

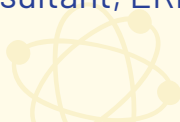
Bringing It Together: Grade 1

An Example
Organizing Idea: Matter & Scientific Methods

Example “Mini Unit” Walk Through



Nicole Lamoureux, M.Ed.
Designer of Professional Learning Consultant, ERLC






Land Acknowledgement



In the spirit of reconciliation, we want to acknowledge that this gathering is taking place on traditional lands across the province of Alberta, home to many diverse First Nations, Métis and Inuit peoples. We acknowledge that this land is a traditional meeting ground giving voice to its original peoples and the story of creation of this country in a way that history has forgotten.



Agenda For Session

1. Science Teaching Practices
2. Curricular Expectations & Science Background
3. Walk Through Resource
4. Question & Answer



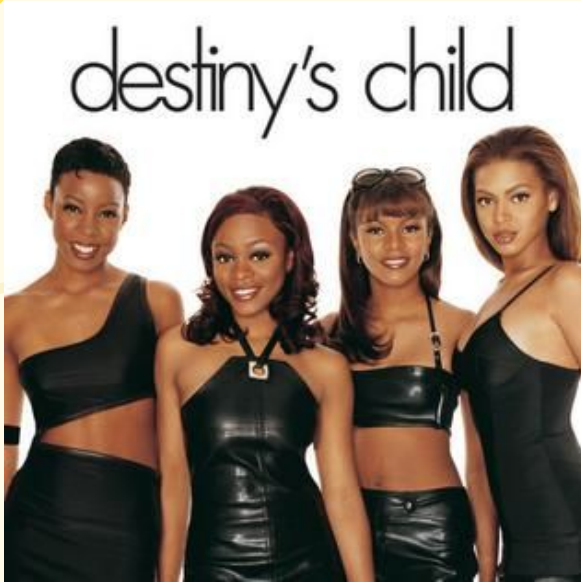
**Resources you will
receive at the end**

1. Plan with Links
2. Student Graphic Organizers
3. Slides

**All resources will be translated into French
& posted on ARPDC Site



A lot Has Changed Since 1996....



Our science instruction & resources should reflect this



Science is a way of thinking
much more than it is a body
of knowledge.

~ Carl Sagan



Key Ideas For Planning

1. Use the learning outcomes and KUSPS to identify key concepts (Science 01 & Scientific Methods)
2. Provide authentic context for students to investigate and connect to
3. Explore before explain in lesson development
4. Use talk and vocabulary to help students make meaning of science ideas (Explain Phase)
5. Triangulate evidence of student learning based on combination (knowledge & skills/procedures)

Bringing Science Instruction to the 21st Century



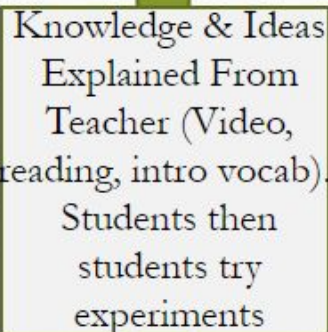
<p>“Hands On” Only Activity Based Learning</p>	<p>Sensemaking Through Phenomenon Based Learning</p>
<p>Planning: Topic “What Activities Support this?”</p>	<p>Planning: Concepts “What are the Big Ideas?”</p>
<p>String of sometimes connected sometimes disconnected hands on activities</p> <ul style="list-style-type: none"> ➤ Coverage ➤ Are students understanding the ideas? 	<p>Authentic Science Investigation</p> <ul style="list-style-type: none"> ➤ Phenomenon connected to “Big Idea” that students trying to find out. ➤ Something students are familiar with ➤ Coherence from student perspective all “hands on” activities, videos and text are used to connect back to the phenomenon



Science Instruction

All Outcomes, All Students

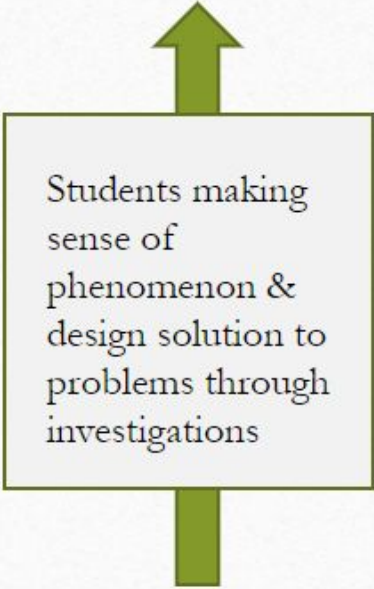
Traditional



Knowledge & Ideas
Explained From
Teacher (Video,
reading, intro vocab).
Students then
students try
experiments

Some Students

Contemporary

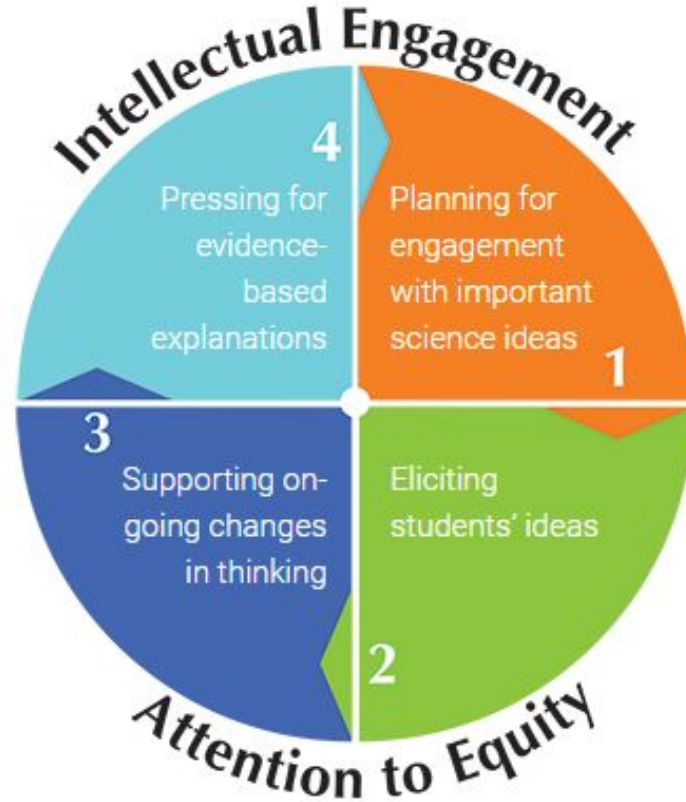


Students making
sense of
phenomenon &
design solution to
problems through
investigations

All Students

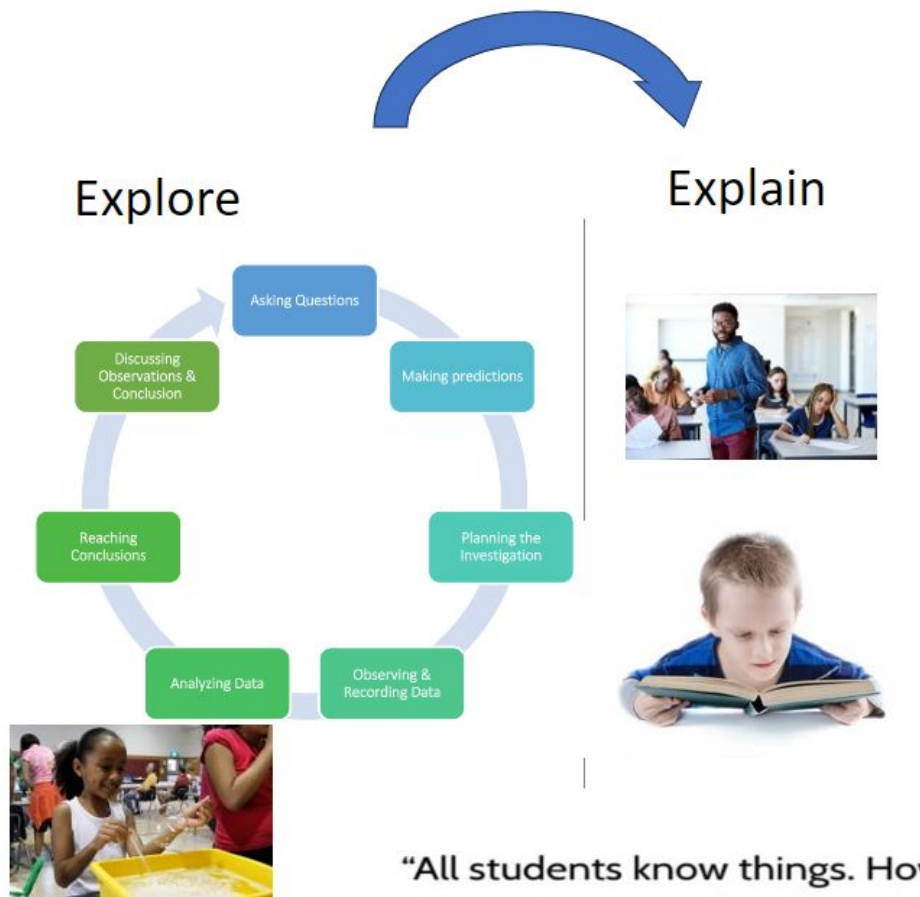
Lee, O. (2021)

Evidence is used in grade 4 and above in primary use:
Support from data



Flip the Sequence

Brown P. (2020). *Instructional sequence matters grades 3-5 : explore before explain*. National Science Teaching Association



“All students know things. However, they may not express their knowledge in academic language.” (Brown, p. 43)

MAKING MEANING OF SCIENCE IDEAS LEARNING JOURNEY





"The materials are a **huge equalizer** in the classroom, especially for students with special needs and English learners. Students are figuring things out and actually doing science rather than just being "told" about science."



Learning Summary Tables

Phenomenon: <i>Present the phenomena to the class</i>			
Focus Question: <i>Write the focus question. This is what students are working to understand/answer.</i>			
Activity/ Investigation	Observations <i>(patterns, what happened?)</i>	Why? <i>(what do you think caused this?)</i>	Clues <i>(how does this help us understand the focus question/phenomenon)</i>
Answer Focus Question: <i>Use evidence gathered in table to develop a claim / explanation of phenomenon.</i>			

- Help students see purpose of smaller hands on investigations and connect back to solving phenomenon
- Reduces cognitive load as students can refer back to what they learned
- Should be worked on as an entire class & filled with student response

Examples

Activity	Observed	Learned	Help us answer Driving Question	Vocabulary
Model Landfill Systems	Food materials changed but paper + plastic stayed the same	Things people make plastic and paper don't decompose easily	Some materials decompose faster because of microbes and some people made materials take longer to decompose	Open and closed Systems Materials Properties Weight Matter
Crushed Material	Weight stayed the same. Properties stayed the same	Materials stay the same when crushed	The materials are still in the landfill. They just change shape	Properties Amount
Food Materials in Model Landfill Bottles	<ul style="list-style-type: none"> • Turning Brown • Green with white edged Blobs that are growing • Yellow oozy liquid • Shrinking and curdling 	Decomposers call microbes break down the food and put nutrients in soil	The food material in our garbage breaks down through decomposition and transfers nutrients to soil	Decomposer Microbes

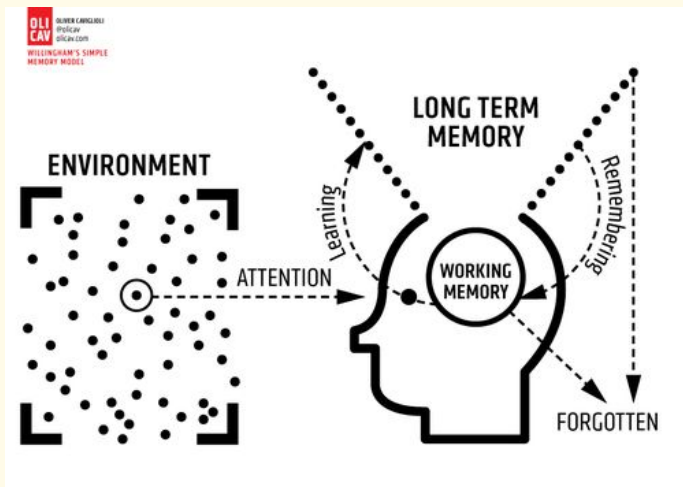
Nicole Lamoureux, Grade 4 Classroom "Where Does Our Garbage Go?"

