New SCIENCE Curriculum

Energy
Grade 1

November 21, 2023

Facilitators: Chris Żarski & Ted Zarowny

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.

The Seven Grandfather Teachings Read by Etienna Moostoos-Lafferty

Photo by Peng Chen on Unsplash

Agenda

The Big Picture - Energy through K-3

- What is *Movement*?
- How do we move?
- Why do we move?

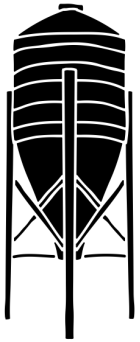
Skills and Procedures

- Explore
- Identify
- Observe
- Compare

1 The Big Picture

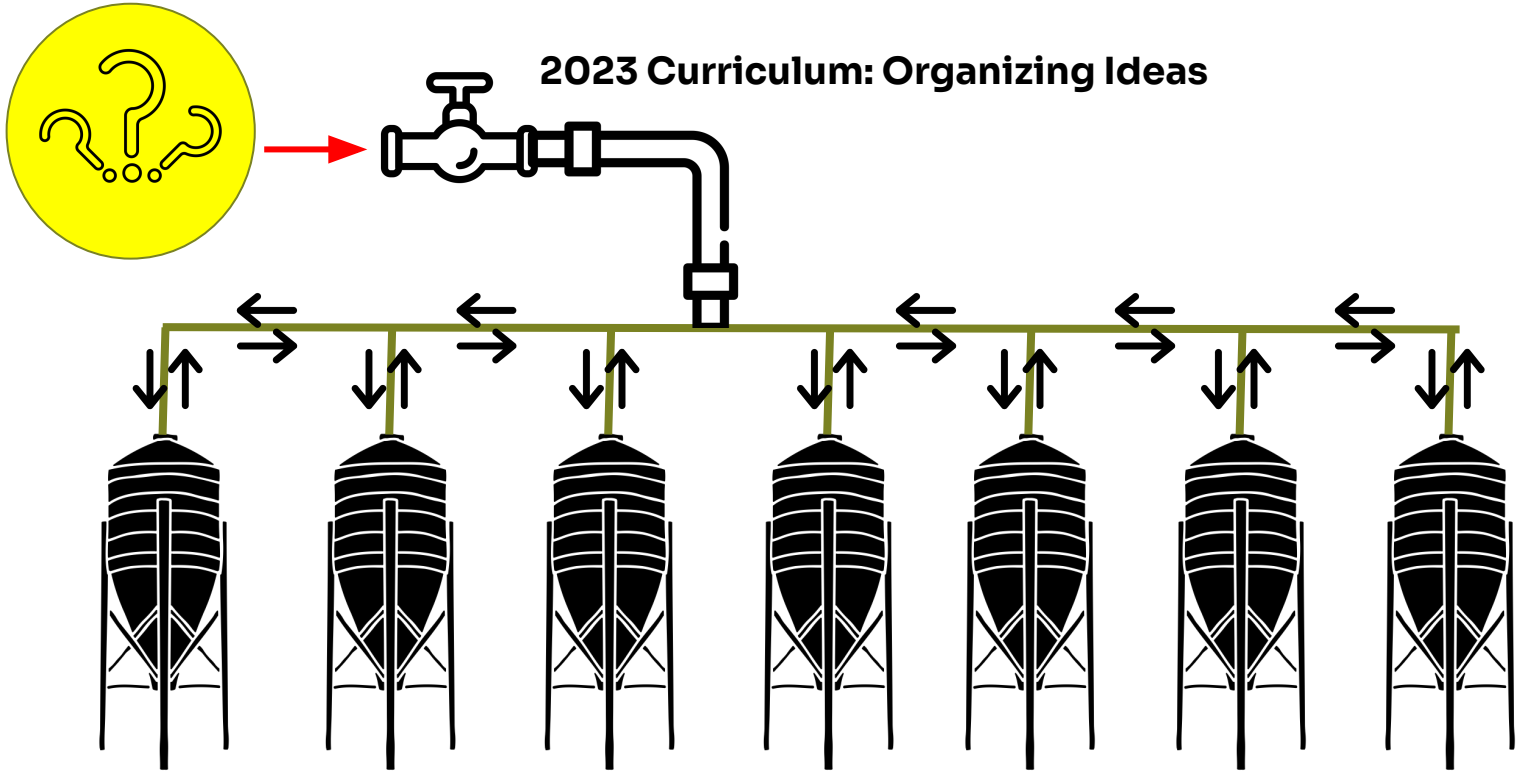




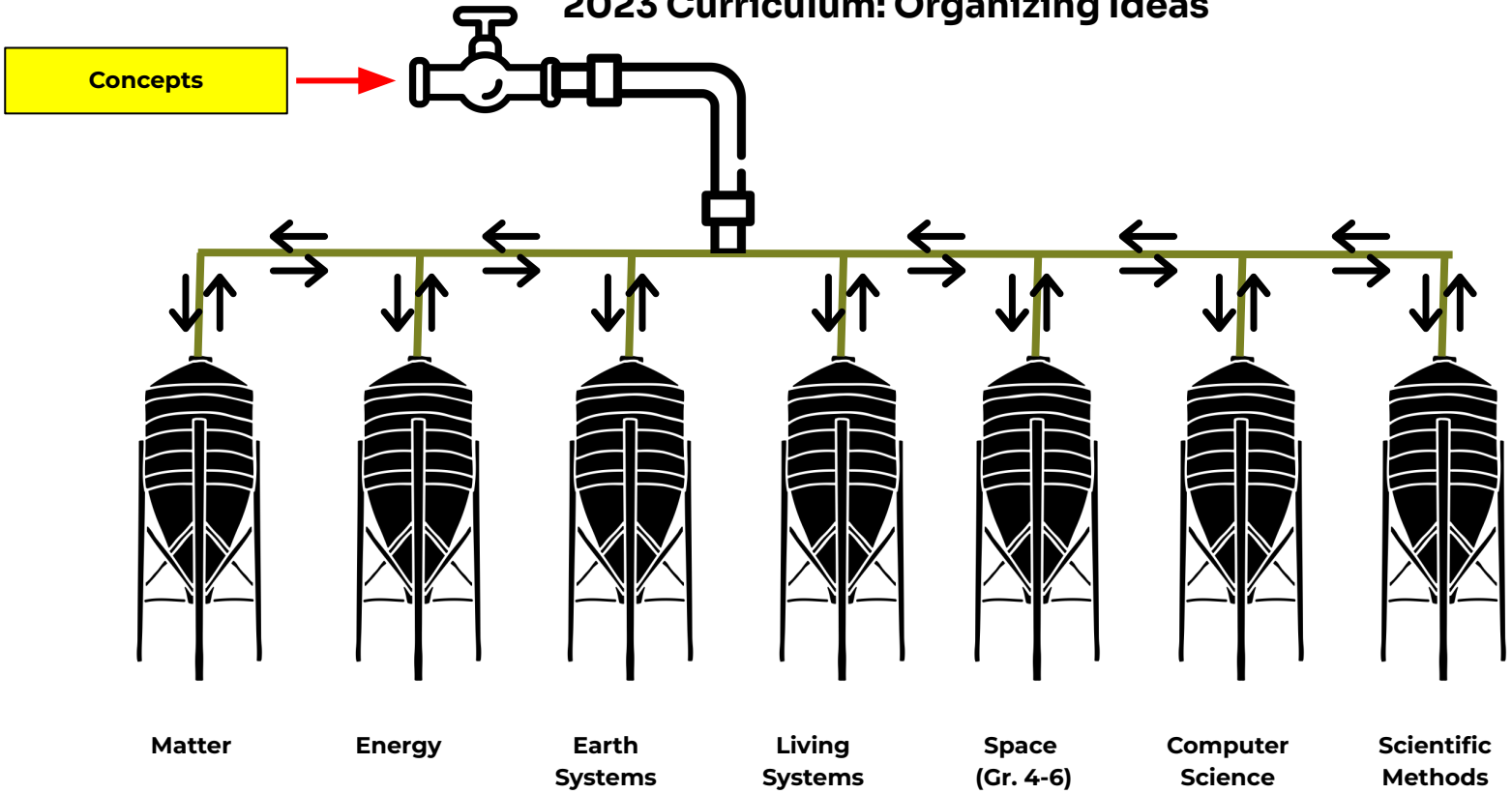


GR. 1	Seasonal Changes	Needs of Animals and Plants	Creating Colour	Building Things	Senses
GR. 2	Small Crawling and Flying Animals	Buoyancy and Boats	Magnetism	Exploring Liquids	Hot and Cold Temperature
GR. 3	Building with a Variety of Materials	Testing Materials and Designs	Rocks and Minerals	Rocks and Minerals	Animal Life Cycles
GR. 4	Building Devices and Vehicles	Light and Shadows	Plant Growth and Changes	Waste and Our World	Wheels and Levers
GR. 5	Electricity and Magnetism	Mechanisms using Electricity	Classroom Chemistry	Weather Watch	Wetlands Ecosystems
GR. 6	Air and Aerodynamics	Flight	Sky Science	Evidence and Investigation	Trees and Forests

