Curriculum Planning & Assessment Resource

Science
Kindergarten: Energy

Alberta Regional Professional Development Consortia

Dedicated to the provision of professional learning opportunities at the local, regional and provincial levels

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About This Document

This Curriculum Planning & Assessment Resource is intended to be a collection of sample activities, assessments, and resources that teachers may wish to use as they develop their unit plans. This document is not intended to be a sequential list of activities. Rather, the intent is that teachers choose from this resource what is appropriate for their context, and sequence it their planning.

The sample activities, assessments and resources included in this document have undergone an initial review to determine appropriateness and alignment to the curriculum. However, it is expected that teachers use their professional judgment in selecting activities, assessments and resources that are appropriate for their context.

While every attempt has been made to provide credit and receive permissions, some errors or omissions may have occurred. Please contact info@arpdc.ab.ca to report any error or omissions.

Table of Contents

Important Links

New Learn Alberta Progressions
- Competency Progressions
- Numeracy Progressions
- Literacy Progressions

Recorded Video:
- How to Read these Curriculum Planning & Assessment Resources
- Unpacking Matter: Kindergarten

Planners and Concept Maps
- Science Planner
- Assessment Planner
- K-6 Action Verbs (EN)
  - Verbes des habiletés et procédures en sciences de M à 3
- Concept Map
  - Cartes conceptuelles [Idée organisatrice]

Curriculum Progressions
- Science Skills and Procedures Progression K-3
  - Progressions des habiletés et procédures en science M à 6
- K-6 Science Concept Progressions
  - Progressions des concepts

Numbered Outcomes Document

Acknowledgements

Thank you to all the teachers, curriculum specialists, and technical expertise from Alberta school divisions and ARPDC who collaborated to develop, review, and revise these planning and assessment documents to support curriculum implementation.

INTRODUCTION

Organizing Idea ENERGY: Understandings of the physical world are deepened by investigating matter and energy.

Guiding Question

How can objects, humans, and other animals move?

Learning Outcome

KE1 Children explore movement of objects, humans, and other animals.

Summative Assessment(s) - Transfer *(In Progress)*

Summative assessments can include the following.

- *Understanding/making sense of a novel context from the real world using one or more concepts (eg. "Is this an example of diversity?). Example*
- *Understanding/making sense of a novel context using one or more understandings (eg.Students watch a video or complete a case study and explain what they viewed/interpreted through the lens of the understanding).. **Example***
- *Being able to describe why (developing predictions or hypotheses) something is unfolding, or what might happen next using learned concepts and understandings.*
- *Apply learning (create products; undertake projects; taking action such as creating a campaign) in a novel context or taking action using the understanding(s). Example*
- *Construct arguments by taking a position on a novel issue and defending it with known understandings.*

Summative Assessments: Surface, Deep and Transfer Assessment

Sample Summative Assessment: *Provide students opportunities to move objects in certain ways and to observe and identify the type of movement an object is making. Contexts may be manipulatives, videos, or real-life observations (eg, movement of animals in a zoo, movement over rides in a carnival, movement of students at recess).* Students may be assessed in different contexts using **this checklist.**

Computer Science & Energy Connections	
• Introductory Video & Slide Deck **"Wait! What? I'm teaching Computer Science?"** ○ (Part 1) (Part 2)	• Exploring ECS computer Science- Video and Slide Deck (42:18)
• Integrating Computer Science & Grade Kindergarten Energy ○ Video Slide Deck • Curriculum Planning & Assessment Resources (CPAR) - Science Kindergarten - Computer Science.pdf	
• Computer Science Organizing Idea KUSP cards - use these to help understand and integrate CS KUSPs throughout teaching and learning in Science and across curricula.	
• CS Unplugged - "Computer Science without a computer"	

Click to jump!

KUSPs	KE1.1	KE1.2					

Literature Connections

KUSPs KE1.1

Prerequisite Knowledge

Students should be able to demonstrate movement in a variety of ways showing they have a basic understanding of its meaning.
Students should be able to distinguish between movement and non movement.

Student Language | Essential Vocabulary & Concepts

(The Concept Project)

- Movement
- Object

Misconceptions

Students may believe that :

- movement and location are the same thing
- that location and position are the same thing
- that change in location changes thea appearance of an object.
- that all objects move only as a result of a push or pull.