Lesson #	Lesson Question	Phenomena/Activities	What we figure out!	New Question
1	Can you smell what I smell?	Observed: Allowed a strong smell to be made, which made it hard to breathe.	Substances can change from one state to another (solid, liquid, gas).	How does the odor travel to my nose? Can the odor be seen? Can the odor be felt? Can the odor be tasted?
2	Can something have more than 1 state?	Observed: Water changing from liquid to solid (ice) and from liquid to gas (steam).	Water has three states (solid, liquid, gas).	What does mass and volume have to do with the state?
3	What is just an apple for me but so I can eat it?	Observed: Apple and cutting of materials.	Matter can be cut into smaller pieces or broken into smaller pieces.	Can the state of matter be changed by temperature?
4	How can I model the things gases can do?	SEER: No color and pressure are from the block.	Gases don't have a definite shape or volume and can be added and removed.	
5	How can we develop models to explain what you can			

Or Document on Google Slide & Display as Needed

Investigation Title	What did we observe?	What did we learn?	How does this help us understand how the puppet show works?

Reduce Cognitive Load



Make Meaning

Grade 1 Version Learning Summary Slide

Did the objects  length change or stay the same after



Directions: Drag the object changed or stayed the same


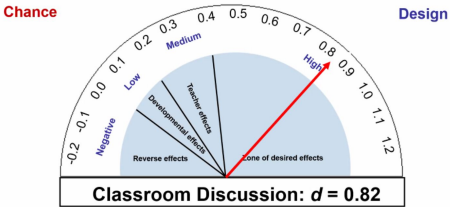
Changed	Stayed the Same



How Do I Fit This In?



ELAL is about communicating and taking in ideas

Science Practice	ELAL Connection (Organizing Idea)
Science terms & Vocabulary (Glossaries, Frayer Model etc.)	Vocabulary (Tier 2 & 3 words)
Think-Pair-Share 	Oral Language 
Whole Class Discussions	Comprehension Text Forms & Structures
Viewing & Reading Text (video & non fiction text)	

Integrate aspects of ELAL & **Time:** Add 10-15 minutes to each lesson from ELAL time.

Science of Reading

- Background knowledge helps reading comprehension
- Science builds background knowledge of how the physical world works

Hattie, J. A. C., & Donoghue, G. M. (2016). Learning strategies: A synthesis and conceptual model. *Science of Learning*, 1. doi:10.1038/npsiclearn2016.

Mini Unit You will Receive






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Credit for resources including using the slides from the session can be indicated as follow:

(Title) ARPDC (2023)
Adapted from (Title) ARPDC (2023)

Resource Mini Unit Plan

Curricular Connections

Grade 1 Matter: Physical changes to an object do not change what the object is made of.

- This series of lesson engagements are an example of how you can teach and assess the KUSPS from Matter and the Scientific Methods. As with any resource, teachers are free to modify and adapt to their particular teaching context.

CURRICULAR CONNECTION		
<p>Organizing Idea: Matter Learning Outcome: Students analyze properties of objects and investigate how they can be changed.</p>		
<p>Important Prior Learning Required: Before starting this "mini unit", students should have worked through the first KUSP in grade 1 Matter and have a solid foundation with:</p> <ul style="list-style-type: none"> What an object is Know and understand the term property Directly compare the length, area, and weight of various objects (This can be linked to the grade 1 Math Measurement organizing idea.) 		
<p>2nd KUSP Taught and Formatively Assessed in This Series Of Lessons from Matter:</p> <p>KNOWLEDGE Properties that can be changed include</p> <ul style="list-style-type: none"> length area weight (mass) shape texture <p>Actions that physically change properties of an object include</p> <ul style="list-style-type: none"> bending twisting stretching cutting breaking <p>Not all objects respond the same way to bending, twisting, stretching, cutting, or breaking.</p>	<p>UNDERSTANDING Physical changes to objects do not change what the objects are made of.</p>	<p>SKILLS & PROCEDURES Predict how actions can physically change properties of various objects.</p> <p>Explore actions that physically change properties of various objects.</p> <p>Describe physical changes that result from various actions.</p> <p>Discuss why physical changes do not change what an object is made of.</p>
<p>Grade 1 Investigation Steps</p>		



Grade 1 Matter: Physical changes to an object do not change what the object is made of.

<p>Organizing Idea: Scientific Methods. Learning Outcome: Students engage in and describe investigation</p> <ul style="list-style-type: none"> For this series of lessons, the following knowledge, skills and procedures will be taught and formatively assessed. 	
<p>Scientific Method Knowledge A prediction is a likely answer to a question based on current understanding.</p> <p>Observations can be made by using the senses.</p> <p>Observations can be recorded as data in many ways, such as</p> <ul style="list-style-type: none"> words drawings photographs numbers and counts sound and video recordings <p>Scientists can keep records of data in record books or computers.</p> <p>A conclusion is an answer to a question based on gathered data</p>	<p>Scientific Method: Skills/Procedures predict the answer to a question</p> <p>Make observations using various senses.</p> <p>Record observations as data.</p> <p>Reflect on recorded data to make conclusions.</p>
<p>Integrating Math: Measurement For this series of lessons, the actions affect the changes to the measurable properties of an object (length, weight and area)</p> <p>➤ Skill/procedure will focus: Comparing the length, area, or capacity of two objects directly, or indirectly using a third object</p> <p>➤ Students will directly compare the measurement with the original object for this series of lessons. Alternatively, teachers may use indirect measurement with a third object, if they wish.</p>	
<p>Integrating ELAL: The goal in developing a series of lessons is for students to make meaning of the science ideas (concepts) they are learning. ELAL provides the opportunity to help students participate in sense making. Most lessons incorporate student conversations and development of tier 2 and 3 vocabulary. It is strongly encouraged to weave the associated KUSPS from the Organizing Ideas into these lessons:</p> <ul style="list-style-type: none"> Vocabulary Oral Literacy <p>As well, using the additional time of approximately 15 minutes per lesson from your ELAL minutes to allow for adequate time to include these aspects in the science lessons.</p>	
Slides from Session	Slides for Students



Resource Mini Unit Plan

Summative Performance Task with Single Point Rubric

Grade 1 Matter: Physical changes to an object do not change what the object is made of.

SUMMATIVE ASSESSMENT PERFORMANCE TASK- KEEPING THE END IN MIND:

Task: Changing Objects

- Provided with an assortment of (4-5) unfamiliar objects, students will compare two or more objects to physically demonstrate and verbally describe how the same action can be performed on 2 different objects but have different results. As well, explain by demonstrating and verbally describing how objects can change but the materials stay the same.

Teacher Preparation:

- Select **new objects** (4-5) to place on the tray that students have not investigated before. Be sure to include:
 - a) 1 object with materials that will not allow the actions to change the object (hard plastic, metal) such as: lego brick, magnet from board, or snap cube).
 - b) 1 object made of stiffer material that doesn't bend or twist easily but can break (ex: styrofoam)
 - c) 2 **objects** that are pliable (e.g. pipe cleaner, Twizzler, etc.)
- Teacher can choose to have student record their demonstration and explanations or interview the students one on one
- Students may take turns to record partners with applicable technology.

Directions:

Provide the tray for the student and instructions:

Use the items on the tray to help show the answer to the following question:

1. Choose 2 objects to demonstrate and describe how some objects respond (behave, react) differently to the same action?
2. Why might the properties of an object change but what they are made of stays the same?

During the following lessons, it would be a good idea to have students discuss their observations and thoughts connected to the above questions.

Prompts if a student is stuck:

- What are some objects we investigated?
- What properties did we look at? What actions did we do?
- Could you show some of the same actions on these objects and tell me how they changed or did not change?

[One Point Rubric Linked](#)

See rubric for curricular connection.




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Materials Required with Links

Grade 1 Matter: Physical changes to an object do not change what the object is made of.

Materials Required For Lessons 3-9:

Materials for Each Group/Partner for lessons 3-9	Whole Class Anchor Chart or Slide Lessons 3-9
<p>The objects' materials were selected for a reason. By the end of the investigation students should be able to draw the conclusion that the materials stayed the same. That is the purpose of the learning summary slides.</p> <ol style="list-style-type: none">1. Label Tray with following items keep as original to directly compare measurements against:<ol style="list-style-type: none">a. Plasticine or play doh (new)b. Quarter (or any real coin)c. Rubber bandd. Popsicle stick2. Label Tray with following items to investigate actions on:<ol style="list-style-type: none">a. Plasticine or play doh (new)b. Quarter (or any real coin)c. Rubber band - teacher demo for breakingd. Popsicle stick - teacher demo to cut or break <p>Choose different objects for students to select for the summative task at the end.</p>	<p>Learning Summary (slide)</p> <ul style="list-style-type: none">• Provides a place for students to reflect on changes to make conclusions• When finished observing and recording the actions impact on property of objects <p>What Objects' Properties Changed? What Objects' Properties Stayed the Same?</p> <p>After doing actions on Objects</p> 

Each student Lessons 3-9: Graphic Organizer

- Observation recording sheet to record observations of actions on physical property (shape, length, area, mass)

[Shape](#) [Length](#) [Weight](#) [Area](#)




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Series of lesson plans - linked resources



Lesson Development				
Total Estimated Time: 18 days	Learning Goal and Procedures: Safety note: Lesson 6 onwards the teacher should demonstrate: <ul style="list-style-type: none"> breaking and cutting popsicle stick 	How will all learners be reached? UDL Principles (not all included below) <i>Teacher should add or modify according to their context</i>	Formative Assessment What do I want to hear or see from students that tells me they are meeting the skills/procedures? Formative assessment Checklist Discussion checklist (students will be sharing ideas in all lessons)	Resources Required
Lesson 1 30 minutes	Engage: Activate Prior Knowledge. Goal: To find out what students may know about physical changes to an object 10 minutes: Crush (bend) Can challenge: Teacher Demonstration before crushing <ul style="list-style-type: none"> Present empty pop can to students Ask students "How would you describe <u>what the pop can looks like</u>?" Students can share a few ideas. Ask students: "If I bend this can, how will the pop can change? How will it stay the same?" <ul style="list-style-type: none"> Students can Think-Pair-Share Hand out image (model) of "original and crushed pop cans" (see resources for link) for students to draw and write their thinking on 	Vocabulary: <ul style="list-style-type: none"> <input type="checkbox"/> Observe <input type="checkbox"/> Crush (bend) Instructional Strategy <ul style="list-style-type: none"> <input type="checkbox"/> Students can think-pair-share ideas with others <input type="checkbox"/> Write words/pictures on the board with sentence stems Sentence Stems: The <u>crushed</u> can <u>changed</u> ... Ex: The crushed can <u>changed</u> shape. The crushed can stayed the same. Ex: What the crushed can is made of stayed the same	Scientific Methods: skill/procedure: Make observations using various senses. Pre-Assessment Look Fors: Do the students talk or show ideas connected to <ul style="list-style-type: none"> <input type="checkbox"/> Shape? <input type="checkbox"/> Length? <input type="checkbox"/> Texture? <input type="checkbox"/> Area? <input type="checkbox"/> Still the same material? Note: The purpose of this learning engagement is to find out what students already know about actions on an object. If they do not mention the change in shape, length etc. that is ok.	Link to Handout Model: students can draw symbols and write what they think what changed and what stayed the same 





Student Observation Recording Sheets



Observation: What Changed?

Note: Compare against original form

Property: Length

Compare before and after action

Object	Action	Is the length
	Bend	<input type="checkbox"/> Shorter <input type="checkbox"/> Longer <input type="checkbox"/> Same
	Twist	<input type="checkbox"/> Shorter <input type="checkbox"/> Longer <input type="checkbox"/> Same
	Stretch	<input type="checkbox"/> Shorter <input type="checkbox"/> Longer <input type="checkbox"/> Same
	Cut	<input type="checkbox"/> Shorter <input type="checkbox"/> Longer <input type="checkbox"/> Same
	Break	<input type="checkbox"/> Shorter <input type="checkbox"/> Longer <input type="checkbox"/> Same

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	Stretch	<input type="checkbox"/> Shorter <input type="checkbox"/> Longer <input type="checkbox"/> Same
	Cut	<input type="checkbox"/> Shorter <input type="checkbox"/> Longer <input type="checkbox"/> Same
	Break	<input type="checkbox"/> Shorter <input type="checkbox"/> Longer <input type="checkbox"/> Same

Each physical property:
How Did the Shape change?

