IGNITING CURIOSITY AND FOSTERING EQUITY:

THE POWER OF PHENOMENA-DRIVEN INSTRUCTION IN SCIENCE EDUCATION

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EducateOnPurpose

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I want to acknowledge the ancestral homelands of the Nacotchtank (Anacostan) and the neighboring contemporary lands of the Piscataway Conoy people. It is important to recognize the painful history of genocide and the forced removal of Indigenous people from this territory. These nations ceded significant portions of their land, forming present-day Washington, DC, in inequitable and unfair treaties with the U.S. government.

The violence directed towards Indigenous, Native, Aboriginal, First Nation, and First Peoples is ongoing. This violence is present when Indigenous people's histories are erased, their cultures are trivialized, their resources are seized, their labor is exploited, their children are stolen, and their lives are taken. To fight against this violence, occupiers of this land must listen and amplify Indigenous people's voices, while fighting against their complicity.

Truth and acknowledgment are critical to building mutual respect and connection across all barriers of heritage and difference. Acknowledgment is a critical public intervention, a necessary step toward honoring Native communities and enacting the much larger project of decolonization and reconciliation. I invite you to call for and spread this practice.

The use of American Indian mascots as symbols in schools and university athletic programs is particularly troubling because schools are places of learning. These mascots are teaching stereotypical, misleading and too often, insulting images of American Indians. These negative lessons are not just affecting American Indian students; they are sending the wrong message to all students."
- Former APA President Ronald F. Levant, EdD
https://www.apa.org/pi/oema/resources/indian-mascots

We are all on native land. I encourage you to visit https://native-land.ca/

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Who is in the room?

Mentimeter

Mentimeter

Why Phenomena-Driven Instruction?

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Why Phenomena-Driven Instruction?

Natural Curiosity

Why Phenomena-Driven Instruction?

Natural Storytellers

Why Phenomena-Driven Instruction?

Inclusion

So . Many . Acronyms

Understanding the Next Generation Science Standards (NGSS)

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DCI - Disciplinary Core Idea
SEP - Science and Engineering Practice
CCC - Crosscutting Concept
PE - Performance Expectation

What Are Phenomena In Science?

A phenomenon is not a driving question.

A phenomenon can be stated as an observation.
Makes students curious; they develop their own questions.
Can only be explained using science knowledge.

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Phenomena-Driven Instruction empowers all students.
Relevant
Relatable
Interesting

A phenomenon is not a WOW moment.

It can be anything that is puzzling, requires science to explain, and is just outside of students' current knowledge.

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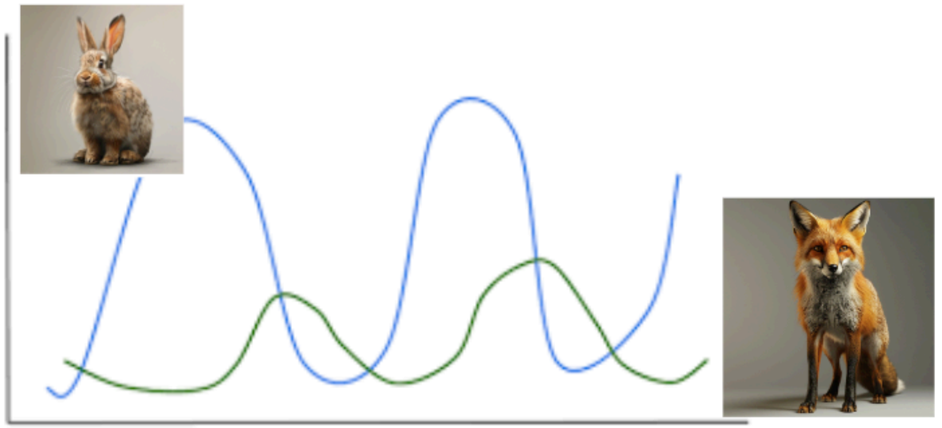
A dataset can introduce a phenomenon.



