


















Long Range Plan Model 1 - Grade 7




STRAND A: STEM Skills and Connections	 A1.1 Scientific Research	 A1.2 Scientific Experimentation	 A1.3 Engineering Design	 A1.4 Safety	 A1.5 Communication	 A2. Coding and Emerging Technologies	 A3. Applications Connections and Contributions
	<p>A1. STEM Investigation and Communication Skills: use a scientific research process, a scientific experimentation process, and an engineering design process to conduct investigations, following appropriate health and safety procedures</p> <p> A1.1 use a scientific research process and associated skills to conduct investigations</p> <p> A1.2 use a scientific experimentation process and associated skills to conduct investigations</p> <p> A1.3 use an engineering design process and associated skills to design, build, and test devices, models, structures, and/or systems</p> <p> A1.4 follow established health and safety procedures during science and technology investigations, including wearing appropriate protective equipment and clothing and safely using tools, instruments, and materials</p> <p> A1.5 communicate their findings, using science and technology vocabulary and formats that are appropriate for specific audiences and purposes</p> <p> A2. Coding and Emerging Technologies: use coding in investigations and to model concepts, and assess the impact of coding and of emerging technologies on everyday life</p> <p style="padding-left: 20px;">A2.1 write and execute code in investigations and when modelling concepts, with a focus on creating clear and precise instructions for simple algorithms</p> <p style="padding-left: 20px;">A2.2 identify and describe impacts of coding and of emerging technologies on everyday life</p> <p> A3. Applications, Connections, and Contributions: demonstrate an understanding of the practical applications of science and technology, and of contributions to science and technology from people with diverse lived experiences</p> <p>A3.1 describe practical applications of science and technology concepts in their home and community, and how these applications address real-world problems</p> <p>A3.2 investigate how science and technology can be used with other subject areas to address real-world problems</p> <p>A3.3 analyse contributions to science and technology from various communities</p>						

Term 1 - Overview, Guidelines, Assessment ideas

Students will begin by focusing on protecting life on land, life on water, and how our energy choices affect these goals. We will begin the year exploring the basics of ecosystems, and focusing specifically on local, regional, and global issues affecting the preservation of these systems. Classes are encouraged to venture outside to explore the ecosystems around them and, if possible, research a local invasive species that is affecting the balance of an ecosystem. Then students will shift their focus towards how global warming is affecting the planet, and how our energy choices play a major role in this phenomenon. Classes are encouraged to circle back to see how not only our energy choices help reduce global warming, but protecting our ecosystems (e.g., wetlands, forests, etc.) also contributes to reducing greenhouse gasses. Finally, students take a closer look at the particle theory of matter and how it plays a part in our understanding of heat.

Students will be completing a build project where they create a wind turbine, so teachers should ensure that proper tool safety is taught before embarking on that task. They will also be creating a model ecosystem and doing some inquiry projects on particle theory, so teachers should ensure they have materials available for these projects (e.g., jinx wood, recyclable materials, balloons, etc.)

Month or Suggested Timeline	Big Ideas and Guiding Questions for an Inquiry Stance	STEM Skills and Connections (Strand A)	Strands and Expectations	Cross-Curricular Integration	Resources
September	<p>Protecting Our Environment</p> <p>Guiding Questions: How can we preserve and restore terrestrial and marine ecosystems?</p> <p>How do different biotic and abiotic components interact within an ecosystem?</p> <p>How do invasive species get introduced to an ecosystem? How do they affect/impact the native species within that ecosystem?</p>	<p>  A1.5 Create an observational map of their local ecosystem (school yard, nearby forest, park, etc.), including both biotic and abiotic characteristics To support students at all levels, some may simply record relevant observations on their maps while others may begin to note connections between their observations, using a cause and effect model.</p> <p> A3 Investigate a local invasive species and how it is affecting the ecosystem it inhabits</p>	<p>B1.1 assess the impact of various technologies on the environment</p> <p>B1.3 analyse how diverse First Nations, Métis, and Inuit practices and perspectives contribute to environmental sustainability</p> <p>B2.1 explain that an ecosystem is a network of interactions among living organisms and their environment</p> <p>B2.2 identify biotic and abiotic components in an ecosystem, and describe the interactions between them</p>	<p>Language Science journal for students to communicate their understanding could be used year-long</p> <p>When asking your students to keep science journals, meet them where they are in skill level. Some students may only be ready to record basic observations, while others may be ready to begin drawing detailed conclusions from their gathered findings. To support students at all levels, provide scaffolded templates and exemplars for recording their observations and for creating conclusions.</p>	<p>STAO Safety in Elementary Science and Technology</p> <p>United Nations Sustainable Development Goals (SDGs)</p> <p>Let's Talk Science's Careers Education Resources</p> <p>Ontario Science Centre's Teacher Resources</p>




