

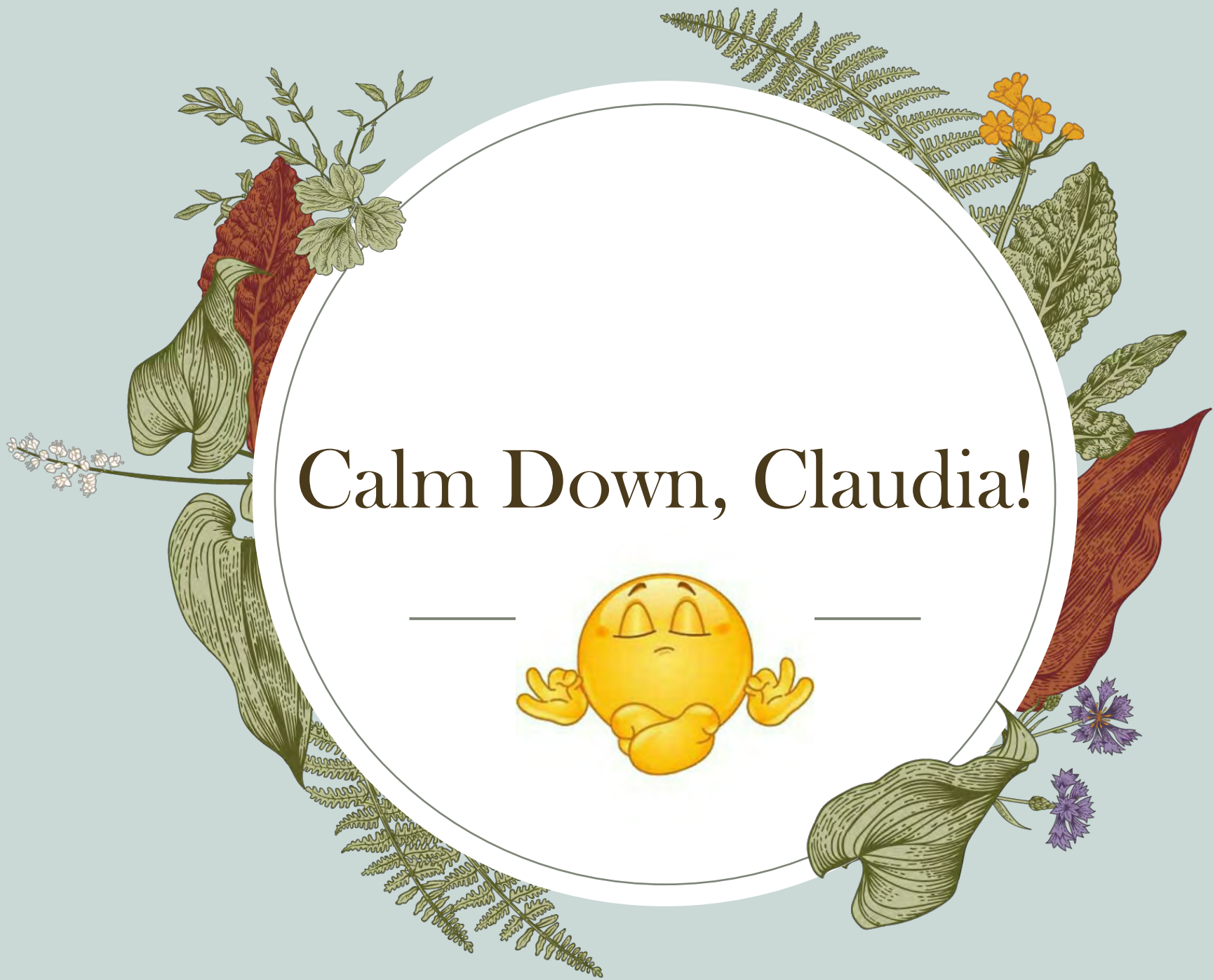


Math AND Science, Naturally!

