Ontario Standards Alignment

Grade 3, Science and Technology

The Ontario STEMterprise project meets Ontario's 2022 STEM curriculum in Science and Technology Strand A STEM Skills and Connections, Strand B Life Systems, Strand D Structures and Mechanisms, and Strand E Earth and Space Systems. The program will also align with the Social Studies curriculum in Strand A Heritage and Identity and Strand B People and Environments, as well as Health and Physical Education Strand D Healthy Living.

Additionally, the STEMterprise project meets Ontario's 2023 curriculum in Language Strand A **Literacy Connections and Applications and Strand B Foundations of Language**.

Lesson	Learning Expectations	Activities and Learnings
Lesson 1: Becoming a Plant Expert	**Ontario Science and Technology Curriculum Strand B Life Systems** **B1.1** Assess ways in which plants are important to humans and other living things, taking different perspectives into consideration, and identify ways in which humans can protect native plant species and their habitats . **B1.3** Assess the benefits and limitations of locally grown food. **B2.1** Describe the basic needs of plants, including the need for air, water, light, heat, nutrients, and space, and identify environmental conditions that may threaten plant survival. **B2.2** Identify different parts of plants, including the root, stem, flower, stamen, pistil, leaf, seed, cone, and fruit, and describe how each part contributes to plants' survival within their environment. **B2.3** Describe changes that different plants undergo in their life cycles. **B2.5** Demonstrate an understanding that most plants get energy directly from the Sun through the process of photosynthesis, which involves the absorption of carbon dioxide and the release of oxygen. **Agriculture/Agri-Food Themes** Grains are an important part of a healthy diet. Ontario is a significant grain-growing region; Ontario farmers grow many types of grains. Oats grown in Northern Ontario are best suited to making granola or snack bars. Furthermore, oats grown in other parts of Ontario are better for other uses.	Students discuss where food comes from and explore the many roles of plants, including Ontario grains, in our lives. They identify and describe the major parts of plants, including root, stem, flower, leaf, seed, and fruit and each one's contribution to the plant's survival. Students explore the key ingredients of granola bars in preparation for designing their own. Students are introduced to the healthy benefits of grains and how ubiquitous they are in our lives, even though we are often unaware of them. They begin to examine Ontario as a grain-growing province. Students begin to learn about the requirements of growing plants. Students are encouraged to think more broadly about the connections between human lives and plants. Students learn about the importance and versality of Ontario grains. They also learn that eating food made with locally grown ingredients means our food does not have to travel as far to reach our plates, which helps the environment.

Lesson	Learning Expectations	Activities and Learnings
Lesson 2: Starting a Business	**Ontario Health and Physical Education Curriculum** **Strand D Healthy Living** **D1.1** Demonstrate an understanding of how the origins of food (e.g., where the food is grown, harvested, trapped, fished, or hunted; whether and how it is processed or prepared) affect its nutritional value and how those factors and others (e.g., the way we consume and dispose of food) can affect the environment. **D3.1** Explain how local foods and foods from various cultures can be used to expand the range of healthy eating choices. **Agriculture/Agri-Food Themes** The nutritional benefits of grain are significant. Various grains help give healthy products their texture, flavour, and smell.	Students design a marketing strategy and conduct market research to discover what will make their new granola bar stand out among similar products. They will design a brand and logo to represent their new product. Students learn about the importance of a healthy balanced diet and how to incorporate that knowledge in their product. This lesson reinforces the functions of the parts of plants and the environmental benefits of eating locally sourced ingredients. Students learn how to apply what they have learned about grains to a marketable product.

Lesson	Learning Expectations	Activities and Learnings
Lesson 3: Growing our Ingredients from Seeds	**Ontario Science and Technology Curriculum Strand A STEM Skills and Connections and B Life Systems.** **Ontario Mathematics Curriculum Strand C Algebra – Modelling; D Data; and E Spatial Sense** **STEM** **A1.2** Use a scientific experimentation process and associated skills to conduct investigations. **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. **A1.5** Communicate their findings, using science and technology vocabulary and formats that are appropriate for specific audiences and purposes. **Life Systems** **B2.1** Describe the basic needs of plants, including the need for air, water, light, heat, nutrients, and space, and identify environmental conditions that may threaten plant survival. **B2.2** Identify different parts of plants, including the root, stem, flower, stamen, pistil, leaf, seed, cone, and fruit, and describe how each part contributes to plants' survival within their environment. **B2.3** Describe changes that different plants undergo in their life cycles. **B2.4** Describe ways in which a variety of plants adapt and/or react to their environment and to changes in their environment. **B2.5** Demonstrate an understanding that most plants get energy directly from the sun through the process of photosynthesis, which involves the absorption of carbon dioxide and the release of oxygen.	Students deepen their learning about plants, including: • their distinct characteristics • the similarities and differences among the various types of plants grown • what plants need to grow, including air, water, light, warmth, and space • how plants get energy from the sun and help other living things get energy when they eat plants • the various ways we grow plants for food, such as farms, orchards, and greenhouses. • environmental conditions that may threaten plant and animal survival Students extend their learning about plants' needs by exploring farmers' concerns about growing requirements and how they meet those needs while working to protect the environment. Students learn about, and conduct, a fair test to compare seeds. They journal their experience and develop conclusions about their plants' rates of growth.

