

Introduction: Scientific Methods

In Alberta's New Science Curriculum for Grades 1-3

Facilitator: Nicole Lamoureux, M.Ed with ERLC



Treaty 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.

Agreement



Position:

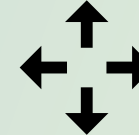
Nothing reflects
on your abilities



Productive Struggle:

Work through struggle:

- Creatively
- Collaboratively
- Taking Risks
- With Perseverance



Situation:

If something isn't right
think of how to make it
right for your context

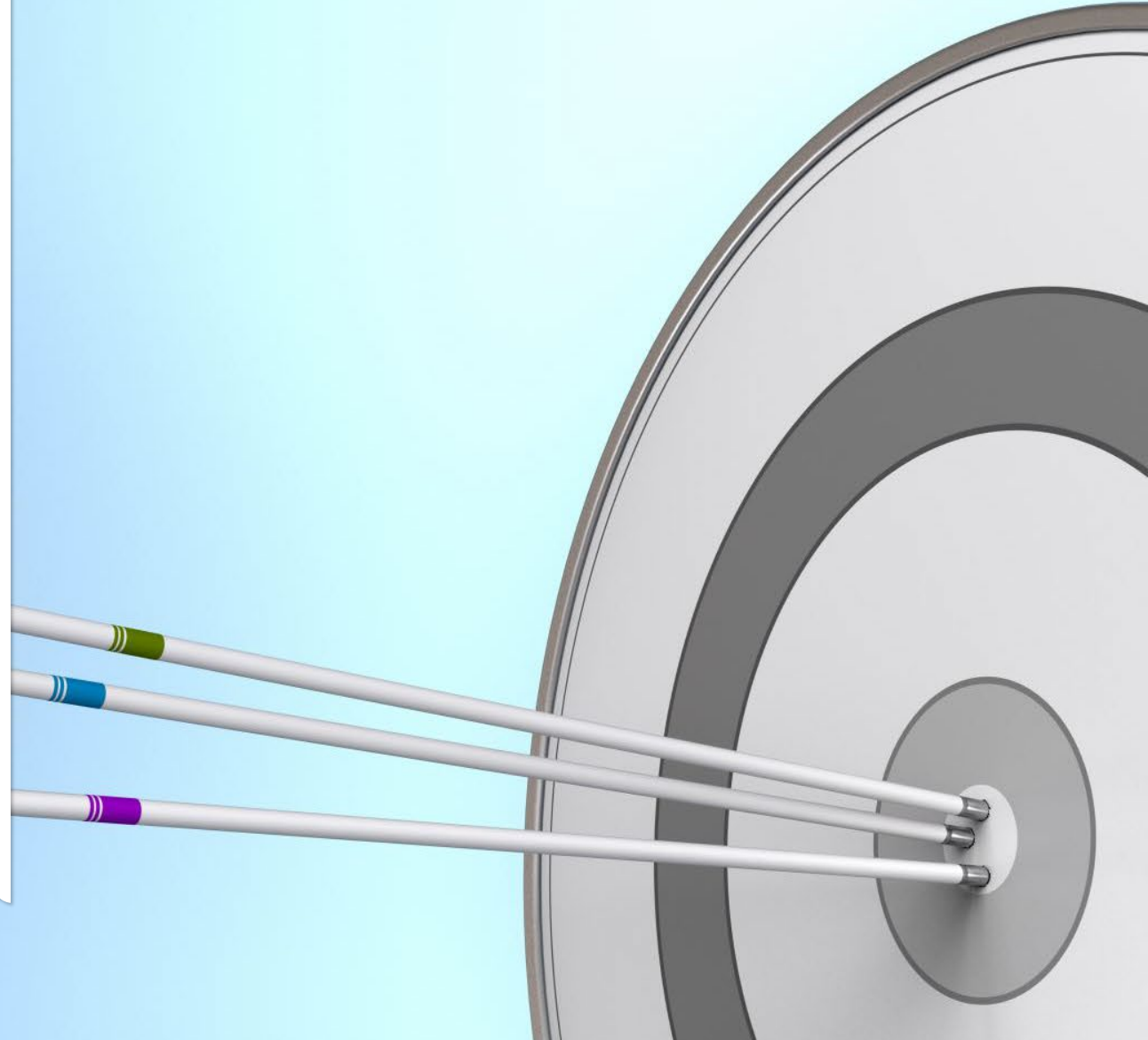
TQS:

2. A teacher engages in career-long professional learning and ongoing critical reflection to improve teaching and learning

a) collaborating with other teachers to build personal and collective professional capacities and expertise;

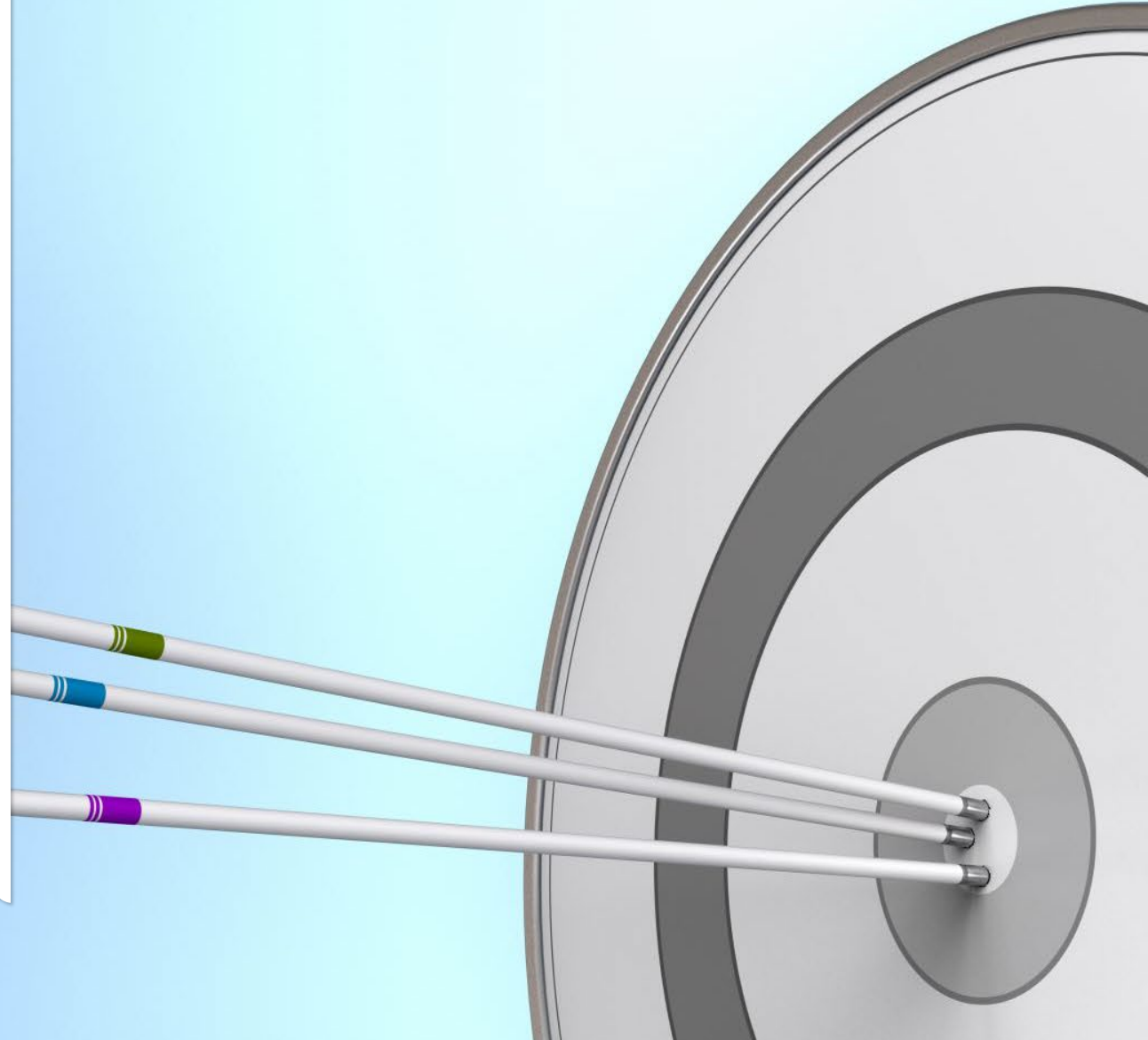
Agenda

1. Background: Science as a Discipline
2. Unpack: Scientific Methods briefly at each grade level as they relate to the investigation cycle
3. Classroom examples of common skills for grades 1-3.
4. Resources will be translated into French.



Key Learnings

1. Science uses methods of investigations to build knowledge and understanding of natural world
2. Each grade learning outcome & KUSPS unwraps deeper layer of focus of the investigations
3. Understand that students will build on aspects of investigations at each grade level that continues to the next grade
4. There are criteria to help primary students develop foundational aspects of an investigation that will carry through to upper elementary