Did the Area change?:
 covers more/less surface

Did the weight change?
 lighter/heavier



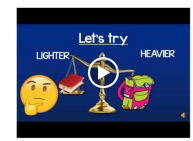
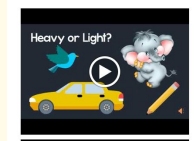
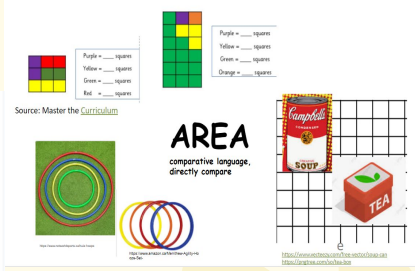
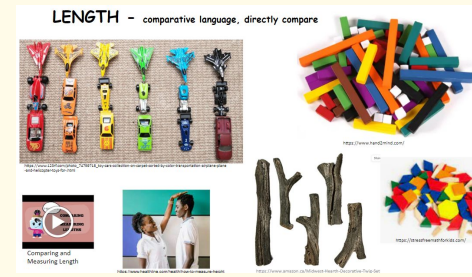
Planning Process:

Unpack the Learning Outcomes
& KUSPS To Examine
Science Concepts (Science Ideas)

Prior Learning Required Before Engaging In the investigation of actions changing physical properties of objects

❖ Introduction and surface understanding of the following concepts: (Outlined in Grade 1 Matter Video)

- Object
- Texture
- Physical Properties of Objects
 - Length
 - Area
 - Weight/Mass
 - Shape
 - Texture



Mass

Balloon Balance Experiment
How to put a pin in a balloon without popping it.



Properties Of Objects

Different features (ways) to describe and understand objects

Color



Texture



Shape



measurement

Weight



Length

Bringing It Together: Grade 1

Organizing Ideas: Matter Learning Outcome

Students analyze properties and INVESTIGATE how they can be changed

Scientific Methods Learning Outcome

Students engage in and describe investigation



Planning for
engagement
with important
science ideas

Grade 1 Matter: Unpacking The Second KUSP

🎓 KNOWLEDGE	💡 UNDERSTANDING	✂️ SKILLS & PROCEDURES
<p>Properties that can be changed include</p> <ul style="list-style-type: none">• length• area• weight (mass)• shape• texture	<p>Physical changes to objects do not change what the objects are made of.</p>	<p>Predict how actions can physically change properties of various objects.</p>
<p>Actions that physically change properties of an object include</p> <ul style="list-style-type: none">• bending• twisting• stretching• cutting• breaking		<p>Explore actions that physically change properties of various objects.</p>
<p>Not all objects respond the same way to bending, twisting, stretching, cutting, or breaking.</p>		<p>Describe physical changes that result from various actions.</p>
		<p>Discuss why physical changes do not change what an object is made of.</p>

Consider the



Background Builder

Science Background Matter

We live in a 3 dimensional world.

Object is anything that takes up space and has mass. (Adult Definition)

Kinder definition: anything perceived using 1 or more of the 5 senses

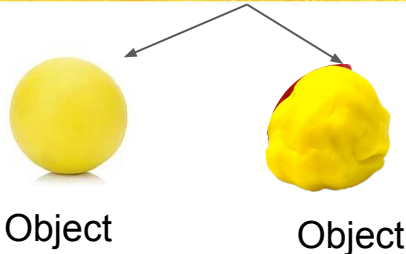


Teacher Notes: Avoid Misconceptions

An object is anything that “takes up space and has mass”

When students cut or break off another piece of the object (there are 2 or more pieces) then by definition there are 2 objects because each piece “takes up space and has mass” and by that definition becomes another object.

Original Object



Avoid confusing students and instruct them to break or cut off a smaller piece. Students will know which object is the original to measure, as it will be the larger object.



Rubber band should only be cut in one spot as it will still be 1 object

Properties

Characteristics or features of an object, material and matter that are observable, measurable or both in order to describe and understand it.

Teacher Background Matter: Properties

Properties of an Object	Properties of Matter (Gr. 3 & Up)	Properties of Materials (Gr. 2)
<p>Extensive Physical Property</p> <ul style="list-style-type: none"> ❑ Dependent on sample size ❑ Useful to describe the object but not identify as it can change size & more objects can be made 	<p>Intensive Property</p> <ul style="list-style-type: none"> ❑ Independent of sample size ❑ Generally is the quality or essence of the substance ❑ Useful in identifying unknown substances 	<p>Materials include both intensive and extensive physical properties</p> <ul style="list-style-type: none"> ❑ The focus is on how these physical attributes make the material useful
<p><u>Example of Properties</u></p> <p>Weight Mass Volume</p> <p>Length Size</p>	<p><u>Example of properties</u></p> <p>Melting/boiling point Color Odor Hardness Density Elasticity Luster Malleability Conductivity States of Matter</p>	<p>Example of Properties</p> <ol style="list-style-type: none"> 1. Transparent 2. Waterproof 3. Absorbent 4. Strong/Weak 5. Insulator/ conductor 6. Flexible/rigid

Objects Chosen For a Reason

Knowledge: Not all objects respond the same way to bending, twisting, stretching, cutting and breaking

Skill/Procedure: Explore actions that physically change properties of various objects



Malleable will change physical properties by hand including shape



Very Hard will not change physical properties by hand



Malleable (Can be shaped) will change physical properties by hand but always returns to same shape



Hard will only change physical property when cut or broken (safety: teacher demo)

Driving Question:

Planning for
engagement
with important
science ideas

1

How do actions change properties of an object ?





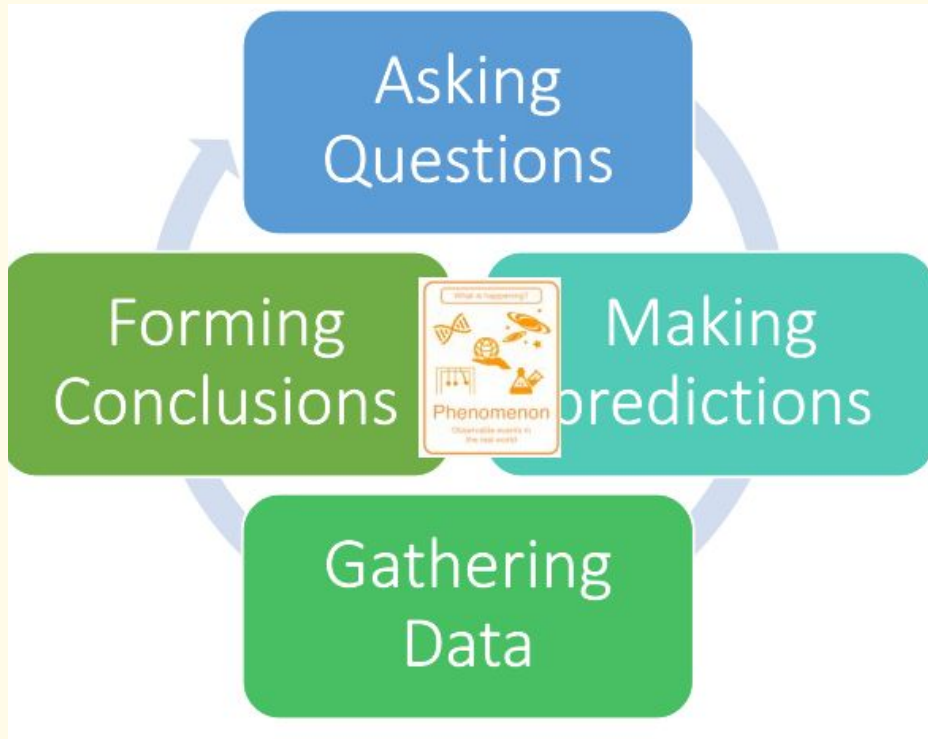
Science Methods



Planning for engagement with important science ideas

1

Learning Outcome: Students engage in and describe investigation



+ Connecting Skills/Procedures To Teach & Assess

Planning for engagement with important science ideas

Matter

Grade 1

Science Methods

Predict how actions (bending, twisting, stretching, cutting, breaking) can change the properties (length, area, mass, texture, shape) of various objects

Predict an answer to a question based on current understanding

Explore actions (bending, twisting, stretching, cutting, breaking) change properties (length, area, mass, texture, shape) of various objects

Make observations using various senses
Record observations as data

Describe physical changes (length, area, mass, texture, shape) as a result of various actions (bending, twisting, stretching, cutting, breaking)
Understanding:

Physical changes to an object do not lead to changes what object is made of

Make observations using various senses
Record observations as data

Reflect on recorded data to **make conclusions**

Math: Measurement Organizing Idea

Part of KUSP can work on

Knowledge	Understanding	Skills/Procedures
Indirect comparison is useful when objects are fixed in place or difficult to move.	The size of two objects can be compared indirectly with a third object.	<u>Compare the length, area, or capacity of two objects directly or indirectly using a third object.</u>





Compare the measurement against the original

EX: Popsicle stick is **shorter** after it is broken

Materials Needed:

Enough materials for each group to investigate

1. Plasticine 
2. Quarter (any coin) 
3. Wide rubber band
4. Popsicle Stick
5. Pan scale for weight

Teacher Materials:

1. Learning Summary Slide
2. Anchor chart for texture

Student Materials:

1. Science Journal or handout to record changes on each object
2. 2 trays of same objects 1 is to perform actions on and the other is to compare physical properties with original

Materials For Groups/Partners



Objects to perform actions (bend, twist, stretching, cutting and breaking) on



Original objects to directly compare measurement with





Keeping the End in Mind: Performance Task

Grade 1 Matter Learning Outcome: Students analyze properties of objects and investigate how they can be changed
Knowledge is demonstrated through the skills/procedures

Task Name: Changing Objects

Student Name:

Grow	Met Criteria	Glow
	<p>Matter Knowledge: Not all objects respond the same way to bending, twisting, stretching, cutting, or breaking. Skill/procedure: Describe physical changes that result from various actions.</p> <p>Question #1</p> <ul style="list-style-type: none"><input type="checkbox"/> Chooses two or more objects comprised of different materials<input type="checkbox"/> Completes same action to each object that demonstrates how the object responds to the action<input type="checkbox"/> Expresses how these similar actions had different result for each object <p><i>Ex: "I cannot bend the Lego but I can bend the Twizzler". (student demonstrates on both objects and provides a verbal explanation)</i></p>	
	<p>Matter Skill/Procedure:</p> <ol style="list-style-type: none">1. Discuss why physical changes do not change what an object is made of.2. Describe physical changes that result from various actions <p>Understanding: Physical changes to an object do not change what the object is made of</p> <p>Question #2</p> <ul style="list-style-type: none"><input type="checkbox"/> Demonstrates and explains why properties of objects change and the materials stay the same <p><i>Ex: Folds paper and states "I can fold this but it is still made of paper"</i></p>	
	<p>Scientific Methods Skills/Procedures: Describes steps of an investigation (This particular investigation)</p> <ul style="list-style-type: none"><input type="checkbox"/> Uses order and sequence to assist with describing the procedures of this investigation	





GATHERING EVIDENCE OF LEARNING

Triangulation of assessment is a process by which an educator collects evidence about student learning.

OBSERVATIONS

- Checklists
- Anecdotal Records
- Pictures
- Videos



By using a variety of data to inform our assessment, we get a more **valid** and **reliable** idea of what the learner knows and what their next steps may be.

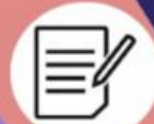
CONVERSATIONS

- Class meetings
- Student Conferences
- Small Group Instruction
- Peer Conversations
- Self-Assessments



PRODUCTS

- Projects
- Presentations
- Demonstrations
- Portfolios
- Tests/Quizzes
- Performances



Assessing Skills/Procedures

What do I want to hear or see from students that shows they meeting the skills/procedure?

(knowledge demonstrated through skills/procedures)

Making Meaning Lesson Development




How am I getting students to think with and about the science ideas they are learning so that it builds on what they are learning and is coherent for them?

When doing hands on activities, are their minds engaged as well? (Science Methods)

How can I engage all learners?