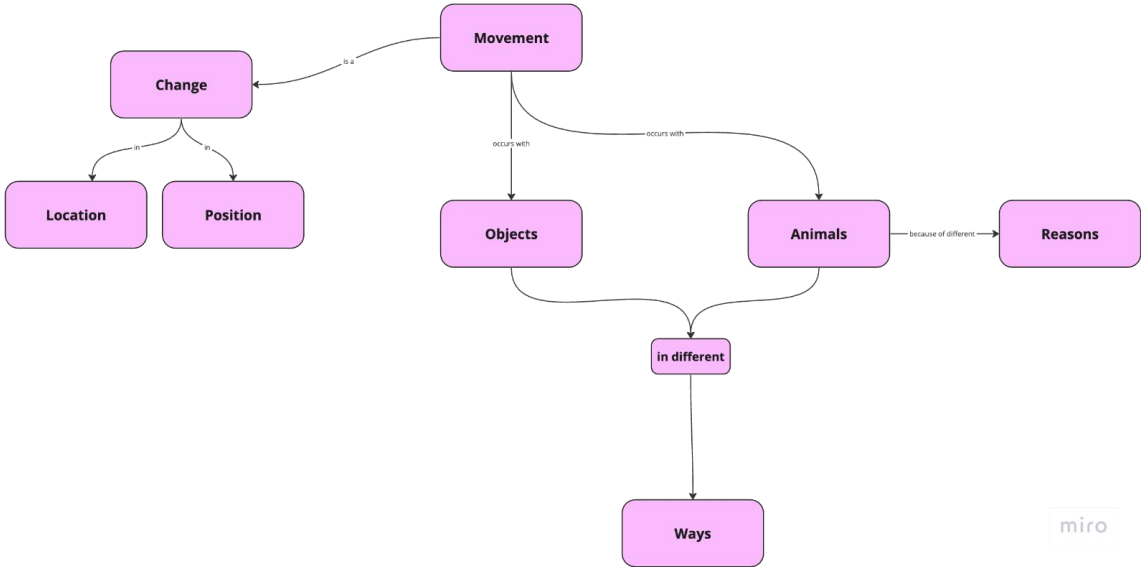
2023 Curriculum: Organizing Ideas



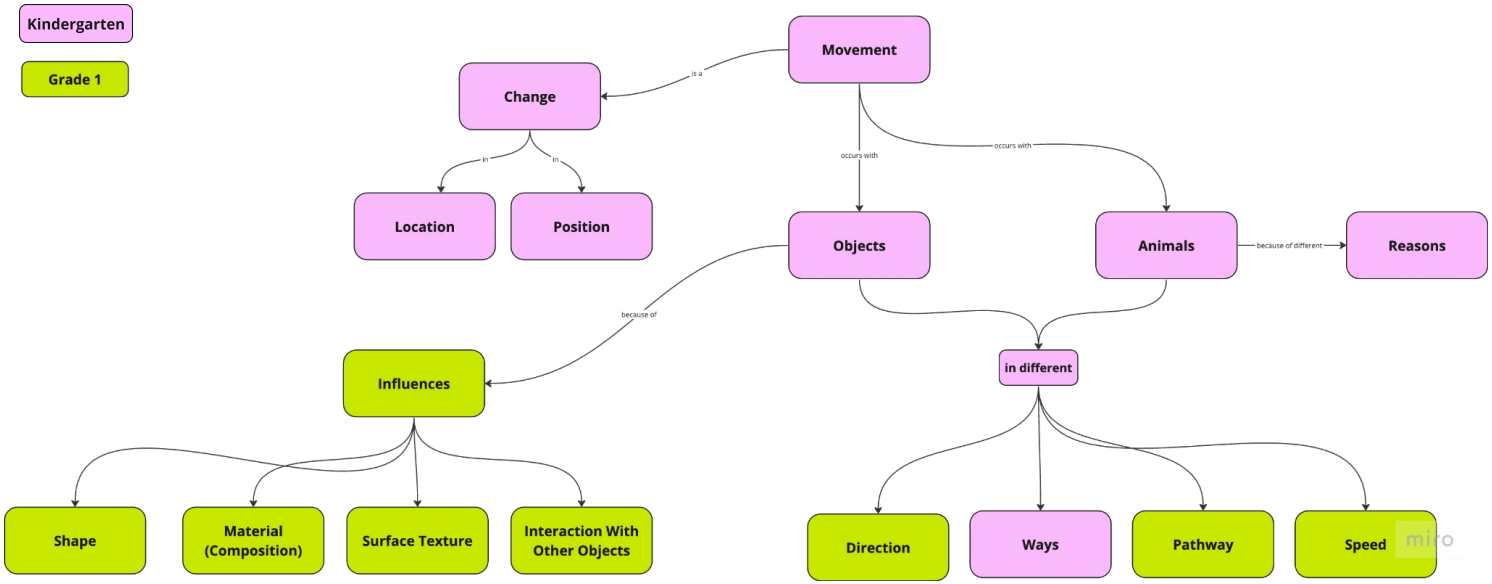
2023 Curriculum: Organizing Ideas



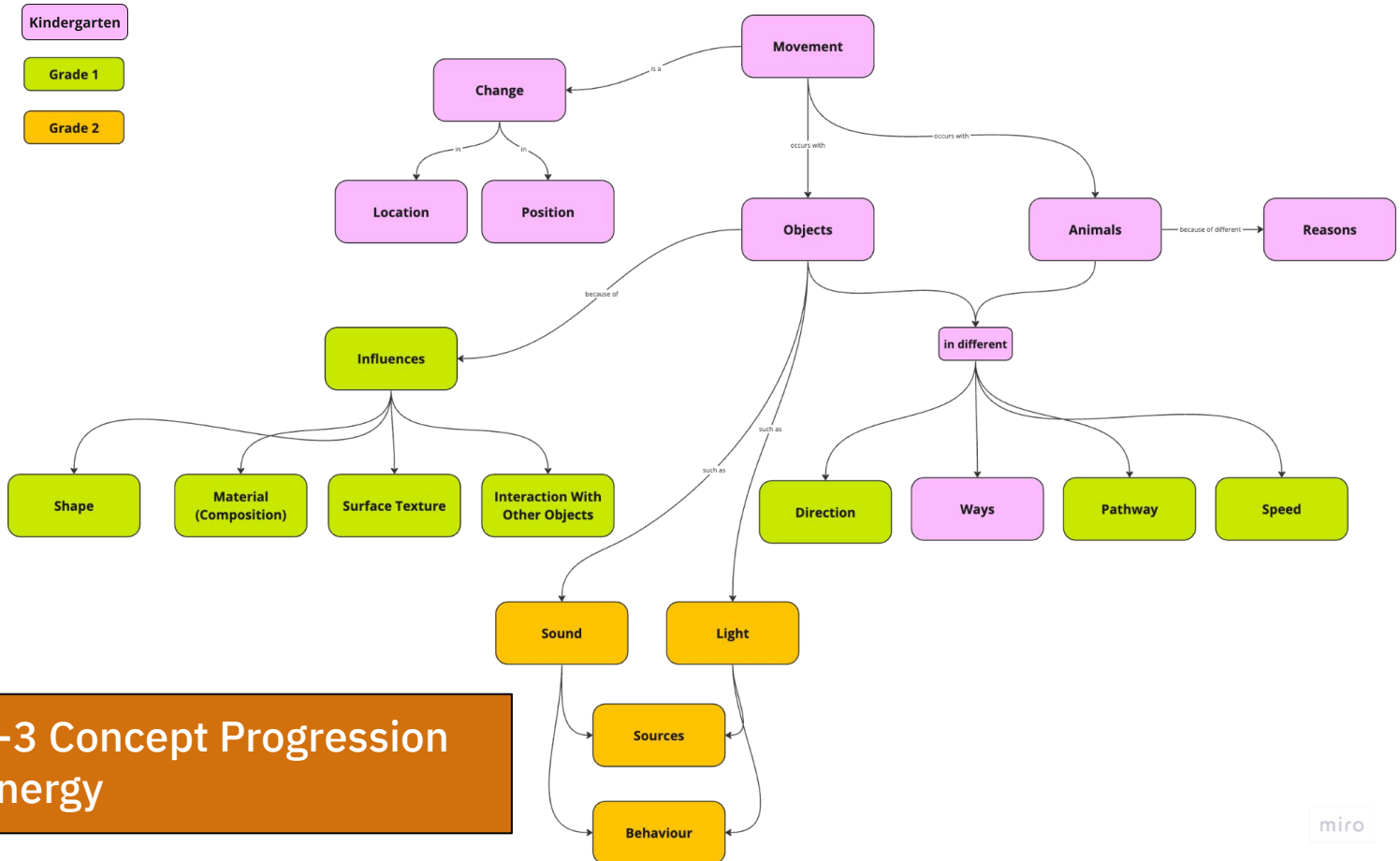
Kindergarten



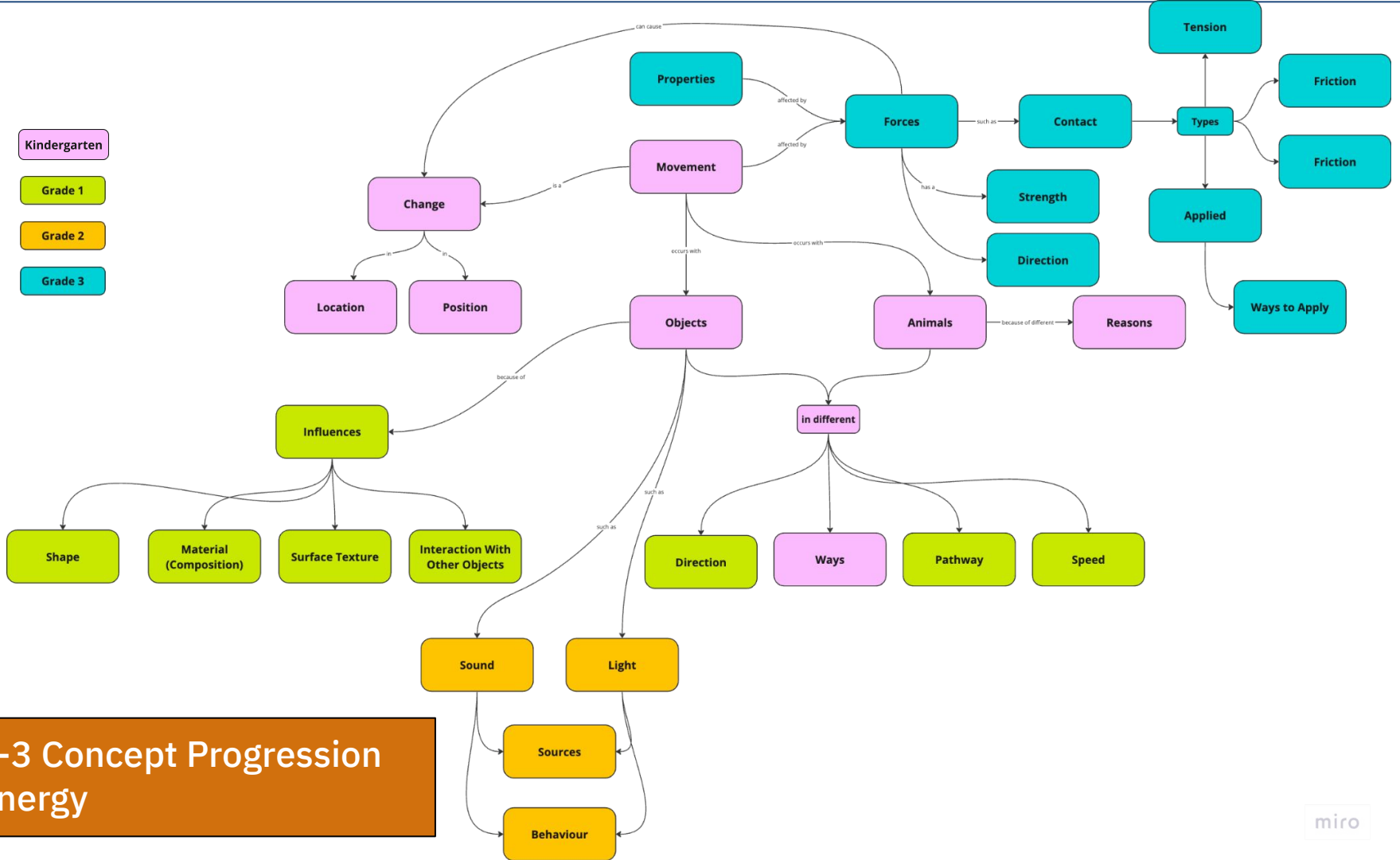
K-3 Concept Progression
Energy



K-3 Concept Progression Energy

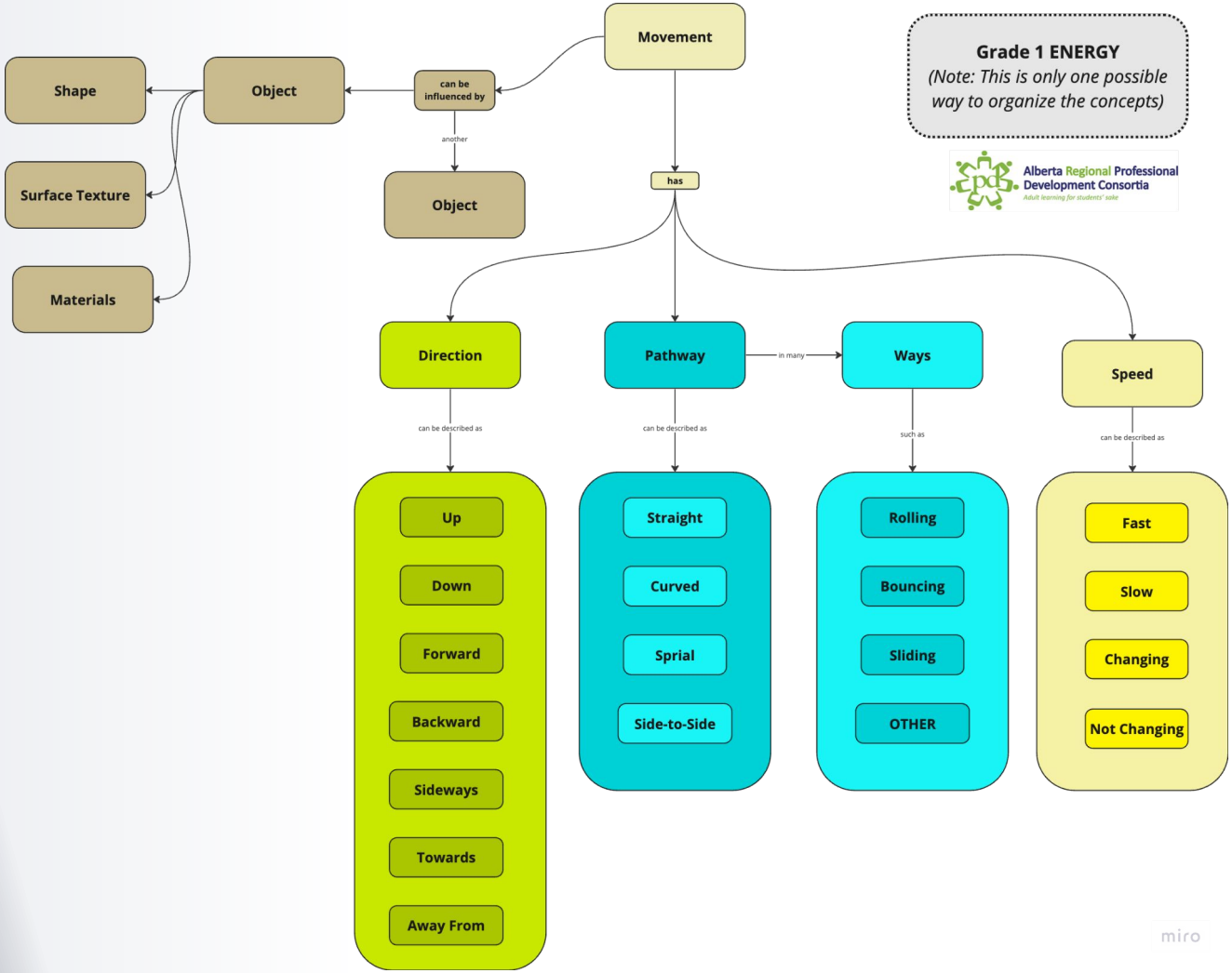


K-3 Concept Progression
Energy



K-3 Concept Progression
Energy

Grade 1 Energy Concept Map



ENERGY (01)

ENERGY (02)

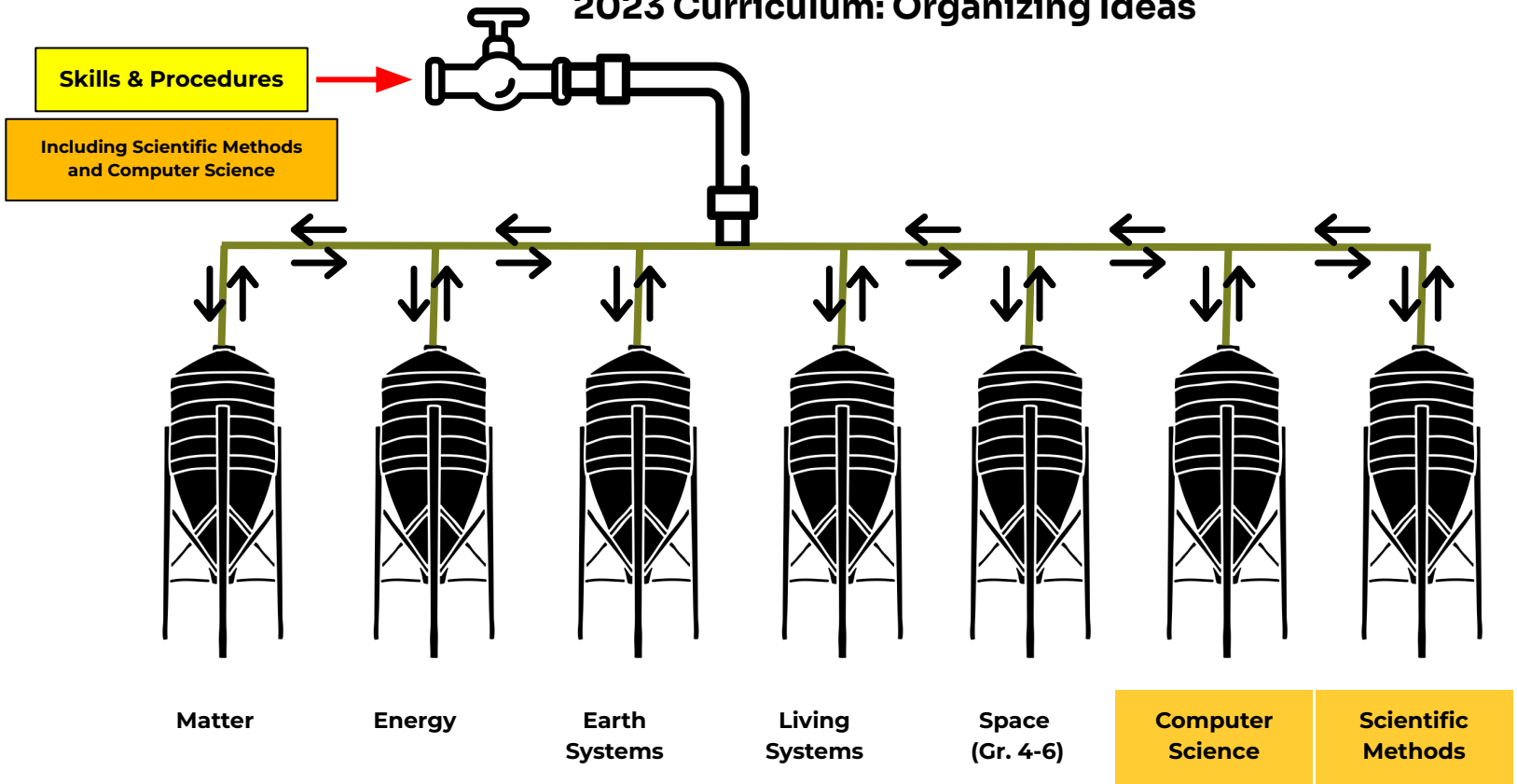
Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 5	Grade 6
Guiding Question: *How can humans, animals, and objects move?*	**Guiding Question:** *How can movement of objects be understood?*	**Guiding Question:** *Where do light and sound come from, and how do they move?*	**Guiding Question:** *How can forces relate to changes in movement?*	**Guiding Question:** *How can forces affect objects from a distance?*	**Guiding Question 01:** *How are forces similar and different in water and air?*	**Guiding Question 01:** *In what ways can interactions lead to physical change?*	**Guiding Question 02:** *What are energy resources?*	**Guiding Question 02:** *How are energy resources used?*
Learning Outcome: *Children explore movement of objects, humans, and other animals.*	**Learning Outcome:** *Students investigate the direction, pathway, and speed of moving objects and animals.*	**Learning Outcome:** *Students investigate the behaviours of light and sound.*	**Learning Outcome:** *Students investigate and explain how forces affect the movement of objects.*	**Learning Outcome:** *Students investigate how forces can act on objects without contact.*	**Learning Outcome 01:** *Students investigate and compare how forces affect living things and objects in water and air.*	**Learning Outcome 01:** *Students analyze forces and relate them to interactions between objects.*	**Learning Outcome 02:** *Students investigate and analyze various energy resources.*	**Learning Outcome 02:** *Students evaluate the use of energy resources and explain factors that influence choice.*
KEY CONCEPTS					**KEY CONCEPTS**			
Change	Animal	Characteristics (Materials that Affect Sound)	Change: Movement	Attraction	Buoyancy	Change	Energy	Advantage
Location	Direction	Light Behaviour	Effort	Distance	Effect on Flight (speed, altitude, horizontal and vertical, straight and level)	Elasticity	Energy Needs	Daily Living