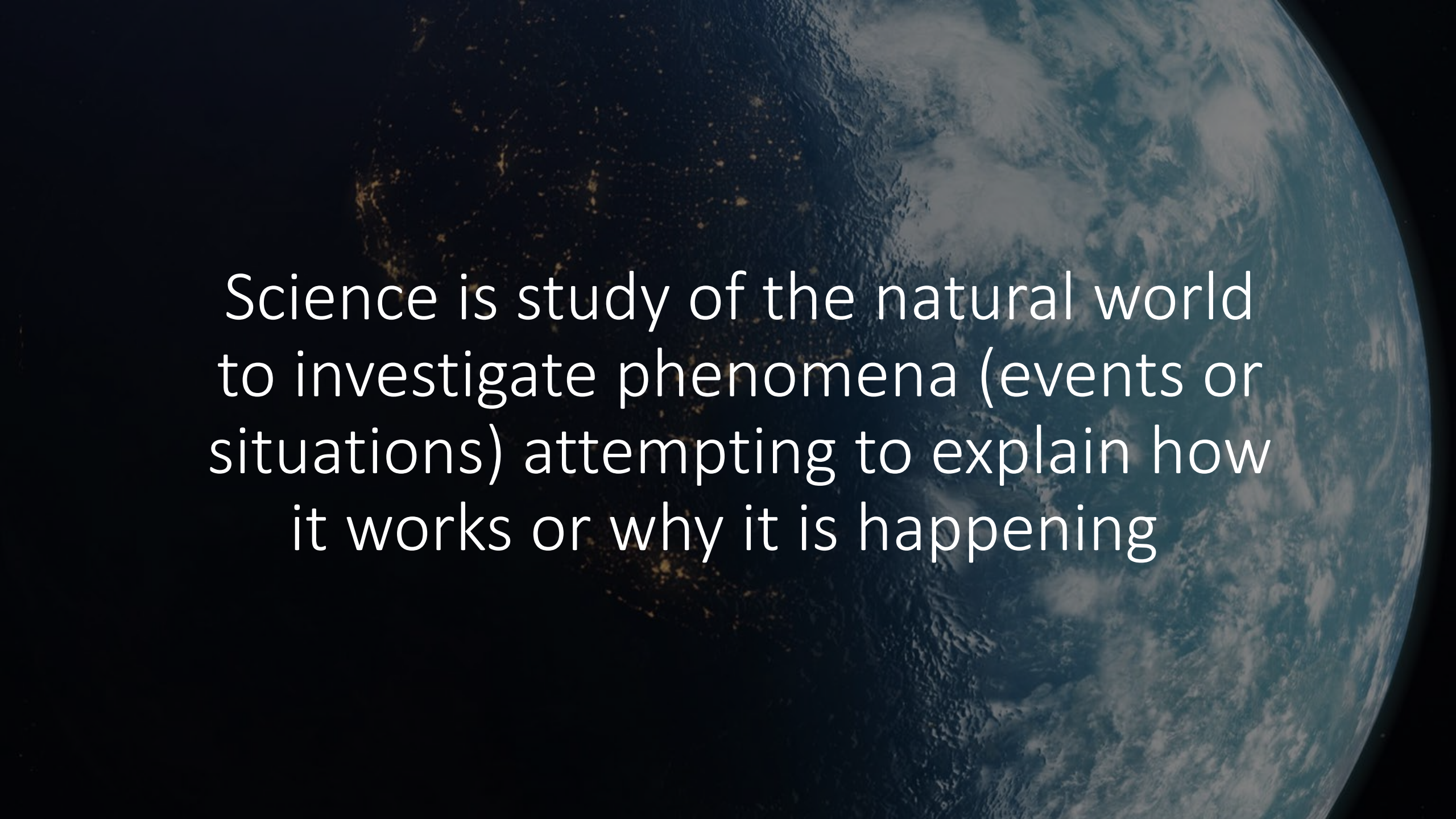
Kindergarten & Grade 1

Kindergarten

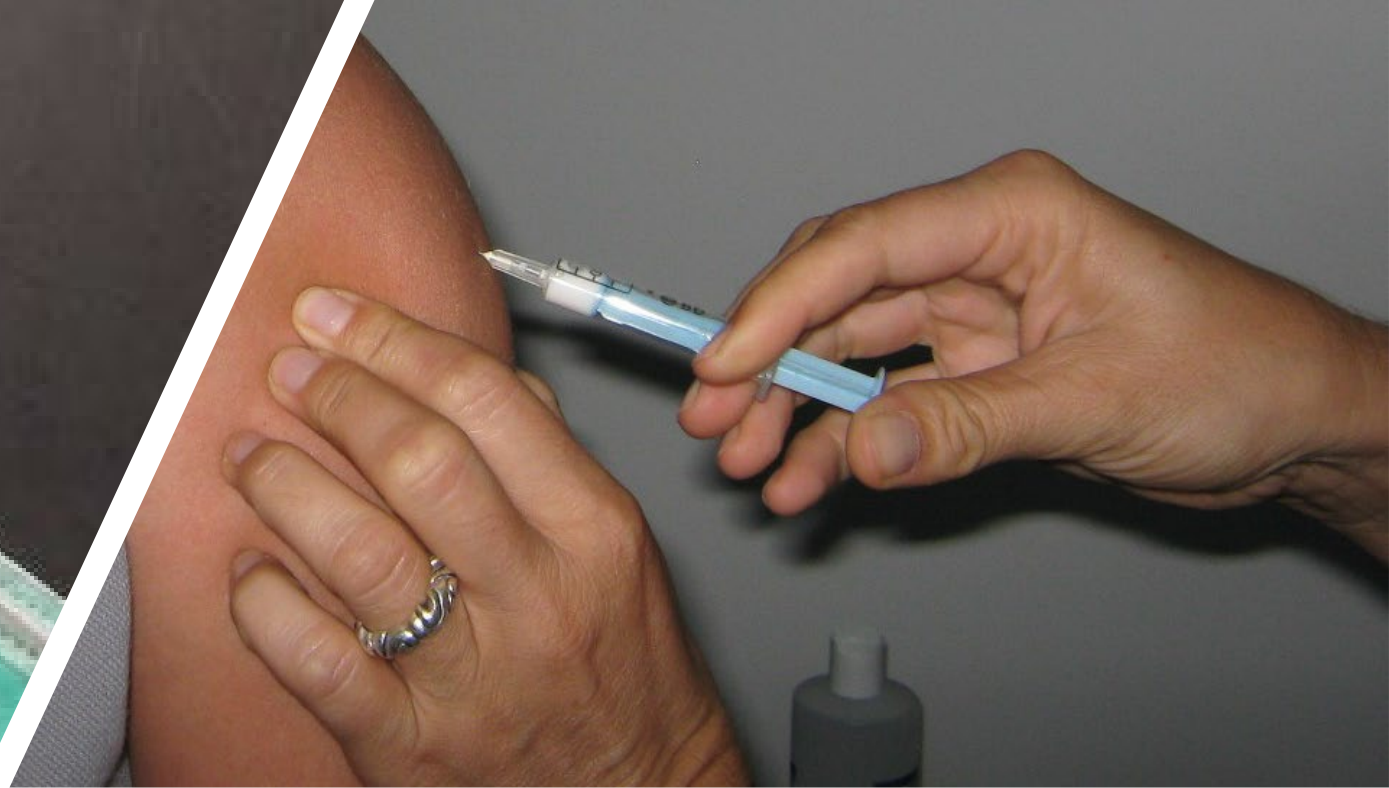
- No Scientific Method
- Computer Science Learning Outcome:
- Children interpret instructions in various environments
- Lends to following sequence of instructions in an investigation.

What is Science?

Purpose of Discipline



Science is study of the natural world to investigate phenomena (events or situations) attempting to explain how it works or why it is happening



EDUCATIONAL JOURNEY OF OUR STUDENTS





Curriculum Subject Introduction: Science

....Scientifically literate citizens are equipped to evaluate sources of information encountered in daily life.

WHAT IS SCIENTIFIC LITERACY?

PISA defines scientific literacy as developing competencies in 3 areas of science:

Scientific Methods

Content Knowledge – conceptual understanding(science ideas) in the various disciplines in science

Procedural Knowledge – Understanding the inquiry process of science (Skills) and **being able to do investigations**

Epistemic Knowledge (Name & Know) – Understanding how knowledge is built in Science e.g. how claims are generated, meaning of foundational practices: theory, hypothesis, data etc.

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

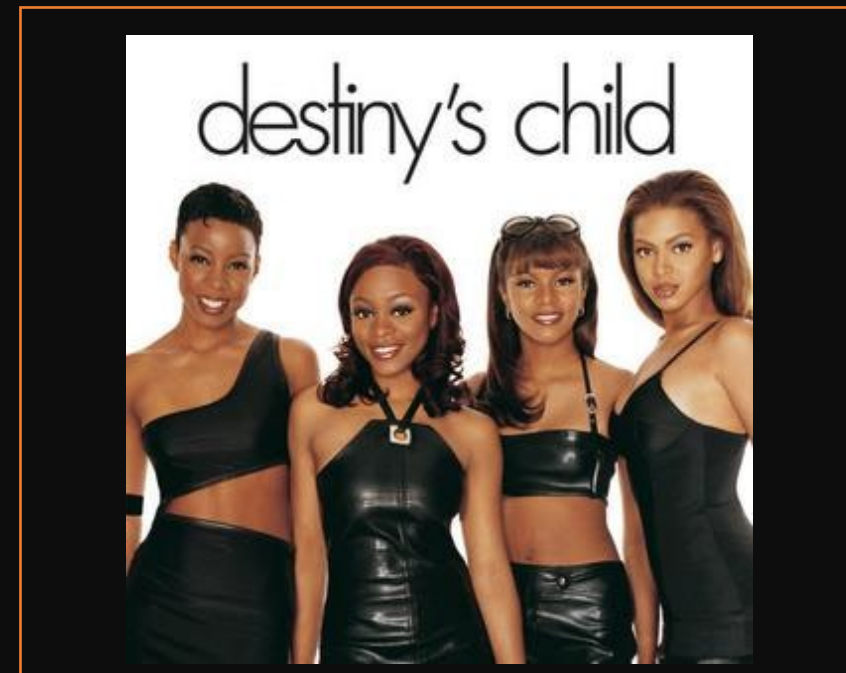
~ Carl Sagan



A lot has changed since 1996:

- Cognitive and Developmental Psychology: How students Learn
- Defining Scientific Literacy
- Science of Reading: Importance of background knowledge on reading comprehension
- Research in Science Education

Our science instruction and resources used should reflect these changes.



Students Need Both "Hands On" Investigations & Text

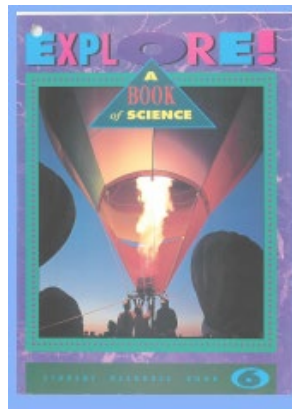
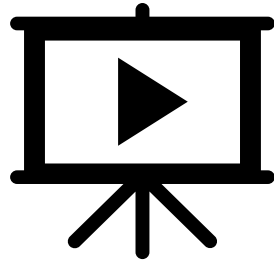
- Research in science education indicates that students learn best when there is a combination of hands-on investigations and texts to make sense of science ideas and significantly improves conceptual knowledge in students
- Classrooms who use **both** significantly **outperform** those that only use straight investigations **or** only use text

(Palinscar, Magnusson, Marano, Ford & Brown, 1998; Cervetti, Barber, Dorph, Pearson & Goldschmidt, 2012; Wang & Herman, 2005)