	<p>How are changing temperatures affecting the ecosystems around us?</p> <p>What can we learn from First Nations, Metis, and Inuit cultures in regard to environmental sustainability?</p>	<p> A1.1 Research an invasive species that is affecting a Canadian ecosystem, evaluate its impact, and create a presentation (poster, infographic, etc.) to share findings</p> <p> A2 Complete a virtual simulation of an ecosystem and explore what happens when you alter a food chain. Some students may be working at a level where they are able to identify biotic and abiotic components within their chosen ecosystem. Others may begin exploring the connections between those identified components. As a stretch, some students may be pushed to consider the wider impacts on an ecosystem when components within a food chain are altered.</p> <p> A.3 Connect with a local First Nations Knowledge Keeper or watch a video to learn about the first nations people's perspective on sustainability</p>	<p>B2.3 describe roles and relationships between producers, consumers, and decomposers within an ecosystem</p> <p>B2.4 describe the transfer of energy in a food chain, and explain the effects of altering any part of the chain</p> <p>B2.5 describe how matter is cycled within the environment, and explain how the cycling of matter promotes sustainability</p> <p>B2.6 explain the differences between primary succession and secondary succession in ecosystems</p> <p>B2.7 explain how biotic and abiotic factors limit the number of organisms an ecosystem can sustain</p>	<p>Geography Constructing maps for various purposes</p> <p>Math Create an infographic on invasive species</p> <p>Create computational representations using coding</p>	
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**A.2**




Code devices to collect data on various environmental conditions (expectations can vary depending on what data is being collected and how it is analysed). Some students may begin by remixing existing code and redesigning it to gather data for pre-determined environmental conditions. More advanced coders may work toward creating their own code, designed to gather data for various environmental conditions, debugging issues within their code as they work. Some students may be further stretched to create code that monitors various data either simultaneously or in real time. Students could be provided the option of which coding language to work in - some may work in blocks, while others may wish to work in JavaScript or Python, etc.


**A1.5**

Analyse gathered data, communicating findings (expectations can vary depending on what data is being collected and how it is analysed).

		 A1.5 Frame your investigations through the lens of SDGs 14 (Life Below Water) and 15 (Life on Land)			
October	Climate Change, Energy, and Our environment. Guiding Questions: How do heat pollution of land, water, and the atmosphere affect the environment? What are the environmental impacts of using non-renewable and renewable sources of energy? How can we design a windmill to effectively harness the wind while also resisting the forces acting upon it?	 A1.1 Research how ecosystems are being affected by climate change and evaluate the impact, and also how ecosystems can mitigate climate change  A1.3 Design and build a representation of a chosen ecosystem, noting the interaction between biotic and abiotic components. This could be created in a virtual environment (Minecraft, Roblox, CoSpaces, etc.) or built using found materials To support students at all levels, and to be conscious of available materials and technology, allow students to work in a medium that they are comfortable with. Some students may be more comfortable working virtually while others may wish to build a physical model or create a drawing as their representation.	B1.1 assess the impact of various technologies on the environment B1.2 assess the effectiveness of various ways of mitigating the negative and enhancing the positive impact of human activities on the environment B2.1 explain that an ecosystem is a network of interactions among living organisms and their environment B2.2 identify biotic and abiotic components in an ecosystem, and describe the interactions between them B2.3 describe roles and relationships between producers, consumers, and decomposers within an ecosystem B2.4 describe the transfer of energy in a food chain, and	Geography How climate change impacts natural events and/or human activities Language Oral language skills during debate Math Mathematical modeling where students design a wind turbine to maximize its function but minimize its cost	Ontario Science Center STEM Toolkit Science North's Educator Resources Perimeter Institute's unit "Temperature Rising" Preserving Canada's Wetlands