Movement	Factor	Pathway: Sound	Force: Applied (stretching, pulling squeezing pushing)	Force: Non-Contact (gravity, magnetic)	Flight	Force: Action	Energy Resource	Disadvantage
Movement: Ways	Influence	Pathway: Light	Force: Contact (applied, friction, elastic/spring)	Gravity	Flight Characteristics	Force: External (applied, friction, elastic/spring)	Resource: Renewable & Non-Renewable	Electricity
Position	Movement	Sound	Force: Direction	Interaction	Fluid	Force: Internal (tension, compression, shear, torsion)		Energy Use Management
Animals	Object	Light Source	Force: Strength	Magnetic Material	Force: Opposing (thrust, drag, weight, lift)	Force: Reaction		Energy Choice Factors
Object	Pathway	Sound Behaviour	Interaction	Magnetism		Interaction		Processed Energy & Non-Processed Energy
Human & Animal	Speed	Vibration	Movement	Poles		Object		
		Sound Source	Property	Properties		Physical Change		
		Sound Characteristics	Simple Machines	Repulsion		Plasticity		
			FNMI: Simple Machines	Strength		Property		

Link: Concept Progressions (ARPDC)

2023 Curriculum: Organizing Ideas

Skills & Procedures

Including Scientific Methods and Computer Science



Learner Outcome Verbs				
	Grade			
	K	1	2	3
Apply Creativity				
Analyze				
Describe				
Examine				
Explain				
Explore				
Follow Instructions				
Interpret Instructions				
Investigate				
Relate				

Learner Outcome Verbs

Verbs are the skills and procedures that students do or perform *to demonstrate knowledge and understanding.*

Learner outcome verbs are those verbs that are identified in the learner outcome

Grade 1 ENERGY Learner Outcome

*Students **investigate** direction, pathway, and speed of moving objects and animals.*

Skills & Process Verbs	Grade			
	K	1	2	3
Ask Questions				
Classify (Sort)				
Compare (find similarities and differences)				
Conclude				
Create				
Demonstrate Safety				
Describe				
Design				
Discuss				
Examine				
Explain				
Explore				
Investigate				
Observe				
Predict				
Record Data/Observations				
Relate				
Represent				

1E1 Learning Outcome: *Students **investigate** direction, pathway, and speed of moving objects and animals.*

1E1.1 Understanding: *Movement consists of direction, a pathway, and speed.*

1S1.1 Skills and Procedures

- **Observe** and **describe** the direction, pathway, and speed of objects or animals.
- **Conduct an investigation** to determine how objects move.
- **Describe** and **record** ways objects or animals move along different pathways.

- **Compare** the direction, pathway, and speed of objects or animals.