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Calm Down, Claudia!



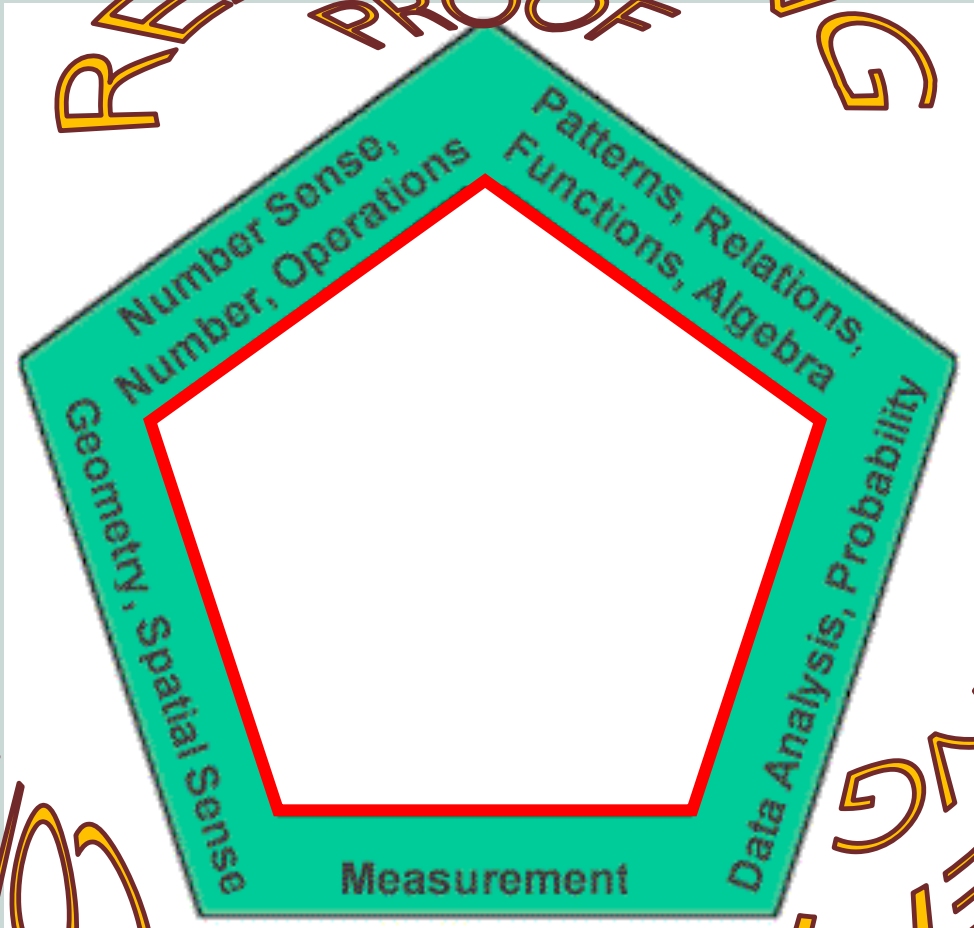
Common “Ground” (Definitions)



- Mathematics
 - The science of **structure, order, and relation** that has evolved from elemental practices of **counting, measuring, and describing** the shapes of objects. It deals with **logical reasoning** and **quantitative calculation**, and its **development** has involved an increasing degree of idealization and abstraction of its subject matter. (Brittanica.com)
 - **Explicit communication of implicit relationships** (Dietz, C.)