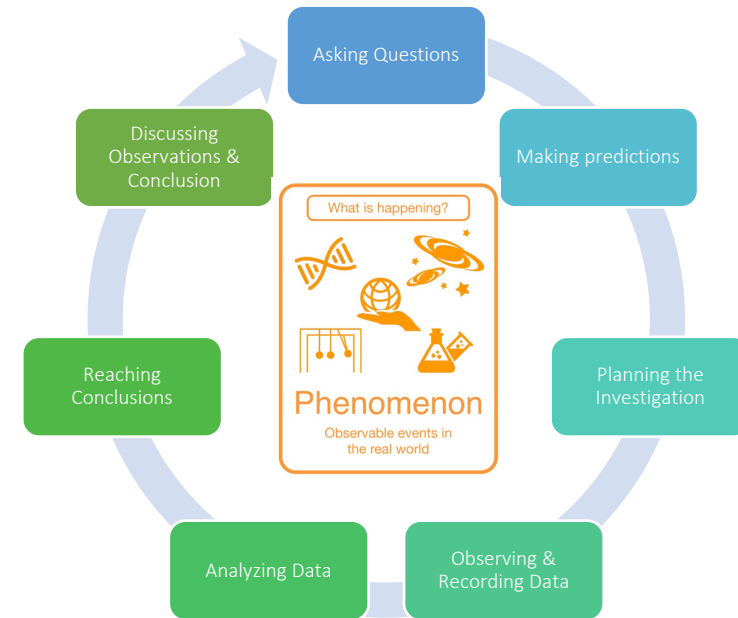


Traditional Instruction Sequence

Explain



Explore



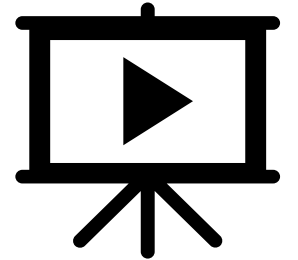
Flip the Sequence

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

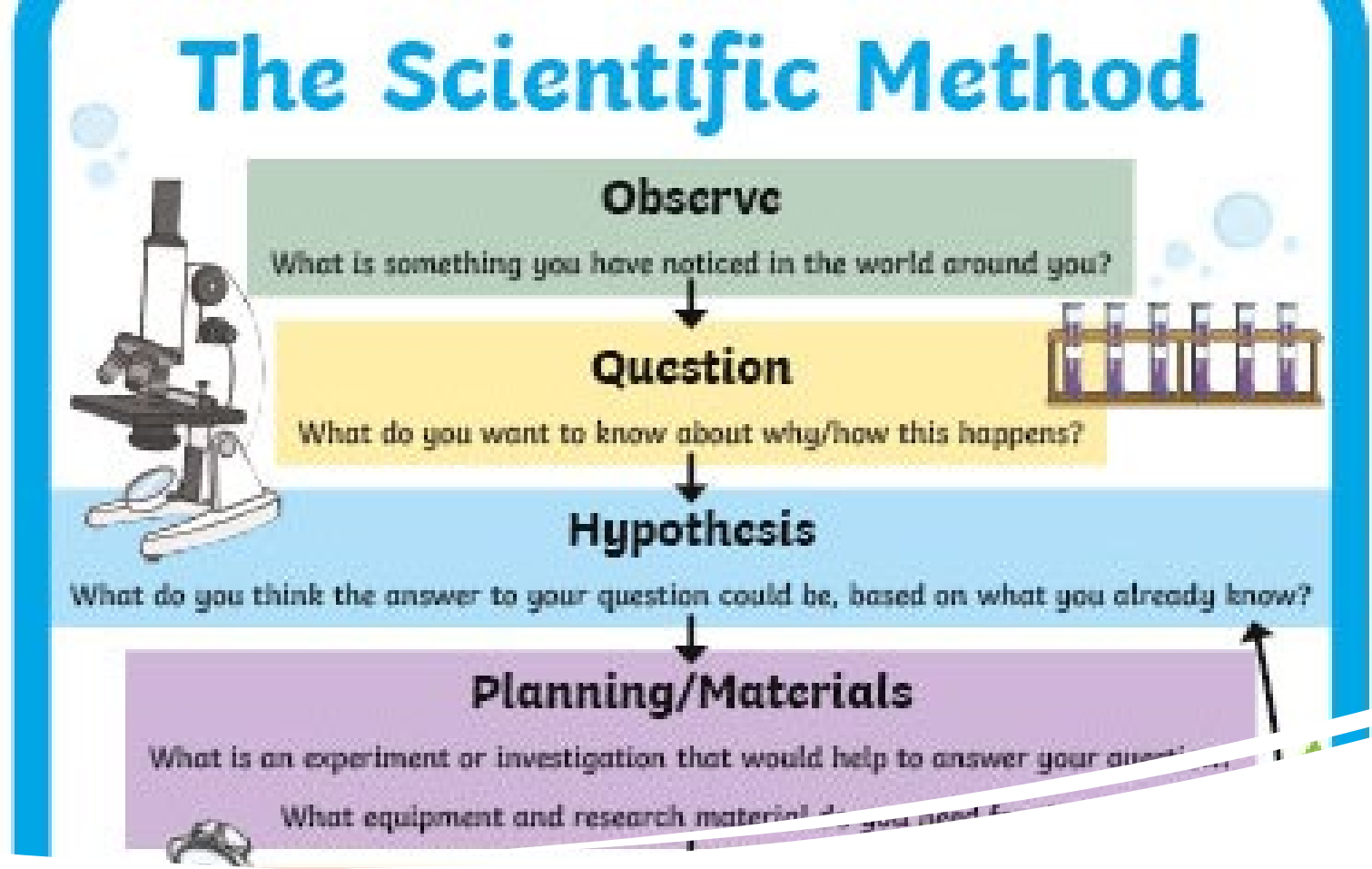
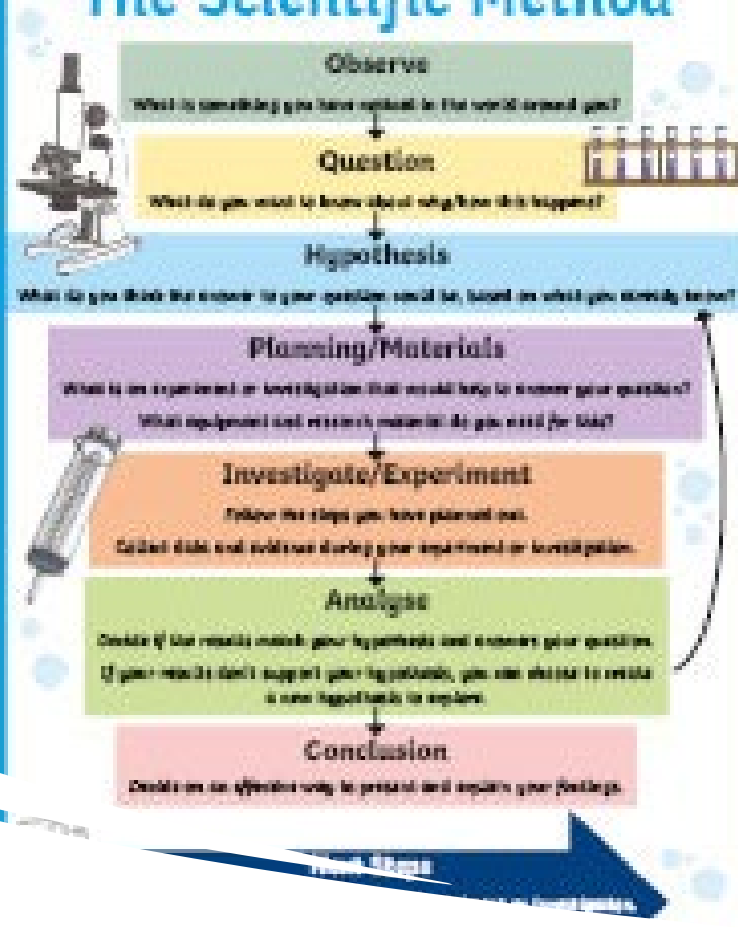
Explore



Explain



Unpacking the Scientific Methods



Traditional Approach

- not the only method to investigating phenomena
- Investigations grades 1 onwards
- Controlled experiments start in grade 5

Investigations in Science

Descriptive Investigations

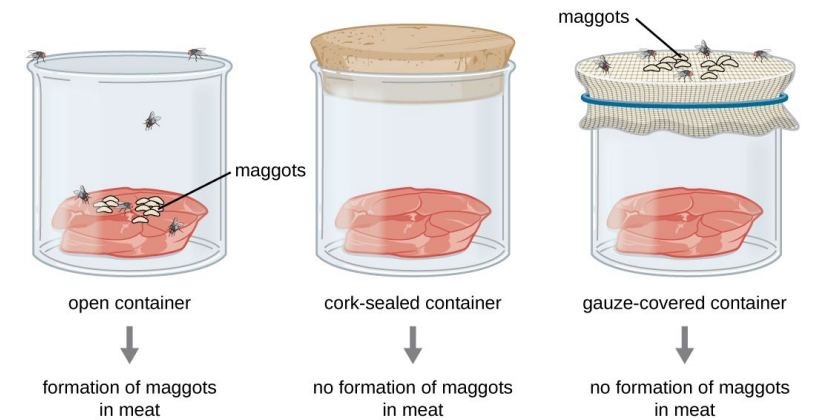


[This Photo](#) by Unknown author is licensed under [CC BY](#).

Comparative Investigations



Experimental Investigations



Scientific Investigations & Experimental Investigations

Investigations

- Purpose – a question is posed
- Does not require complete scientific method
- Hypothesis not necessary

Experimental Investigations

- Purpose – a question is posed
- Involves testing dependent and Independent variables to confirm or refute a hypothesis
- Classic scientific method

Subject Introduction Science:

Scientific Methods

Students will have opportunities to integrate these skills into all other areas of the Science curriculum.



1 . Matter



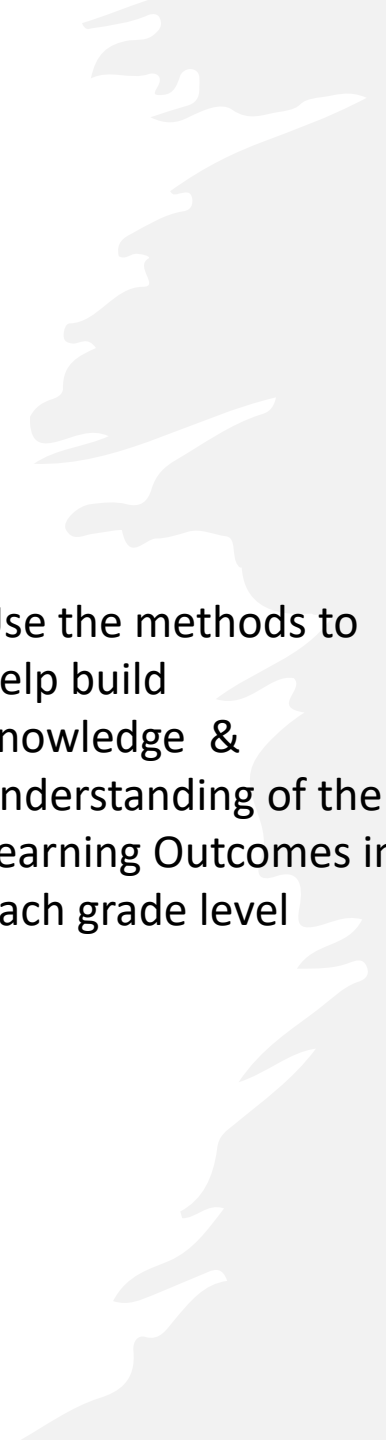
2. Energy



3. Earth Systems



4. Living Systems



Use the methods to help build knowledge & understanding of the Learning Outcomes in each grade level

Grades 1-3

Unpacking The Scientific Methods



By Grade 12

Science Change Subject ▾

 Expand All

< Prev

Grade 3

Grade 4

Grade 5

Next >

 ORGANIZING IDEA

Scientific Methods: Investigation of the physical world is enhanced through the use of scientific methods that attempt to remove human biases and increase objectivity.

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ORGANIZING IDEA

Scientific Methods: Investigation of the physical world is enhanced through the use of scientific methods that attempt to remove human biases and increase objectivity.

GUIDING QUESTION

What is investigation?

GUIDING QUESTION

What methods and processes can be used in scientific investigation?

GUIDING QUESTION

How can investigation help to deepen understanding in science?

LEARNING OUTCOME

Students engage in and describe investigation.

LEARNING OUTCOME

Students examine investigation and explain how it is influenced by purpose.

LEARNING OUTCOME

Students relate investigation to building knowledge.

KNOWLEDGE

The skills and knowledge required to carry out an investigation can be learned.

Investigations can be sparked by curiosity.

Investigations are carried out by a variety of individuals or groups, such as

- teachers
- students
- scientists
- police
- doctors

Steps followed during an investigation include

- asking questions

UNDERSTANDING

Investigations are carried out to try to understand the world.

SKILLS & PROCEDURES

Ask a question sparked by curiosity.

Predict the answer to a question.

Describe steps of an investigation.

Demonstrate safety and respect during investigations.

KNOWLEDGE

Investigations are conducted for purposes such as

- answering questions
- building knowledge
- satisfying curiosity
- problem solving

Procedures scientists use to guide investigations include

- asking questions
- making predictions
- planning the investigation
- observing and recording data
- analyzing data
- reaching conclusions
- discussing observations and

UNDERSTANDING

Investigations involve carrying out procedures for a purpose.

SKILLS & PROCEDURES

Explore various purposes for conducting an investigation.

Describe procedures of an investigation.