Instructional Strategies To Help Students Make Meaning

1. Students draw /write to make meaning
2. Think-Pair-Share 
3. Gradual Release of Responsibility
4. Include Vocabulary Development (Explain Phase)
 - a. Glossary/Word Wall
 - b. Frayer Model



Talking



0

for 30 seconds

for 1 minute

during class

before class

THINK

Ask students to respond to a question independently.

with pen and paper

or a laptop

in writing

as you doodle

turn to your neighbor

walk across the room

group size = 2

group size = 3 or 4

- PAIR -

Have students compare answers in small groups.

come to consensus

agree to disagree

explain your reasoning

share your opinion

with the whole class

with another group

verbally

in writing

SHARE

Ask students to share their work with the class.

via polling software

via whiteboard

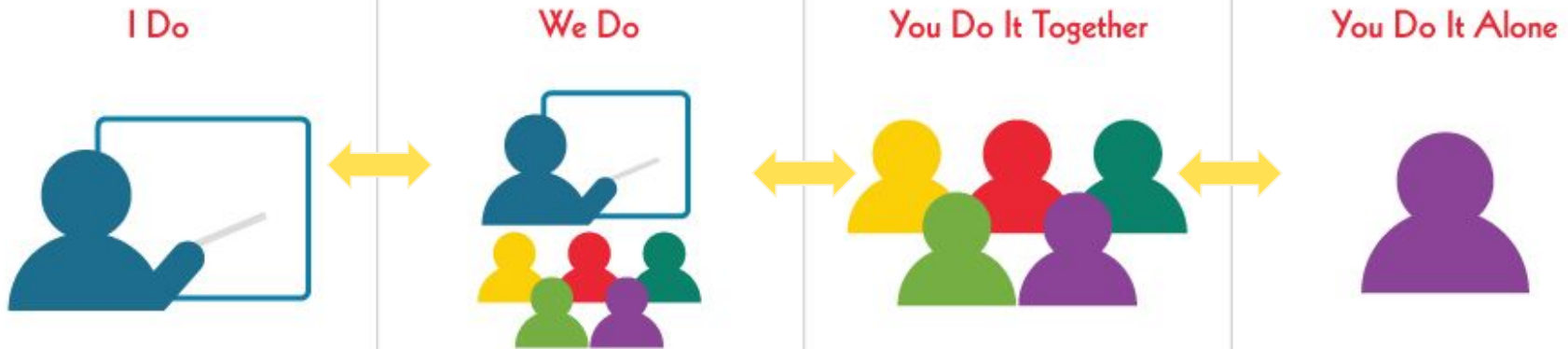
class discussion

time for telling

@derekbruff



Gradual Release of Responsibility



Model Thinking
I think

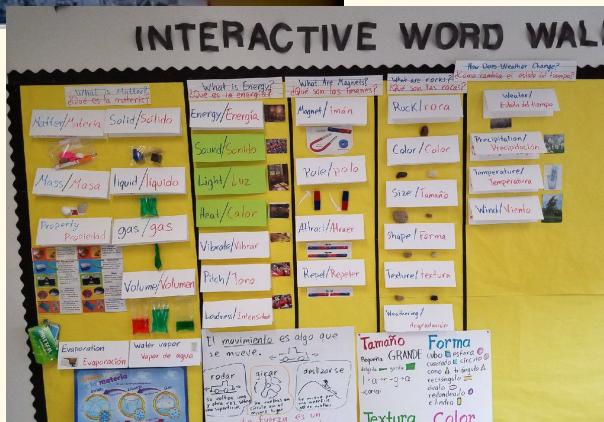
Guided Interactive
We think together

You think together

You think
independent

Image Retrieved from: <https://www.continentalpress.com/blog/gradual-release-model-ela-strategy/>

