What Math Lives Here?

Math Investigations and Numeracy Outdoors

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Why do Math Outside?

- Connection to Land and Place – First Peoples Principles of Learning
- Mental and physical health
- Deepening understandings: authentic contexts and problems develops numeracy skills
- Curiosity, Exploration and Connections: Sense-making
- SEL: Connecting Math to our world and exploring it's centrality to our lives and our community
- Equity and social justice: Math as a tool of empowerment and change that belongs to everyone

Mathematicians are Curious!
What do you Notice? What do you Wonder?

- Little plants tin trays and rows (arrays)
- Lots of giant trees
- Different structures: size, shape, purpose
- Ducks, geese and chickens
- Water: puddles, ponds, ditches, hoses, barrels
- All different sizes of rocks
- Some pathways are dirt and some are paved
- Eggs for sale
- There is a noisy road that goes past

- How do you know how big to make the garden?
- How do you know how much to sell the eggs for?
- Could I stand up in the pond?

Look at all the ants eating that smashed egg!! Will they eat it all? How long would that take? How far do they have to travel to get back to their nest? How many ants live there? How much do they eat? Did the ants carry the egg here? How much can an ant lift?

- Why are all the greenhouses that shape?
- How much "fertilizer" do the animals make?
- How big is that tractor? How much can it pull?
- How big is that tree?
- How steep is this path?
- Why is that road so busy?
- Why is that path so skinny?
- How much space do beavers need so they don't destroy the trees?
- How much water is in there?

How many trees are there? (Outdoor Counting Collections)

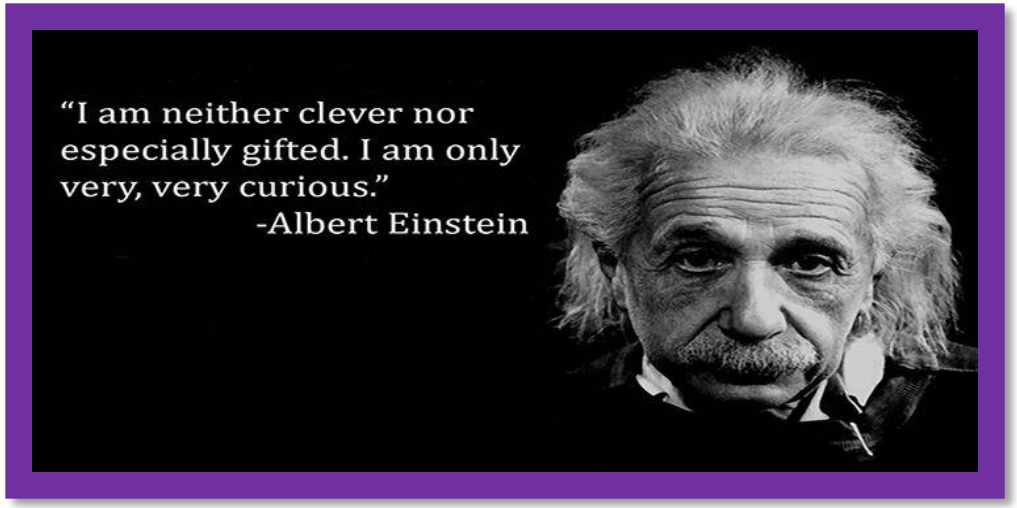
Why is there a "ruler" in the pond?

Why are those doors so short?

Inquiry:
Mathematicians Explore and Investigate

How does the "dry reach" effect the salmon?

- How many salmon spawn here? How has it changed over time? Is there a pattern?
- How big is the dry reach? How long does it stay dry?
- How can we measure change across the year? How can we track the data? How can we use data to make change?



What Math lives here?

What is the relationship between...?

How can Math help us...?

For more Inquiry resources and ideas, visit my website
https://mathingaround.com/curriculum/

Mathematicians and Narrative

Math is often perceived as a disconnected bunch of rules and processes to be memorized and repeated.

Viewing math through different lenses and contexts enriches and deepens learning by offering students sense-making narratives and connections between concepts, "strands" and other areas of learning.

Narrative can be a powerful way of honouring the First People's Principles of learning in Math.

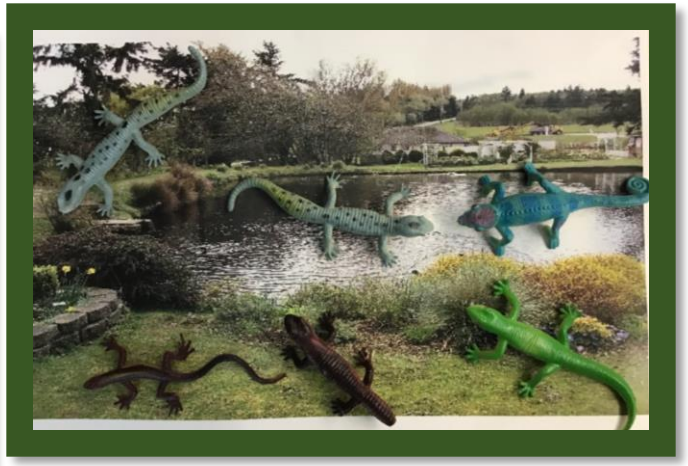
Exploring Math through different narratives, contexts and lenses can be a great way to make it more inclusive and to disrupt the idea that Math is only for some people.