Teaching for Transfer

Phases of Learning

Hattie, Fisher & Frey: *Visible Learning for Literacy* (2016)

Surface

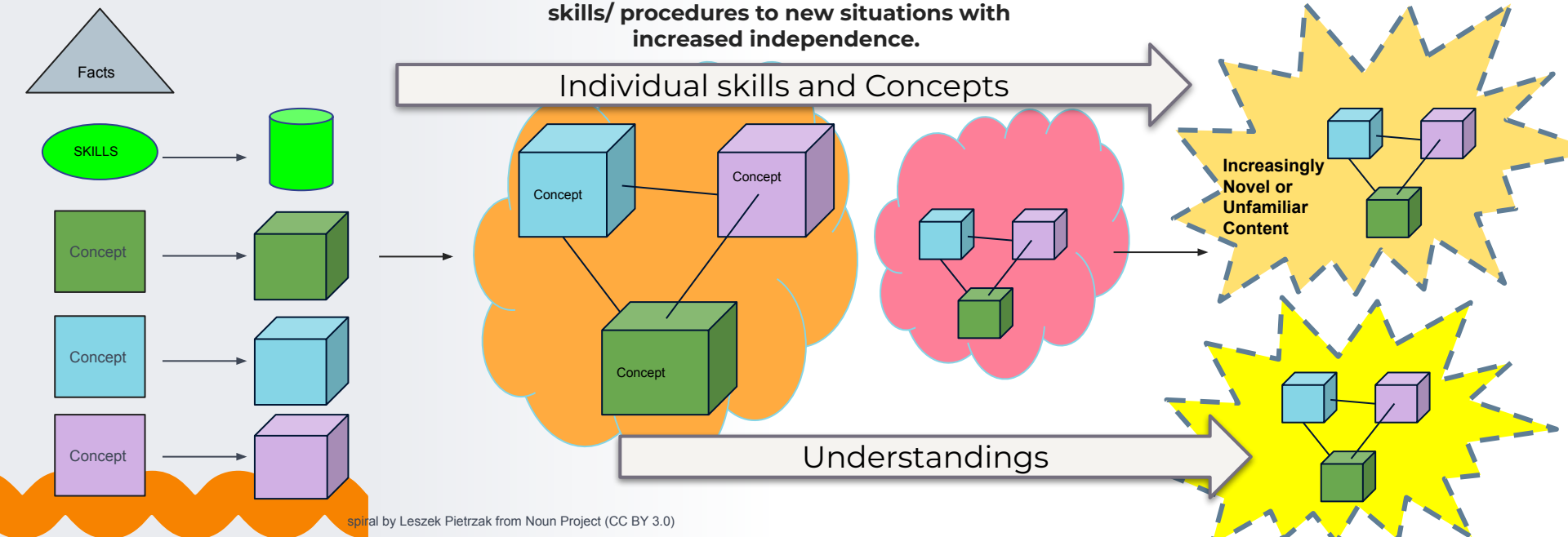
Students are first exposed to individual skills, concepts and their related knowledge.

Deep

Students make connections between concepts to create deeper understanding and appropriately apply skills/ procedures to new situations with increased independence.

Transfer

Students apply concepts, understandings and skills to a variety of novel and unfamiliar contexts.



Planning

Begin With the End In Mind

Stephen R. Covey, 1989

Backward by Design

Grant Wiggins & Jay McTighe, 1998

Phases of Learning

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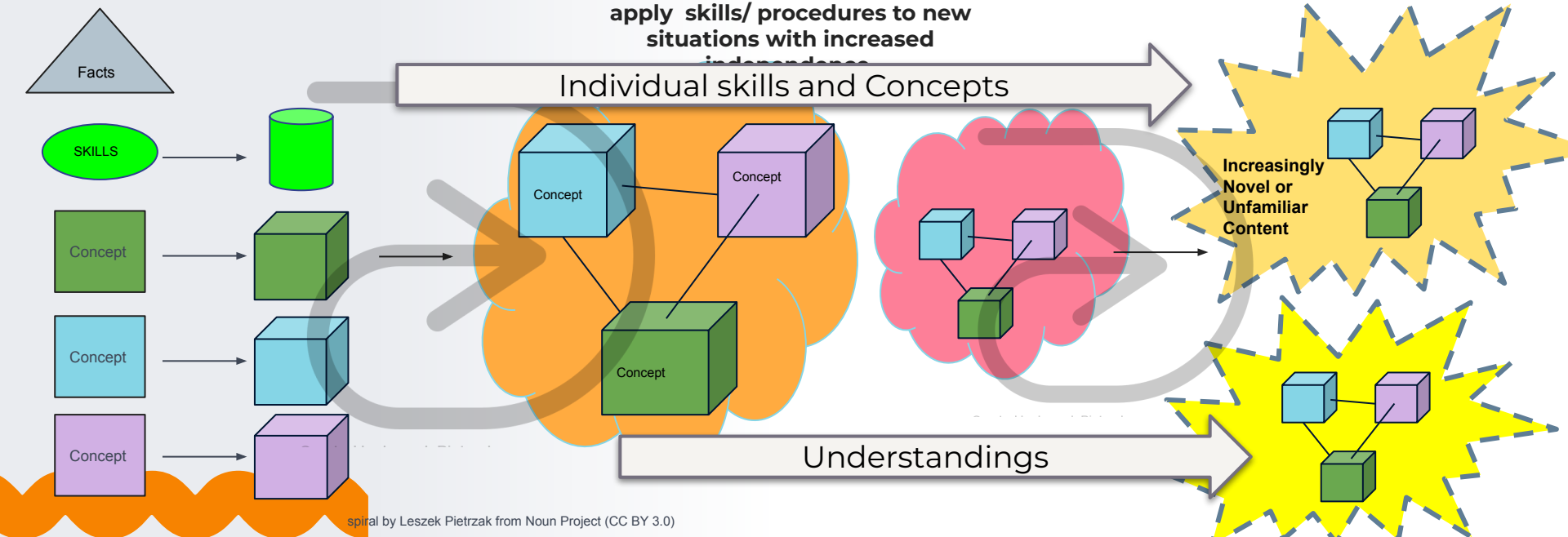


Learning Outcome
Students investigate direction, pathway, and speed of moving objects and animals.
Understandings
1E.1 Movement consists of direction, a pathway, and speed.
1E1.2 The movement of objects can be influenced in a variety of ways.

Sample Assessment: Students participate in an investigation.

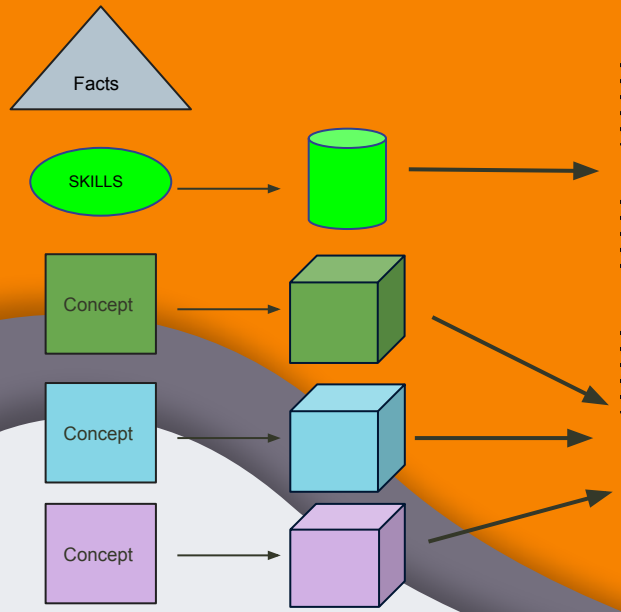
What will students need to ***know and/or understand*** in order to be successful?

What will students need to be able ***to do*** in order to be successful?

Phases of Learning

Surface

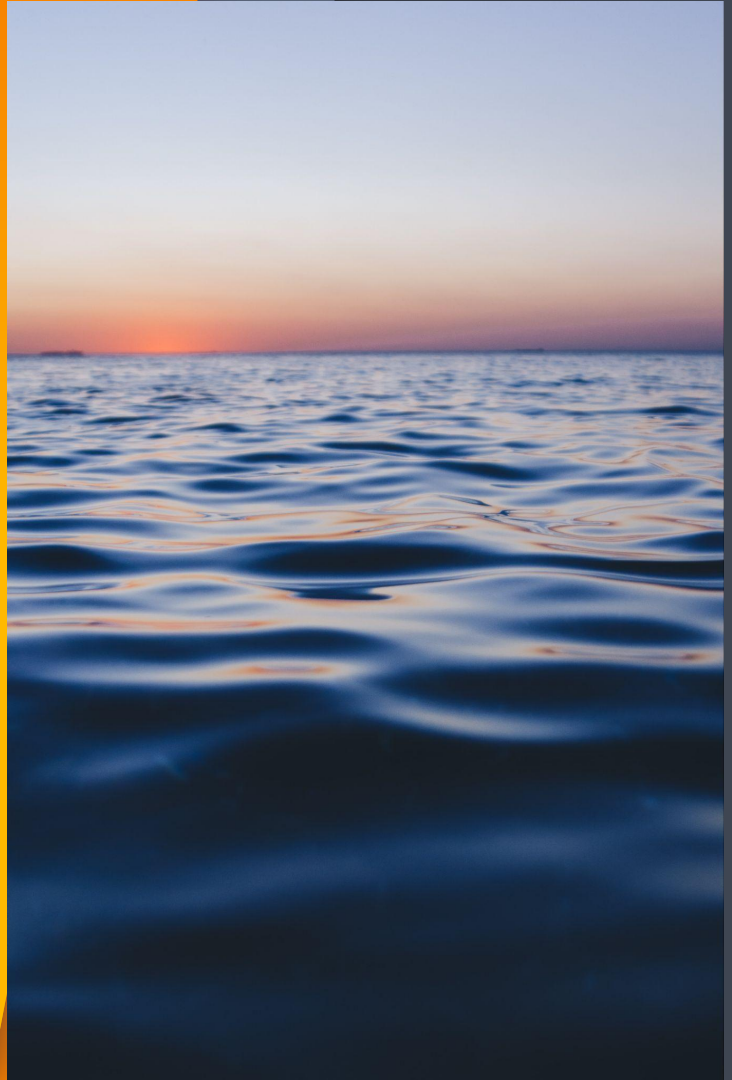
Students are first exposed to individual skills, concepts and their related knowledge.



Steps in an investigation.

Pre Assessment for Prior Learning

Concepts such movement, pathway, direction, speed.



From Kindergarten

What is Movement?

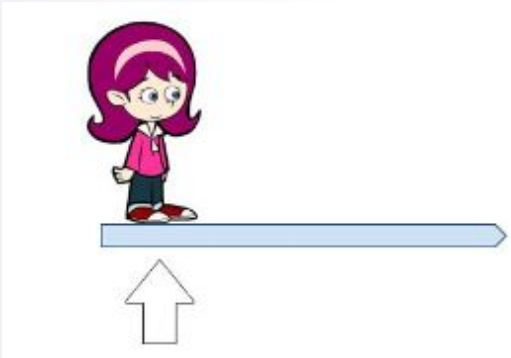
Can you show me what movement is?

Can you show me what movement is not?

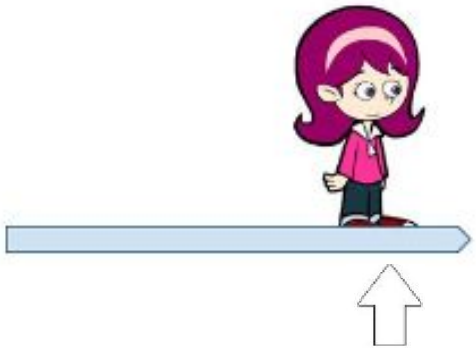
How would you explain to someone what movement is?