I Know Statements

- I know movement is a change in position or location that happens over time.
- Objects can be moved in various ways including straight lines, curves, circles, back and forth, zigzags, up and down & fast and slow.

I Understand Statements

- I understand that objects, humans, and other animals can move or be moved in various ways

I Can Statements | Skills

- I can move objects in a variety of ways.
- I can identify objects that move.
- I can identify objects that do not move.
- I can observe and imitate how animals can move.
- I can identify various ways that humans and other animals can move.

KUSP KE1.1

Learning Outcome	KE1: Children explore movement of objects, humans, and other animals.Children examine properties of objects.			
Knowledge	**Understanding**	**Skills & Procedures**	**Sample Activities & Resources** **What is Surface, Deep and Transfer**	**Assessments (formative)**
Movement is a change in position or location that happens over time. Objects can be moved in various ways, including ● straight lines ● curves ● circles ● back and forth ● zigzags ● up and down ● fast and slow Humans and other animals can move in a variety of ways, such as ● flying ● crawling ● hopping ● swimming	Objects, humans, and other animals can move or be moved in various ways.	Move objects in a variety of ways. Identify objects that move. Identify objects that do not move. Observe and imitate how animals can move. Identify various ways that humans and other animals can move.	**Sample Surface Level Activities** ● What Is Movement? ○ This activity introduces ■ movement ■ fast/slow ■ ways of moving ● Introduction to Ways of Moving ● Observe and imitate how animals can move. ○ Imitate Animal Movement. ○ Video (Song With Movement) : How Do Animals Move? | Jack Hartmann (3:55) ○ Video Animals on the Move (1:40) --- **Sample Deep Level Activities** ● Have students observe different environments/contexts (eg. outside, another PE class, video) ○ Identify objects that move. ○ Identify objects that do not move. ○ What movement of people and objects did they see? ○ What animals did they see? What was the movement? ● Play “Simon Says” using different movements. --- **Infusing Indigenous Knowledge into Curriculum (Grades K-12) Website:** Kindergarten Science: --- **Other Resources** ● EPIC: What is Motion? ● EPIC: Motion: First Science Book ● Animal Movement TVO Kids.com (7:00)	**Sample Formative Assessment** ● Students describe the motion they see in the following slides: ○ What Motion Do You See_ Side Deck B (1).pdf ○ What Motion Do You See_Slide Deck A (1).pdf ● Ask the student this question. *Can objects, humans, and other animals move or be moved in various ways? Show me.* ○ *Checklist*

Resources

Additional Websites and Resources to Support *Learning*

Indigenous Related:

- The Learning Circle: Classroom Activities on First Nations in Canada - Ages 4 to 7- **The Learning Circle** has been produced to help meet Canadian educators' growing need for elementary-level learning exercises on First Nations. It is the second in a series of four classroom guides on First Nations in Canada. See Unit 2 for Seasons.

- Learning from the Land (teacher information) - Although there is much diversity between First Nations, Métis, and Inuit, a deep and abiding connection to the land is common. Dr. Leroy Littlebear says that “The land is a sacred trust from the Creator. The land is the giver of life like a mother. The ecological aspect of Indigenous knowledge is all about the land. The land is a source of identity for Aboriginal People. CASS Resource.

Specific to Kindergarten Energy

- ***Provocations:* *How Things Move* -** Hands On Ideas to Teach Force and Motion. *MyTeachingMama.*
- ***Force and Motion - Ontario Science Centre*:** Stem Education Toolkit - contains resources to assist in starting your students in their inquiry journey, beginning with their question. It also has several assessment tools readily available.
- Motion: How Things Move Life’s Garden in Kindergarten - includes the various pathways of movement.

- **Kids Academy: What is Energy? Energy is the ability to do something - in your child’s case, it’s his/her capacity to play over a certain period of time.**
- ***Movement of Objects* -** SuperSTAAR - Observe and describe the ways that objects can move such as in a straight line, zigzag, up and down, back and forth, round and round, and fast and slow.

