Albertan Curriculum **British Columbian Curriculum**

Subject	Topic / Principle / Unit of Study	How it fits / how to incorporate geology
	Grade K	
Science	Principle 5: Children are unique and active contributors to their learning. Principle 6: Children construct and represent knowledge in a variety of ways. Principle 7: Children are citizens and active participants in school and society. • Adaptations of local plants and animals • Local First Peoples uses of plants and animals • Properties of familiar materials • Weather changes • Seasonal changes • Living things make changes to accommodate daily and seasonal cycles • First Peoples knowledge of seasonal changes	• Going out and exploring the local landscape/ permafrost landscape incl. describing what they see (landscape, animals, plants) ➢ How does this change with the seasons? ➢ Understand cold weather and conditions creates this ➢ How have plants/animals adapted to living here • Learn this is science + citizen science -> making and recording observations to help scientists
Social Studies	K.1.2 appreciate the unique characteristics, interests, gifts and talents of others K.2.3 appreciate how their participation in their communities affects their sense of belonging K.2.5 examine ways in which people create a climate of cooperation • Ways in which individuals and families differ and are the same • Personal and family history and traditions • Rights, roles, and responsibilities of individuals and groups • People, places, and events in the local community, and in local First Peoples communities	• Oral traditions of the landscape/ surroundings/ physical features – what are they? Does anyone else in the class have a different story for a similar feature? Discuss similarities/ differences • How can we care for the environment? What can I do? What can we do as a class/ family/ community?
	Grade 1	
Science	Topic A: Creating Colour Topic B: Seasonal Changes Topic C: Building Things Topic D: Senses Topic E: Needs of Animals and Plants • Names of local plants and animals • Structural features of living things in the local environment • Behavioural adaptations of animals in the local environment • Specific properties of materials allow us to use them in different ways	• Going out and exploring the permafrost landscape incl. describing what they see (landscape, animals, plants) ➢ How does this change with the seasons? Any difference in colours? ➢ What can you smell, see, touch, hear, taste? ➢ Understand cold weather creates this • Look at the building materials used to build the road – what are they? Where could they come from? Any building materials needed for animals?

	• The knowledge of First Peoples (local First Peoples knowledge of the local landscape, plants and animals, local First Peoples understanding and use of seasonal rounds) • Local patterns that occur on Earth and in the sky	• Find things that animals/plants need to survive and how a lack of this can affect the food chain/ ecosystem. • Learn this is science + citizen science -> making and recording observations to help scientists
Social Studies	1.1.5 distinguish geographic features in their own community from other communities 1.2.1 appreciate how stories and events of the past connect their families and communities to the present 1.2.2 analyze how their families and communities in the present are influenced by events or people of the past • Characteristics of the local community that provide organization and meet the needs of the community • Diverse cultures, backgrounds, and perspectives within the local and other communities • Relationships between a community and its environment • Natural and human-made features of the local environment	• What landmarks are around? Do they have any history/ legends/ stories associated with them? How do you think they formed? Are the natural or man-made? • Find where Canada/ Alberta/ your school is on a world map/ globe and then zoom in on a more detailed map. Could also do this on a computer using Google Earth and Google Maps. • Any place names/ landmark names that come from Indigenous, Francophone or other cultures around? How does the impact the community?
Grade 2		
Science	Topic D: Hot and Cold Temperature Topic E: Small Crawling and Flying Animals • Water sources including local watersheds • Water conservation • The water cycle • Local First People's knowledge of water (water cycles, conservation, connection to other systems)	• Changes in landscape in summer vs winter • Learn that this landscape forms in cold weather. How is this changing now with climate change? Any differences from the last time you went/ the last class that went? (Can set up an area to take repeated photos with each class to track changes each time going – this is something that students can add to if going there with family/ out of school time) • Observe the insects/ flying animals living in this habitat – can do basic quadrant counts? • How does water fit into this landscape? Is it important? How essential is it for permafrost regions? • Learn this is science + citizen science -> making and recording observations to help scientists
Social Studies	2.1.1 appreciate the physical and human geography of the communities studied 2.1.2 investigate the physical geography of an Inuit, an Acadian, and a prairie community in Canada 2.1.4 investigate the economic characteristics of communities in Canada	• Observe the physical geography around you. How do you think this have shaped your community vs another community that doesn't have the same geography. Compare and contrast to other communities living in similar areas vs different areas.