		<p>  A1.5 Conduct a class debate on the advantages and disadvantages of non-renewable and renewable sources of energy. Some students may be working at a level where they are only able to participate minimally during an oral debate (e.g., by speaking briefly during the opening or closing remarks, or by assisting with preparing rebuttal comments) while others may be more comfortable creating and delivering more advanced arguments.</p> <p> A1.3 Design and build a wind turbine that can raise a suspended load, employing the engineering design process. To support students at all levels and provide a series of levelled benchmarks for projects of this nature. Some students may be working at a level where they can recreate a windmill using a provided template, while others may be working at a level where they are ready to explore multiple individual designs. Some students may be further pushed to evaluate and critique</p>	<p>explain the effects of altering any part of the chain</p> <p>B2.5 describe how matter is cycled within the environment, and explain how the cycling of matter promotes sustainability</p> <p>B2.6 explain the differences between primary succession and secondary succession in ecosystems</p> <p>B2.7 explain how biotic and abiotic factors limit the number of organisms an ecosystem can sustain</p> <p>D1.1 evaluate environmental, social, and economic factors that should be considered when designing and building structures to meet specific needs for individuals and communities</p>		
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		<p>their designs, and those of their peers, incorporating revisions into their final designs.</p> <p> A2 Code a microcontroller, such as a micro:bit, and a motor to control the wind turbine</p> <p> A1.5 Frame your investigations into energy generation and consumption through the lens of SDGs 7 (Affordable and Clean Energy) and 11 (Sustainable Cities and Communities) When exploring connections to the SDGs some students may only be working at a level where they can identify overlap between their work and relevant SDGs. Other students may be pushed to explore those connections more deeply while others still might be stretched to think about ways in which current practices could be adjusted to mitigate negative impacts or foster positive impacts.</p>			
November	Particles all around us <i>Matter can be classified according to its physical characteristics; heat is a form of energy transfer</i>	<p> A1.2 Conduct an inquiry on how particles behave in a balloon when placed in a freezer.</p>	<p>C2.1 demonstrate an understanding of the particle theory of matter</p> <p>C2.2 use particle theory to</p>	<p>Language Science journal for students to communicate their understanding</p> <p>Procedural writing in lab write-ups</p>	<p>Ontario Science Center Curriculum Resources</p> <p>Science North - Science at Home</p>

	<p>Guiding Questions Is it always easy to determine what something is made of?</p> <p>How do particles behave in a solid, liquid, and gas?</p> <p>How does heat affect the behavior of particles?</p> <p>How can we distinguish between pure substances and mixtures?</p> <p>How can we distinguish between homogenous and heterogenous mixtures?</p>	<p>Provide scaffolded templates for students to record observations and draw conclusions. Some students may only be at a level of understanding where they will be able to observe and note changes in the balloon's size. Others may begin explaining those changes and why they occurred, using the postulates of the particle theory to support their reasoning. Others may be pushed to illustrate their understanding using particle diagrams.</p> <p> A1.2 Understand the scientific experimentation process by conducting various lab investigations Throughout the year students may be supported at all levels through various methods. Some students may require detailed lab outlines, including the use of images to support understanding. (chemix.org is a useful tool when creating lab handouts). At various times throughout the year, other students might be stretched through the opportunity to develop their own testable questions or lab procedures, designed to gather pre-determined data points.</p>	<p>distinguish between pure substances and mixtures</p> <p>E2.1 use particle theory to explain how heat affects the motion of particles in a solid, a liquid, and a gas</p> <p>E2.2 demonstrate an understanding of various ways in which heat is generated</p> <p>E2.3 use particle theory to explain the effects of heat on volume in solids, liquids, and gasses, including during changes of states of matter</p>	<p>Generate, gather, and organize information to write for an intended purpose (results of research conducted)</p> <p>Math Create computational representations using coding</p>	
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A1.5

Record observations in observation journals.



A1.5

Communicate findings for various audiences.

Provide various options for students to communicate their findings based on ability and comfort level. Some students may be supported through the option to record audio or video files, while others may be pushed to use a more formal written format.

Various technological supports may be useful during these activities as well (eg. Google read and write).







A1.3





Design and build a model to demonstrate understanding of the postulates of the particle theory of matter.