Movement is a change in position or location over time.

What does **location** mean?



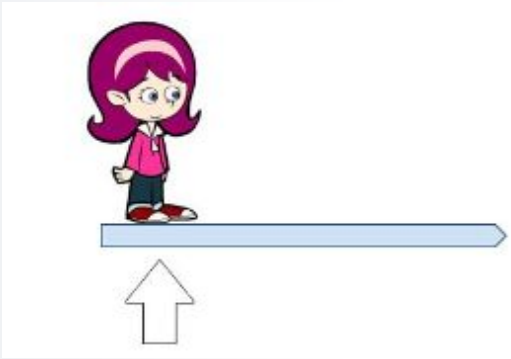
Starting point



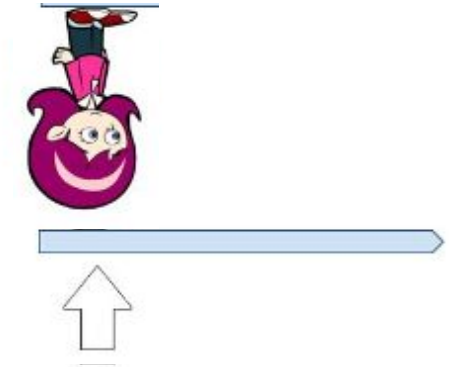
Finishing point

Movement is a change in position or location over time.

What does **position** mean?



Starting point



Starting point

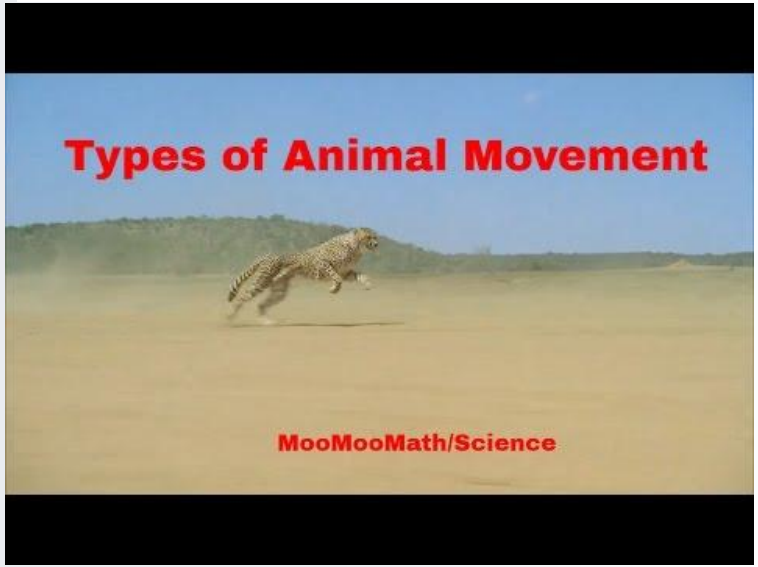
Identifying Objects that Move/Not Move and Describing the Movement

Fill a green garbage bag with pictures of animals, humans, boxes, articles from the classroom - looking to compare things that **can move without help** and those that **require** it. Have your items listed by picture on a sheet of paper that can be used to classify the objects easily. (pets in the classroom, items that are familiar to students - ski's, snowboard, glasses, fish etc.)

OR

Depending on where you are located, go for a nature walk and find examples of things that can move and not.

Let’s Watch Animals Move!



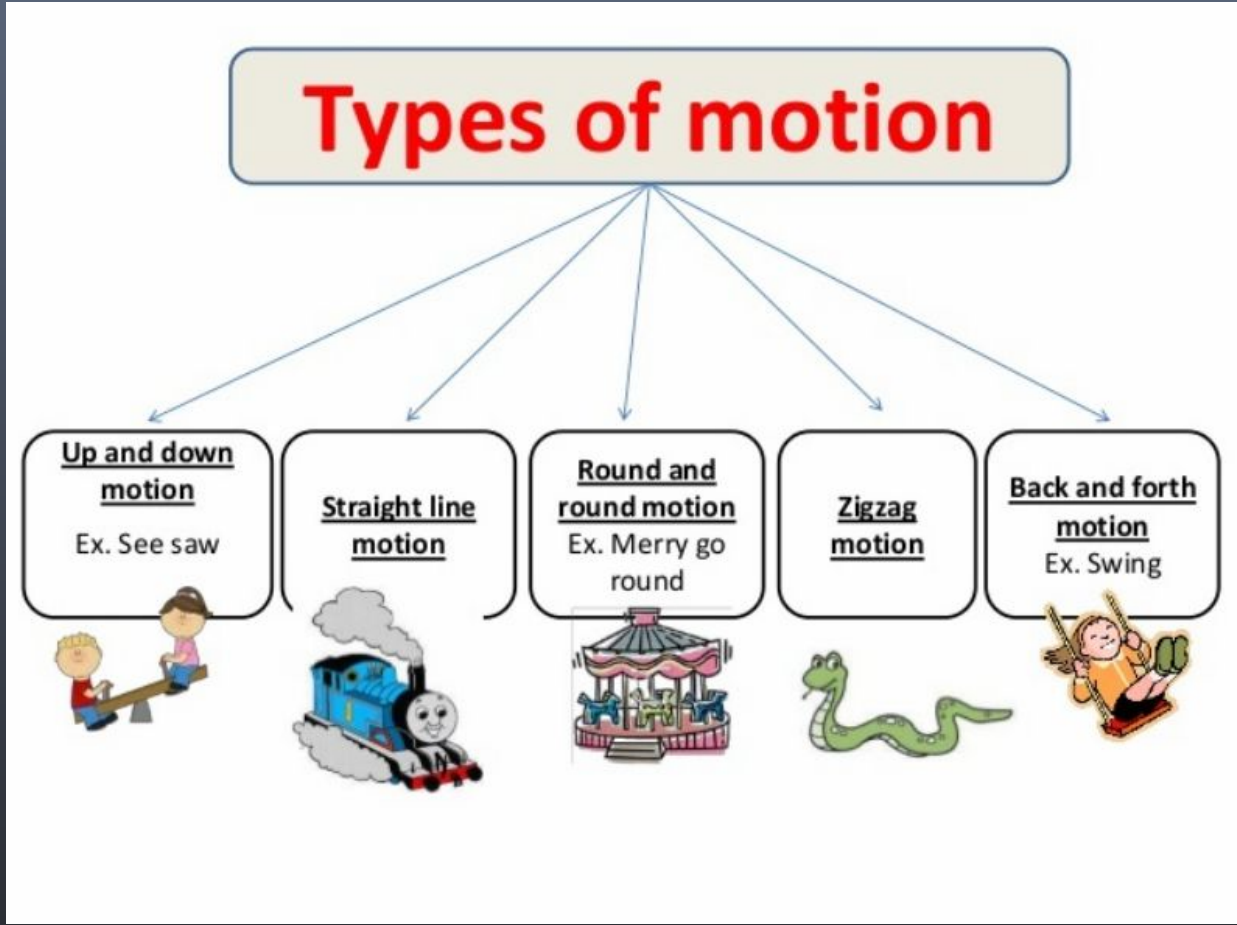
Life Science-Types of Animal - starting video
Movement@MooMooMath

Movement in Animals - Macmillan Education

How do animals move? What did you learn?

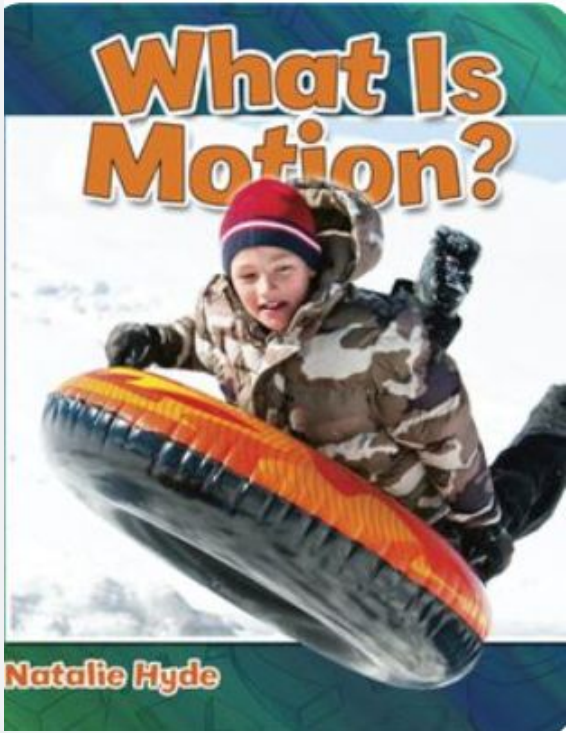
PE or Outdoor Education Time!

Sidewalk Chalk would be a great tool!

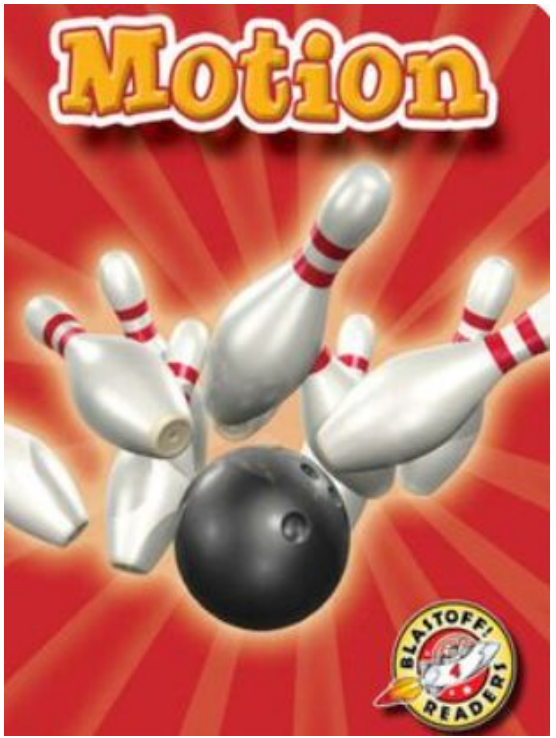


Quizizz Library. Science: Types of Motion

Can I Move Objects



EPIC



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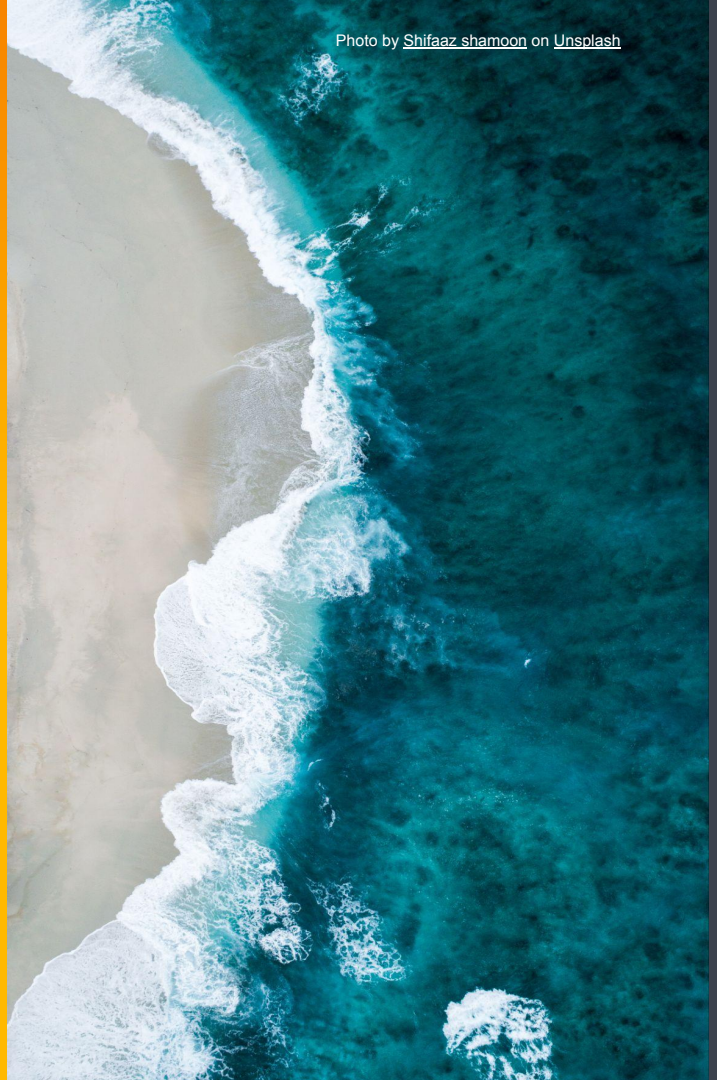


Transfer & Assessment

Transferring My Knowledge

What type of movement is happening in each slide?