The information provided is just enough to get kids curious about the relationship between foxes and rabbits.

A phenomenon can be stated as an observation.
Makes students curious; they develop their own questions.
Can only be explained using science knowledge.

Take 3 minutes to work with an elbow partner to find phenomena here.
Hint: There can be multiple

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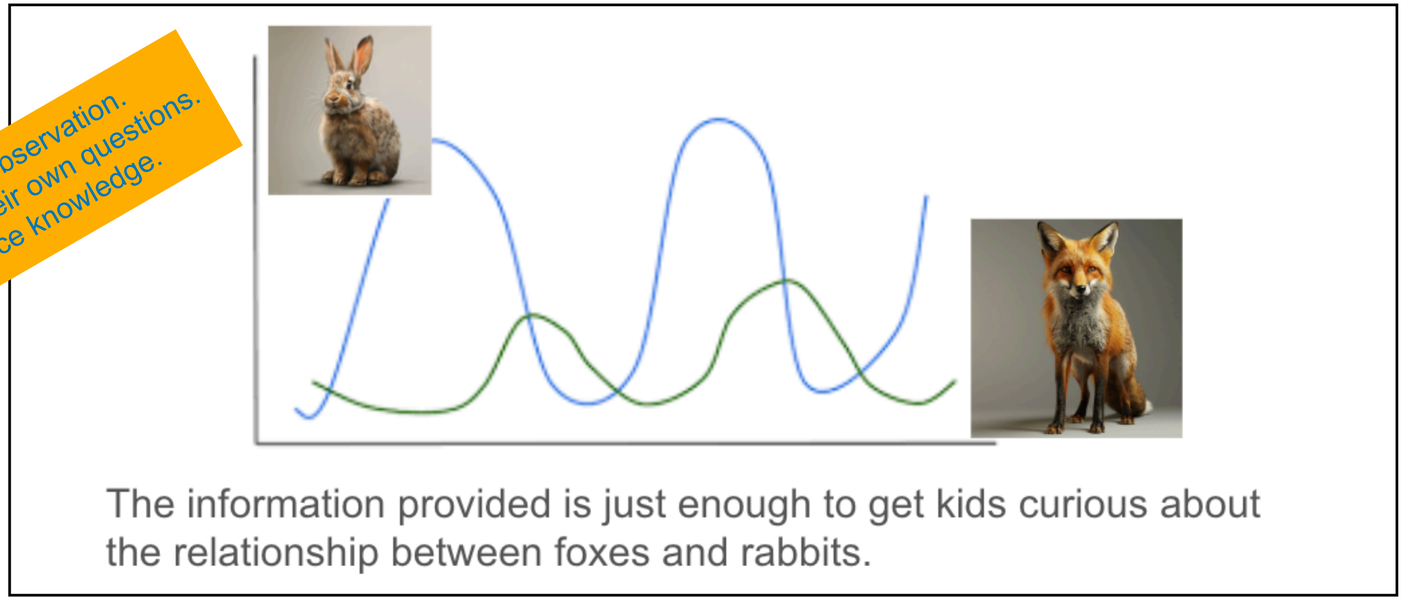

The phenomenon here could be:
The population of rabbits decreases as the population of foxes increases.
The population of foxes increases as the population of rabbits increases.
There is a connection between the populations of rabbits and foxes.

Use a notice and wonder or questioning protocol to gather students' questions.

Create a driving question board.

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Disciplinary Core Idea

Let’s Consider a Genetics DCI

Individuals of the same kind of plant or animal are recognizable but can also vary in many ways.

Consider what you could present to students to get them asking why this happens.

Photo by Elena Mozhvilo on Unsplash

Photo by Ed Robertson on Unsplash

Photo by Markus Winkler on Unsplash

Individuals of the same kind of plant or animal are recognizable but can also vary in many ways.