Science Word Walls

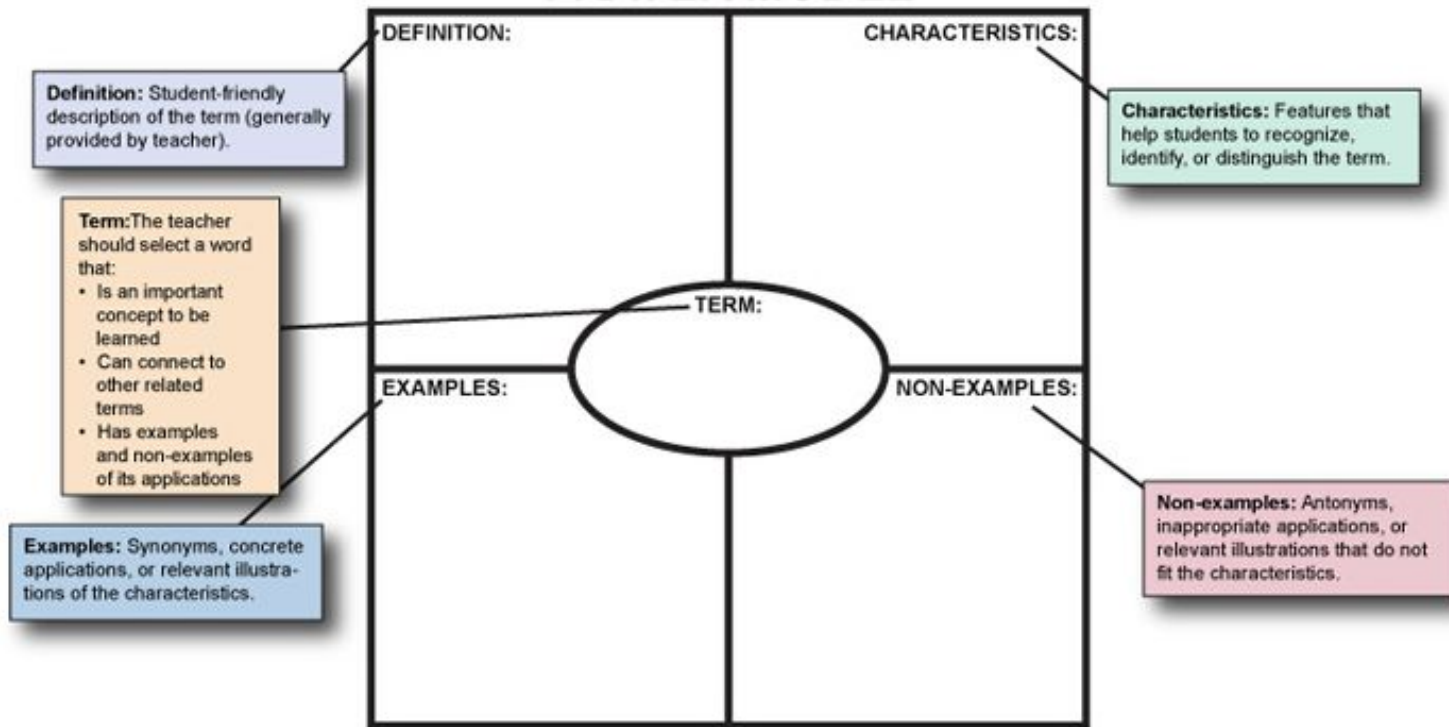


+



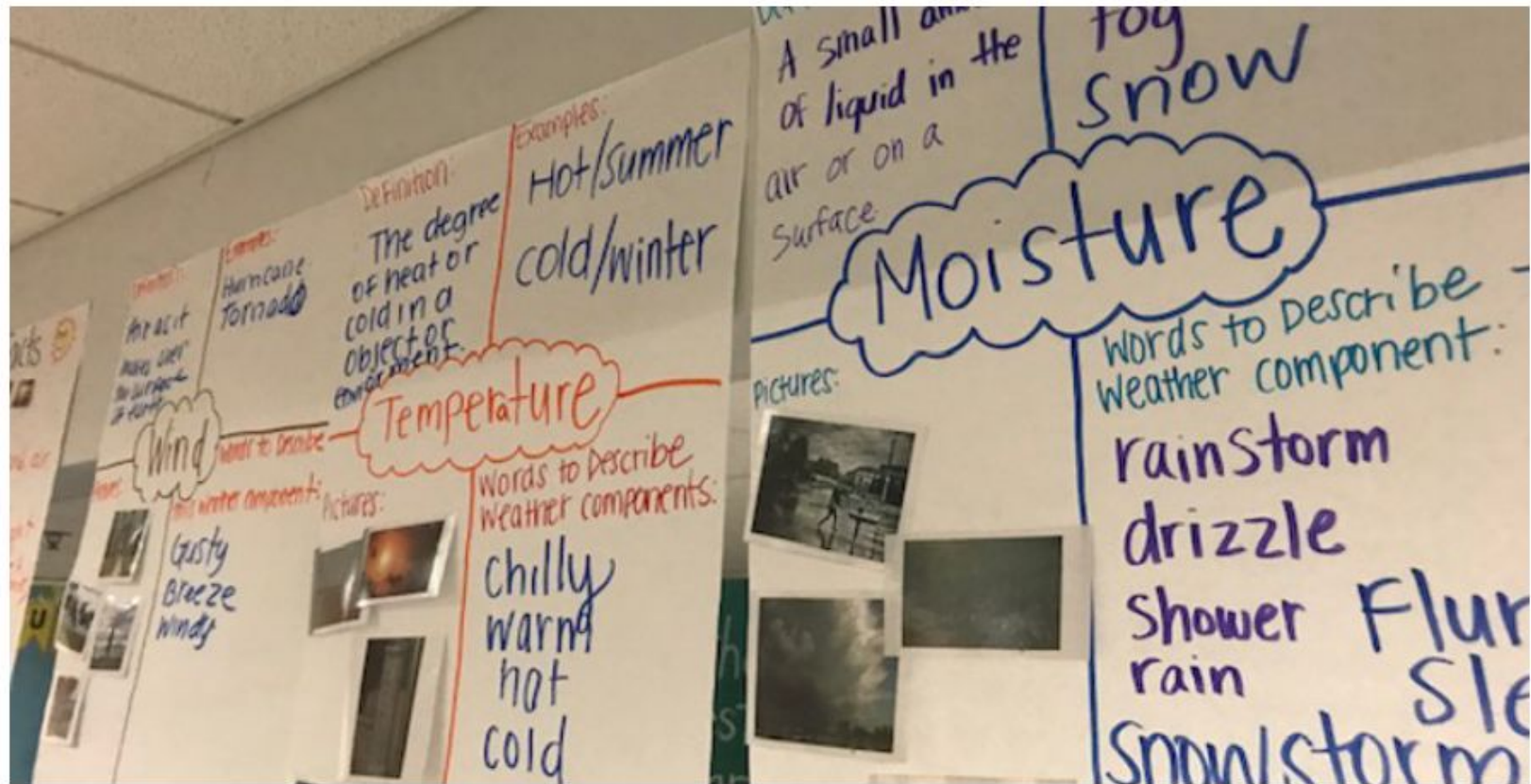
Vocabulary Strategies

FRAYER MODEL



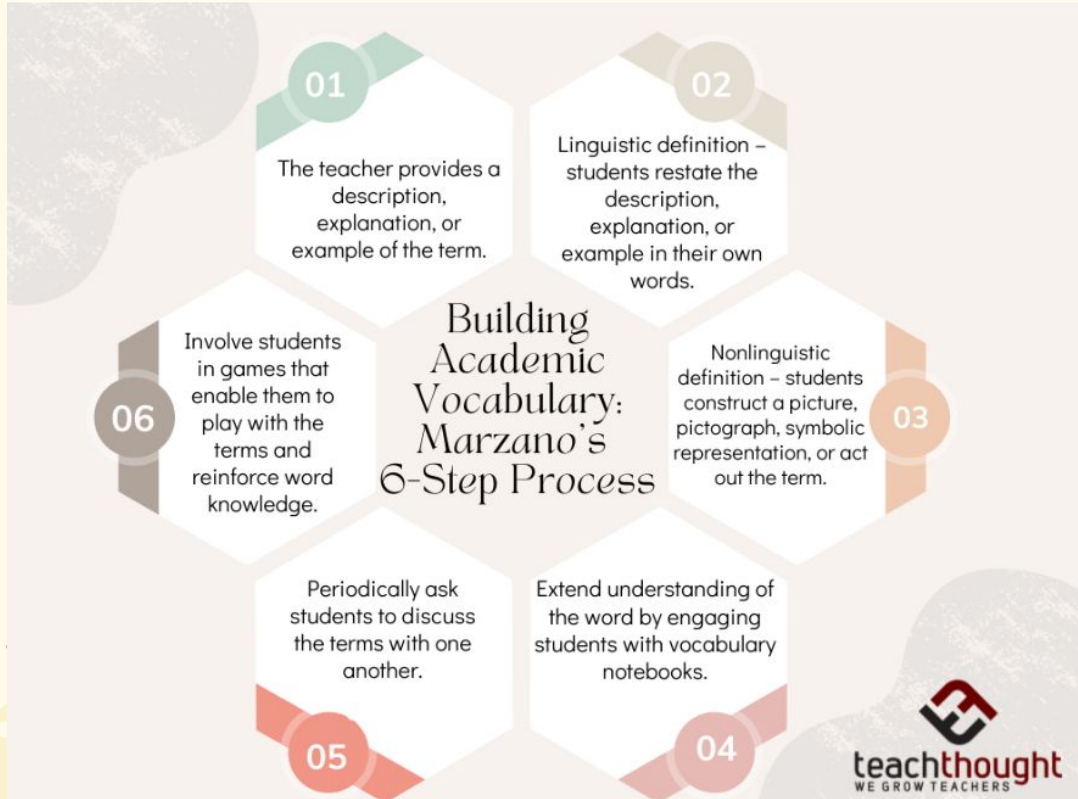


Example Frayer Model

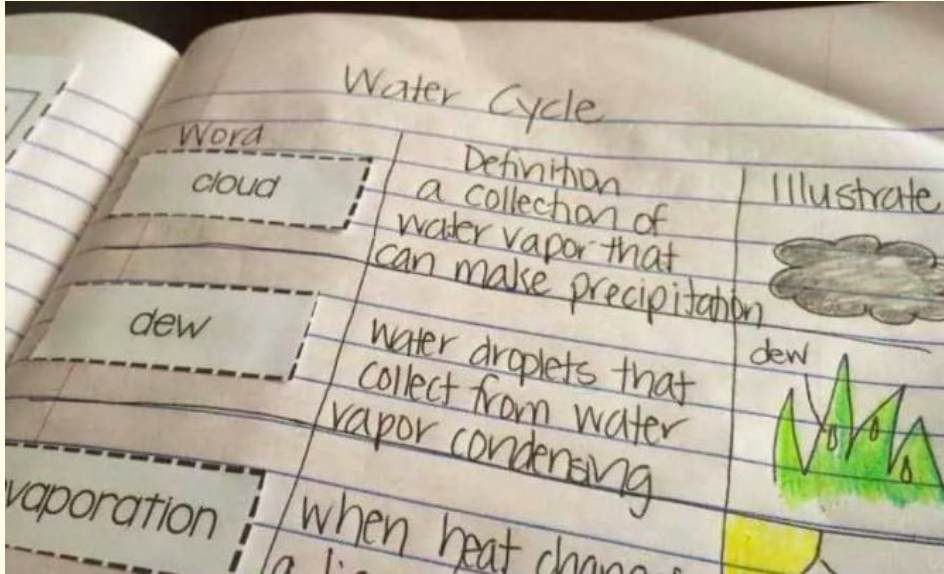


Kindergarten anchor charts from the EL Education K-8 Language Arts unit on "Weather Wonders." (UP Academy Holland)

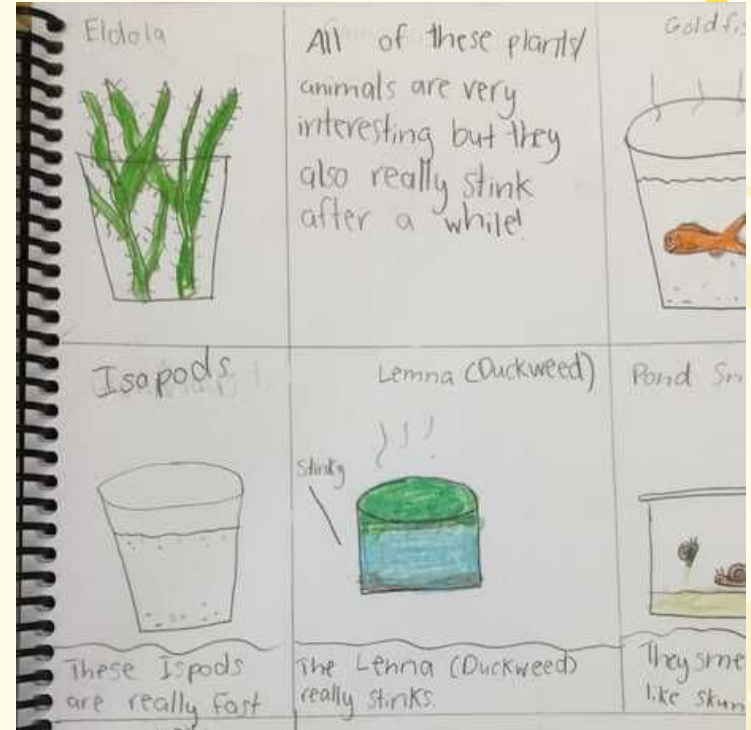
Marzano 6 Steps Vocabulary Development



Primary Version Marzano 6 Steps



+ Students put definition in own words very important!



Lesson 1

Providing Context by Engaging with An Idea
Accessing prior knowledge pre-assessment

Science Methods Skills/procedures: Make observations using various senses



ENGAGE



How is the can the same and different after bending it?



Teacher Demonstration



Students Discuss

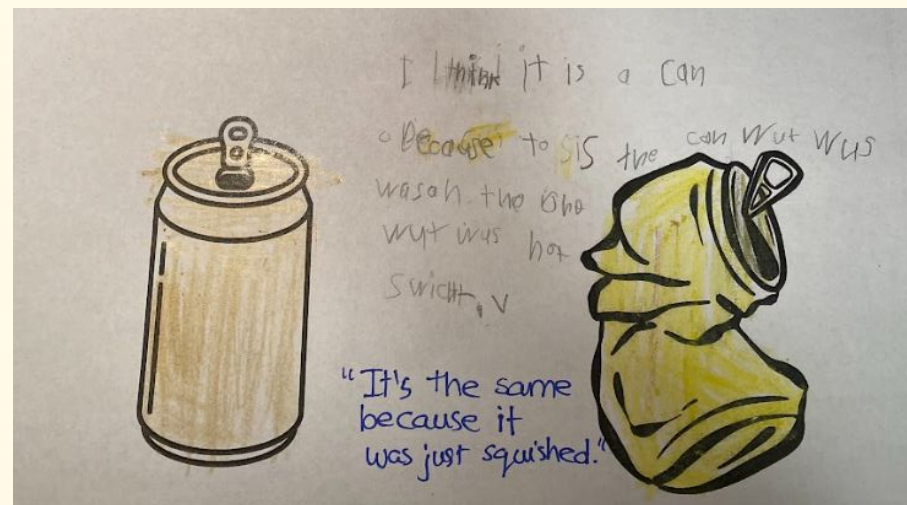


How is the can the same or different after it is crushed?

Teacher circulate & ask questions



Student Ideas



Keep for End of Unit





ENGAGE



Lesson 2

Accessing Prior Knowledge Introducing Texture if Students Are not Familiar

Grade 1 Scientific Methods: Skills/Procedures: Make Observations using various senses

Prior knowledge from Kindergarten: Describe texture

Grade 1 ELAL Skills/procedures: identify the meaning of tier 2 words and use them in sentences

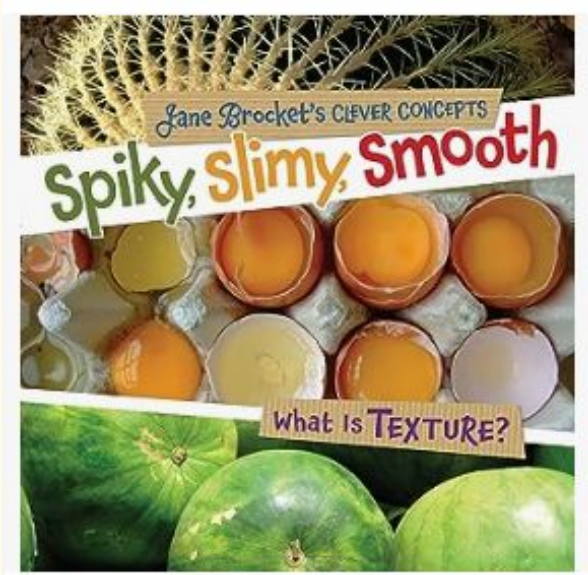


Texture



Eliciting
students' ideas

2



Accessing Prior Knowledge

Eliciting students' ideas

Co-construct Anchor Chart with Students to retrieve and provide vocabulary

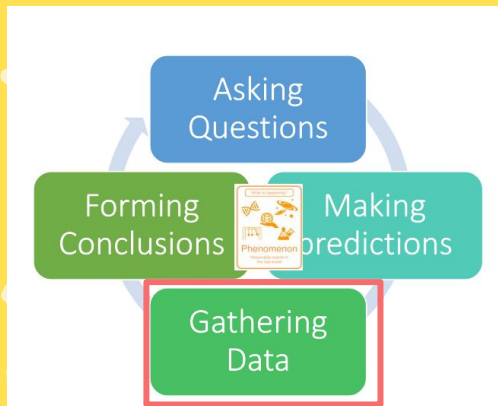
2



Grade 1 Scientific Methods: Skills/Procedures: Make Observations using various senses

Prior knowledge from Kindergarten: Describe texture

Grade 1 ELAL Skills/procedures: identify the meaning of tier 2 words and use them in sentences



Lesson 4

Day 2-3

Accessing Prior Knowledge & Developing observation skills:
Describing Texture & Shape of Objects They will Investigate

EXPLORE

Accessing Prior Knowledge

3

Supporting on-going changes in thinking




Grade 1 Scientific Methods: Skills/Procedures: Make Observations using various senses



Prior knowledge from Kindergarten: Describe texture

Accessing Prior Knowledge

Students take turns touching items in small groups use sentence stems:

The (Name of Object)  texture is _____

Objects:

Plasticine

Quarter

Rubber Band

Pipe cleaner

Yarn

Smooth, bumpy, soft, hard, rough

Teacher: Circulates to observe & listen for formative assessment. Provide feedback as needed
Do the students use the vocabulary correctly to describe the texture of the object?

Science Methods: Skills/Procedures: Makes Observations using various senses

ELAL: Oral Language skills/procedures: Contribute to discussions as a listener and speaker

Vocabulary: identify the meaning of tier 2 words and use them in sentences





Observing & Inferencing Skills

3

Supporting on-going changes in thinking

I am learning to look carefully at objects to describe the properties of objects so others can identify the object

What am I observing? Game

Model Through Think aloud & Write in chart the properties:

I am thinking of an object that is yellow, a rectangle, and smooth. What object properties do you think I am describing? Students will have 2 choices because you needed to add another property (length).

They should use as many details or properties to help describe the object.

Students can do as whole class or small group if they have done this before.





Science Methods: Skills/Procedures: Makes Observations using various senses

ELAL: Oral Language skills/procedures:

Contributes to discussions as a listener and speaker

Vocabulary: identify the meaning of tier 2 words and use them in a sentence

See Think Write	
 <u>SEE</u> What do you see?	 <u>THINK</u> What do you think is going on?
- Yellow, rectangle, smooth	

Adapted by Alice Vigors 2017

What are the objects made of?

Object	Made Of
Plasticine	Plasticine
Quarter	Metal
Rubber Band	Rubber
Popsicle Stick	Wood

Data: Property of Object

3

Supporting on-going changes in thinking

Object

Made Of

Texture

Shape




Plasticine

plasticine

Soft &
Smooth

rectangle



Quarter

metal

Little
bumpy,hard

circle



Rubber
Band

rubber

Smooth

Circle,
flat



Popsicle
Stick

wood

Smooth

Flat, long

Public Record



Lesson 5

Day 1

Introduce Actions: bending, twisting, stretching, cutting and breaking to students

EXPLAIN

Matter Knowledge: Actions that physically change properties of an object include (bending, twisting, stretching, cutting, breaking)

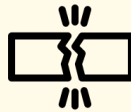
Actions on an Object

3

Supporting on-going changes in thinking



cut



break

- Students can use bodies to practice actions
- Students can practice bending, twisting and stretching on classroom objects or coats

Students presented with driving question:

How do actions change properties of an object ?