PRESENTATION

CONNECTIONS



REASONING
PROOF

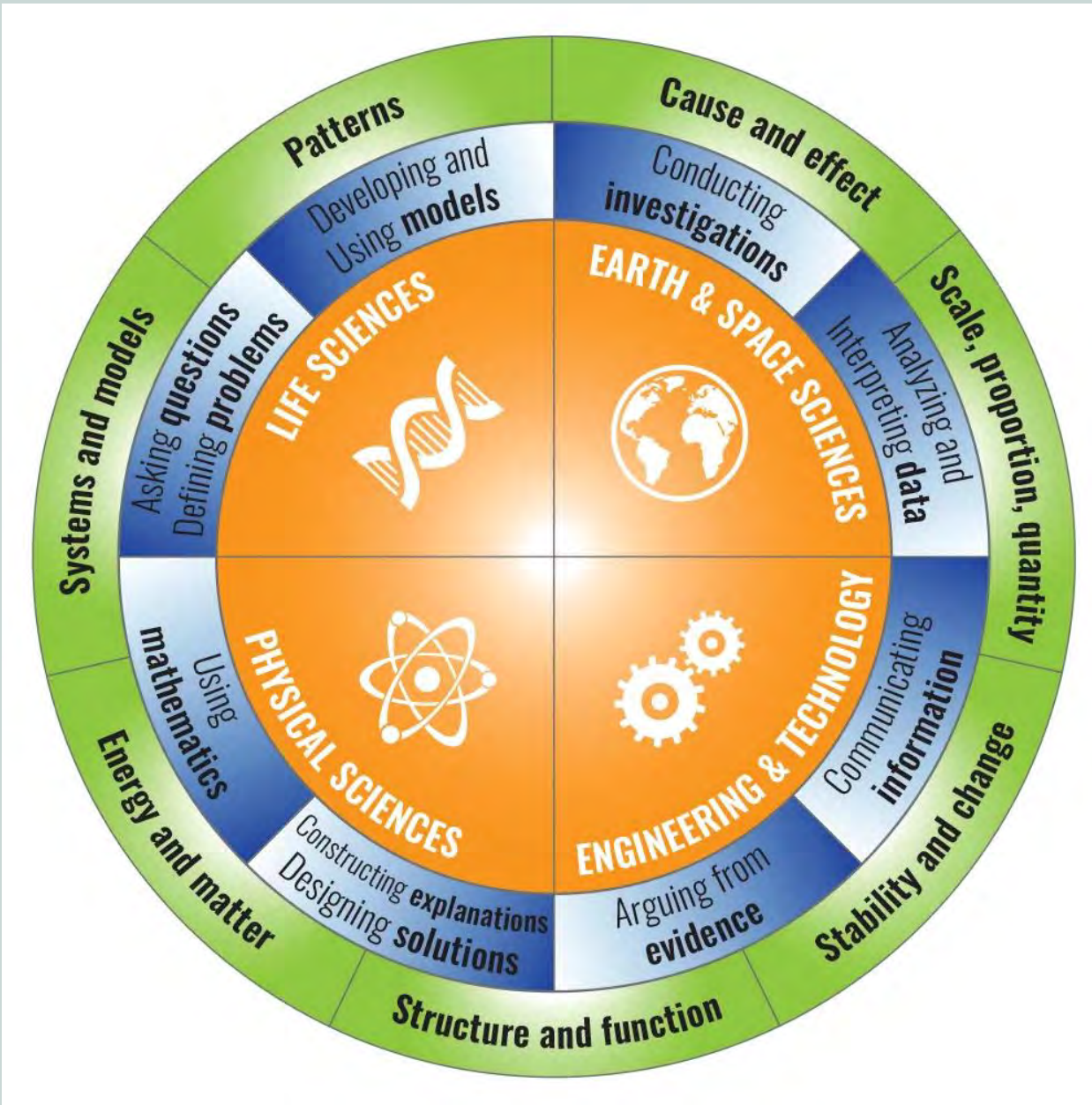
PROBLEM SOLVING

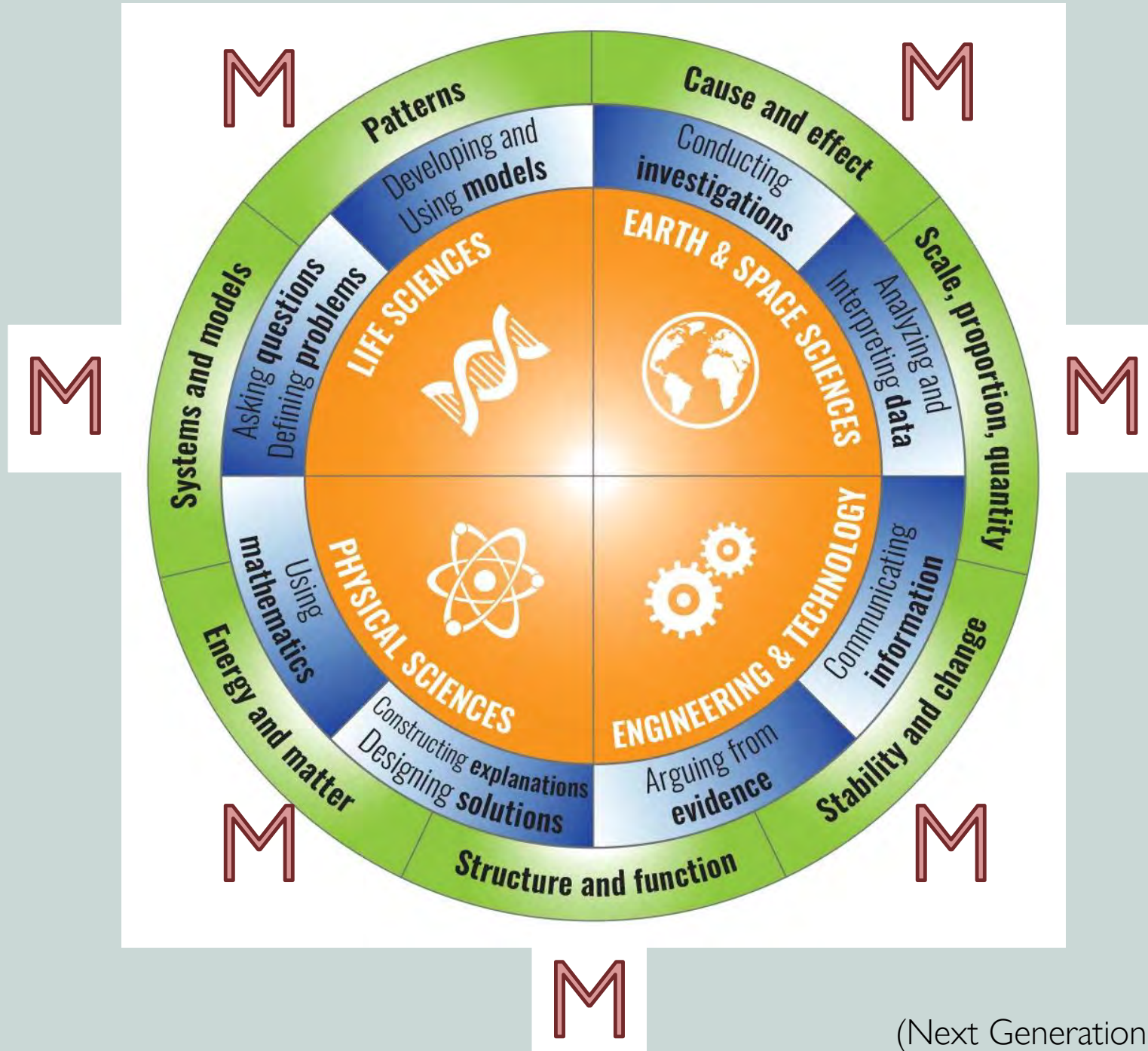
COMMUNICATION

Common “Ground” (Definitions)



- Mathematics
 - The science of structure, order, and relation that has evolved from elemental practices of counting, measuring, and describing the shapes of objects. It deals with logical reasoning and quantitative calculation, and its development has involved an increasing degree of idealization and abstraction of its subject matter. (Brittanica.com)
 - Explicit communication of implicit relationships (Dietz, C.)
- Science
 - **Systematic study** of the **structure and behavior** of the **physical and natural world** through **observation, experimentation, and the testing** of theories against the evidence obtained. (Oxford Dictionary, 6/24/24)
 - The **pursuit and application** of knowledge and understanding of the natural and social world following a systematic methodology based on evidence. (Science Council, 6/24/24)





Hold on!