A1.2

Conduct investigations to explore changes of state through a transfer of energy.



		 A2 Use block coding software to design and build a model to represent particle movement in various states of matter, how a transfer of energy facilitates changes of state, and evaluate the models of others in the class.			
		 A3 Research the contributions from diverse cultures to the fields of physics and chemistry through various periods in time.			
		 A1.4 Demonstrate understanding of health and safety protocols when conducting investigations.			
December	Heat in the Environment How is heat transmitted through the processes of conduction, convection, and radiation? How does the greenhouse effect keep the Earth warm? How are human activities contributing to the increase in	 A1.2 Conduct investigations to explore methods of heat transfer (conduction, convection, radiation) Place various objects (e.g., wood, metal, glass, etc.) into hot water to test heat conductivity, use hot water and food colouring to show convection (i.e., battling bottles demonstration), and have students take materials of different colours outside and place them in the shade and sunlight to observe radiation.	E2.1 use particle theory to explain how heat affects the motion of particles in a solid, a liquid, and a gas E2.4 explain how heat is transmitted through conduction, and describe natural processes that are affected by conduction E2.5 explain how heat is transmitted in liquids and gasses through convection, and describe natural	Language Procedural writing in lab write-ups Geography Using convection to understand and describe patterns and physical characteristics of bodies of water, particularly ocean currents, and how climate change can impact water currents Geography Using the concepts of heat transfer to understand and describe how climate change can impact global weather	Perimeter Institute - Tools For Teaching Science





	greenhouse gas levels in the atmosphere, and how can we reduce greenhouse gas emissions?	 A1.3 Design and build a model to demonstrate how the atmosphere traps greenhouse gasses, which increases the impact of the greenhouse effect.  A3 Research how human activity is impacting climate change, relating your learning to SDG 13 (Climate Action)	processes that depend on convection E2.6 explain how heat is transmitted through radiation and describe the effects of radiation from the Sun on different kinds of surfaces	patterns, including the increase in severe weather events	
January	Particle Theory and Understanding Matter Guiding Questions: How can we separate a mixture while still maintaining its components? What affects a solute's ability to dissolve within a solvent? What are the processes through which various mixtures can be separated into their constituent pure substances?	 A1.2 Conduct investigations into methods for separating various mixtures into their constituent pure substances. For example, create a soil sifter or create a concentrated solution using a variety of techniques  A1.2 Conduct experiments to design the 'perfect' iced tea, exploring concentrations of various solutes qualitatively and quantitatively, employing the engineering design process throughout. Remind students that the engineering design process is cyclical, and remember that not all students will make it through all	C2.1 demonstrate an understanding of the particle theory of matter C2.2 use particle theory to distinguish between pure substances and mixtures C2.3 distinguish between homogenous and heterogenous mixtures C2.4 use the particle theory to describe how different factors affect the solubility of a substance and the rate at which it dissolves C2.5 describe the concentration of a saturated solution in both qualitative and quantitative terms, and	Language Procedural writing in lab write-ups Math Data collection & appropriate graph selection	




		<p>steps individually. Some will require additional support, especially in the prototyping, testing, and iterating phases. Some students may be pushed to explore their prototypes deeply and improve their initial designs through testing, revision, and iteration.</p> <p>Encourage reflection by all students throughout the process to best assess their learning and takeaways throughout the process, regardless of advancement through the phases.</p> <p> A1.2 Conduct investigations to identify various substances, employing the scientific experimentation process</p> <p> A1.5 Classify various substances as pure substances, mechanical mixtures, or solutions based on their physical characteristics</p> <p> A1.5 Communicate an understanding of the differences between pure substances and mixtures, possibly through the creation of an infographic</p>	<p>differentiate between saturated and unsaturated solutions</p> <p>C2.6 explain why water is referred to as the universal solvent</p> <p>C2.7 explain various processes used to separate mixtures, including solutions, into their components, and identify some applications of these processes</p> <p>C2.8 describe pure substances as elements and compounds consisting of atoms and combinations of atoms</p>		
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Term 2




In term 2, students will focus on the impacts of humans on their environment, as well as the innovative ways scientists and engineers have solved some of the problems we face. Students will also be encouraged to “think like a scientist” and come up with their own prototypes to solve a problem outlined by the UN sustainability goals. There will be many opportunities for students to explore various careers in STEM this term, and teachers are encouraged to connect with Skills Ontario, and local OYAP programs, and consider hosting a presentation with skilled trades. There are further opportunities for build and design projects, so teachers are reminded to gather materials appropriate for building, and ensure you have received proper safety training on the tools you have available to you in your school (e.g., hand tools, scroll saws, sanders, etc.)