	• Diverse characteristics of communities and cultures in Canada and around the world, including at least one Canadian First Peoples community and culture • How people's needs and wants are met in communities • Relationships between people and the environment in different communities • Diverse features of the environment in other parts of Canada and the world • Rights and responsibilities of individuals regionally and globally • Roles and responsibilities of regional governments	• Locate where you are on a map and the other geographic regions. What are the differences we can see from a map. Use different sorts of maps e.g. geological, topographical, vegetation coverage etc. Can these changes be linked to different ways of life? E.g. primary jobs/ natural resources etc • Is the environment degrading? If so, is this natural or have humans caused it? How can we care for the environment?
Grade 3		
Science	Topic A: Rocks and Minerals Topic B: Building with a Variety of Materials Topic C: Testing Materials and Designs Topic D: Hearing and Sound Topic E: Animal Life Cycles • Biodiversity in the local environment • The knowledge of local First Peoples of ecosystems • Major local landforms • Local First Peoples knowledge of local landforms • Observable changes in the local environment caused by erosion and deposition by wind, water, and ice	• Study basic geological map before going out to learn/ anticipate what kind of things you're expecting to see. Observe if you can see anything. If so, what do you think it is? • Look at the building materials used to build the road – what are they? Where could they come from? Any building materials for animals? • Look at the Dempster Highway – does it seem to be a good design? Can you see anything wrong with this design (highlight subsidence here and what caused it) • What can you hear? Mostly natural vs man-made noises? Any differences if coming here at another time (during the day or season) • Any difference in animals coming at a different time of year? E.g. hibernation / babies in spring • Learn this is science + citizen science -> making and recording observations to help scientists
Social Studies	3.1.3 examine the geographic characteristics that shape communities in other parts of the world 3.2.1 appreciate elements of global citizenship 3.2.2 explore the concept of global citizenship • Cultural characteristics and ways of life of local First Peoples and global indigenous peoples • Aspects of life shared by and common to peoples and cultures • Interconnections of cultural and technological innovations of global and local indigenous peoples	• Expand on grade 2 activities: • Observe the physical geography around you. How do you think this have shaped your community vs another community that doesn't have the same geography. Compare and contrast to other communities living in similar areas vs different areas. • Locate where you are on a map and the other geographic regions. What are the differences we can see from a map. Use different sorts of maps e.g. geological, topographical, vegetation coverage etc. Can these changes be linked to different ways of life? E.g. primary jobs/ natural resources etc