Exploring Math through the daily life of cultures is called "Ethnomathematics." All communities have a shared culture and use math in particular ways. For example:

- What kind of Math do farmers use?
- How did Coast Salish Peoples use Math?
- What is the relationship between traditional mathematical processes for building a canoe and modern processes?

Story Mats and Anchor Texts

Just as using story can help students make sense of other relationships, they can be used for sense-making in Math as well. Creating narratives to explain what happens helps students build concrete connections upon which to base the pictorial and symbolic representations that Mathematicians use. **ALL students need access to concrete connections** as they engage in new learning and deepen their understandings.



Resources :

- My website: https://mathingaround.com/curriculum/reading/
- Indigenous Storywork Website: https://indigenousstorywork.com/
- Book: Mathematizing Children's Literature by Allison Hintz and Anthony T. Smith

Mathematicians Play and Explore

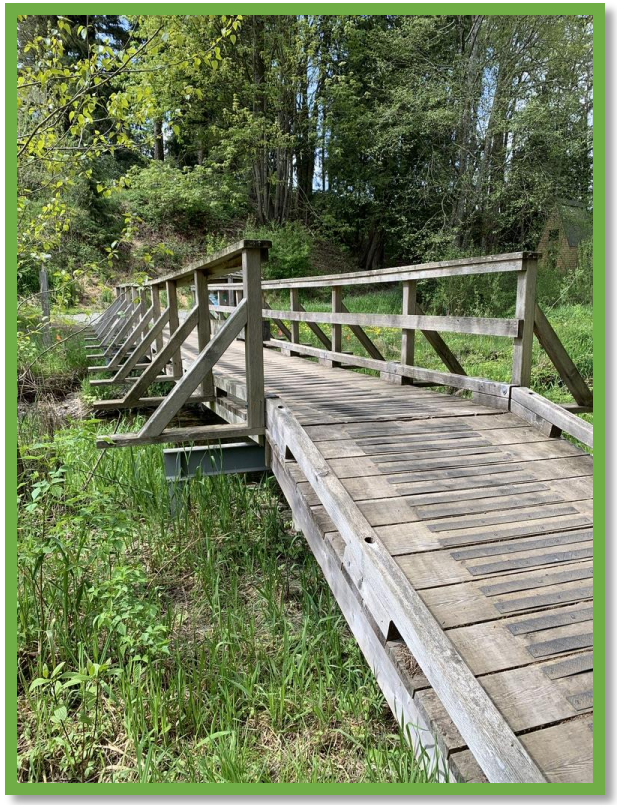
Are chickens fast?

How do we decide on prices for the farm market?

Why aren't fields round?

How many cars fit in the parking lot? what is the best way to park them?

What shapes can you see? How do you see them? What else could they create?



How can that spider run on water?!

Where does Math live in our game/artwork/construction?

For more Math Play resources and ideas, visit my website
https://mathingaround.com/math-play/

Slahal

Resources for Playing and Mathematizing Slahal:

- Abbotford SD Indigenous Department (PDF): **Slahal (4-12) (PDF download)** from https://indigenous.abbyschools.ca/search/google/slahal

- Youtube Video: https://www.youtube.com/watch?v=_BBHge8wzR0

- BCTF Resources lesson plan (Gr. 8, but adaptable to 6/7): https://sites.google.com/gsuite.viu.ca/lahal-math-connections/the-game?authuser=0

- Stick Game and other Indigenous games by Math Strand: http://mathcentral.uregina.ca/RR/database/RR.09.00/reptau1/mathcontent.html

Mathematicians Justify and Consolidate

Observe: Get curious about how our students think and work. WHY do they make the choices they make?

Listen: Children are wired for sense-making and learning. By listening to their self-talk, conversations and responses to our authentic questions, we learn much about their current understandings and what nudges or supports might be helpful to their learning.

Ask: Showing and telling shut down curiosity and thinking. Practice asking questions instead:

- Why did you use that strategy?
- What problem are you trying to solve?
- What could you try?
- What have you learned so far?
- Is this…similar to or different from…?
- What information do you have or need?
- How do you know?
- Can you prove it?

Consolidate Learning:

Use the last 10-15 minutes of the lesson or activity time to have a discussion about what students **learned in relation to the planned and stated learning intention.** Lots of cool things will happen during investigations and we need to help students integrate that learning. Use thoughtfully chosen student examples and explanations gathered as you observed, listened and asked questions.

Remember: We cannot assume students will learn what we intended, if we neglect to consolidate the learning.