Develop questions for the purpose of an investigation.

KNOWLEDGE

Techniques that can be used to improve the accuracy of data include choosing appropriate tools, carefully measuring, and demonstrating objectivity.

Accuracy of data refers to the correctness of a recorded observation.

Objectivity is an attempt to remove the influence of personal thoughts, feelings, and expectations.

Data can come from many sources, such as

UNDERSTANDING

Investigations build on previous knowledge by supporting or contradicting existing knowledge.

SKILLS & PROCEDURES

Reflect on how conducting an investigation contributes to building knowledge.

Collect data using techniques to improve the accuracy of data.

Analyze data collected during investigations.

Compare the trustworthiness of sources of data.

Develop new questions for further inv

Assessment

Learning Outcomes

- Students Know, Understand and Do
- Assess and report on

KUSPS

- Ongoing Learning Outcome is broken down
- Teach ALL KUSPS
- Formatively assess MOST KUSPS not all
- Provide feedback to students

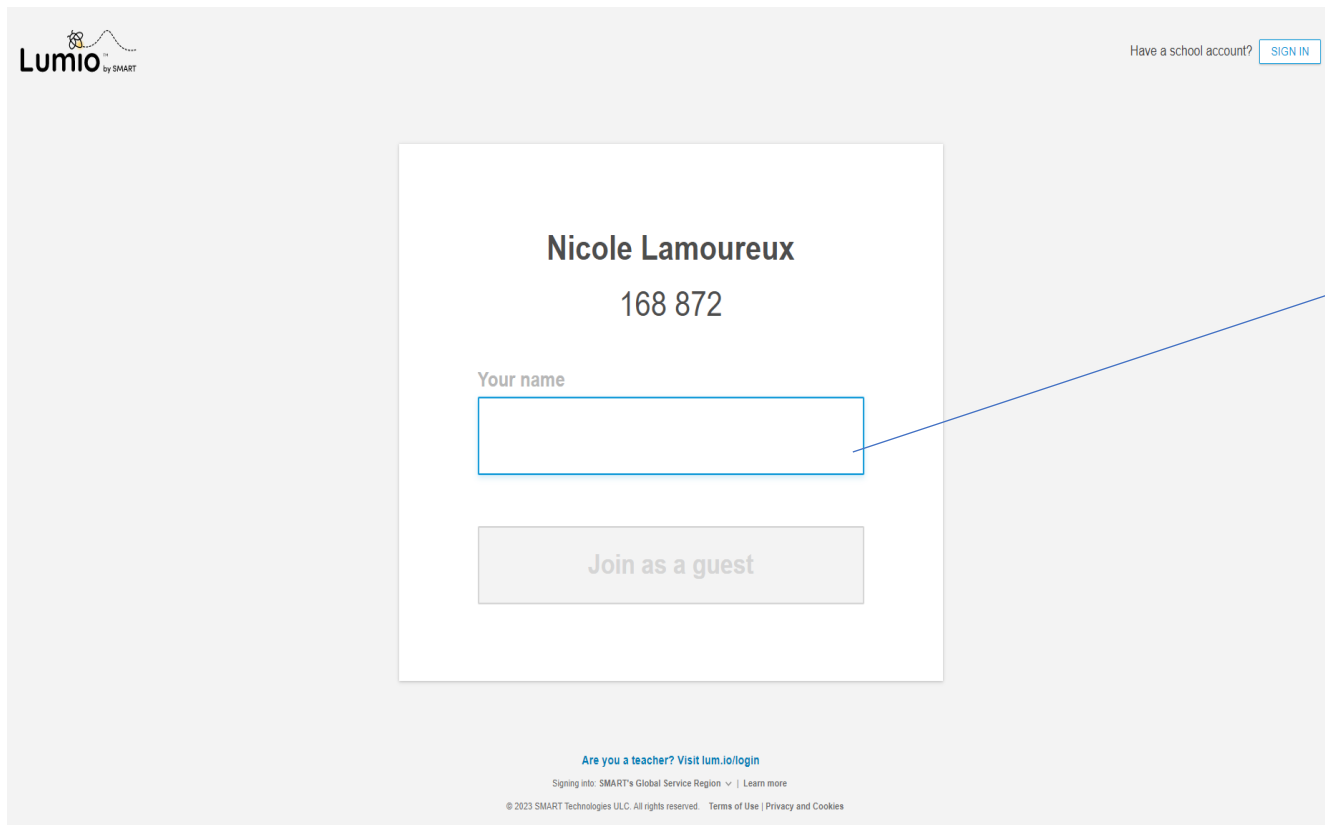
Scientific Method Ongoing
Process:

Unpacking Layers of the Process
through the grades



Processing Work: 10-15 minutes in LUMIO

Click Link in Chat. It will open a new tab or screen



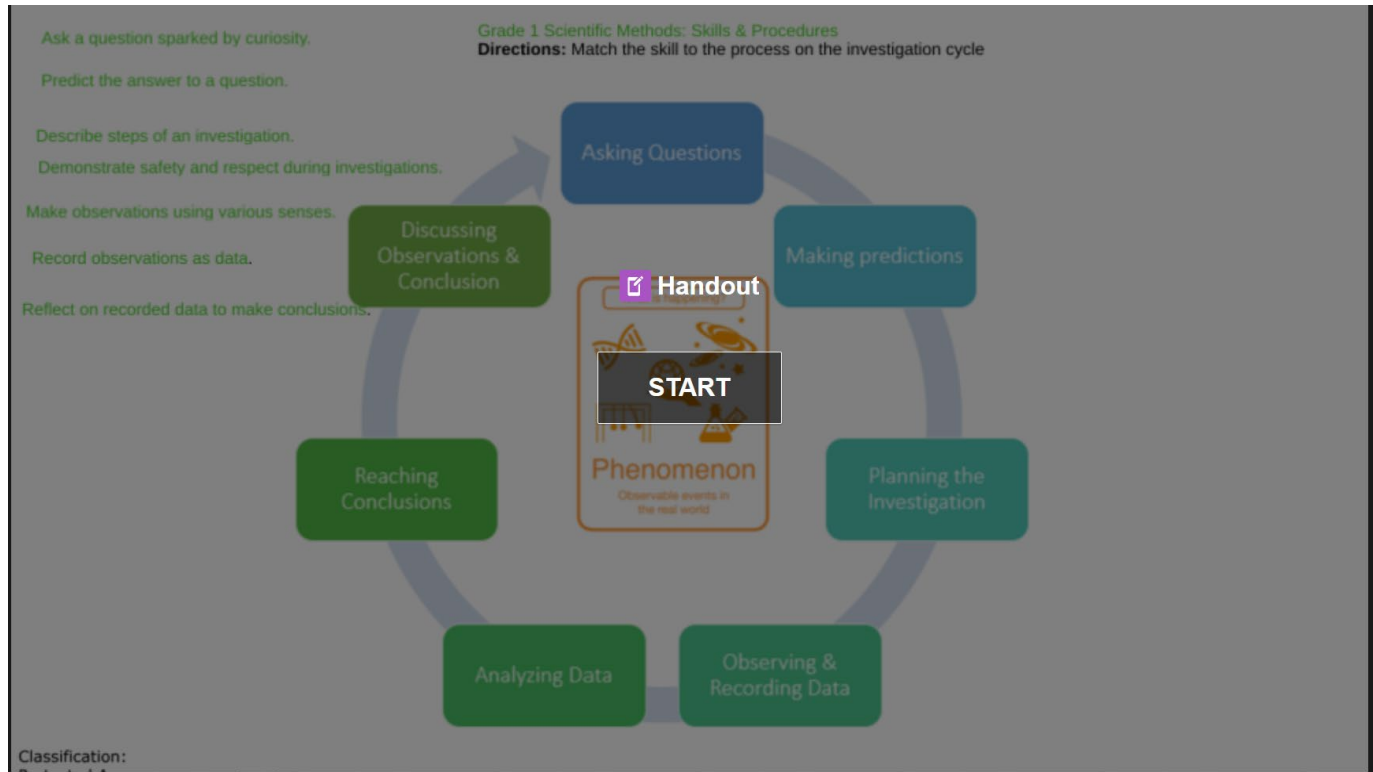
The screenshot shows the Lumio 'Join as a Guest' interface. At the top left is the Lumio logo with 'by SMART' underneath. At the top right, there is a link 'Have a school account?' followed by a 'SIGN IN' button. The main content area is a white box containing the name 'Nicole Lamoureux' and the ID '168 872'. Below this is a text input field labeled 'Your name' with a blue border. Underneath the input field is a grey button labeled 'Join as a guest'. At the bottom of the page, there is a link 'Are you a teacher? Visit lum.io/login', a small text line 'Signing into SMART's Global Service Region | Learn more', and a footer '© 2023 SMART Technologies ULC. All rights reserved. Terms of Use | Privacy and Cookies'.

Type your first name & Click "Join as a Guest"

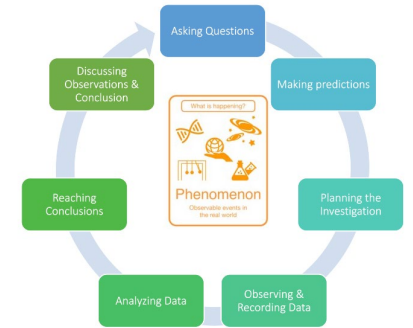
I have the presentation on teacher led so I have control of the screen.

Processing Work: 10-15 minutes in LUMIO

I will present but at some point this screen will pop up. It means you will be doing some interactive work. Click start to join.



Science Method Process: Building Investigation skills from grades 1-3



Grade 1

What is Investigation?

- Make Predictions
- Record Observations
- Make Conclusions (answers to questions)

Grade 2


Examine Investigation and explain how it relates to its purpose

- Develop questions for the purpose of an investigation
- Make Predictions
- Record Observations
- Determine if data relates to purpose of investigation
- Observations and data should be similar
- Collaborate to put data on a single chart
- Make conclusions

Grade 3

Students relate investigation to knowledge building

- Develop questions for the purpose of investigating
- Collect data using techniques to improve the accuracy of data.
- Analyze data collected during investigations.
- Compare the trustworthiness of sources of data.
- Reflect on how conducting an investigation contributes to building knowledge.
- Develop new questions for further investigations.

A photograph of two young girls in a science classroom. They are both wearing safety goggles and smiling. The girl on the left is holding a beaker with blue liquid. The girl on the right is gesturing towards a large, blue, foamy substance that has formed in a flask on the table. The background is slightly blurred, showing other students and classroom equipment.

What does this look like in the Classroom? Common skills Grades 1-3

-
- Making Predictions
 - Making & Recording Observations
 - Make conclusions (inferences)

Review and set expectations in September

Graphic Organizers: Ensure Alignment with Curriculum

Not Part of Our Curriculum

Grade 6 Expectation.
Scientific Literacy use
terms correctly

The Scientific Method

Name: _____ Date: _____

Question

Hypothesis

Materials

Procedures

Observations

Conclusion

View image

Grade 2 Investigation Organizer

Name: _____

INVESTIGATION

Purpose: What are we trying to find out?

Question: What question can we investigate?

Prediction: What do I think will be the answer?

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



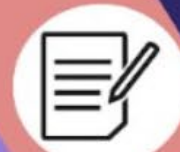
CONVERSATIONS

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



PRODUCTS

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



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.