	• Governance and social organization in local and global indigenous societies • Oral history, traditional stories, and artifacts as evidence about past First Peoples cultures • Relationship between humans and their environment	• Is the environment degrading? If so, is this natural or have humans caused it? How can we care for the environment? How can we do this as individuals? How can we do it as a school? As a community? Are these environmental concerns the same as the geographic regions? Why/ why not?
Grade 4		
Science	Topic E: Plant Growth and Changes • Sensing and responding (humans, other animals, plants) • Biomes as large regions with similar environmental features • Local changes caused by Earth's axis, rotation, and orbit • The effects of the relative positions of the sun, moon, and Earth including local First Peoples perspectives	• Repeat trips to observe any changes and growth in plants. Why are/aren't there changes and growth? • Learn this is science + citizen science -> making and recording observations to help scientists
Social Studies	4.1.1 value Alberta's physical geography and natural environment 4.1.2 examine, critically, the physical geography of Alberta 4.1.3 examine, critically, how geology and paleontology contribute to knowledge of Alberta's physical geography 4.1.4 analyze how Albertans interact with their environment 4.3.3 examine, critically, Alberta's changing cultural and social dynamics 4.3.4 examine recreation and tourism in Alberta • Physiographic features and natural resources of Canada	• Deep dive into Alberta's geological and geographical history. Connecting this to the rest of Canada. Connecting this to how the geology influences the land which influences the people, traditions, way of life, occupations etc. • How does the geology of Canada compare to Alberta compare to this region? Why? • Are there any fossil discoveries up here? If not, why could this be? • Are any natural resources found up here? • Are there any national and provincial parks or protected areas? Why are these designations useful? • How can we care for the environment? What happens if we don't? • Try and build a pingo to show it building and collapsing.
Grade 5		
Science	Topic E: Wetland Ecosystems • The rock cycle • Local types of earth materials • First Peoples concepts of interconnectedness in the environment • The nature of sustainable practices around BC's resources • First Peoples knowledge of sustainable practices	• Learn about the arctic wetlands and how these compare to wetlands in other parts of Canada/ the world. • Observe changes from repeat trips. • Learn this is science + citizen science -> making and recording observations to help scientists
Social Studies	5.1.1 value Canada's physical geography and natural environment 5.1.2 examine, critically, the physical geography of Canada 5.1.3 analyze how people in Canada interact with the environment	• Which of these physical features exist in the area? How have they formed? How do they contribute to way of life here e.g. water – fishing, sea – tourists etc.

	5.2.2 examine, critically, the ways of life of Aboriginal peoples in Canada • Resources and economic development in different regions of Canada • First Peoples land ownership and use	• Further expansion on grade 4 findings (and previous years).
Grade 6		
Science	Topic C: Sky Science Topic D: Evidence and Investigation Topic E: Trees and Forests • The overall scale, structure, and age of the universe • The position, motion, and components of our solar system in our galaxy	• Organise a trip in the dark to observe the night sky. What can you see? Can you use these for orienteering? Are there any differences in the different months? • Mini research project for the road condition and permafrost. Any cause and effect? Investigate this. What is your evidence? (develop science hypothesis and working to accept or reject it) • Are there trees/ forests here? Are these native? How do the differ/ are the same to trees/ forests in other areas? Why? • Learn this is science + citizen science -> making and recording observations to help scientists
Social Studies	6.1.6 analyze how individuals, groups and associations within a community impact decision making of local and provincial governments • Roles of individuals, governmental organizations, and NGOs, including groups representing indigenous peoples • Different systems of government • Economic policies and resource management, including effects on indigenous peoples	• Using the information/data gathered about the road conditions, students can see how this data can be used to lobby to get better infrastructure, and the steps needed to go about this. Use examples from elsewhere in Canada too.
Grade 7		
Science	Unit of Study A: Interactions and Ecosystems Unit of Study D: Structures and Forces Unit of Study E: Planet Earth • Organisms have evolved over time • The fossil record provides evidence for changes in biodiversity over geological time • First Peoples knowledge of changes in biodiversity over time • evidence of climate change over geological time and the recent impacts of humans (physical records, local First Peoples knowledge of climate change)	• Observe how this ecosystem works and interacts within itself. Is it the same interactions year-round? Does this ecosystem behave in the same way as the same type of ecosystem in another part of the country/world? • Is the ecosystem vulnerable? Why/ why not? Is it becoming vulnerable/ endangered? Why? • What techniques are being use to manage the environment here? • What natural and man-made structures can be observed here? • What forces are acting on the road? Analyse and observe the road. Where these the right materials to use? How could the road be improved? • What bedrock can you see here? (pre-excursion exercise to look at the geological map). Can you identify any from the