General Sites to Support a Variety of Concepts in Kindergarten

- ***Ontario Science Centre*:** Curriculum Resources - This photo gallery illustrates a teacher conducting the activity Mapping Storybooks with students in grades PreK and K. Scroll through Steps 1 through 7 to see how you can map storybooks to build young children's spatial thinking and language skills. Mapping the Classroom -Model for students how to use their fingers to "walk" from place to place on the map. Think aloud as you model so students hear you using the language of location.
- Instructional Planning and Teaching in Science - IOWA Department of Education
- What Are Storylines? - Next generation Science Storylines
- **cK-12 - Free STEM teaching resources** - provides a set of online science textbooks as open educational resources. These are not aligned to NGSS but could be modified.
- ***Backyard Science:*** **https://www.ulnoowegeducation.ca/programs/backyard-science/ A FREE online curriculum-connected and culturally connected educational resource.**
- ***Let’s Talk Science* - a large variety of sources for STEM - search your topic and grade**
- ***PBS Learning Media*** - Science - a large selection of science related resources. Review by subject, subtopic and grade.
- ***Alberta Parks*** - Alberta Parks - ABC Nature Walk
- **Hand2Mind Science Activities** - Lessons and Investigations for K-5 students Check Motion
- Plants, People and Climate Change | Little Green Thumbs 2023

Resources Developed by School Divisions/Educational Institutions

Edmonton Catholic Pacing Guides

Edmonton Catholic Curriculum Crates

Edmonton Catholic Schools: Academic Vocabulary: Kindergarten to Grade 3

Edmonton Public Science Snippets K-3

Edmonton Public Scope and Sequence

LearnAlberta Curriculum

APRDC New Curriculum Professional Learning Resources

Alberta Science Curriculum Teacher Resources (CMASTE): Click on the Teaching Resources Tab at the top of The Home Page.

> This website hosts resources developed to support teachers in implementing the Alberta Science Curriculum initially released in 2023. The resources were created with support from the Centre for Mathematics, Science, and Technology Education (CMASTE) and contributions from students in the Faculty of Education, Elementary Education B.Ed. program. We will be continuing to add resources to this site, so please check back regularly.

SLEAKs, SPAMs and SWAGs - Sciences Resources Developed by Red Deer Public Schools:

> The purpose of this guide is to assist any kindergarten teacher in their instruction of the new science curriculum. Within this document, you will find links to external sites and resources, as well as internal resources that are organized by the coordinators of RDPSD. This is certainly a dynamic document in that it is always changing; if you have any suggestions for modifications, please do not hesitate to contact the RDPSD science coordinator. Contact Nate Siler if you have any questions.

Lesser Slave Watershed Council Classroom Presentations
Lesser Slave Forest Education Society (they are updating their programs to match the new curriculum)

Comox Valley School District #71 - Science Resources. BC Ministry of Education

Government of Canada Science Resources:
Activity Books:
Science is all around us and can be discovered, explored and used in so many ways! This new Activity Book showcases the diversity of the world of science through activities in health, energy, environment, agriculture, meteorology, astronomy, the living world and much more!
Canadian Science - History and Achievements
Select from 67 different entries of the history and achievements of Canadians in Science.
Resource links
Select from pages of activities, maps, lesson plans, videos etc. to support students of all age levels in science education.

Websites and Resources to Support *Planning*

	Inclusion - Best Practices Meeting the Needs of **All Learners in Science** **Differentiation:** Preview vocabulary and pre teach to students. Use various forms of media to present vocabulary including simplified explanations, visuals in the form of diagrams to label and connect concepts.
Primary Connections (teacher guides, units of study and sample assessment rubrics based on Australian Science Curriculum but offers great links and activities to our curriculum) *No applicable one's for this KUSP* On the Move - *the way objects move depends on a variety of factors, including their size and shape*, in the context of inquiring about familiar objects like toys, playground equipment, and their own body.	**Gizmos**(Teacher Login Required) New Learn Alberta: ***no Kindergarten match*** ExploreLearning Gizmos Site: Request a Gizmos account: alberta@explorelearning.com

Click to jump!

KUSPs	KE1.1	KE1.2					

Literature Connections

KUSPs KE1.2

Prerequisite Knowledge

Students know movement and the different paths it can take.
Students know the difference between location and position.been identified as UNESCO World Heritage Sites.
Bodies of water on Earth's surface include glaciers, lakes, wetlands & rivers.

Misconceptions

Students may believe that we move because:

- Things only move when they have a push or a pull
- All objects will slow down and stop
- Objects stop because the 'push wore off'.
- We need to go somewhere
- We need to get food
- We need to run away from something or play

Student Language | Essential Vocabulary & Concepts

(The Concept Project)

- Movement

I Know Statements

- I know that reasons for human and other animal movement include seeking food and water, exercising and playing & escaping danger.