Making Predictions

- Teach & Assess in grade 1 & Continue to implement in other grades
- What is a prediction
- Introducing to students
- Teaching and assessing



Prediction

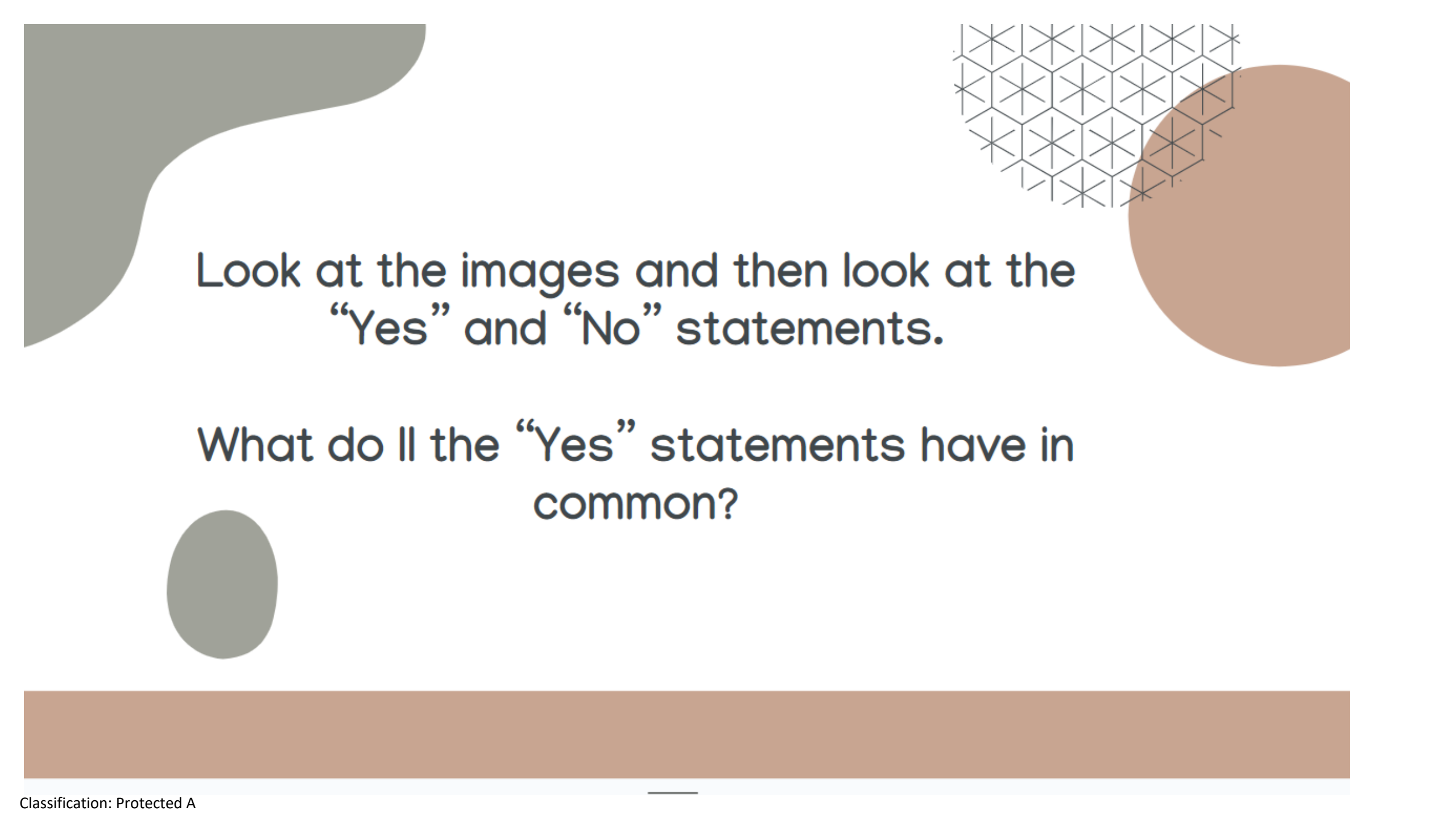
A likely answer to a question using what you know.

Prediction

Concept Attainment

What is a Prediction?

Created by Ted Zarowny, ERLC Consultant



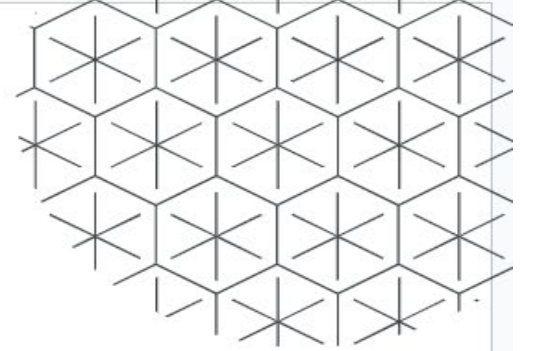
Look at the images and then look at the
“Yes” and “No” statements.

What do all the “Yes” statements have in
common?

Grade 1 Beginning of Year



Photo by [Braden Collum](#) on [Unsplash](#)



YES: The runner is going to win the race .

NO: The runner is at the start line.

Grade 2 &3 Beginning of Year or as Grade 1 becomes more comfortable



YES: The snowman will melt in the spring because in the spring it gets warm and snow melts

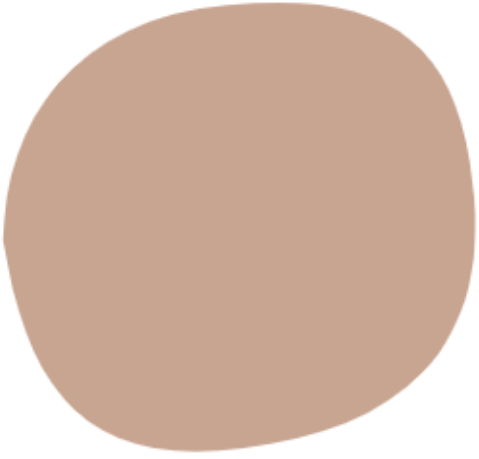
NO: The snowman will walk away because I watched a cartoon and the snowman walked



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Yes: The girl in the white shirt and red pants will catch the ball because it looks like the ball is falling towards her

No: The girl in the light blue shirt will catch the ball because I want her too.



**All of the “Yes” statements
are predictions. What is a
prediction?**



Introduce Vocabulary Card - Authoritative Explanations

Predict

Likely answer to a question using what I know already about the topic



Teacher Assessing Predictions in Grade 1 Reviewing in Grades 2&3

Based on what you learned about predictions, what criteria would you use to assess if your students are making good predictions?

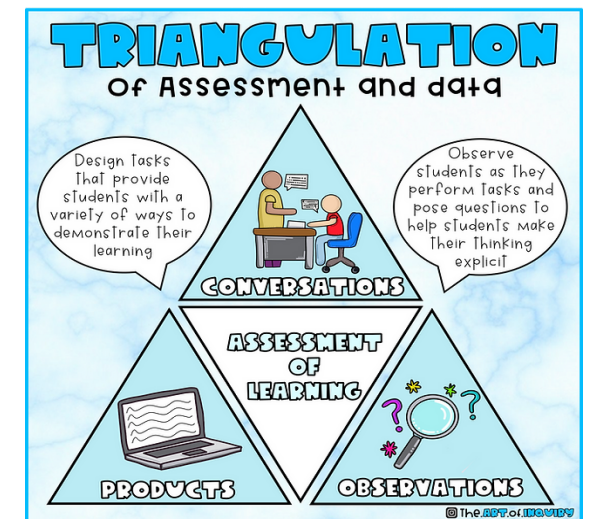
- See or hear from students **based on curriculum?**

KNOWLEDGE

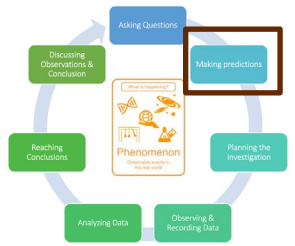
A prediction is a likely answer to a question based on current understanding.

SKILLS & PROCEDURES

Predict the answer to a question.



Making predictions



Assessing Predictions:

Teacher **See or Hear** from students:

- ☐ Likely answer to the question based on what they know

Example:

Question:

What do you predict you will observe grows outside?

Student response can be written, verbal and/or pictorial

- ☐ I predict **I will see/observe** grass, birds and trees because when I go outside **I see grass in the field and trees. trees get bigger and grass grows you need to cut it.**

Teacher Need to prompt?

- What makes you think that?

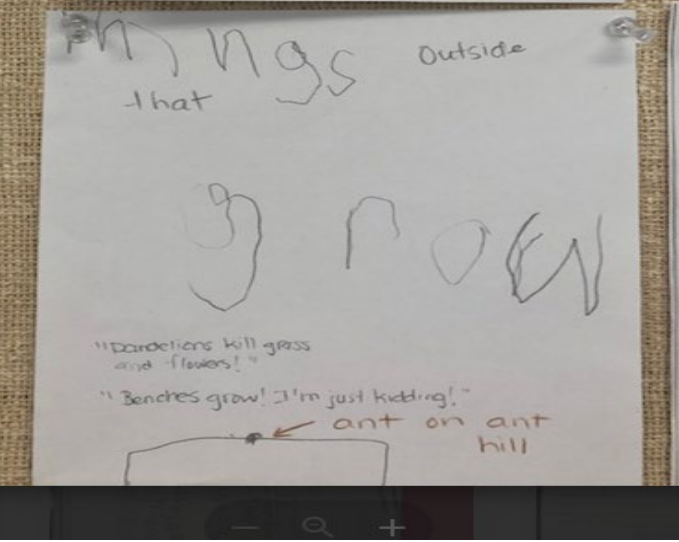
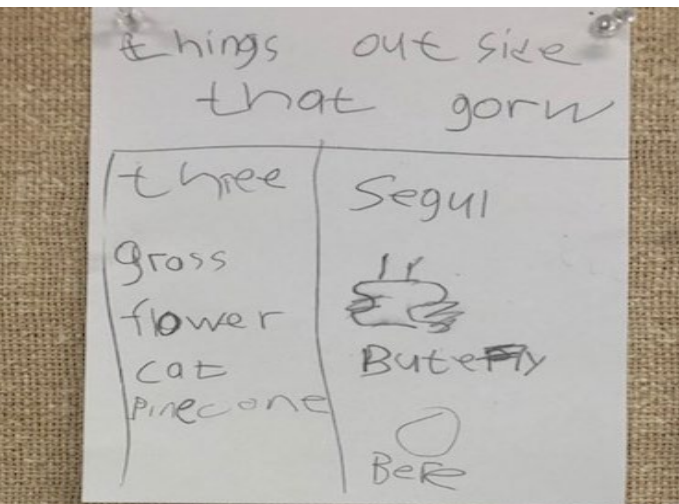
Grade 1 Living Systems

Name: _____

My predictions of what I observe grows outside

I predict I will observe _____

because _____



Assessing Predictions: Criteria & Documenting

Science Methods knowledge A prediction is a likely answer to a question based on current understanding Science Methods Skills & Procedures: Predict an answer to a question															
Task:															
<p>Teacher Talk Prompts For Interviews with Students or Observations of Performance during Task or Presentation</p> <p>Doesn't have an answer to a question. "Think about(bending) something in half is it still the same....? "When you (insert action) something what happens to an object's (insert property)? Shares answer only but doesn't elaborate how they know. What makes you say that? Think about what you know about (action)</p> <hr/> <p>Criteria Based on Curriculum:</p> <div style="border: 1px solid black; padding: 5px;"> <p>1. Student provides an answer to the question that is appropriate to the context. Note: predictions do not have to be correct. The purpose of an investigation is to confirm or change our initial thinking based on the data gathered.</p> </div> <div style="border: 1px solid black; padding: 5px;"> <p>2. Students <u>shares</u> the reason for the answer based on what they already know. Ex: I know that stretching the plasticine will make it longer because when I played with play dough before and it was longer when I stretched it.</p> </div>	<table border="1"> <thead> <tr> <th>Criteria #</th> <th>Not Yet</th> <th>With Assistance</th> <th>Independently</th> </tr> </thead> <tbody> <tr> <td>1</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>			Criteria #	Not Yet	With Assistance	Independently	1				2			
	Criteria #	Not Yet	With Assistance	Independently											
1															
2															

