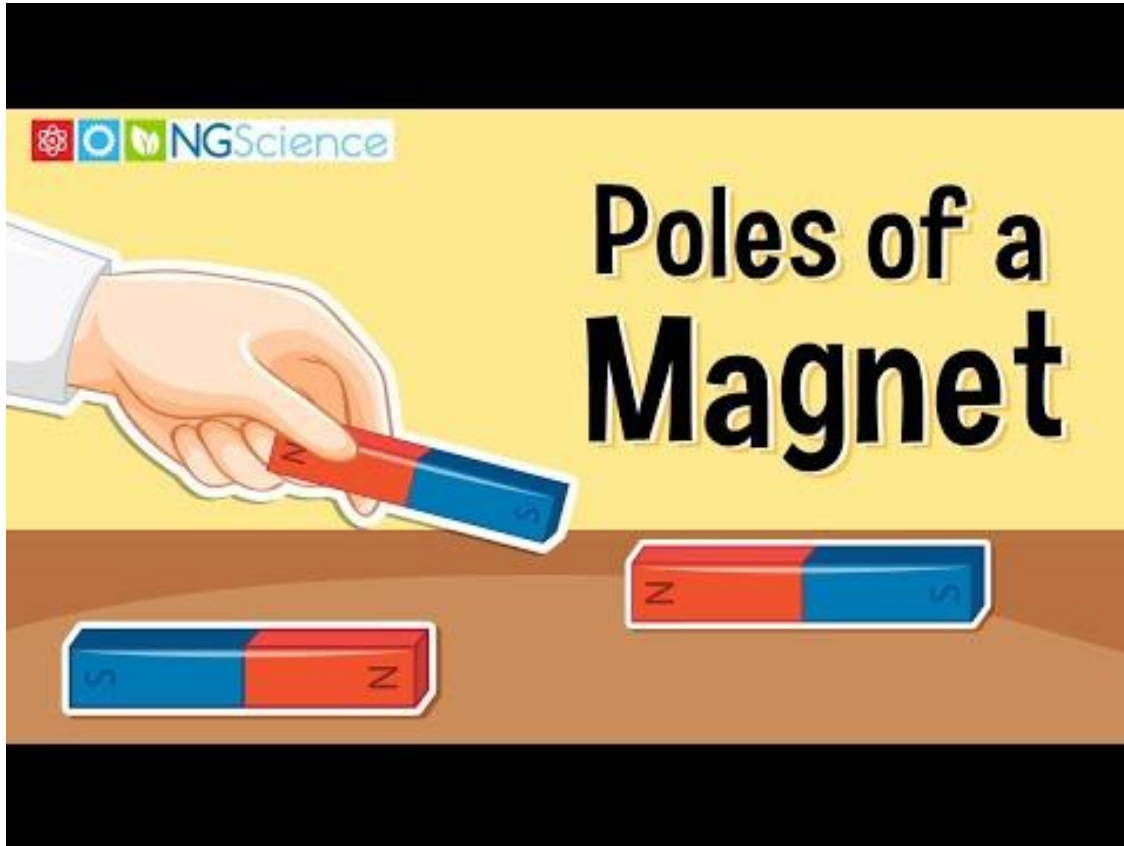
Exit Slip

Write one thing that you learned from today's lesson about magnets.

Lesson 4: Forces & Magnetism

Lesson 4 :	Introduction	Main Activity	Reflections
<p>WALT: Describe magnets as having a north and south pole.</p> <p>Describe how magnets interact when near each other, using the terms repel and attract.</p> <p>Use specialised vocabulary accurately to match a familiar topic</p>	<p>Mini Lesson: Teacher shares with students that magnets have two poles, a north and south pole.</p> <p>Teacher identifies the north pole as red, and the south pole as blue.</p> <p>Teacher shares that the poles are where the magnetic force is the strongest.</p> <p>Teacher introduces to students the terms attract and repel. Teacher elaborates on the terms in relation to magnets and models for students.</p> <p>Teacher models how magnetic poles interact for students.</p>	<p>Video: Teacher shares video to students which depicts what can happen when north and south poles are joined. https://www.youtube.com/watch?v=hk9tV4OE8Ns</p> <p>Investigate: Students are given magnets and investigate what happens when magnetic poles are joined together.</p> <p>Students create a poster which explains and shows what happens when magnets interact with one another.</p> <p>Poster Criteria:</p> <ul style="list-style-type: none">● Include the terms repel and attract● Include drawing of a magnet● Label the poles of the magnet● Include drawing that depicts what happens when magnets interact	<p>Students share their posters with the classroom.</p> <p>Teacher provides a true/false worksheet.</p>

Lesson 4: Forces & Magnetism



ATTRACTION AND REPULSION

When two magnets are placed next to each other they either **attract** each other or **repel** each other.



Unlike poles
attract



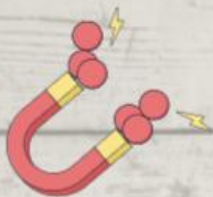
Like poles
repel



Lesson 4: Forces & Magnetism

True/False Worksheet

- | | | |
|---|---|---|
| 1. South and north poles would repel. | T | F |
| 2. North and north poles would attract. | T | F |
| 3. Magnets have 2 poles. | T | F |
| 4. The north pole is blue. | T | F |
| 5. The south pole is red | T | F |



CIE STANDARDS IN THESE LESSONS



ELA 03

Reading:

3Ri.04 Read and explore a range of non-fiction text types.

ELA 03

Writing:

3Wv.01 Use specialized vocabulary accurately to match a given topic.

3Wp.02 Complete a table or diagram to record information drawn from a text.

SCI 03

3Pe.01 Describe magnets as having a north pole and a south pole.

3Pe.02 Describe how magnets interact when near each other, using the terms repel and attract.

3Pe.03 Investigate how some materials are magnetic but many are not.

3Pf.03 Know that friction is a force created between surfaces when they move against each other and it makes this movement harder.

3Pf.04 Describe how smooth and rough surfaces can generate different amounts of friction.

Keep in touch!

We will be asking for your feedback on this unit:

- what went well;
- what challenges there were;
- where you brought in your own ideas and resources; and
- learning that you saw in your class and in what ways.

This will help us for next year..

Thank you for attending. Please can you complete this Google Form providing feedback on our workshop.

To share any learning in action from this cross-curricular unit, please email photos to Steph at stephanie@ben.bm - and let her know if you want to be tagged! Photos will then be posted on Instagram and FB.

***Please make sure waivers are checked, or take photos of work.



Link to Teacher Resources

The lesson plans, slides, and video will be shared on the BEN website as of tomorrow:

<http://www.bermudaeducationnetwork.com/what-we-do/lesson-plans/>

Feedback Form Link:

<https://docs.google.com/forms/d/e/1FAIpQLSd7q1VWaWz1CB4VUB-yOvuC7XeBBfYWjmaH46ftHvt1vtpQyQ/viewform>