Lessons 6 -9

Lesson 6: Properties that can be changed include: shape and texture

Lesson 7: Properties that can be changed include length

Lesson 8: Properties that can be changed include weight

Lesson 9: Properties that can be changed include area

Curricular Connection:

Matter Skills/ Procedures:

Predict how actions can physically change properties of various objects

Explore actions that physically change properties of various objects

Describe physical changes that result from various actions

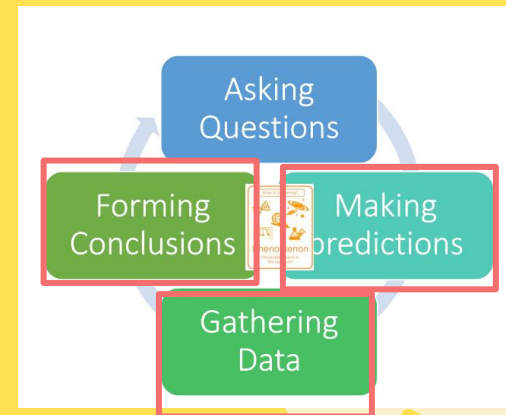
Scientific Methods Skills/Procedures:

Predict an answer to a question

Make Observations using various senses

Record observations as data

Reflect on recorded data to make conclusions





Option 2 Investigate



All actions



All physical properties on plasticine

Length
Area
Weight
Texture
Shape

All physical properties of quarter

Length
Area
Weight
Texture
Shape

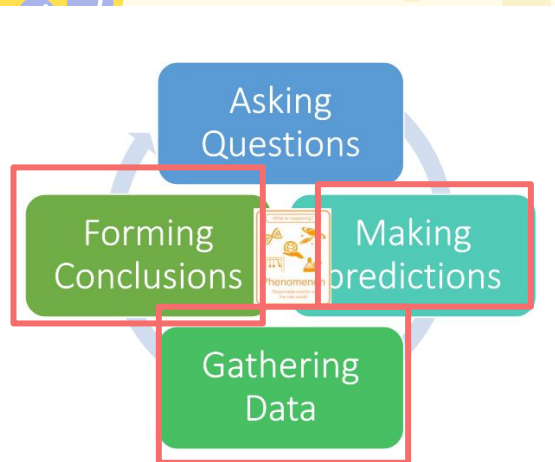
All physical properties of rubber band

Length
Area
Weight
Texture
Shape

All physical properties of popsicle stick

Length
Area
Weight
Texture
Shape





Lesson 6: Shape

2-3 Days

EXPLORE

Matter Skills/ Procedures:

- Predict how actions can physically change properties of various objects
- Explore actions that physically change properties of various objects
- Describe physical changes that result from various actions

Scientific Methods Skills/Procedures:

- Predict an answer to a question
- Make Observations using various senses
- Record observations as data
- Reflect on recorded data to make conclusions

Predict: Will bending change the shape of the plasticine?



Take Turns

I predict



bending

will / will not change the shape of



plasticine

because

Matter Skills/Procedures: Predict how actions can physically change properties of various objects

Scientific Methods Skills/Procedures: Predict the answer to a question







Explore various actions and Record Observations

Observation: What Changed?

Name:

Property: Shape







Directions: Draw a picture of the shape before and after action

Object Quarter 	Shape Before Actions		
Action	Shape after change	Action	Shape after change
 Bend <input type="checkbox"/> Yes <input type="checkbox"/> No		 Cut <input type="checkbox"/> Yes <input type="checkbox"/> No	
 Twist <input type="checkbox"/> Yes <input type="checkbox"/> No		 Break <input type="checkbox"/> Yes <input type="checkbox"/> No	
 Stretch <input type="checkbox"/> Yes <input type="checkbox"/> No			

Name:

Property: Shape

Directions: Draw a picture of the shape before and after action







Object  Rubber band	Shape Before Actions		
Action	Shape after change	Action	Shape after change
 Bend <input type="checkbox"/> Yes <input type="checkbox"/> No		 Cut <input type="checkbox"/> Yes <input type="checkbox"/> No	
 Twist <input type="checkbox"/> Yes <input type="checkbox"/> No		 Break <input type="checkbox"/> Yes <input type="checkbox"/> No	
 Stretch <input type="checkbox"/> Yes <input type="checkbox"/> No			

Observation: What Changed?

Name:

Property: Shape

Directions: Draw a picture of the shape before and after action

Object  Popsicle stick	Shape Before Actions		
Action	Shape after change	Action	Shape after change
 Bend <input type="checkbox"/> Yes <input type="checkbox"/> No		 Cut <input type="checkbox"/> Yes <input type="checkbox"/> No	
 Twist <input type="checkbox"/> Yes <input type="checkbox"/> No		 Break <input type="checkbox"/> Yes <input type="checkbox"/> No	
 Stretch <input type="checkbox"/> Yes <input type="checkbox"/> No			

Predict: Will twisting change the shape of the plasticine?



Take Turns

I predict



twisting

will/will not change the shape of



because

plasticine

Matter Skills/Procedures: Predict how actions can physically change properties of various objects

Scientific Methods Skills/Procedures: Predict the answer to a question



Predict: Will bending change the length of the plasticine?



Take Turns

t

Scientific Methods Skills/Procedures: Predict the answer to a question

I predict



will make the



shorter / longer / same length because

bending

plasticine

Students Directly Compare “bent” Plasticine with Original Plasticine Length



The bent plasticine is shorter than the original plasticine.

Math Measurement Skill/Procedure: Compare the length, area or capacity of two objects directly or indirectly with a third object

Science Matter: Explore actions that physically change properties of various objects

Describe physical changes that result from various actions

Assessment Tip: What do I want to see or hear from students?







3 Supporting on-going changes in thinking

Observation: What Changed?

Note: Compare against original form

Property:  Length

Compare before and after action

Object	Action	Is the length
	 Bend	<input type="checkbox"/> Shorter <input type="checkbox"/> Longer <input type="checkbox"/> Same
	 Twist	<input type="checkbox"/> Shorter <input type="checkbox"/> Longer <input type="checkbox"/> Same
	 Stretch	<input type="checkbox"/> Shorter <input type="checkbox"/> Longer <input type="checkbox"/> Same
	 Cut	<input type="checkbox"/> Shorter <input type="checkbox"/> Longer <input type="checkbox"/> Same
	 Break	<input type="checkbox"/> Shorter <input type="checkbox"/> Longer <input type="checkbox"/> Same

Recording Observations

Does the student accurately record changes in measurement?

Draw conclusions (Infer)

- Describe how the action changed the property

Matter Skills/Procedures: Describe physical changes that result from various actions

Scientific Methods Skills/Procedures

Records observations as data

Reflect on recorded data to make conclusions



Predict: Will bending change the length of the  quarter?



Take Turns

I predict



bending

will make the



quarter

shorter/longer/ same length because

Continue investigating how actions physically change length of objects

- Predict, directly compare measurement, record observations, conclusion (learning summary table)







Objects

1. Quarter
2. Rubber Band
3. Popsicle Stick

Recording Data for Remaining Objects







Property:  Length

Compare before and after action

Object	Action	Is the length...
 Quarter	 Bend	<input type="checkbox"/> Shorter <input type="checkbox"/> Longer <input type="checkbox"/> Same
	 Twist	<input type="checkbox"/> Shorter <input type="checkbox"/> Longer <input type="checkbox"/> Same
	 Stretch	<input type="checkbox"/> Shorter <input type="checkbox"/> Longer <input type="checkbox"/> Same
	 Cut	<input type="checkbox"/> Shorter <input type="checkbox"/> Longer <input type="checkbox"/> Same
	 Break	<input type="checkbox"/> Shorter <input type="checkbox"/> Longer <input type="checkbox"/> Same

Property:  Length







Compare before and after action

Object	Action	Is the length...
 Rubber Band	 Bend	<input type="checkbox"/> Shorter <input type="checkbox"/> Longer <input type="checkbox"/> Same
	 Twist	<input type="checkbox"/> Shorter <input type="checkbox"/> Longer <input type="checkbox"/> Same
	 Stretch	<input type="checkbox"/> Shorter <input type="checkbox"/> Longer <input type="checkbox"/> Same
	 Cut	<input type="checkbox"/> Shorter <input type="checkbox"/> Longer <input type="checkbox"/> Same
	 Break	<input type="checkbox"/> Shorter <input type="checkbox"/> Longer <input type="checkbox"/> Same

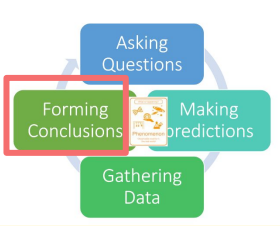
Note: Compare against original form







Property:  Length

Compare before and after action

Object	Action	Is the length...
 Popsicle Stick	 Bend	<input type="checkbox"/> Shorter <input type="checkbox"/> Longer <input type="checkbox"/> Same
	 Twist	<input type="checkbox"/> Shorter <input type="checkbox"/> Longer <input type="checkbox"/> Same
	 Stretch	<input type="checkbox"/> Shorter <input type="checkbox"/> Longer <input type="checkbox"/> Same
	 Cut	<input type="checkbox"/> Shorter <input type="checkbox"/> Longer <input type="checkbox"/> Same
	 Break	<input type="checkbox"/> Shorter <input type="checkbox"/> Longer <input type="checkbox"/> Same

Learning Summary Slide



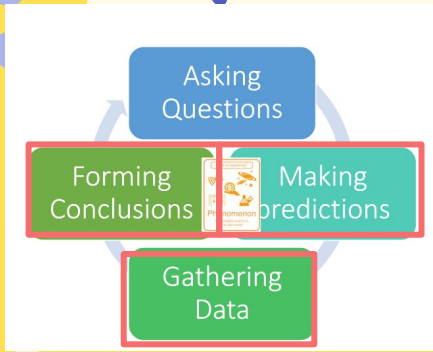
Did the objects  length change or stay the same after     

Directions: Drag the object changed or stayed the same

Changed	Stayed the Same



Science Methods Skills/Procedures: Reflect on recorded data to make conclusions



Lesson 8: Investigate Actions Changes to Object's Weight

2-4 Days

EXPLORE

Matter Skills/ Procedures:

- Predict how actions can physically change properties of various objects
- Explore actions that physically change properties of various objects
- Describe physical changes that result from various actions

Scientific Methods Skills/Procedures:

- Predict an answer to a question
- Make Observations using various senses
- Record observations as data
- Reflect on recorded data to make conclusions



Pan Scales



Heavier,
lighter or the
same as
original object

Predict: Will bending change the weight of the plasticine?



Take Turns

I predict



bending

will make the



plasticine

heavier / lighter/ same because

Students Directly Compare “bent” Plasticine with Original Plasticine Weight



Science Matter: Explore actions that physically change properties of various objects

Describe physical changes that result from various actions



Misconception Alert

Cutting and breaking will create 2 separate objects. Ensure students cut one larger than another to use as the “changed” object to measure weight. The mass should be less as mass was taken away to create another object.



Same with the Popsicle Stick



Assessment Tip: What do I want to see or hear from students?

Recording Observations







Does the student correctly record the results?

Draw conclusions (Infer)

- Describe how the action changed the property

Property:  Object's Weight

Compare before and after action

Object	Action	Is the weight...
	 Bend	<input type="checkbox"/> Heavier <input type="checkbox"/> Lighter <input type="checkbox"/> Same
	 Twist	<input type="checkbox"/> Heavier <input type="checkbox"/> Lighter <input type="checkbox"/> Same
	 Stretch	<input type="checkbox"/> Heavier <input type="checkbox"/> Lighter <input type="checkbox"/> Same
	 Cut	<input type="checkbox"/> Heavier <input type="checkbox"/> Lighter <input type="checkbox"/> Same
	 Break	<input type="checkbox"/> Heavier <input type="checkbox"/> Lighter <input type="checkbox"/> Same

Matter Skills/Procedures: Describe physical changes that result from various actions

Scientific Methods Skills/Procedures

Records observations as data







Reflect on recorded data to make conclusions

Record Observations of Other Objects



Property: **weight**







Compare before and after action

Object	Action	Is the weight ...
 Quarter	 Bend	<input type="checkbox"/> Heavier <input type="checkbox"/> Lighter <input type="checkbox"/> Same
	 Twist	<input type="checkbox"/> Heavier <input type="checkbox"/> Lighter <input type="checkbox"/> Same
	 Stretch	<input type="checkbox"/> Heavier <input type="checkbox"/> Lighter <input type="checkbox"/> Same
	 Cut	<input type="checkbox"/> Heavier <input type="checkbox"/> Lighter <input type="checkbox"/> Same
	 Break	<input type="checkbox"/> Heavier <input type="checkbox"/> Lighter <input type="checkbox"/> Same



Property: **weight**







Compare before and after action

Object	Action	Is the weight...
 Rubber Band	 Bend	<input type="checkbox"/> Heavier <input type="checkbox"/> Lighter <input type="checkbox"/> Same
	 Twist	<input type="checkbox"/> Heavier <input type="checkbox"/> Lighter <input type="checkbox"/> Same
	 Stretch	<input type="checkbox"/> Heavier <input type="checkbox"/> Lighter <input type="checkbox"/> Same
	 Cut	<input type="checkbox"/> Heavier <input type="checkbox"/> Lighter <input type="checkbox"/> Same
	 Break	<input type="checkbox"/> Heavier <input type="checkbox"/> Lighter <input type="checkbox"/> Same