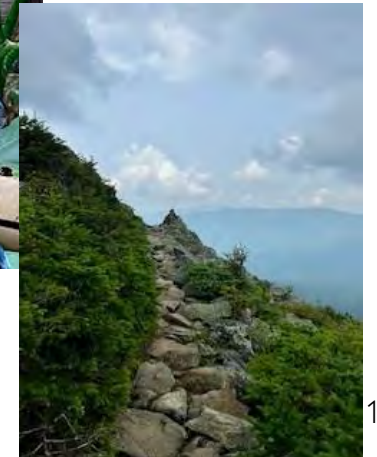
Common “Ground” (Definitions)



- Nature

- The external world in its entirety
(Merriam-Webster.com)

- The phenomena of the **physical world collectively**, including **plants, animals, the landscape, and other features and products of the earth [universe]**; the basic or inherent features of something, especially when seen as **characteristic** of it; or “the innate or essential **qualities** or character of a person or animal.”
(New Oxford American Dictionary)



Common “Ground” (Definitions)



Teaching math *and* science in **CONTEXT**
via lessons that are meaningful and purposeful.

- Using math AND science – together – to understand, explain, clarify, and better our world for the good of the world.

Common “Ground” (Definitions)



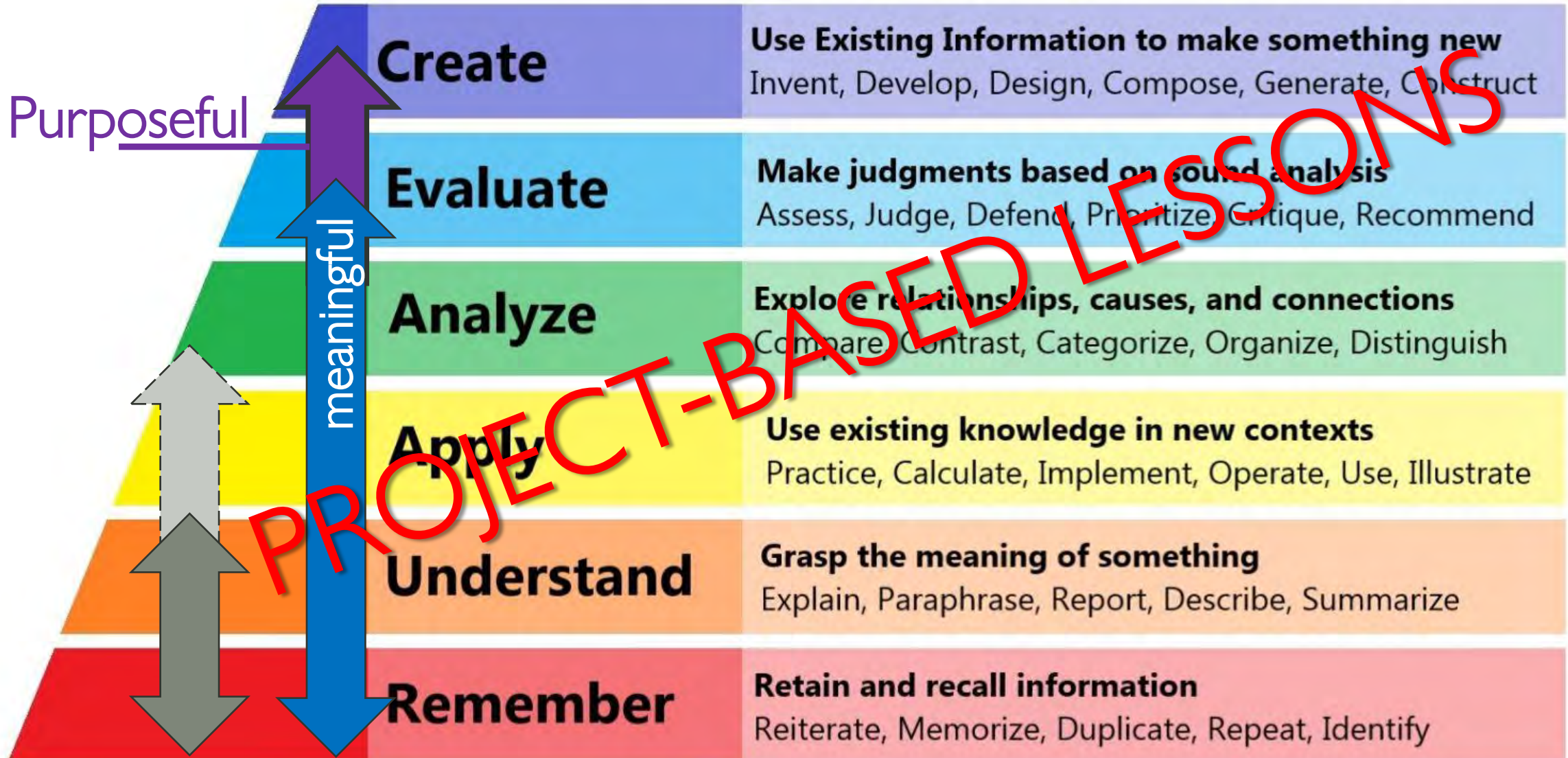
• Meaningful Lessons


- Understanding, explaining a phenomenon.
- Finding out the facts or the reasons, the “what” and “why.”
- Learning that has a significant reality, especially to the learner.

• Purposeful Lessons

- Has a further goal
- Not just for facts or for finding out the “why” of something, but also to USE that “why.” To go beyond just learning.
- To contribute to the solution to a problem or contributing to finding out more about a phenomenon
- Iterative; putting information/data back into a collection of information/data towards a purpose or goal that has meaning.

BLOOM'S TAXONOMY





**“GROWING”
YOUR STUDENTS’
KNOWLEDGE**



“Seeds”

Local - “Backyard”