Building and Returning to a Driving Question Board.

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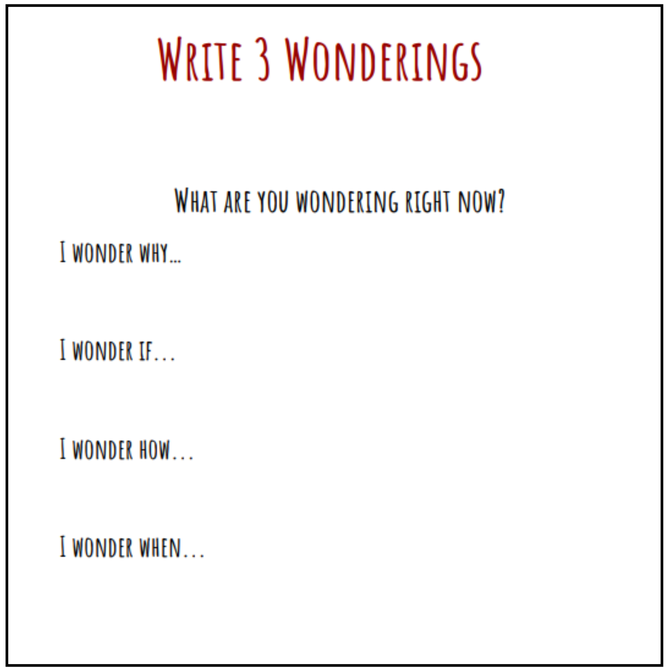
Now, It's All About

Routines

- Questioning Protocols
  - QFT (lengthy)
  - Notice and Wonder (faster)
  - Write 3 Wonderings (fastest)
  - INQUIRE (just right)



I.N.Q.U.I.R.E. Protocol for Image-Based Phenomena

🔍 Initiate with Observation

Start by sharing an image with students. Instruct them to observe the image silently for one minute.
Ask students to describe what they see in the image without making any inferences. This step is purely about noting observable details.
Example Questions: What do you notice about the image? What objects, colors, or patterns do you see?

🕵️ Note Inferences

Encourage students to explain what is happening in the image.
Example Prompt: Write a statement explaining what is happening in the image.

🤔 Question Curiously

Guide students to formulate questions about the image that reflect their curiosity and any aspects they find puzzling or want to learn more about.
Example Questions: What questions do you have about this image? What do you wonder about the people, places, or events depicted?

🔗 Understand Connections

Ask students to connect the image to their own experiences, knowledge, or other content they have learned.
Example Questions: Does this image remind you of anything? Can you make any connections to what we have studied or your own life?

💡 Investigate Further

Encourage students to speculate about aspects of the image that go beyond the visible details.
Example Questions: What do you think may have led to this situation? What might happen next?

📝 Reflect and Summarize

Have students reflect on their observations, inferences, questions, connections, and speculations. Summarize their thoughts to consolidate learning.
Example Activity: Write a summary of what you learned from the image and how it relates to our current topic.

🧠 Engage in Discussion

Facilitate a group discussion where students share their insights and learn from each other's perspectives.
Example Questions: What new ideas or understandings did you gain from this activity? How did your peers' observations and inferences influence your thinking?