Turn Rubrics Into Google Forms

Making Predictions

Note: Predictions do not need to be correct. The purpose of a prediction is to anticipate what will happen based on previous experience with situations in order to investigate to confirm or refute predictions.

nlamoureux@arpc.ab.ca [Switch account](#)

Not shared

* Indicates required question

Name *

Choose

Task *

Your answer

Provides an answer to the question that is appropriate to the context. *

Choose

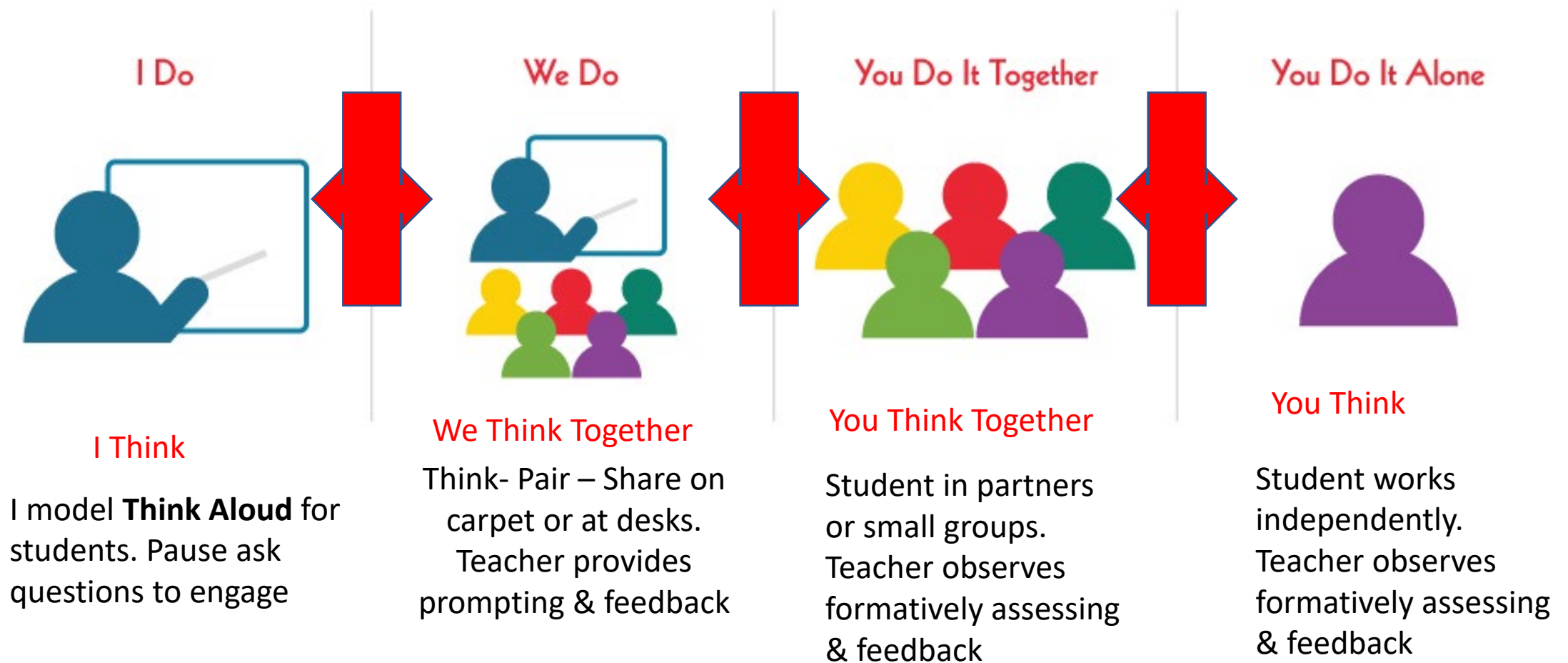
At Level

With Assistance

Not Yet

answer based on what they already know. *

Teaching Predictions Throughout the Year





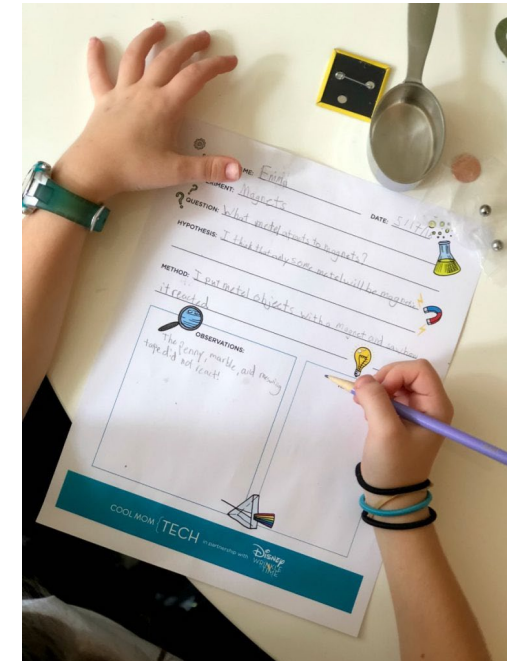
Making & Recording Observations

- Teach & Assess in grade Grades 1-3
- Foundations & Expectations
- Student challenges & Misconceptions

Accurately Recording Observations

Observations have certain characteristics. They need to be:

- ❑ Clear so when recorded, scientists can go back look at it to use as evidence
- ❑ Complete – have all necessary details to describe the situation, event, object well
- ❑ Accurate- need to represent what is actually seen, heard, smelled or touched as closely as possible. Measurements accurately recorded
- ❑ Objective- using standard tools to measure exactly. Not describe emotion or feeling
- ❑ Labeled and when appropriate use scientific vocabulary



Student Challenges and Misconceptions With Recording Observations

- ❑ Students think they will remember their observations so they do not write it down or label their observations
- ❑ Students often record inferences rather than observations ex. Grass is brown (observation) The grass died (inference)
- ❑ Students might not notice important details.
- ❑ Students sometimes like to attach emotion to their observations



How Can We Support Students To Overcome These Challenges?

Co –Construct Criteria of Good Observations With Students:

- Students should be able to self-assess or peer assess observations using a rubric or checklist

TABLE 2.

Features of High-Quality Observation.

Recorded Observations

Clear	Observations should be neat and specific, so that you or another person can understand what is written or drawn. (For example, "the mustard plant" rather than "the plant.")
Complete	Observation should describe all parts of the phenomenon of interest.
Accurate	Observations should include ONLY what is ACTUALLY seen. Drawing should include authentic colors, sizes, and shapes.
Includes Scientific Vocabulary	Drawn observations should have labels to identify the items. Written observations should use appropriate scientific language.
Objective	An observation should NOT state an opinion. Another person should be able to look at an object of interest and make the same observation. An objective statement is "the mustard seed is one millimeter across." A less objective observation is "the seed is really small."




How Can We Support Students To Overcome These Challenges?

Co –Construct Criteria of Good Observations With Students:

- Students know expectation and can use the feedback from teacher in order to improve their learning

FIGURE 2.

Student work evaluated with the rubric.

Student Work	Category		Teacher Comments
	Complete	Proficient	<i>This is an accurate and clear drawing of a complete circuit. Next time, be sure to label your drawing.</i>
	Accurate	Proficient	
	Clear	Proficient	
	Labeled	Needs Improvement	
	Complete	Improving—one wire is missing.	<i>The circuit is missing a wire. Try the circuit again to find out where the wire goes and add it to your pictures along with labels.</i>
	Accurate	Improving—the wire needs to be a complete circuit.	
	Clear	Improving—it is difficult to tell what the lightbulb is.	
	Labeled	Needs improvement.	
	Complete	Proficient	<i>The drawing has all of the pieces needed to show a complete circuit. I cannot determine which is which and where the connections are. Can you draw the lightbulb and connections more clearly and label the parts of your drawing?</i>
	Accurate	Needs improvement—the wire needs to be touching the battery to be complete. The lightbulb is not larger than the battery.	
	Clear	Improving—it is difficult to determine what the picture is showing.	
	Labeled	Needs improvement.	

Use of Sentence Stems To Support All Learners

Use sentence stems to support high quality observations such as:

I notice _____;

I observe _____;

I see _____;

The _____ measures _____. This is different from earlier observations because _____.

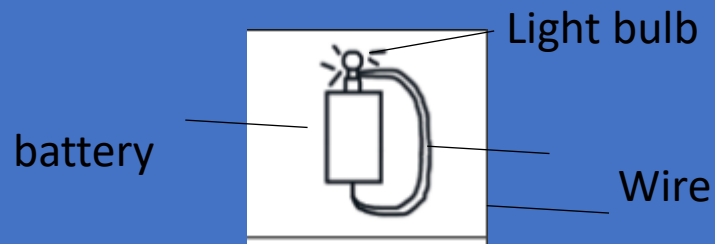
Word Banks to choose From :

Cup, water, Hot , Cold, Freeze, liquid, solid

How Can We Support Students To Overcome These Challenges?

Examples

Electrical Circuit



Non Example



Grade 3



Grade 3



Helping students Distinguish Between Observation and Inference



T- Chart to Separate Observation and Inference

Guide students to slow down:

1. Use words to describe (color, shape, amount, property) without naming.
2. Guessing game – can others guess (infer) what you are describing based on the attributes/features you use to describe the object?
3. X2 looking Routine – Look describe, look again add more descriptions

Observe: See, Hear, touch,

Infer

 <u>SEE</u> What do you see?	 <u>THINK</u> What do you think is going on?