Global - Webcams

Online - Simulation Labs

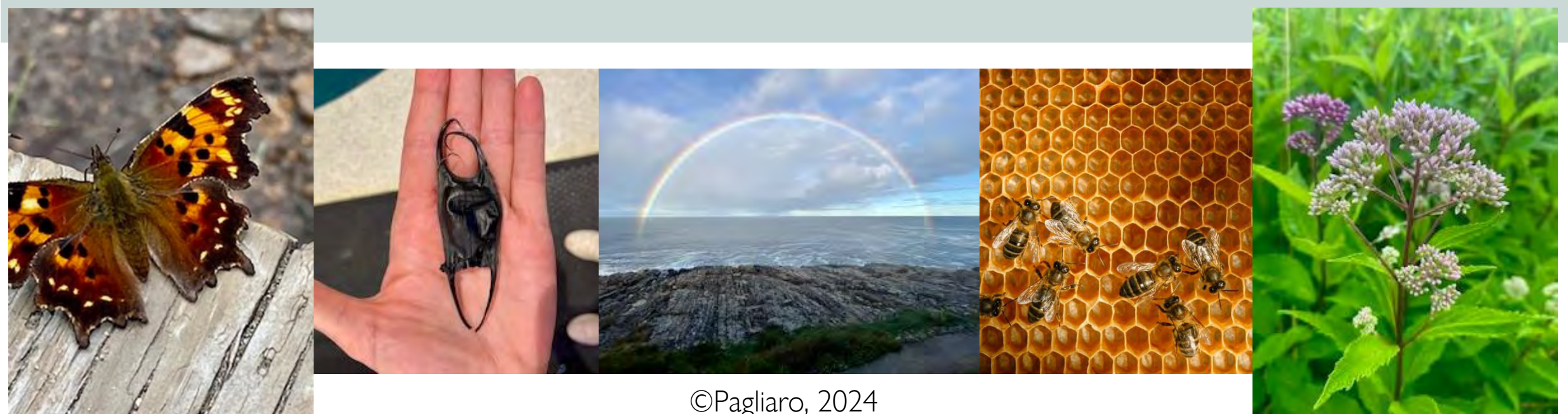
Citizen Scientist



“Backyard”



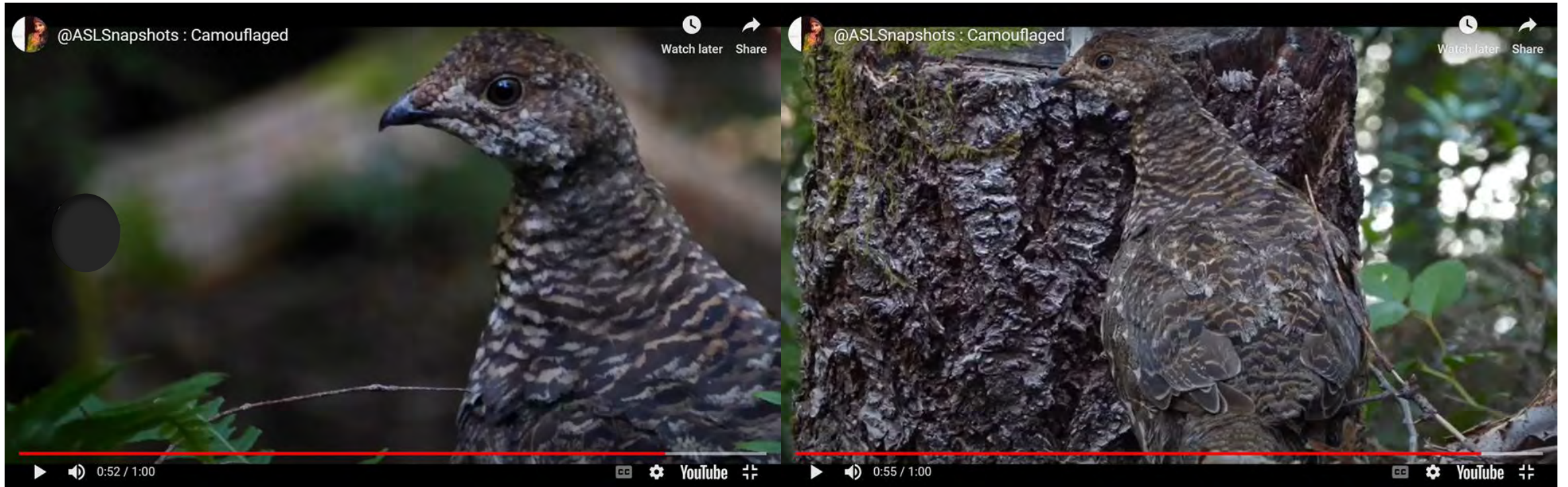
“Backyard”



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- [Beautiful Mathematics in the Natural World \(youtube.com\)](https://www.youtube.com/watch?v=...) – great video regarding high-level math and science in nature
- [Natural Patterns are extremely beautiful - ECstep](https://www.ecstep.com/...)