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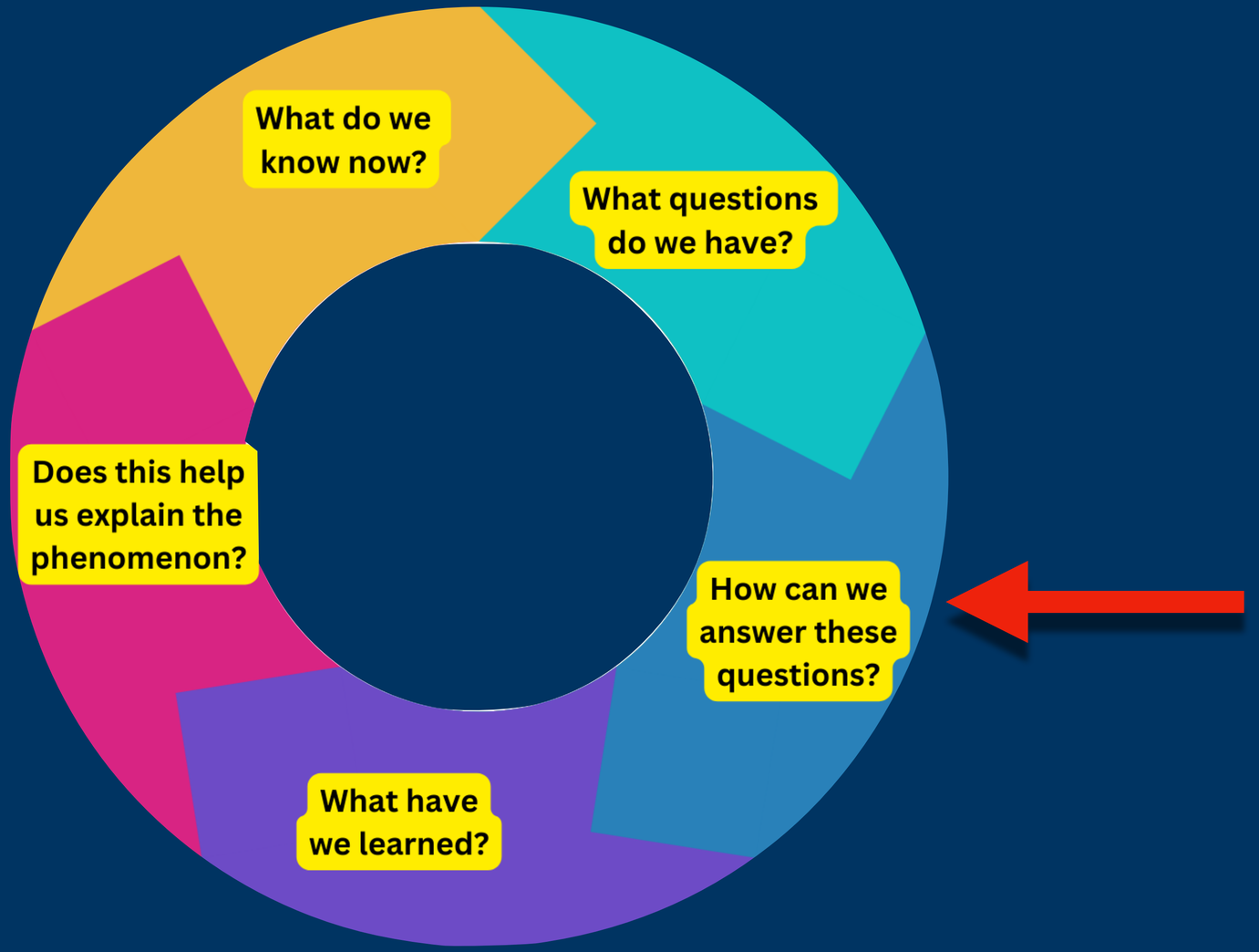
Building and Returning to a Driving Question Board.