- What Motion Do You See_ Slide Deck A.pdf
- What Motion Do You See_ Slide Deck B.pdf

What helps us Move? What do you remember?

Dreamstime.com

Pxfuel Royalty free

Shutterstock.com ID 2219652723

Shutterstock ID 1219482937

FreePik

How do seasons affect animal movement?

Hibernation
Migration
Food availability
‘Packs’ for survival

Sorting our animals

Using the sorting cards from the *Living Systems* Unit (Grade 1), take out any pictures of nonliving things and have students sort the remaining into groups.

How do the animals in each of your groups move?

Why do each of the different animals move the way they do? Are there some animals that you think are faster or slower than others? Why do you think this is so?

Transfer

My Trip to the Zoo

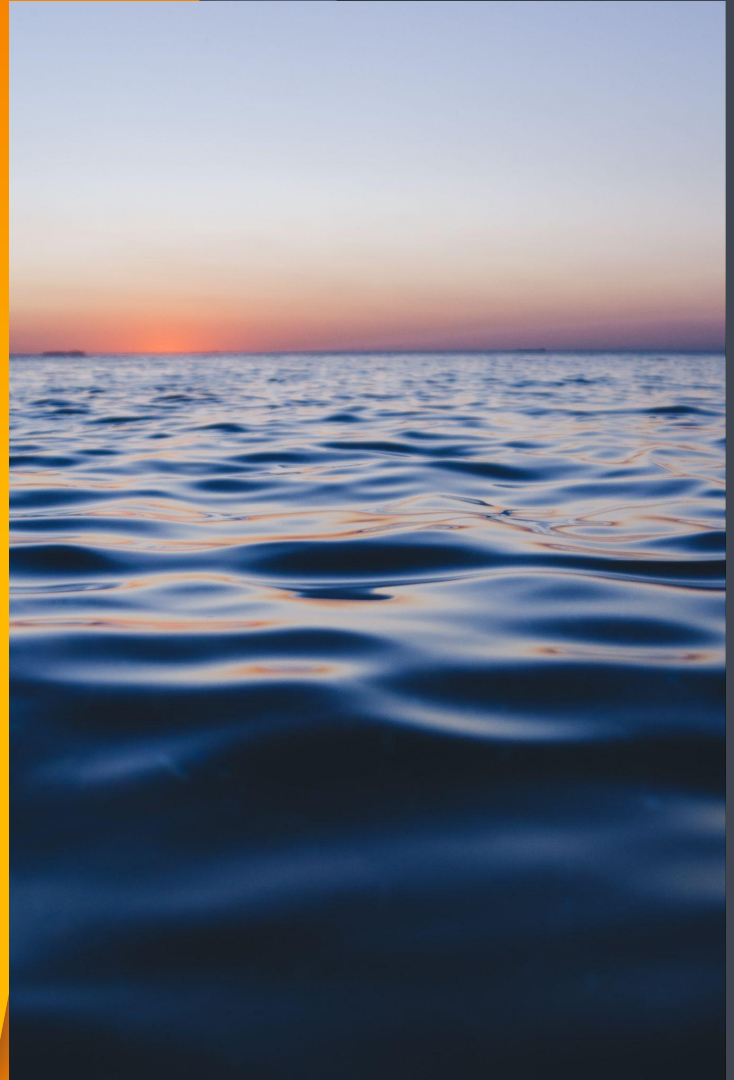
Sutterstock.com 2148595493

Take a Field Trip To The Zoo | KidVision Pre-K

My Trip to the Farm

Shutterstock 1673192608

Moving to Grade 1



Surface Level Activities

Understanding 1E1.1

Movement consists of direction, a pathway, and speed.

Surface Level Activities for …

Observation
Description
Investigation

Let's Move!


videos with
activities ..


Christmas
FREEZE
DANCE
BRAIN
BREAK

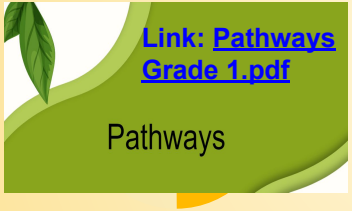

MOVE AND
FREEZE!
St. Patrick's Day Edition
PE With
Mr. G
BRAIN
BREAK!

Aspects of Movement: Direction, Pathway and Speed

Direction

Describing “Up, down, forward,backward, sideways, towards, away from”

Pathway



Movement pathways can be straight, curved, spiral, side-to-side

Speed

Speed - fast, slow, stay the same, change

Speed

Skiing

There are different types of skiing races where speed is important.

Ski races can be:

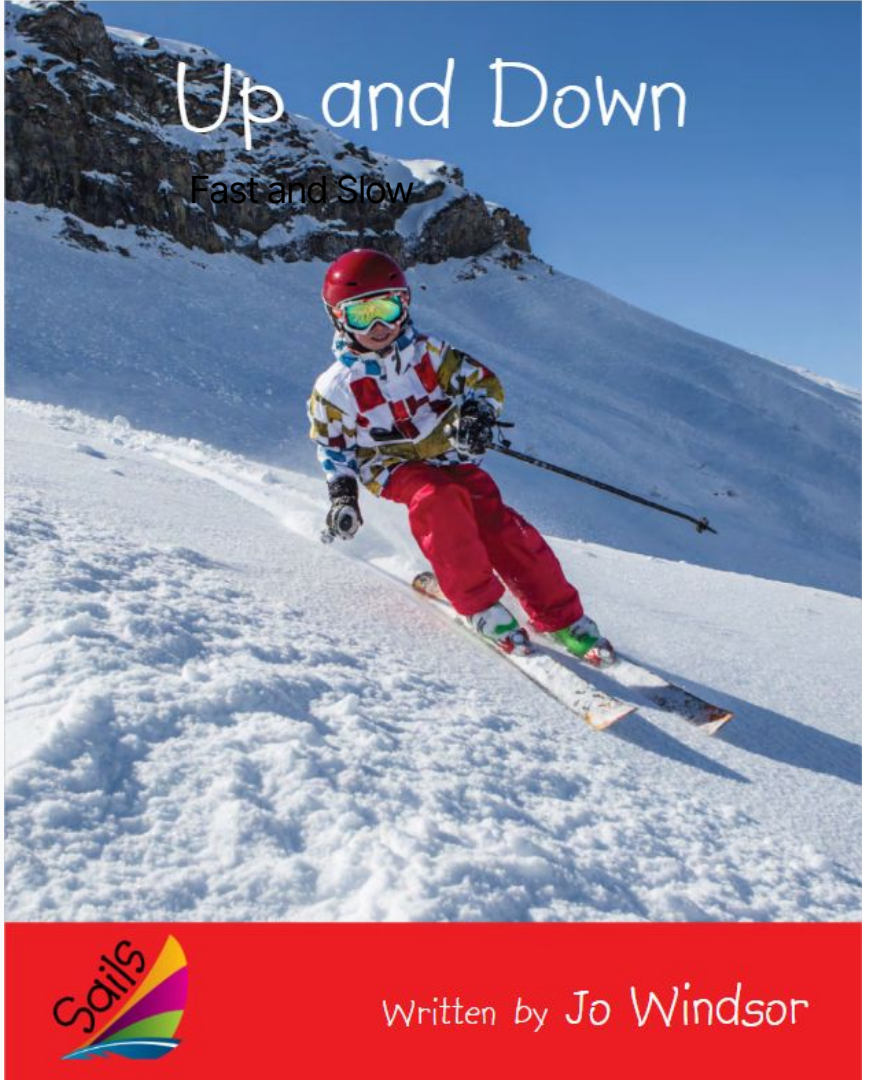
- downhill
- cross country
- racing between flags.

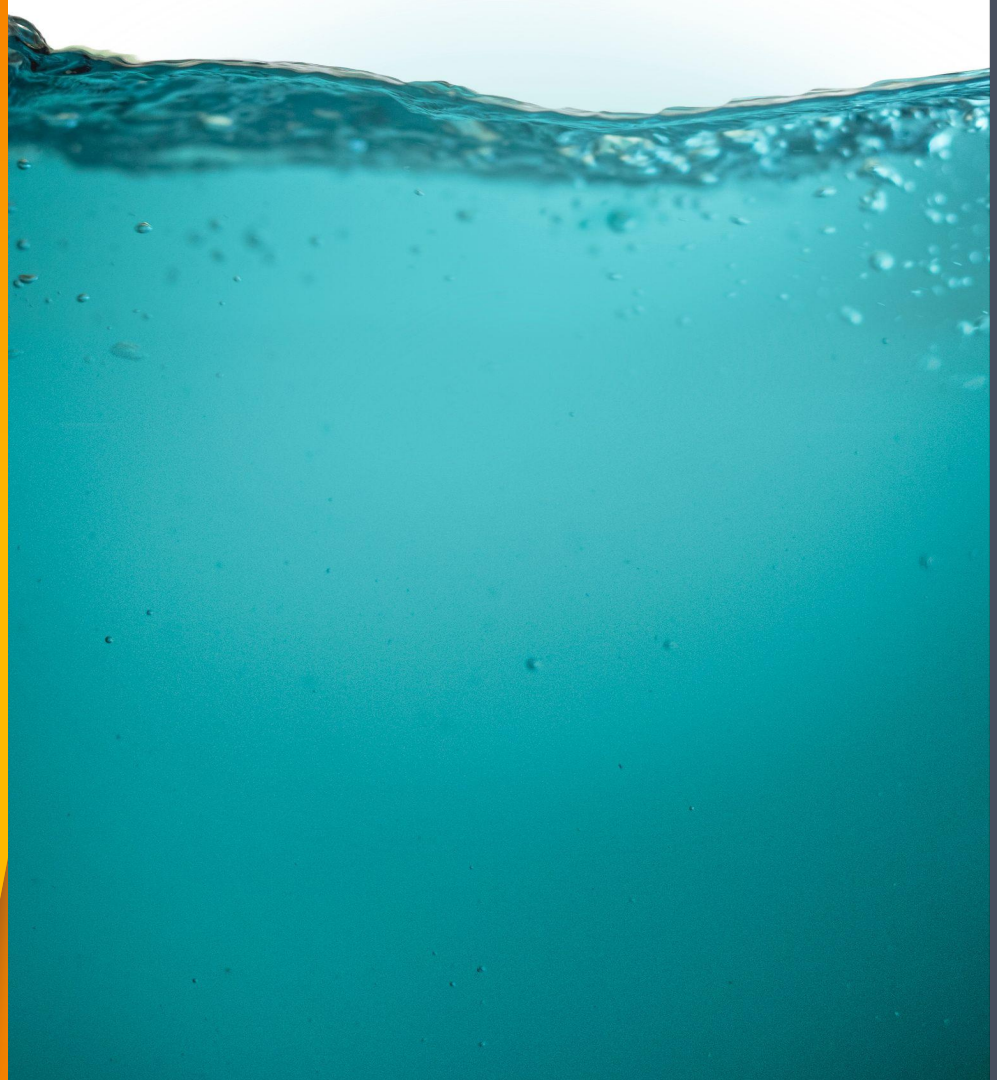
Faster and Faster

Today people keep trying to go faster and faster. They are always trying to break records and be the fastest in the world!