Adapted by Alice Wigton, 2014



Making Conclusions

Define Conclusions

Whole Class

Using Models (pictures) to represent thinking




Conclusion

A statement (claim) that answers a question drawing support from data

Whole Class Discussion – Claim, Support Question

Grade 2 Energy Light

Grade 1 Living Systems

Claim	Support	Question
 <p>When shadows disappeared... where did they go?</p> <p>→ "into the air" (Gracie) → "they flew away" (Jay)</p> <p>→ "they're hiding under ground" (Eddie) → "when there's no sun, the shadows run away." (Jenni)</p> <p>→ "the clouds are in front of the sun" (Carlotta)</p>	<p>"the shadows went away" (Gracie)</p> <p>"When the cloud went in front of the sun, the cloud was blocking it." (Eddie)</p> <p>↳ when the sun is blocked, you can't see your shadow." (Eddie)</p>	<p>How does a shadow disappear? (Gracie, Kotaru, Jay, Rui, Eddie)</p>

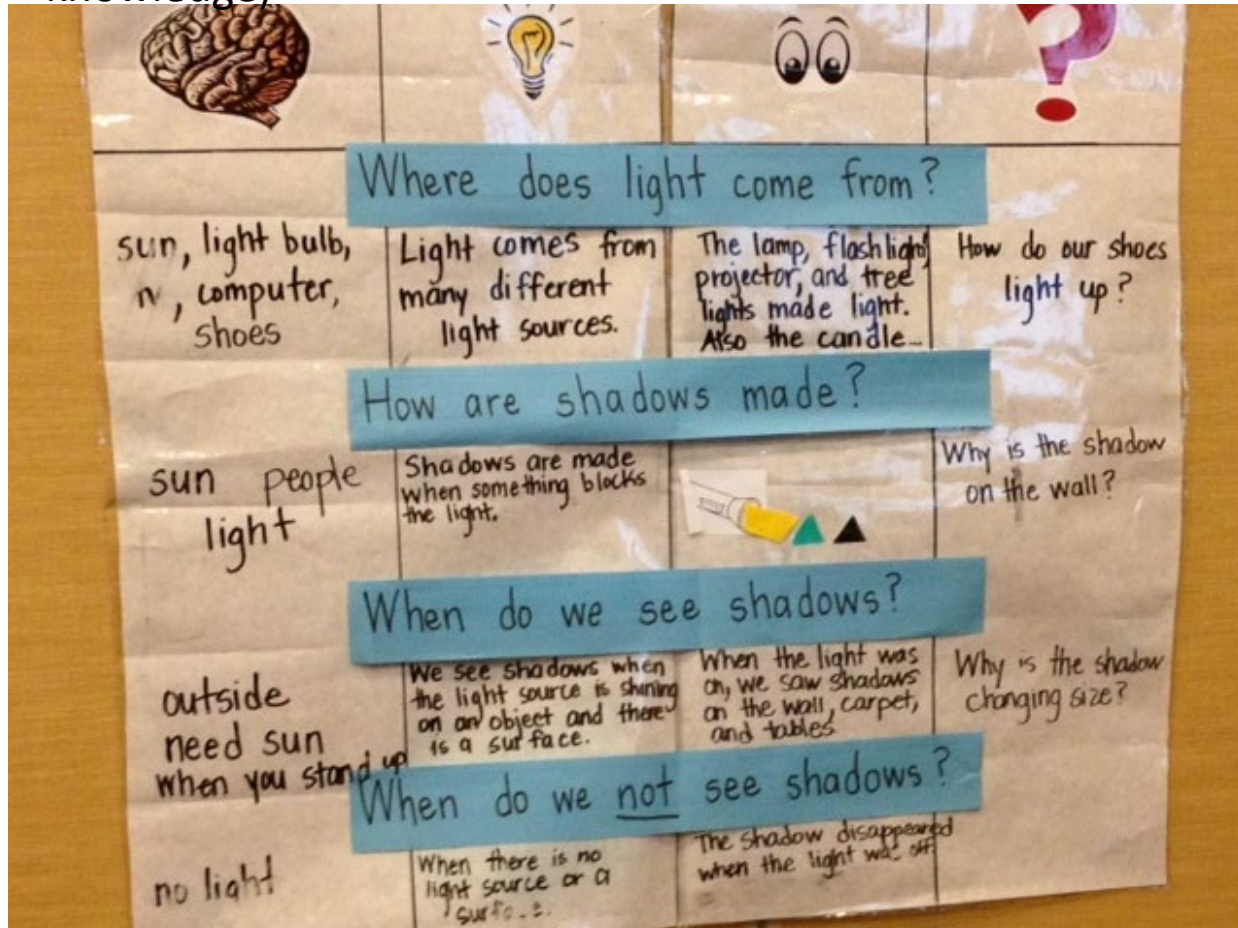
Boogie is living or non-living?		
Claim	Support	Question
<p>a statement about what's going on here</p> <p>I know Boogie is living because he needs food (energy) ~ Evelyn</p> <p>He is living because he needs air ~ Neha</p> <p>He is living because he can move by himself. ~ Abodege</p> <p>He is living because he needs water. ~ Justin A.</p> <p>Boogie is living because he gets rid of waste. ~ Patrick</p> <p>I know he's living because he can breathe. ~ Easton</p> <p>He's living because he can change. ~ Angelynn</p>	<p>What can we see, notice or know to stand up for our claim?</p> <p>I could see him walking (which means he had energy) ~ Evelyn</p> <p>I know he is breathing because I saw his chest moving. ~ Kayla</p> <p>He was walking around the classroom.</p> <p>He was panting. ~ London</p> <p>I've seen other dogs poop and pee before. ~ Kayla</p> <p>His chest was moving. ~ Simon</p> <p>I could feel air coming from his mouth. ~ Itemide</p> <p>I see that Boogie has more white fur around his mouth. His teeth are not as white anymore. ~ Ms. Polheiser</p>	<p>Do you have new ideas or questions? Do we need to investigate more?</p> <p>Does he eat dog treats?</p> <p>Does Boogie have a brain?</p> <p>* Did we see him move in different ways?</p> <ul style="list-style-type: none"> - jump + stand up on 2 legs - shake a paw - walk - wagging his tail <p>Does he get energy from food or water or both?</p>

Whole Class : Learning Summary Tables

Know
(Prior
knowledge)

Learned
(Claim)

Evidence
(data)



Matter Grade 2: Light

Driving/Lesson Question:

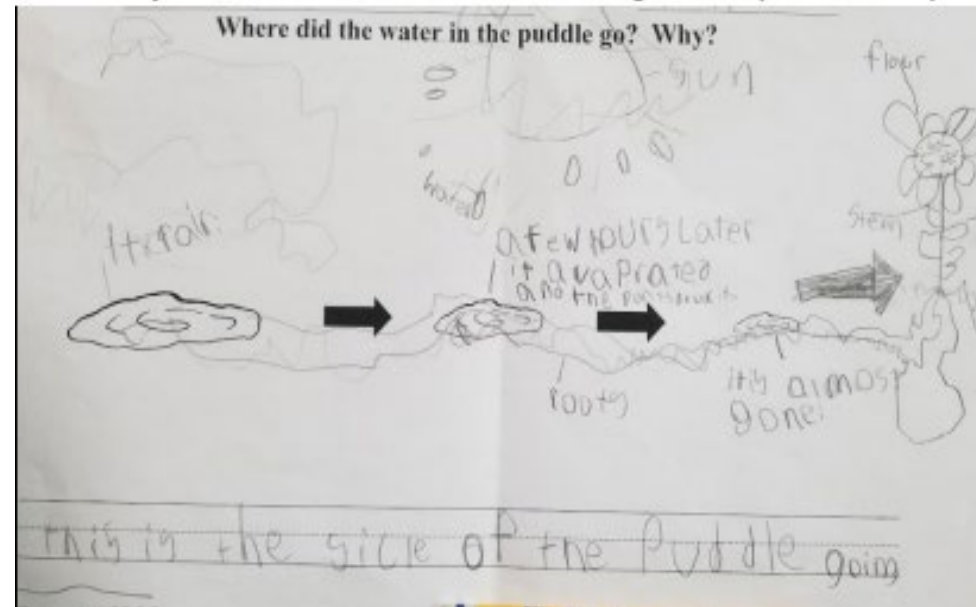
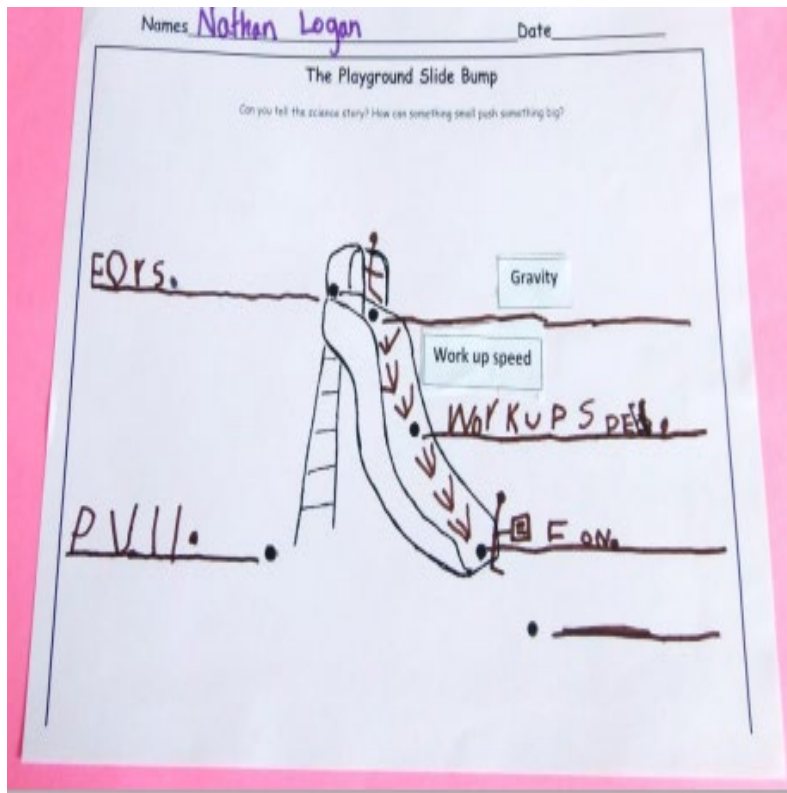
K	L	E	W	S
What we think we know about the phenomenon	What we are learning	Evidence (from our data)	Wonderings	Scientific Concepts and Words

KLEW Chart to be used during investigations to guide inquiry

What do we Think we Know?	What are we Learning?	What is our Evidence?	What are we Wondering?
Students share about the subject Can see areas of misconceptions; helps in deciding needed inquiry	Students make a claim about their findings after explorations... Every item must also show evidence	Students must give evidence for each claim	Teacher records questions heard during the investigations and asks for other questions after class discussions These may become new testable questions

Pictures as scientific models: Making Conclusion

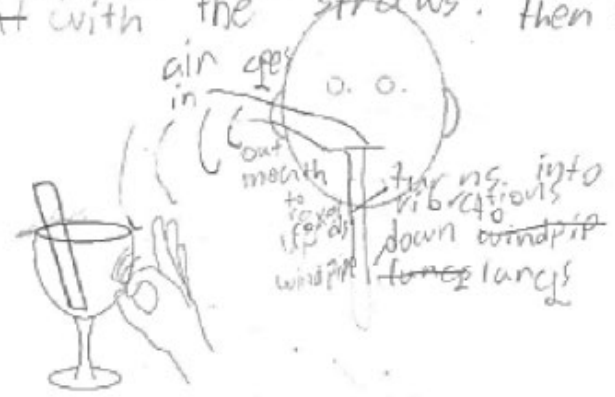
Use of symbols (arrows)
provide word cards



Grade 2 & 3

Why does the glass shatter?

Singer taps the glass and listens. I think that it is easier without a straw because it took him longer without with the straws. then without longer without with the straws. then without



I think that it is easier without a straw because it took him longer with the straw than without.

Air goes in and out mouth to vocal cords turns into vibrations.

Singer sings near glass. when he makes his lips into a weird shape that was like a circle and the sound waves hit glass. I think that sound waves hit glass. thing he has behind. when the singer is singing a weird shape a circle is because wider his lips the more sound waves

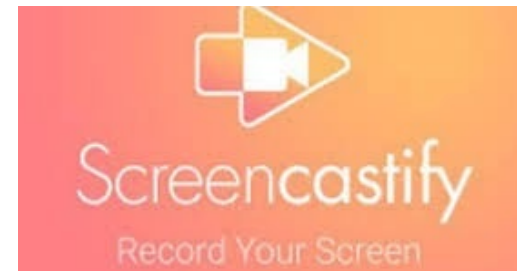


When the singer is singing, he makes his lips into a weird shape that was like a circle and I think that is because the sound waves wider his lips the more sound waves hit glass. Sound waves caused by vibrations.