Month or Suggested Timeline	Big Ideas and Guiding Questions for an Inquiry Stance	STEM Skills and Connections (Strand A)	Strands and Expectations	Cross-Curricular Integration	Resources
February	<p>Effects of Humans on the Environment</p> <p>What materials make good insulators vs conductors?</p> <p>How is our knowledge of insulators & conductors used in the trades?</p> <p>What can the phenomenon of an urban heat island help us understand about heat retention?</p>	<p> A1.4 Demonstrate understanding of hand tools, machines, and D&T room safety protocols Reinforce these safety protocols through spoken, written, and visual reminders to support all students in their understanding.</p> <p> A1.2 Investigate how houses are constructed to reduce heat loss Provide scaffolded templates to support students in this research. Some students may be at a level where they can identify areas of heat loss within a house. Others may be able to compare and differentiate areas of heat loss both qualitatively and quantitatively. Some students may be pushed to explore methods to further mitigate heat loss within a house.</p>	<p>E1.1 assess the social and environmental benefits of technologies that reduce heat loss in enclosed spaces or heat transfer to surrounding spaces</p> <p>E1.2 analyse various social, economic, and environmental impacts, including impacts related to climate change, of using non-renewable and renewable sources of energy</p> <p>E2.4 explain how heat is transmitted through conduction, and describe natural processes that are affected by conduction\</p> <p>E2.5 explain how heat is transmitted in liquids and gasses through convection, and describe natural processes that depend on</p>	<p>Student Success Career research & exposure to the skilled trades</p> <p>Math Data collection, organization, and visualization regarding heat retention and loss</p> <p>Math Coding, solve problems using coding and read and alter existing code while using microcontrollers to gather temperature data</p> <p>Math Mathematical modeling (maximizing function while minimizing cost during a design-build)</p> <p>Language Generate, gather and organize information to write for an intended purpose (results of research conducted, data on heat retention and loss, interview questions, etc.)</p>	<p>Skills Ontario - Consider booking a virtual or in-person presentation on the skilled trades</p> <p>Ontario Youth Apprenticeship Program</p> <p>ChatterHigh - College and Career Exploration</p> <p>Canadian Geographic Educator Resources</p>




		<p> A1.3 Design, build and evaluate a model thermos, designed to retain heat and mitigate heat loss, employing the engineering design process. Support students at all levels through levelled checkpoints. Some students may be supported through the use of pre-existing materials, adding their own improvements to those items. Others may be pushed to further individually design and create their own models. Some students may only work toward the design phase, while others may be ready to create their design through modelling software or using gathered materials. Encourage reflection by all students throughout the process to best assess their learning and takeaways throughout the process, regardless of advancement through the phases.</p> <p>  A1.5 Gather and analyse data on heat retention and loss.</p> <p> A2 Code a microcontroller, such as a micro:bit, to gather temperature data, possibly to be</p>	<p>convection</p> <p>E2.7 describe the role of radiation in heating and cooling Earth, and explain how greenhouse gasses affect the transmission of radiated heat through the atmosphere</p> <p>E2.8 identify common sources of greenhouse gasses, including sources resulting from human activity, and describe how humans can reduce emissions of these gasses</p>		
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		<p>used during investigations.</p> <p> A1.1 Research the phenomenon of urban heat islands.</p> <p> A3 Interview/ Presentation/Video chat with local OYAP program or skilled trades organization to learn about connected careers (e.g., construction, HVAC, electrical, etc.) It is important to ensure that our students are exposed to, and learn about, a variety of different post-secondary education and career pathways.</p>			
March	<p>Effects of Humans on ecosystems</p> <p>How do human activities impact an ecosystem both positively and negatively?</p> <p>Are there alternatives to traditional farming that could protect our natural resources while still providing Canadians with the food we need?</p>	<p> A1.2 Ecosystem inquiry project - students design and build two mini “ecosystems” (e.g. grass seed, bean plant, etc.) and explore how a “human factor” (e.g. oil, soap, road salt, pesticides, etc.) affects the quality of the ecosystem Support all students by providing scaffolded templates for the creation of these models. Some students may need to identify components of their local ecosystem, while others might be able to conduct independent</p>	<p>Strand B: Interactions in the Environment B1.1 assess the impact of various technologies on the environment B1.2 assess the effectiveness of various ways of mitigating the negative and enhancing the positive impact of human activities on the environment B2.8 describe how different approaches to agriculture and to harvesting food from</p>	<p>Language Procedural writing for inquiry projects</p> <p>Language Generate, gather and organize information to write for an intended purpose (results of research conducted, information on oil sands technology, procedures, and impacts, etc.)</p> <p>Geography Describe human activities (oil sands mining) that create change in water bodies, vegetation patterns, and natural landscapes</p>	<p>Vertical Farming</p> <p>Canadian Geographic Education - Climate Change and Food Security</p>