Speeds in Sports – Comparison Graph

Sails


Up and Down
Fast and Slow
Sails
Written by Jo Windsor



Deep Level Activities

Transfering My Knowledge

Describe the type of movement/pathway in each of the following slides.

- What Motion Do You See_Slide Deck A Grade 1.pdf
- What Motion Do You See_ Slide Deck B Grade 1.pdf

Link of possible Items

Ideas for students to explore.
Descriptions of how objects move.

Deepen by Integrating Computer Science Skills

Computer Science Understanding 1CS1.2

Instructions are ordered in a way that will produce a desired outcome.

How can the steps in the instructions use descriptors of

- pathway?
- direction?
- speed?

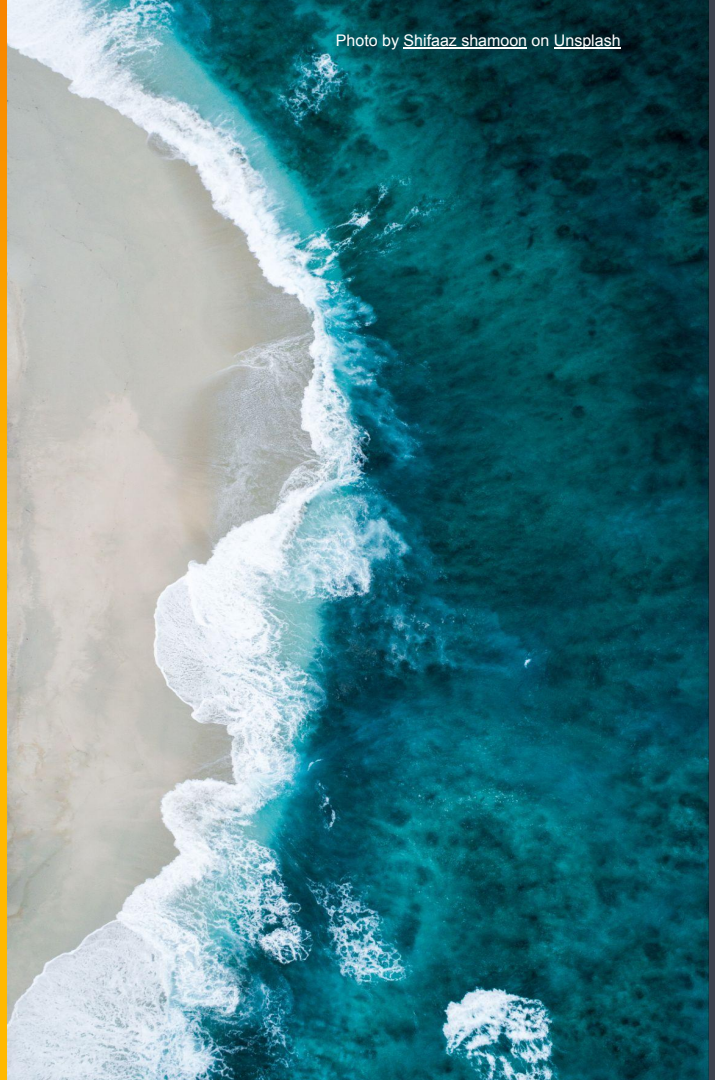
What are some contexts?

- Classroom?
- Gym?

Determine if instructions with two or three steps given in different orders still produce the **desired outcome.**

Sequence two or three instruction steps to achieve a **desired outcome.**

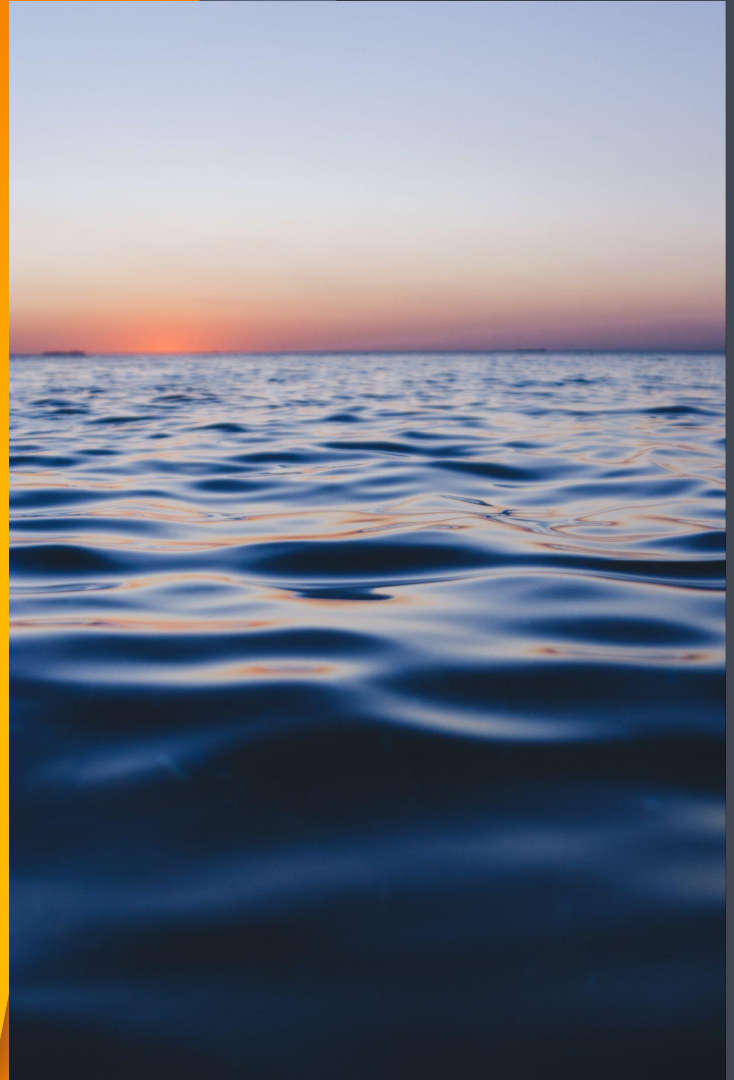
Exchange ideas for creating three-step instructions that achieve a **desired outcome.**



Transfer & Assessment

Choose a novel context such as a video clip of a hockey game.

Have describe the movement they see in terms of speed, direction, and pathway.



Surface Level Activities

Understanding 1E1.2

The movement of objects can be influenced in a variety of ways.

What influences the way an object can move?

How does shape influence movement?

Let's explore!

How does the material influence movement?

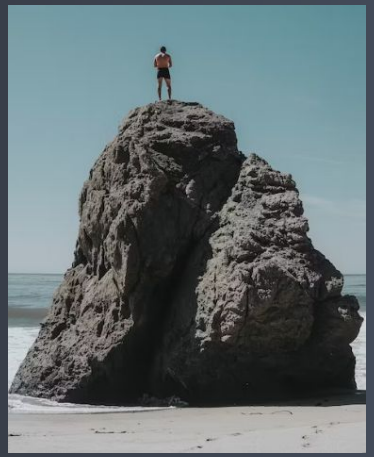


Photo by Andrew Charney on Unsplash

How does the surface texture influence movement?

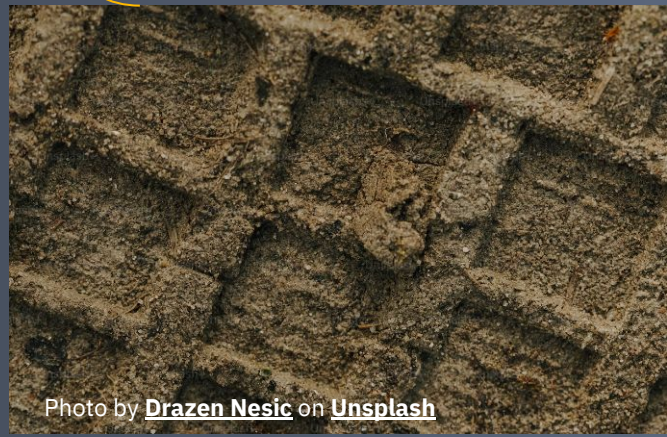


Photo by **Drazen Nesic** on **Unsplash**

How does shape influence movement?

Photo by salvatore ventura on Unsplash

Photo by amjd rdwan on Unsplash

How does shape influence movement?

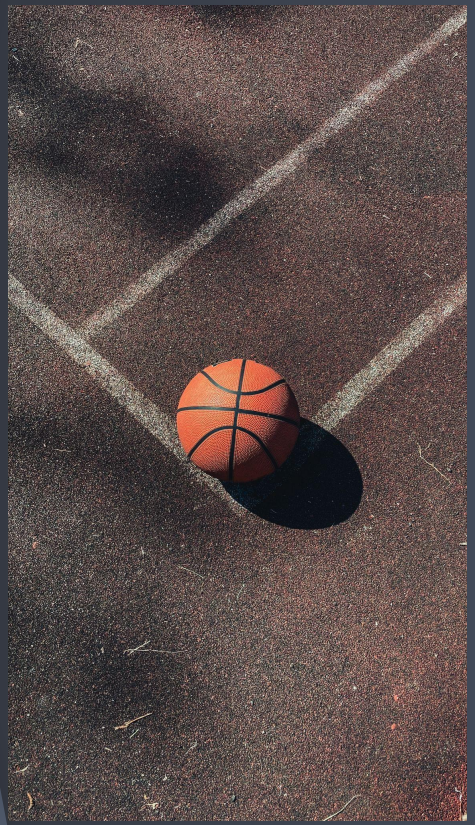


Photo by Ruslan Ruslan on Unsplash

Photo by Ruslan Ruslan on Unsplash

How does material influence movement?

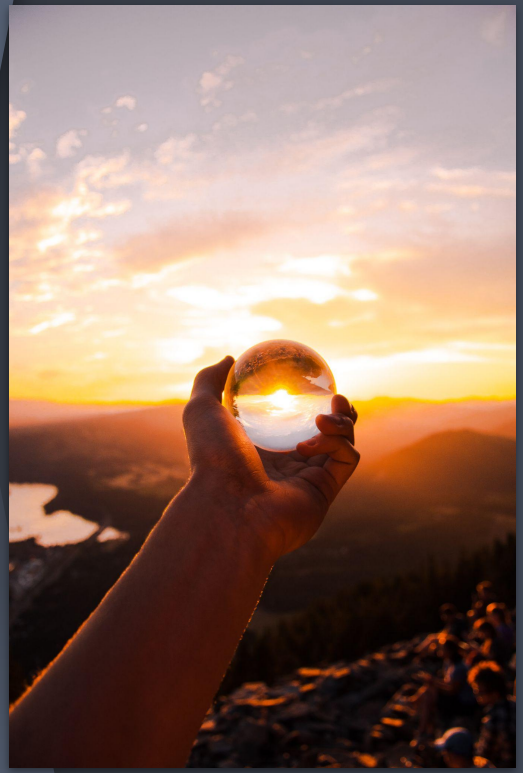


Photo by Arthur Ogleznev on Unsplash

Photo by Annie Lang on Unsplash

How does interaction with other objects influence movement?