		map? Incorporate geological timescale and the order things happen in. • Any evidence of rock formations / fossils etc. if no, why do you think they can't be seen here? Use surrounding landscape to explain any processes e.g. mountain building, weathering/erosion, • Learn this is science + citizen science -> making and recording observations to help scientists
Grade 8		
Science	Unit of Study E: Freshwater and Saltwater Systems • Plate tectonic movement • Major geological events of local significance • First Peoples knowledge of local geological formations and significant local geological events • Layers of Earth	• Is this a freshwater or saltwater system? Why? • Drainage patterns – why? • Do water quality checks • What is the human impact on this ecosystem? How has it reacted/ responded to humans? • Learn this is science + citizen science -> making and recording observations to help scientists
Grade 9		
Science	Unit of Study A: Biological Diversity Unit of Study C: Environmental Chemistry • Sustainability of systems • First Peoples knowledge of interconnectedness and sustainability	• Quadrant test for biological diversity. Compile who class data to see spread/ variation. ○ Which are the most common species? Is that surprising? • Testing the water and air quality here vs in town • Any evidence of toxicity in area (perhaps piles from quarry?) • Learn this is science + citizen science -> making and recording observations to help scientists
Grade 10		
Science	Incorporates Aboriginal perspectives in order to develop, in all students, an appreciation of the cultural diversity and achievements of First Nations, Métis and Inuit (FNMI) peoples. Unit C: Cycling of Matter in Living Systems ➢ life processes and structure of plants Unit D: Energy Flow in Global Systems ➢ environmental monitoring, environmental impacts, energy flow, environmental management ➢ climate, glaciers and icecaps ➢ biological diversity, habitat diversity	• Start with a member of a First Nations people to come and say how the land used to be used. Is it still used the same way now? Is this the name for other First Nations in Arctic Canada? • Observe the life process of plants and how this varies throughout the seasons • Are any plants specialised to live in this env. e.g. a pine living here vs a pine in Vancouver • Monitoring the air and water quality. Building on Grade 9 findings. Any seasons where it's better/ worse? Why? Any anomalies e.g. fires • Climate forming permafrost environment. How is this environment changes with climate change?

		• Have any human actions impacted the climate here? How? • Biological diversity in area. Is it a healthy ecosystem? • Learn this is science + citizen science -> making and recording observations to help scientists
Grade 11		
Science	Unit C: The Changing Earth ➢ theory of plate tectonics ➢ fossilisation and radiometric dating ➢ major characteristics and life forms of past eras ➢ evidence of variations in Earth's climate Unit D: Changes in Living Systems ➢ biotic and abiotic factors ➢ population size ➢ habitat destruction ➢ species diversity ➢ human intervention in biogeochemical (nitrogen, carbon, water) cycles ➢ adaptation of organisms, natural selection Earth Sciences: • properties of earth materials (minerals, igneous/ sedimentary/ metamorphic rocks, geologic resources) • surface and internal processes of the rock cycle • economic and environmental implications of geologic resources within B.C. and globally • evidence that supports plate tectonic theory • factors that affect plate motion • First Peoples knowledge of local plate tectonic settings and geologic terrains • the hydrologic cycle • changes in the composition of the atmosphere due to natural and human causes • weather as the interaction of water, air, and energy transfer • solar radiation interactions and impacts on the energy budget • evidence of climate change • First Peoples knowledge of climate change and interconnectedness as related to environmental systems	• How plate tectonics eventually formed Canada and this landscape. Is it still changing? • How did this area look like in the geological past? Was it always located in this position? What animals/ plants were here? • If any fossils, can we determine the age of the rocks? Relative age vs absolute age • Has this area always had the same climate? Has it changed recently? How has it changed through geological time? • Which biotic and abiotic forces can you identify in this environment? Are any more prevalent at any particular times of the year? • Build on populations and species diversity as determined by younger years. • How has the habitat been destroyed? What are the consequences? What has been done to mitigate this? Are there any successful examples of mitigation that have been done elsewhere that could be applied here? • How have humans intervened? What has this affected? • Have any organisms needed to adapt? How have they? • Learn this is science + citizen science -> making and recording observations to help scientists