Property: **weight**

Compare before and after action

Object	Action	Is the weight...
 Popsicle Stick	 Bend	<input type="checkbox"/> Heavier <input type="checkbox"/> Lighter <input type="checkbox"/> Same
	 Twist	<input type="checkbox"/> Heavier <input type="checkbox"/> Lighter <input type="checkbox"/> Same
	 Stretch	<input type="checkbox"/> Heavier <input type="checkbox"/> Lighter <input type="checkbox"/> Same
	 Cut	<input type="checkbox"/> Heavier <input type="checkbox"/> Lighter <input type="checkbox"/> Same
	 Break	<input type="checkbox"/> Heavier <input type="checkbox"/> Lighter <input type="checkbox"/> Same



Continue investigating how actions physically change weight of objects

- Predict, directly compare measurement, record observations, conclusion (learning summary table)

Objects

1. Quarter
2. Rubber Band
3. Popsicle Stick

Learning Summary Slide

Did how much the object



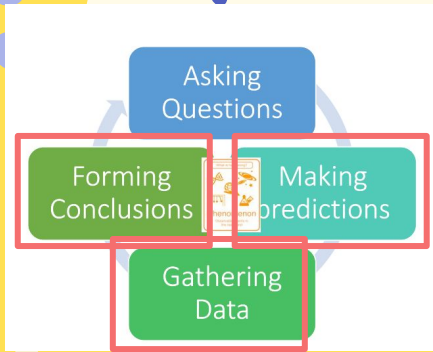
weight change after



Directions: Drag the object changed or stayed the same

Changed	Stayed the Same





Lesson 9: Investigate how actions change the area of an object

2-4 Days

EXPLORE

Matter Skills/ Procedures:

- Predict how actions can physically change properties of various objects
- Explore actions that physically change properties of various objects
- Describe physical changes that result from various actions

Scientific Methods Skills/Procedures:

- Predict an answer to a question
- Make Observations using various senses
- Record observations as data
- Reflect on recorded data to make conclusions

Math Measurement Skills/Procedures:

Compare the length, area or capacity of two objects directly or indirectly with a third object



Predict: Will bending change the area of the plasticine?



Take Turns

I predict



bending

will make the



plasticine

cover more / less/ the same area

because

Matter Skills/ Procedures:

Predict how actions can physically change properties of various objects

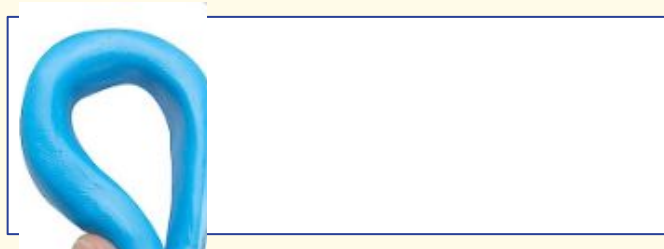
Scientific Methods Skills/Procedures:

Predict an answer to a question



Directly compare area and Observe

1. Students trace original area on sheet protector or paper
2. Lay the object that the action was performed on over top



The bent plasticine covers less area than the original plasticine

Explore actions that physically change properties of various objects
Describe physical changes that result from various actions

Continue investigating how actions physically change area of objects

- Predict, directly compare measurement, record observations, conclusion (learning summary table)







Objects

1. Quarter
2. Rubber Band
3. Popsicle Stick



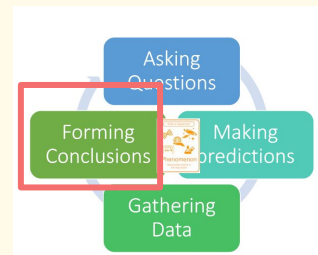
Learning Summary Slide



Did the objects property of  area change or stay the same after     

Directions: Drag the object changed or stayed the same

Changed	Stayed the Same










Matter Knowledge: Not all objects respond to the same way to bending, twisting, stretching, cutting and breaking
Scientific Methods Skills/Procedures: Reflect on recorded data to make conclusions

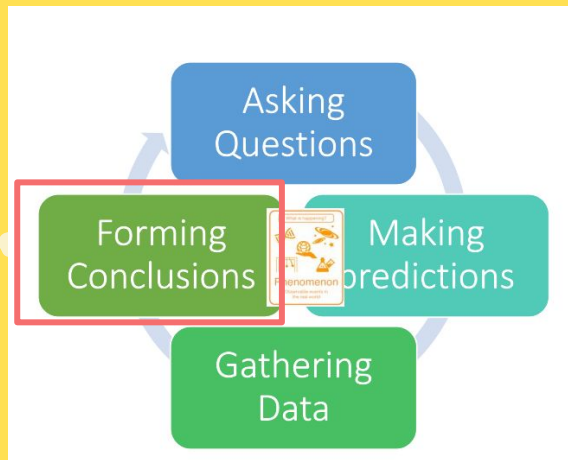


Completed Teacher Version Class Learning Summary Table

Question: How do actions change the property of an object?

Object	Actions We Could Do	Did we change?	Stayed Same
	<input checked="" type="checkbox"/> Bend  <input checked="" type="checkbox"/> Twist  <input checked="" type="checkbox"/> Stretch <input checked="" type="checkbox"/> Cut <input checked="" type="checkbox"/> Break	<input type="checkbox"/> Made of <input type="checkbox"/> Texture  <input checked="" type="checkbox"/> Shape  <input checked="" type="checkbox"/> Length  <input checked="" type="checkbox"/> Area  <input checked="" type="checkbox"/> Mass 	<input checked="" type="checkbox"/> Made of <input checked="" type="checkbox"/> Texture <input type="checkbox"/> Shape <input type="checkbox"/> Length <input type="checkbox"/> Area <input type="checkbox"/> Mass
	<input type="checkbox"/> Bend <input type="checkbox"/> Twist <input type="checkbox"/> Stretch <input type="checkbox"/> Cut <input type="checkbox"/> Break } Not able to do actions	<input type="checkbox"/> Made of <input type="checkbox"/> Texture <input type="checkbox"/> Shape <input type="checkbox"/> Length <input type="checkbox"/> Area <input type="checkbox"/> Mass	<input checked="" type="checkbox"/> Made of <input checked="" type="checkbox"/> Texture <input checked="" type="checkbox"/> Shape <input checked="" type="checkbox"/> Length <input checked="" type="checkbox"/> Area <input checked="" type="checkbox"/> Mass
	<input checked="" type="checkbox"/> Bend <input checked="" type="checkbox"/> Twist <input checked="" type="checkbox"/> Stretch <input checked="" type="checkbox"/> Cut <input checked="" type="checkbox"/> Break } Teacher demo	<input type="checkbox"/> Made of <input type="checkbox"/> Texture <input type="checkbox"/> Shape <input type="checkbox"/> Length <input checked="" type="checkbox"/> Area <input type="checkbox"/> Mass	<input checked="" type="checkbox"/> Made of <input checked="" type="checkbox"/> Texture <input checked="" type="checkbox"/> Shape <input checked="" type="checkbox"/> Length <input type="checkbox"/> Area <input checked="" type="checkbox"/> Mass
	<input type="checkbox"/> Bend <input type="checkbox"/> Twist <input type="checkbox"/> Stretch <input checked="" type="checkbox"/> Cut <input checked="" type="checkbox"/> Break } Teacher demo } Not able to	<input type="checkbox"/> Made of <input checked="" type="checkbox"/> Texture <input checked="" type="checkbox"/> Shape <input checked="" type="checkbox"/> Length <input checked="" type="checkbox"/> Area <input checked="" type="checkbox"/> Mass	<input checked="" type="checkbox"/> Made of <input checked="" type="checkbox"/> Texture <input type="checkbox"/> Shape <input type="checkbox"/> Length <input type="checkbox"/> Area <input type="checkbox"/> Mass










EXPLAIN

Formal Vocabulary
Introduced
Read and watch videos



Review learning summary slides




What stayed the same for every object after the actions      ?

Directions: Drag the answer to the line

What the object _____ **stayed the same** for each one.

 length

 texture

made of

 area

 weight

shape

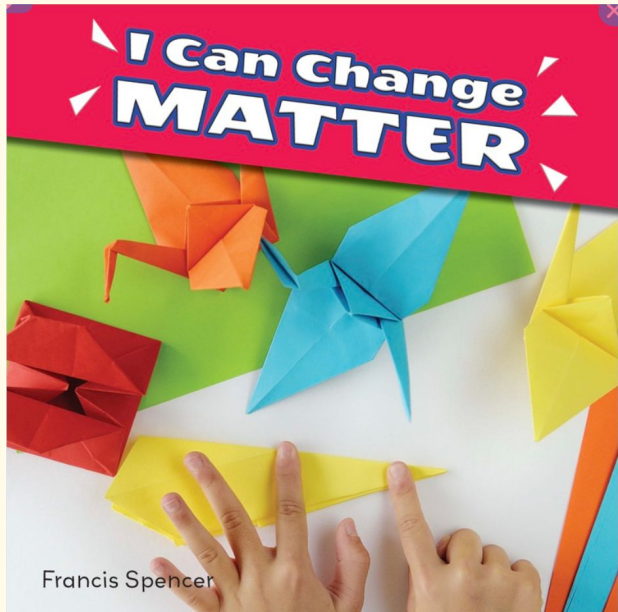


Explain

3 Supporting on-going changes in thinking



epic!



Focus on the changes, not what matter is.
Skip the pages that talk about what matter is.



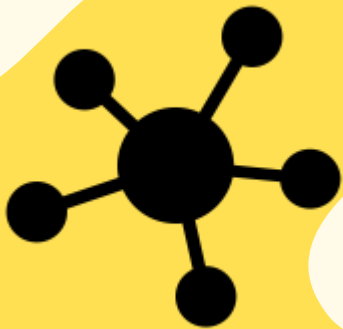
Play until 2:17
states of
matter is grade
3

Ask: What is the origami made of?
What is the crumpled ball made of?
What ways did it change?
Why is what it made from stays the same?

Connect-Extend-Challenge



Connect What did I already know?	Extend What is new that I learned?	Challenge Questions
<p>Prior to watching video and reading. Students tell you what they know about actions and changes to objects write in this section.</p> <p>Read or play video. Pause and put a check mark asking if this is new or they already knew this</p>	<p>New information is a different color. This section when you pause video or reading at certain points ask students "What is the new information we learned? Add in this column</p>	<p>Students can brainstorm questions or write on a sticky (some may need scribe)</p>



Elaborate

Matter:

Describe physical changes that result from various actions

Scientific Methods Skills/ Procedures:

Predict an answer to a question

Computer Science Skills/Procedures:

Follow instructions with two or three steps given in different forms

Transfer to new context

- Action (folding)
- Object (paper)

Origami - Computer Science Outcome ::



LEARNING OUTCOME
Students follow instructions and relate them to outcomes.

KNOWLEDGE	UNDERSTANDING	SKILLS & PROCEDURES
Instructions are directions that can be followed and given in various forms, including verbal, audio, visual, and written.	The form in which instructions are given may not affect the outcome.	Follow instructions with two or three steps given in different forms.

Students can continue integrating scientific methods to keep them thinking about actions changing the physical properties. Focus on one paper (the flower part)

1. Predict before folding paper what physical properties of paper do you think will change texture, shape, length, area, weight? What properties will stay the same? Why?
2. Use the instructions to fold to work through computer science KUSPs.
3. After making the origami tulips can compare to the original paper properties to confirm

Discussion Question:

Why is what the tulip is made of still the same?