Photo by Larry George II on Unsplash

Photo by Proper Quality Shandis on Unsplash

How does interaction with other objects influence movement?

Photo by Quino Al on Unsplash

Photo by Jonathan Chng on Unsplash

How does interaction with other objects influence movement?

Photo by Mohammed Attia on Unsplash

Photo by Luke Southern on Unsplash

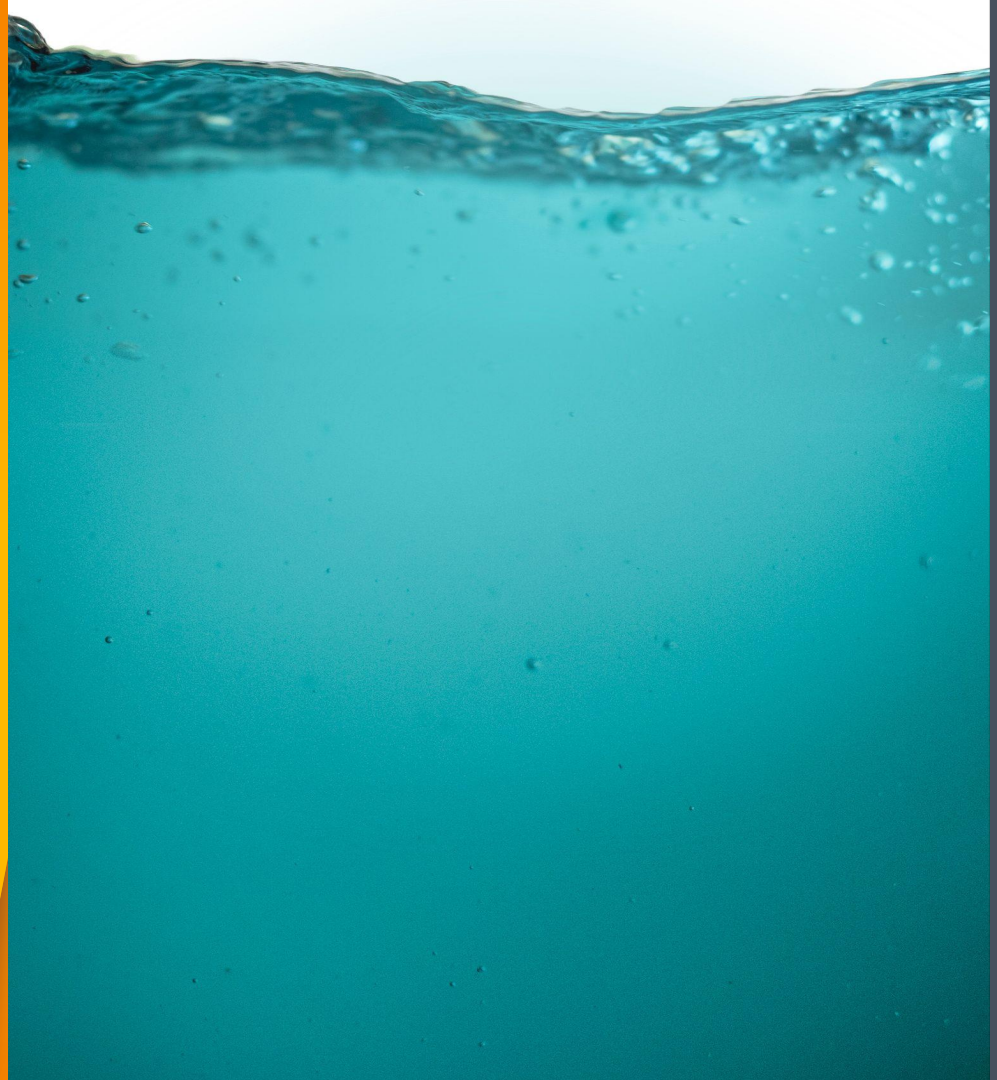
How does material and shape influence movement?

Which would bounce? Why?

Which would spin? Why?

Which would be harder to move? Why?

PREDICT | OBSERVE| RECORD | CONCLUDE



Deep Level Activities

How do objects move?

How does the surface we move things on affect how they move?

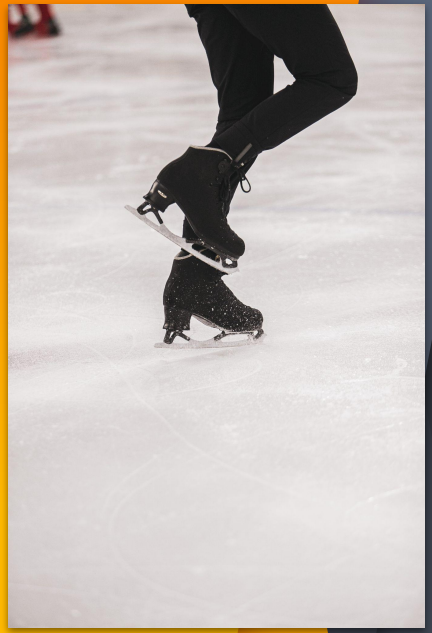
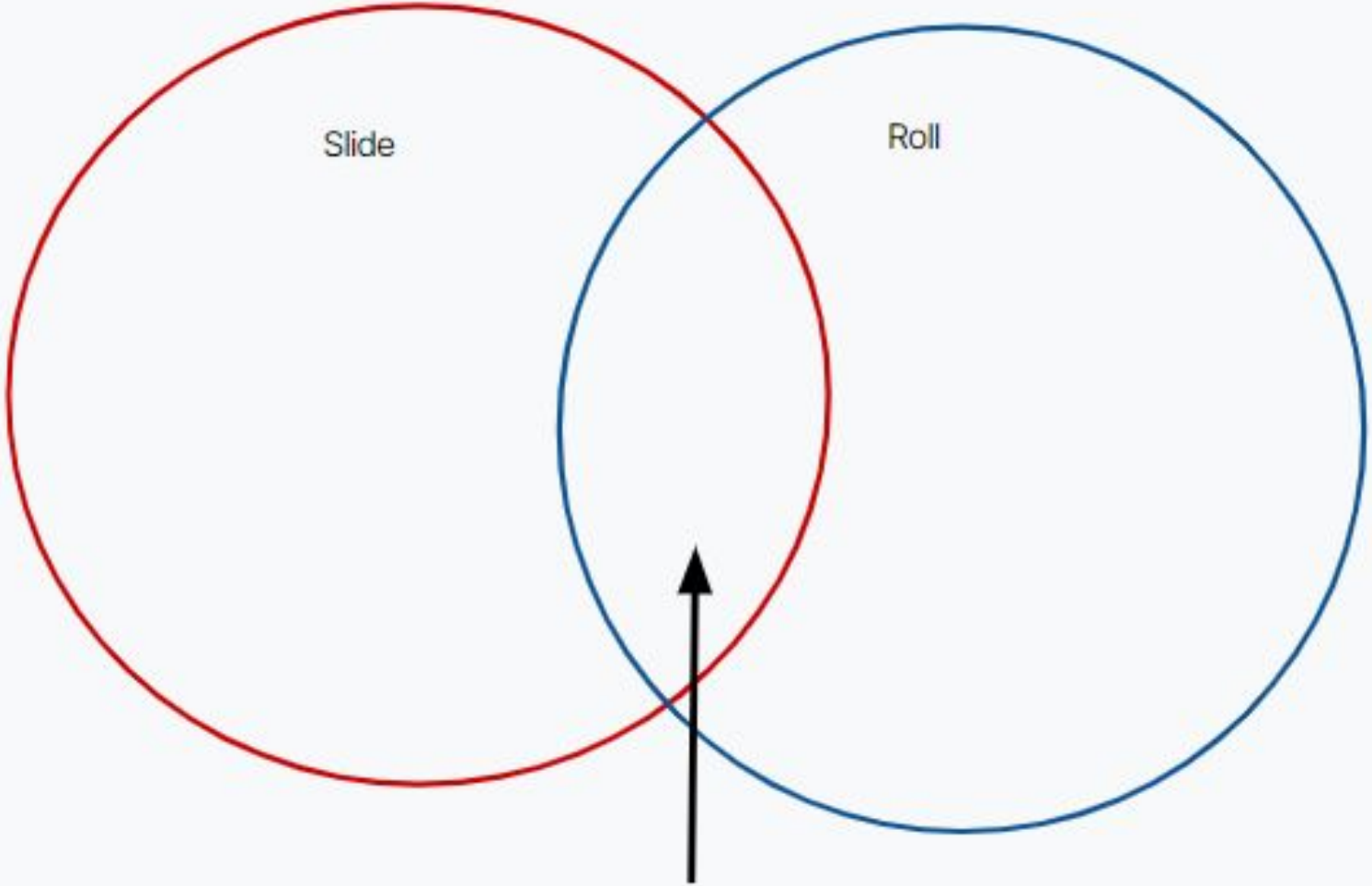


Photo by LOGAN WEAVER | @LGNWVR on Unsplash

Photo by Devin Avery on Unsplash

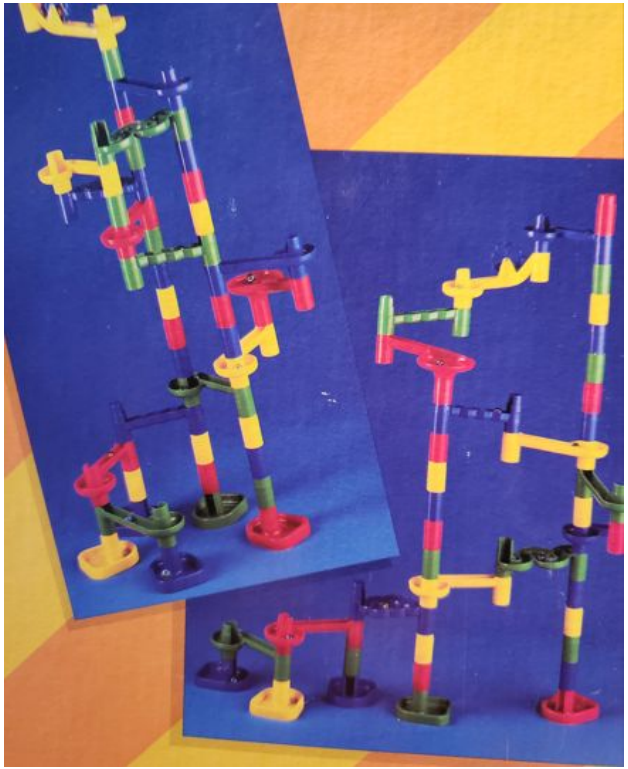


bouncing

What would go in the centre?

Transfer

STEM: Paper Roller Coaster



Resources

Connection to Math

Computing Science and Energy in Kindergarten

Video with Angela Dearing

Slide Deck:

- Gr 1 Energy Connections to Computer Science.pdf

Thanks!

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