		<p>research into global ecosystems. Push students to explore how human factors affect their chosen ecosystem. Some may only be able to identify those human activities that have an impact while others might be able to discuss the effects of those activities on the biotic and abiotic components within their ecosystem. Still, others might be stretched to discuss possible ways to mitigate negative impacts or promote positive impacts.</p> <p> A1.1 Research and evaluate the process of separating the useful components found in oil sands and the disposal of non-useful components, and assess the impacts of oil harvesting on society and the environment</p> <p> A1.2 Create a simulated oil spill and test out and evaluate different methods for removing and containing the oil. Provide scaffolded and levelled lab outlines to support students at various levels of independence. Some students may need detailed procedures to follow while others</p>	<p>the natural environment can impact an ecosystem, and identify strategies that can be used to maintain and/or restore balance to ecosystems</p> <p>Strand C: Pure Substances and Mixtures C1.1 analyse the social and environment impacts of the use and disposal of pure substances found in technological devices, considering local and global perspectives</p> <p>C1.2 assess environmental and social impacts of different industrial methods used to separate mixtures</p> <p>C2.7 explain various processes used to separate mixtures, including solutions, into their components, and identify some applications of these processes</p>		
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		<p>may be able to determine the specific steps within a procedure on their own, leveraging research and class learning.</p> <p> A3</p> <p>Research and evaluate innovations in the farming industry that provide sustainable alternatives to traditional framing. Prepare a research guide to support students in the research process - asking good questions, developing query terms, and citing sources.</p> <p>Provide 1-2 vetted research sources to support those students who need additional direction.</p>			
April	<p>Innovative Technologies</p> <p>Guiding Question: How do we use structures to meet a need within a community?</p> <p>How is a structure designed to withstand the forces of nature (wind, snowfall weight, earthquakes, etc.)?</p> <p>How can urban planners and engineers make</p>	<p> A1.4</p> <p>Demonstrate understanding of hand tool, machine, and D&T room safety protocols</p> <p> A1.2</p> <p>Complete mini-inquiry challenges on the strengths of various common structures (e.g., strength of various beam designs, the strength of shell vs frame vs solid)</p>	<p>Strand B: Life Systems</p> <p>B1.2 assess the effectiveness of various ways of mitigating the negative and enhancing the positive impact of human activities on the environment</p> <p>Strand D: Structures and Mechanisms</p> <p>D1.1 evaluate environmental, social, and economic factors that should be considered when designing and building structures to meet specific</p>	<p>Math</p> <p>Mathematical modeling to maximize function while minimizing cost of a design-build</p> <p>Language</p> <p>Generate, gather and organize information to write for an intended purpose (results of research conducted, impacts of AI technology on careers, etc.)</p>	<p>Let's Talk Science Educational Resources</p>