I Understand Statements

- I understand that humans and other animals move for many reasons.

I Can Statements | Skills

- I can examine the reasons why humans and other animals move

KUSP KE1.2

Learning Outcome	KE1: Children explore movement of objects, humans, and other animals.Children examine properties of objects.			
Knowledge	**Understanding**	**Skills & Procedures**	**Sample Activities & Resources** **What is Surface, Deep and Transfer**	**Assessments (formative)**
Reasons for human and other animal movement include ● seeking food and water ● exercising and playing ● escaping danger	Humans and other animals move for many reasons.	Examine the reasons why humans and other animals move.	**Sample Surface Level Activities** ● Have students reflect on the different reasons they move. ○ Students can use a graphic organizer and draw pictures that identify why they move. ● Complete a sorting activity. ○ Why Do People and Animals Move? --- **Sample Deep Level Activities** ● Watch videos with people and animals. Pause occasionally to ask why the person or animal is moving. ○ Eg. Animal Movement TVO Kids.com (7:00) ○ Eg. Video (Song With Movement) : How Do Animals Move? | Jack Hartmann (3:55) ○ Eg. Video Animals on the Move (1:40) --- **Infusing Indigenous Knowledge into Curriculum (Grades K-12) Website:** Kindergarten Science: --- **Other Resources**	**Sample Formative Assessment**

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- **Edutopia** More than a dozen ways to build movement into learning

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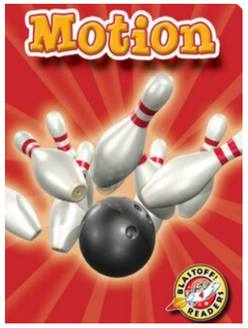
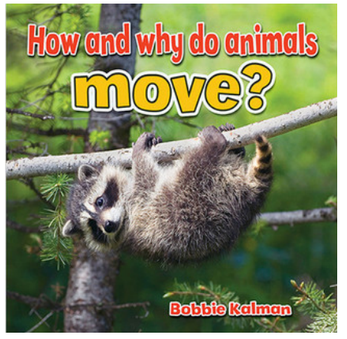
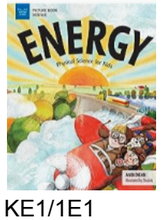
Literature Connections

KUSPs	KME1.1	KE1.2					

Title & Author	Format (Picture Book, Novel, Non-fiction, other)	Publisher & ISBN	Book & Numbered Outcome Link
What Is Motion *by* ***Natalie Hyde*** Motion is a change in an object's positionThis fascinating title explains in a clear, simple way how objects are moved by a change in energy. Simple activities show young readers how energy is changed by applying a force, either by coming in contact with an object or by a force that does not touch it physically, like gravity.	Picture Book, Non-Fiction	Crab Tree Publishing 10-0778705315 13-978-0778705314 Available through Pearson Publishing	 EPIC KE1
Motion by ***Kay Manolis*** The planets in the solar system are in constant motion as they orbit the sun. Motion is all around! Children will get an introduction to the laws of motion and learn about speed, friction, and action and reaction.	Picture Book, Non-Fiction	*Blastoff! Readers: First Science* 10-1600142257 13-978-1600142253 Available through Pearson Publishing	 EPIC KE1

How and why do animals move? by ***Bobbie Kalman*** From crawling and climbing to swimming and slithering, animals move in many ways. This action-packed book looks at motion in the animal world and the different body parts animals use to get from place to place.	Picture Book, Non-Fiction	Crab Tree Publishing 10-9780778706168 13-978-0-7787-0616-8 Available through Pearson Publishing	 KE1 EPIC
Energy: Physical Science for Kids *by* ***Andi Diehn*** *and* ***Hui Li*** Do you have a lot of energy? What else has energy? Just about everything that moves! When you feel like running, leaping, and singing, people might say you have a lot of energy. And you're not the only one! Energy is the stuff that makes everything live and move. People, animals, plants—we all need energy to live! Young readers discover different forms of energy, including heat, light, and chemical energy, that keep the world working and moving. Simple vocabulary, detailed illustrations, easy science experiments, and a glossary all support learning for kids ages 5 to 8	Picture Book, Non-Fiction	Nomad Press 10-1619306417 13-978-1619306417	 KE1/1E1