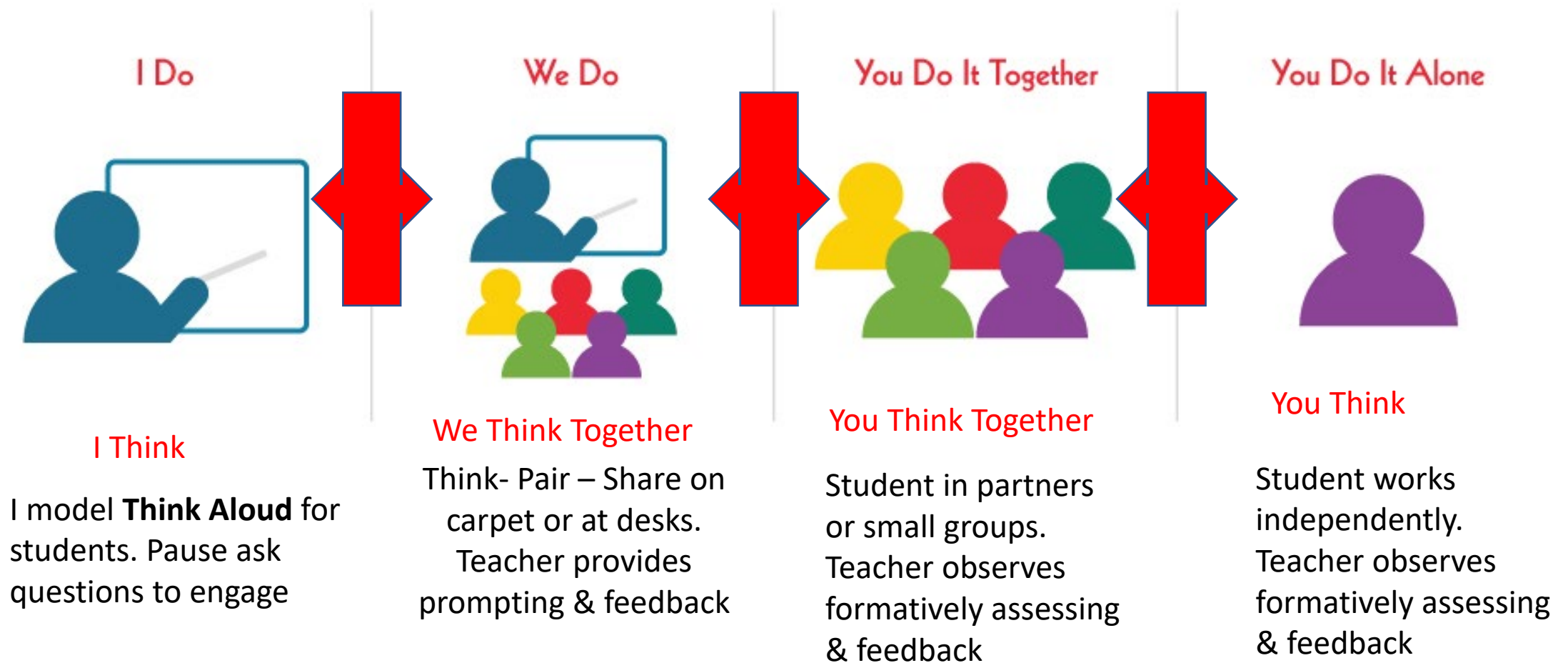
Reaching All Learners: Multimodal Representation

Students can demonstrate skills in the scientific method multiple ways:

- Draw pictures and describe orally
- Write paragraphs
- Record using video



Teaching Conclusions Throughout the Year





Resources on
NLA

Resources on New Learn Alberta

LEARNING OUTCOME ⓘ
 Students investigate properties of materials and relate them to a purpose.

Knowledge, Understanding and Skills & Procedures **Resources** Competency Progressions Literacy Progressions Numeracy Progressions

Pearson Literacy Readers ⓘ
 Good Ideas for People

Shows how people are inspired by nature...

Grade(s) K-2
 Subject(s) English Language Arts and...
 Audience(s) Learner

ONLINE RESOURCE ❤️

Medicine Wheel Workbook: Finding Your Healthy Balance

This workbook recognizes the medicine wheel as a sacred symbol. Lessons,...

Grade(s) K-6
 Subject(s) English Language Arts and...
 Audience(s) Learner, Parent, Teacher

INFORMATION ONLY ❤️

Pearson Literacy Readers ⓘ
 Buildings

Discover buildings made from different materials...

Grade(s) K-2
 Subject(s) English Language Arts and...
 Audience(s) Learner

ONLINE RESOURCE ❤️



Pearson Literacy Readers



Gizmos Grade 3 Example

The screenshot shows the 'Ants on a Slant (Inclined Plane)' simulation. At the top, the 'Gizmos' logo is on the left, and 'Ants on a Slant (Inclined Plane)' is in the center, with a 'Lesson Info' button on the right. Below this is a 'Tools' section with a 'Tools' dropdown menu. A row of six ant icons is shown, with a text box that says 'Drag ants to the bottom of the stick to push the blueberry.' Below the ants are two radio buttons: 'Friction' (unselected) and 'No friction' (selected). The main simulation area shows a tree stump on the right with a height of 10 cm. A stick of length 20 cm is leaning against the stump, with a blueberry at its bottom end. Below the stick is the text 'Drag the stick to change the angle.' At the bottom, there is a 'Select item:' section with icons for Blueberry, Peanut, Almond, and Corn. The Blueberry icon is selected. To the right of these icons are play, pause, and refresh buttons. Below these are 'Time = 0 sec' and a speedometer showing '0 cm/sec'.

Teacher version contains:

- Student handout
- Teacher guide
- Answer Key
- Vocabulary Sheet



SCIENTIFIC METHODS HANDOUT



ABOUT THE

RESOURCES

Each grade will receive the following:

- Sample lessons to introduce scientific methods in September
- Assessment "Look For" connected to one or more skills/procedures in scientific method
- Teacher definitions Scientific Methods
- Graphic Organizers
 - Investigation template

UPCOMING SESSIONS

*Bringing It Together Series:
Integrating Matter with the
Scientific Methods:*



GRADE 1

September 18 @ 3:45-5:00 pm



GRADE 2

September 19 @ 3:45-5:00 pm



GRADE 3

September 20 @ 3:45-5:00 pm

Click the folders below view only:
File-Make A Copy to add to your Drive.

GRADE 1

GRADE 2

GRADE 3

For more information visit the link

WWW.ERLC.CA

- Slides from Today
- Lesson Plans Intro Scientific Methods
- Grade specific assessment "Look Fors" 1 skill in scientific method
- Graphic organizer
 - Investigation template for grade

My September Sessions

Bringing It Together Series: Teaching & Assessing Sequence of Lessons Integrating Matter & Scientific Methods

Grade 1

How actions change the properties of objects

- Sept. 18 @ 3:45 – 5:00
- Resources to use in classroom

Grade 2

How the purpose of an object will influence the materials used

- Sept. 19 @ 3:45-5:00
- Resources to use in classroom

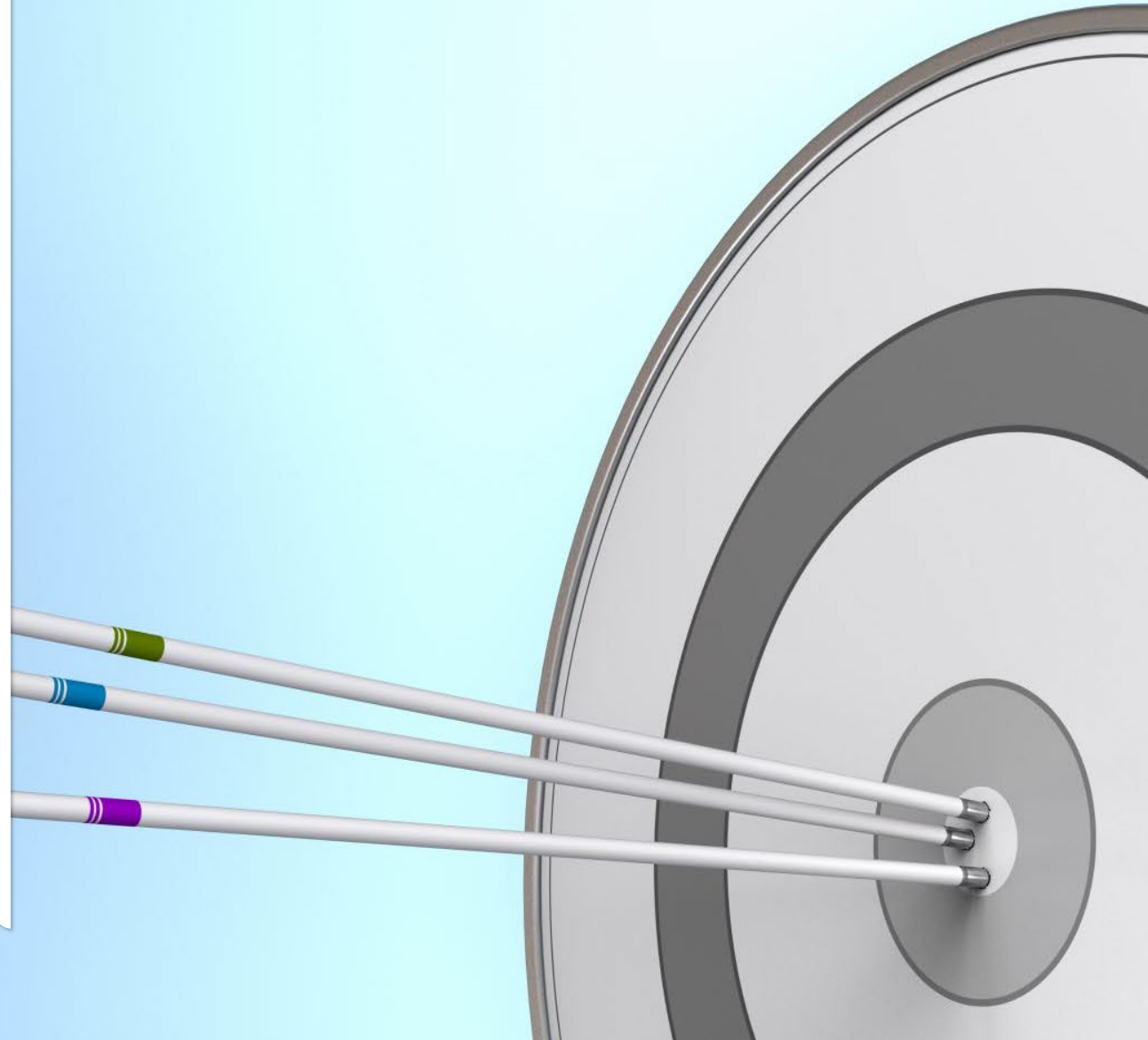
Grade 3

How matter can change states if it is heated or cooled

- Sept 20 @ 3:45-5:00
- Resources to use in classroom

Key Ideas

- ✓ Science uses methods of investigations to build knowledge and understanding of natural world
- ✓ Each grade learning outcome & KUSPS unwraps deeper layer of focus of the investigations
- ✓ There are criteria to develop skills & assess to help prepare students for next grades



Questions?



Thank you!

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