Evaluate

Summative Performance Task
Transfer to unfamiliar objects
Scientific Methods

Summative Task:

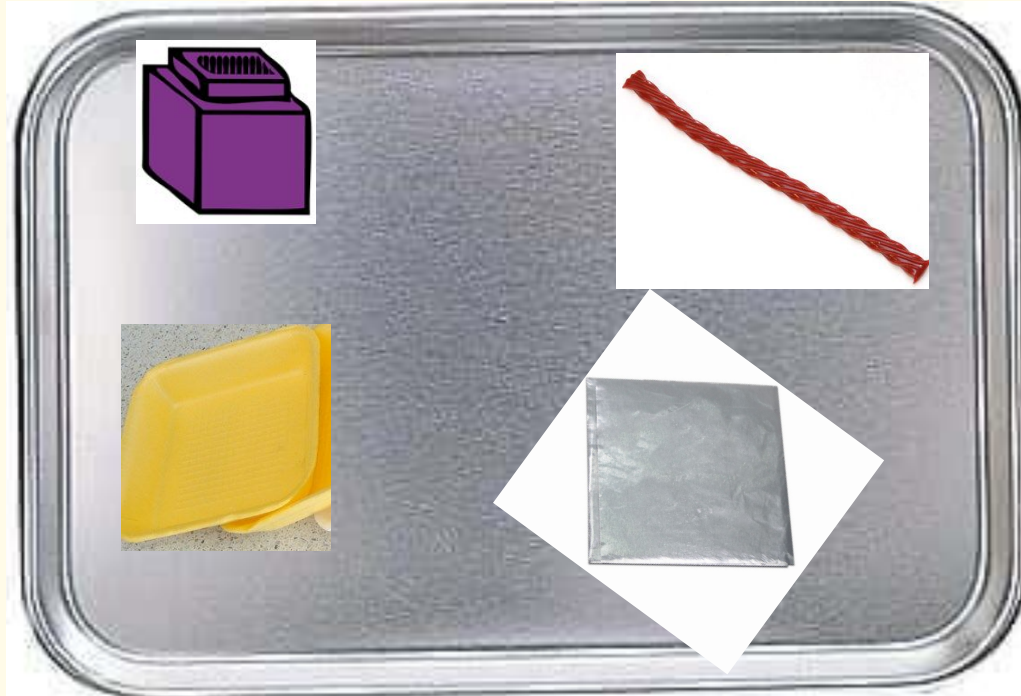
1. Select new objects(4-5) to place on tray such as: that students have not investigated before. Be sure to include:
 - a) 1 object with materials that will not allow the actions to change the object (hard plastic, metal etc.) such as: lego brick, magnet from board, or snap cube.
 - b) 1 object made of stiffer material that doesn't bend easily but can break (ex:pencil)
 - c) Various objects that are pliable

Provide the tray for the student and instructions:

Use the the items on the tray to help answer the question:

1. Why might the properties of an object change but what they are made of stays the same?
2. How do some objects respond (behave, react) differently to the same action?

Tray 4-5 Unfamiliar Objects





Single Point Rubric

Grade 1 Matter Learning Outcome: Students analyze properties of objects and investigate how they can be changed
Knowledge is demonstrated through the skills/procedures

Task Name: Changing Objects

Student Name:

Grow	Met Criteria	Glow
	<p>Matter Knowledge: Not all objects respond the same way to bending, twisting, stretching, cutting, or breaking. Skill/procedure: Describe physical changes that result from various actions.</p> <p>Question #1</p> <ul style="list-style-type: none"> <input type="checkbox"/> Chooses two or more objects comprised of different materials <input type="checkbox"/> Completes same action to each object that demonstrates how the object responds to the action <input type="checkbox"/> Expresses how these similar actions had different result for each object <p><i>Ex: "I cannot bend the Lego but I can bend the Twizzler". (student demonstrates on both objects and provides a verbal explanation)</i></p>	
	<p>Matter Skill/Procedure:</p> <ol style="list-style-type: none"> 1. Discuss why physical changes do not change what an object is made of. 2. Describe physical changes that result from various actions <p>Understanding: Physical changes to an object do not change what the object is made of</p> <p>Question #2</p> <ul style="list-style-type: none"> <input type="checkbox"/> Demonstrates and explains why properties of objects change and the materials stay the same <p><i>Ex: Folds paper and states "I can fold this but it is still made of paper"</i></p>	
	<p>Scientific Methods Skills/Procedures: Describes steps of an investigation (This particular investigation)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Uses order and sequence to assist with describing the procedures of this investigation 	





How do some objects respond differently to the same action?

Why might the properties of objects change but the material stays the same?

New tray of objects to demonstrate in flip ipad



Summative Assessment Scientific Methods

Skills/Procedures: Describes steps of an investigation

- ❑ Uses order and sequence to assist with describing procedures of this investigation

Name: _____

Describe the steps of our science investigation

 Cut out and  the order of our investigation
"How actions change properties of an object?"



Step 1



Step 2



Step 3



Form Conclusions



Gather Data

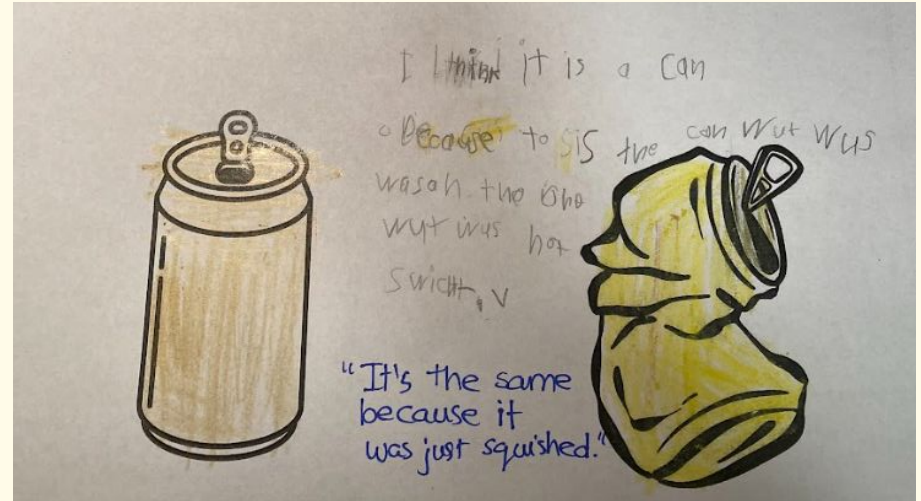


Make a prediction



Play with objects

Hand Back The “Crushed Can”



Use different color pencil crayon or stickies to add what they know now has changed or stayed the same



Co-Construct What to Consider

Texture

Shape

Length

Weight

Area

Made of

Students' Writing and Drawing Over Time

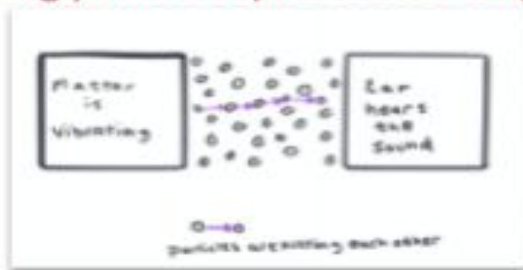
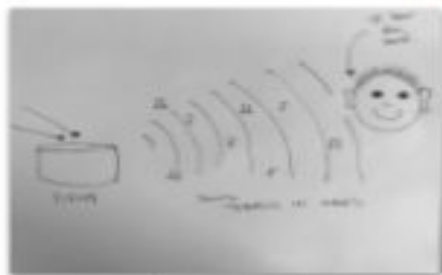
- During a science unit, students' science ideas, language and representations (e.g. drawings) are mutually supportive of each other and become increasingly more sophisticated over time (Lee & Stephens, 2020).

When I hear music, the sound travels from the speaker or the drum to my ear. I think it travels in waves.

Sound needs a medium. It can not travel in nothing. Sound travels when particles hit each other. The bumping is sound.

When an object vibrates, it makes sound. The sound is produced by particles that are bunched together and spread apart in bands as they move through a medium.

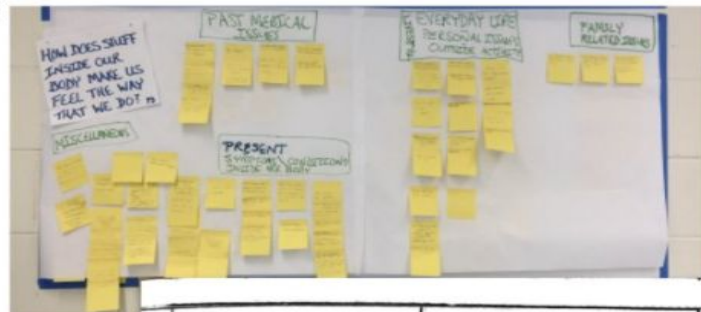
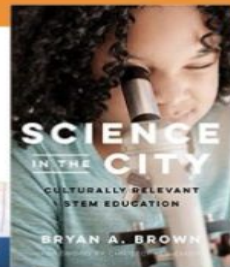
Increasingly more sophisticated language



Increasingly more sophisticated representations

Initial & Ongoing Writing and Drawing

- “All students know things. However, they may not express their knowledge in academic language.” (Brown, p. 43)
- “Teachers can no longer expect students to be able to offer a correct answer and rich arguments on the first try. Instead, effective science teaching would allow students to engage in multiple explanations with an assumption that if they continue to explain and revise their ideas, they will talk (and *write*) their way toward fluency and scientific accuracy.” (Brown, p. 144)



Lesson Question	I Figured Out
L3	the bath bomb
What is	is a chemical
in a	made thing produced
bath	with natural things
bomb?	is a mixture

Writing and Drawing for Sensemaking



Less of a Focus on	More of a Focus on
Writing/drawing only for students to show what they know	Writing/drawing for students to figure things out - building understandings of phenomena and science ideas
Writing/drawing for recall, fact recitation, copying down notes or images, or procedure writing	Writing/drawing to make sense of investigations, readings, and experiences; to synthesize learning; to communicate to others
Decontextualized science vocabulary work	Using science vocabulary when students need it and building off of their resources and language repertoires
Privileging final form only - reports, written arguments, final models, etc	Prioritizing multiple different forms of writing/drawing across the unit
Writing/drawing for a "general" single audience (i.e. teacher)	Writing/drawing for different audiences (myself, others) for different pieces with different purposes
Single, disconnected writing/drawing tasks	Writing/drawing as a continuing practice tasks

Key Ideas For Planning

1. Use the learning outcomes and KUSPS to identify key concepts (Science 01 & Scientific Methods)
2. Provide authentic context for students to investigate and connect to
3. Explore before explain in lesson development
4. Use talk and vocabulary to help students make meaning of science ideas (Explain Phase)
5. Triangulate evidence of student learning based on combination (knowledge & skills/procedures)



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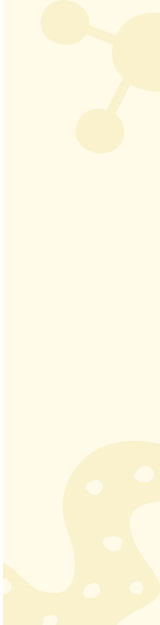
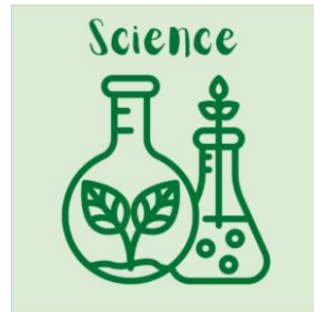
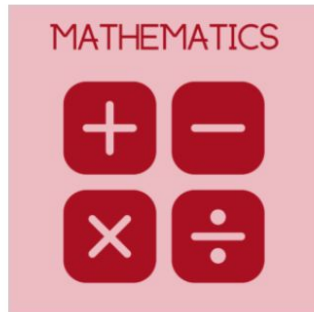
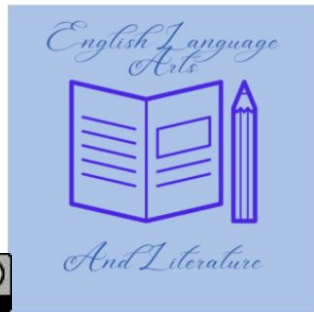
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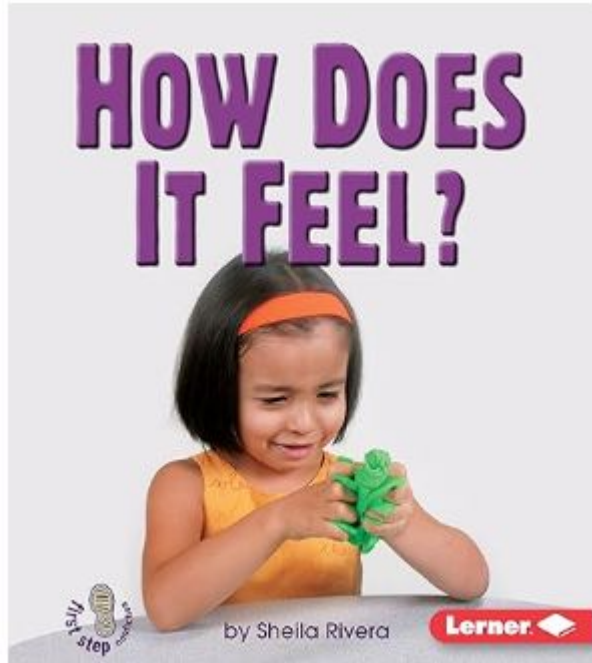
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Raffle



23

Thank you for attending live today!

1. Choose a number between 1-100.
2. Put the number in the chat.
3. Closest will win the book for your classroom!



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