	<p>cities and human settlements inclusive, safe, resilient, and sustainable?</p>	<p> A1.2 Explore how the center of gravity affects a structure's ability to withstand a force applied to it.</p> <p> A3 Research how structural design can impact SDGs 9 (Industry, Innovation, and Infrastructure) and 11 (Sustainable Cities and Communities)</p> <p> A1.3 Design, build, and evaluate a structure that is designed to serve a specific purpose, employing the engineering design process. For example, designing and building a chair from recycled materials to meet the needs of a specific user. Some students may benefit from being provided a specific purpose around which to design a structure, while others may be able to identify a need on their own, around which they will design their structure. Encourage reflection by all students throughout the process to best assess their learning and takeaways throughout the process, regardless of</p>	<p>needs for individuals and communities</p> <p>D1.2 evaluate the impact of the ergonomic design of various tools, objects, and workspaces on a user's health, safety, and ability to work efficiently, and use this information to describe changes that could be made in their own spaces and activities</p> <p>D2.1 classify structures as solid structures, frame structures, or shell structures</p> <p>D2.2 describe ways in which the center of gravity of a structure affects the structure's stability</p> <p>D2.3 identify the magnitude, direction, point of application, and plane of application of the forces applied to a structure</p> <p>D2.4 describe the role of symmetry in structures, and identify instances of symmetry in various structures</p>		
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		<p>advancement through the phases.</p> <p> A2, A3</p> <p>Research how coding and artificial intelligence systems are used by those in careers involved in designing and building a purpose-built structure.</p>			
May	<p>Innovative Technologies</p> <p>How does the engineering design process help engineers create new and innovative solutions to problems?</p>	<p> A1.3</p> <p>Conduct a design thinking challenge (e.g., students must build the tallest tower using marshmallows and spaghetti). Add in a requirement (e.g., tower must support one textbook on top) and have students redesign with this in mind.</p> <p>Prepare prompts and guiding questions to support those students who may struggle to begin an activity such as this. Consider assigning roles for each student within a working group to ensure responsibility and equity of participation.</p> <p> A3</p> <p>Research various engineering career pathways, noting the STEM skills that would be leveraged in each</p>	<p>Strand D: Structures and Mechanisms</p> <p>D1.1 evaluate environmental, social, and economic factors that should be considered when designing and building structures to meet specific needs of individuals and communities</p> <p>D2.2 describe ways in which the center of gravity of a structure affects the structure's stability</p> <p>D2.3 identify the magnitude, direction, point of application, and plane of application of the forces applied to a structure</p> <p>D2.5 describe factors that can cause a structure to fail</p> <p>D2.6 identify the factors that</p>	<p>Math</p> <p>Mathematical modeling to maximize function while minimizing the cost of a design build</p> <p>Math</p> <p>Coding, solve problems using coding and read and alter existing code</p>	<p>Perimeter Institute - The Power of Innovation</p> <p>Perimeter Institute - What It Takes to Innovate</p> <p>Perimeter Institute - Automated for the Future</p> <p>Let's Talk Science Career Pathways</p>

		 A2 Use block-code software (e.g., Tinkercad, Scratch) to design a simple structure which serves a function (e.g. chair).  A2 Unplugged coding - students create an algorithm for their partner to build a bridge using the least amount of materials that can support a load. Once done with their algorithm, trade with their partner and attempt to build and then evaluate the bridge using the instructions provided. Scaffold the student experience by preparing an exemplar and demonstration. Students could be further supported through video instructions, written instructions, and/or visual instructions.	determine the suitability of materials for use in manufacturing a product or constructing a structure D2.7 describe methods engineers and other professionals use to assess, improve, and maintain the safety of structures		
June	Science Innovation to solve problems Guiding Questions: Why is it important to learn about the UN sustainability goals? How do the goals connect to issues we are facing in Canada?	 A1.3 Use the engineering design process to identify a local, regional, or global issue that is connected to one or more of the SDGs and propose a creative solution to that problem Some students may benefit from being provided a specific issue to propose a solution for, while	Strand B-E expectations covered will be dependent on the goals focused on by the class. Suggest goals that tie into the Grade 7 curriculum, including goals 13, 14, or 15.	Media Literacy Create a slideshow to “pitch” their prototype	

	<p>Can we create an invention to tackle one of the problems we have learned about?</p>	<p>others may be able to identify an issue on their own.</p> <p> A2 Develop code that could be used to automate some of the processes involved in the creation of your proposed solution</p> <p> A3 Research some of the careers and skilled trades that might be involved in further developing your proposed solution, noting the STEM skills that they would leverage in doing so Be conscious of the background of your students and prepare examples that show various career and trade pathways that are reflective of your students' background and experience. Encourage your students to explore career pathways that follow various post-secondary education opportunities as well as apprenticeships.</p>			
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