Meaningful



Meaningful

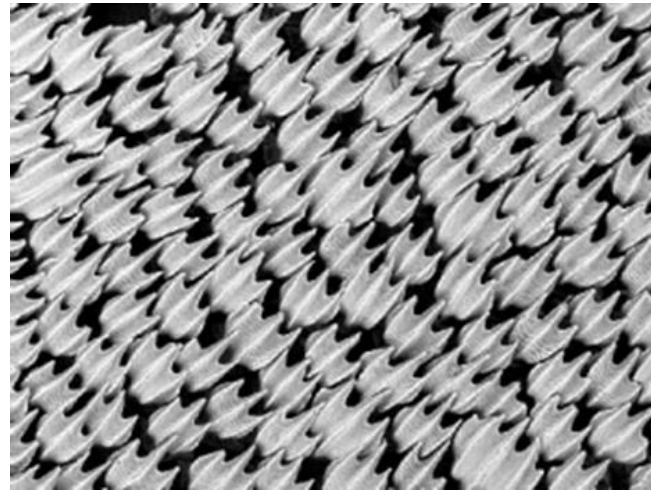


<https://www.tynemouthaquarium.co.uk/blog/animal-stories/8-clever-fish-species-that-use-camouflage-to-survive-in-the-ocean/>

Meaningful



Meaningful



- Shark skin -- Denticles

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Purposeful



- Biomimicry: the imitation of characteristics and behaviors of the natural world in solving challenges faced by humans
 - Olympic bathing suits
 - Underwater robots
 - Medical surfaces
 - Other???

Meaningful & Purposeful



- [Project NOAH](#) (“networked organisms and habitats”)
 - Project Noah [Nature School](#)
 - Ex. Turtle Tunnel



Nature Webcams



Meaningful



- [Brown Bear Cam - Brooks Falls in Katmai National Park | Explore.org](#)

2024
OCTOBER
2 - 8

FAT BEAR WEEK

909 JR.



WED. 2



519



FRI. 4

128



MON. 7
SEMIFINALS

747



903



FRI. 4

WED. 2



909



TUE. 8



SAT. 6



32

MON. 7
SEMIFINALS



164

SAT. 6



THUR. 3



901



856

THUR. 3



504

Meaningful



- [Brown Bear Cam - Brooks Falls in Katmai National Park | Explore.org](#)
- [Cornell Lab FeederWatch Cam at Sapsucker Woods \(youtube.com\)](#)
- **FOBBV CAM: Friends of Big Bear Valley (CA)**
 - [Big Bear Bald Eagle Live Nest - Cam 1 – YouTube](#)
 - [FOBBV LIVE Recap & Observations - Google Docs](#)
- [Namibia: Live stream in the Namib Desert \(youtube.com\)](#)
- [California Academy of Sciences in San Francisco, CA \(calacademy.org\)](#)
- [Shark Cam - Live underwater webcam of sharks | Explore.org](#)



Citizen Scientist

Data Contribution



Meaningful & Purposeful



- [Citizenscience.gov](https://www.citizenscience.gov)
- [Scistarter.org](https://www.scistarter.org)
- [Chart of Marine Debris Decomposition - The Global Education Project](#)
- [On a Mission to Monitor Shoreline Marine Debris | OR&R's Marine Debris Program \(noaa.gov\)](#)
- [Data Platform | Marine Debris Tracker](#)
- [The Lost Ladybug Project](#)
- [Home | ZomBee Watch Project](#)
- [Shark Tracking at the Guy Harvey Research Institute \(ghritracking.org\)](https://ghritracking.org)



Online Simulation Labs



Meaningful & Purposeful



- [Lab Xchange Virtual Lab Simulations \(labxchange.org\)](http://labxchange.org)
- [Labster | Virtual Labs for Universities and High Schools](#)
- [Energy | NOVA Labs | PBS](#)



Summary

Mathematics and science are *means* by which we understand our world, and tools with which we share, and perhaps change our world for the better!

Let you students in on that! Offer them lessons that having meaning and purpose, NATURALLY!





Thank you!

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