	• water as a unique resource • First Peoples knowledge and perspectives of water resources and processes • properties of the ocean and the ocean floor • local and global ocean currents • influences of large bodies of water on local and global climates • effects of climate change on water sources • the nebular hypothesis (explanation of the formation and properties of our solar system) • Earth as a unique planet within its solar system • stars as the centre of a solar system • impacts of the Earth-moon-sun system • application of space technologies to the study of changes in Earth and its systems Environmental Science: • First Peoples knowledge and other traditional ecological knowledge in sustaining biodiversity • benefits of ecosystem services • human actions and their impact on ecosystem integrity • First Peoples ways of knowing and doing • resource stewardship • restoration practices Science for Citizens: • evidence-based decision making through science • practical applications of science in the workplace • natural hazards and responses • human impact on Earth's systems – natural resources and effects of climate change • actions and decisions affecting the local and global environment, including those of First Peoples	
Grade 12		
Science	Unit B: Chemistry and the Environment ➢ sources and environmental impact of SOx, NOx, acid deposition and photochemical smog ➢ sources, uses and environmental effects of organic compounds	• Investigation for the analyse of any sources of SOx, NOx, acid deposition and photochemical smog and is there any evidence for this here? If there is, is it at dangerous levels? What can be done to mitigate? Where is it coming from? What pollutants

	➢ biomagnification and persistence of pollutants Geology: • classification of minerals • processes of rock formation (igneous, sedimentary, metamorphic) • B.C. resource deposits – origin and formation, economic, environmental, and First Peoples considerations • the geologic time scale and major events in Earth's history • the local and global fossil record (evidence of evolution, methods of fossil formation, First Peoples perspectives) • methods for relative and absolute dating of rocks, fossils, and geologic events • reconstruction of Earth's past through correlation of fossil data and rock strata • the formation of volcanic and deformational features through plate movement • evidence that supports a layered model of Earth • earthquakes and analysis of seismic waves • First Peoples knowledge of geologic events • internal and external factors that affect the plasticity of rock strata • faulting and folding • geologic maps, cross-sections, and block diagrams • weathering and erosion processes • First Peoples knowledge of landforms over time • periods of glaciation • groundwater and aquifers • causes and controls of mass wasting Environmental Sciences: • water quality parameters and bioindicators • availability and water use impacts • global water security (laws and regulation, conservation of water) • changes to climate systems • impacts of global warming • mitigation and adaptations • soil characteristics and ecosystem services • land use and degradation	can be found here? Any way to prevent them? (can learn to plot data using GIS software) • Is this area a carbon sink? Could it be? What happens when the climate warms? • Learn this is science + citizen science -> making and recording observations to help scientists

	• land management • personal choices and sustainable living • global environmental ethics, policy, and law	
Social Studies	Human Geography: • relationships between cultural traits, use of physical space, and impacts on the environment • relationship between First Peoples and the environment • industrialization, trade, and natural resource demands • factors behind increased urbanization and its influence on societies and environments • relationships between natural resources and patterns of population settlement and economic development • political organization of geographic regions Physical Geography: • structure of, feedback within, and equilibrium of natural systems • distinguishing features of the atmosphere, hydrosphere, cryosphere, lithosphere, biosphere, and anthroposphere • connections and interactions between the spheres • features and processes of plate tectonics and their effects on human and natural systems • features and processes of gradation and their effects on human and natural systems • natural disasters and their effects on human and natural systems • features and processes of Sun–Earth interactions and resulting patterns of climate, landscapes, and ecosystems • climate, weather, and interactions between humans and the atmosphere • characteristics of global biomes, including climate, soil, and vegetation • features and processes of the anthroposphere and their effects on natural systems. • natural resources and sustainability Urban Studies: • urban planning and urban design • decision making in the planning of cities and regions • contemporary issues in urban studies	• Activity: using aerial photos and geological/ bedrock/ permafrost maps to determine where you would build a road, taking into account where it would be most stable and least at risk from hazards etc and where to get material from to build the road • Learn this is science + citizen science -> making and recording observations to help scientists