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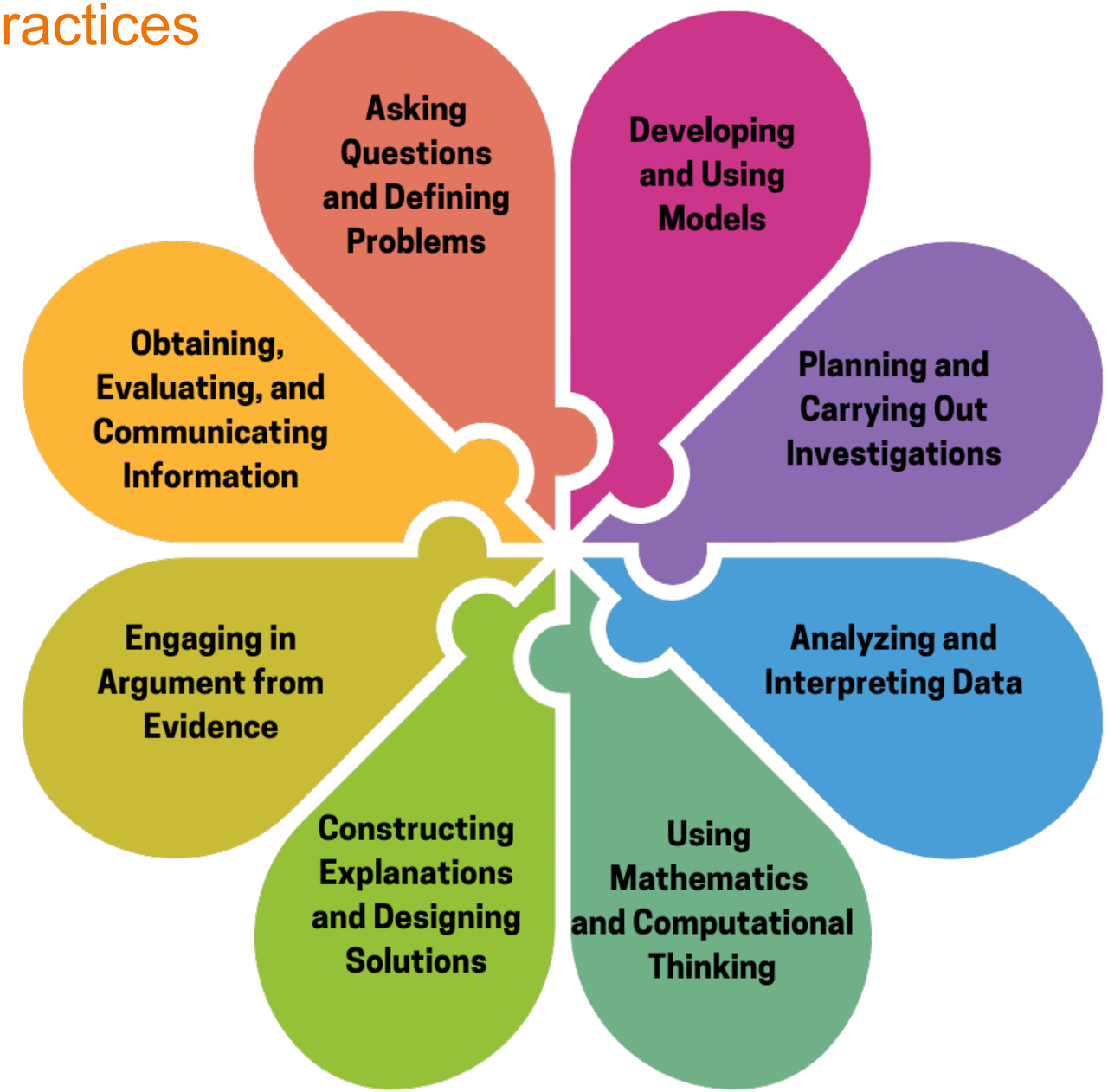
Science and Engineering Practices

Investigations!

The **REALLY** Fun Part

This is not the scientific method.
Think of each practice as a way of learning or demonstrating learning.



Give feedback to Bonnie

Scan this QR code

Or go to

https://talk.ac/bonnienieves

and enter this code when prompted

RISING

Powered By talkadot

The Shifts

Worksheets	⇨	*Workflows*
Explanations	⇨	*Investigations*
Active	⇨	*Engaged*
Interested	⇨	*Inspired*
Extrinsic	⇨	*Intrinsic*
Most	⇨	*ALL!*

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