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Lesson 3: Growing our Ingredients from Seeds	**Ontario Science &and Technology Curriculum Strand A STEM Skills and Connections and B Life Systems.** **Ontario Mathematics Curriculum Strand C Algebra – Modelling; D Data; and E Spatial Sense** **Mathematics** **C4** Apply the process of mathematical modelling to represent, analyze, make predictions, and provide insight into real-life situations. **D1.2** Collect data through observations, experiments, and interviews to answer questions of interest that focus on qualitative and quantitative data, and organize the data using frequency tables. **D2.1** Use mathematical language, including the terms "impossible," "unlikely," "equally likely," "likely," and "certain" to describe the likelihood of events happening, and use that likelihood to make predictions and informed decision. **E2.5** Use various units of different sizes to measure the same attribute of a given item, and demonstrate that even though using different-sized units produces a different count, the size of the attribute remains the same. **Agriculture/Agri-Food Themes** The importance of agriculture is reinforced by revisiting the topics of Lesson 1: Where do plants come from? Where do seeds come from? Farmers support plant growth by ensuring that the elements they can affect, such as water diversion and soil nutrients, are managed judiciously. Regional differences (hardiness zones and weather) determine the types of crops we can grow, where specific crops can be grown, and when seeds can be planted.	In addition to investigating the requirements for plant growth, students will explore the role of agriculture in producing our food and the interaction of farmers with nature. Students will be introduced to farmers' efforts to mitigate climate change through sustainable practices and how they adapt to environmental change.

Lesson	Learning Expectations	Activities and Learnings
Lesson 4:	To Be Determined	

Lesson	Learning Expectations	Activities and Learnings
Lesson 5: Soil in the Environment	**Ontario Science and Technology Curriculum Strand E Soils in the Environment; Ontario Social Studies Curriculum Strand B People and Environments** **Soils in the Environment** **E1.1** Assess the importance of soils for society and the environment. **E1.2** Assess the impact of human activity on soils, and describe ways in which humans can improve the quality of soils and/or lessen or prevent harmful effects on soils. **E2.1** Identify the living and non-living components of soil, and describe the characteristics of healthy soil. **E2.2** Identify different substances that are commonly added to, or absorbed by, the soil, and describe their effects on soil health. **E2.3** Examine different types of soils found in Ontario, and describe how different soils are suited to growing different types of food, including crops. **E2.4** Explain the process of erosion, including its causes and its impact on soils. **E2.5** Identify various strategies used to maintain and improve soil health in Ontario. **E2.6** Describe the process of composting, and explain some benefits of composting. **New expectations:** **Gr 3 E2.5** Identify various strategies used to maintain and improve soil health in Ontario. **People and Environments** **B3.5.** Describe major types of land use (e.g., agriculture, industry, commerce, housing, recreation, transportation, conservation) and how they address human needs and wants. **B3.** Describe major landform regions and types of land use in Ontario and some of the ways in which land use in various Ontario municipalities addresses human needs and wants, including the need for jobs. **B1.** Demonstrate an understanding of key aspects of the interrelationship between the natural environment, land use, employment opportunities, and the development of municipal regions in Ontario. How do physical features influence the ways in which land is used? How does the way land is used influence local communities and local jobs? **B2.** Use the social studies inquiry process to investigate some of the environmental effects of different types of land and/or resource use in Ontario municipal regions, as well as some of the measures taken to reduce the negative impact of that use.	Students learn about soil composition, the importance of soil and soil health and how the ground beneath their feet is the foundation of their lives. They also assess the human impact on soils, how we can improve soil quality, and the challenges to farmers and how they work to maintain and enhance soil health. Students investigate the effect of fertilizer on plant growth using the plants they grow from seeds. They apply their Lesson 3 learning about fair testing. Students learn about soil erosion by water and wind and the importance of cover crops to prevent erosion and support soil. Group activities help students learn about soil biodiversity when they examine soil samples and count the number of worm in samples as an indicator of soil health. Students learn how farming practices are changing to mitigate soil damage, including the development of innovative farming machines, including robotics, that are more efficient and smaller to prevent soil compaction.

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Lesson 5: Soil in the Environment	**Ontario Science and Technology Curriculum Strand E Soils in the Environment; Ontario Social Studies Curriculum Strand B People and Environments** **People and Environments** **B2.1.** Formulate questions to guide investigations into some of the short- and/or long-term effects on the environment of different types of land and/or resource use in two or more municipal regions of Ontario (e.g., the impact of mining, forestry, agriculture, suburban land development) and measures taken to reduce the negative impact of that use. **B2.5.** Evaluate evidence and draw conclusions about some of the short- and long-term effects on the environment of different types of land use in municipal regions of Ontario and about key measures to reduce the negative impact of that use. Sample question: "What did you find out about the environmental impact of some types of agricultural land use?" **Agriculture/Agri-Food Themes** Soil literally impacts every bite we take. Soil health is a crucial component of agriculture. By using sustainable farming practices, such as driving on fields less and planting cover crops, farmers support soil health and protect our ability to grow food. More and more, agriculture is applying technology to create a sustainable farming future.	Students will learn about the importance of soil and soil health by getting their hands dirty during activities that explore soil. They will also gain an understanding of human impacts on soil and the technology and sustainable farming practices tthat maintain, enhance and protect soil.

Lesson	Learning Expectations	Activities and Learnings
Lesson 6: Designing an Innovative Farming Machine	**Ontario Science & Technology Curriculum Strand A STEM Skills and Connections; Ontario Language Curriculum Strand A; Literacy Connections and Applications; Ontario Language Curriculum Strand B; Foundations of Language** STEM **A1.3** Use an engineering design process and associated skills to design, build, and test devices, models, structures, and/or systems. **D1.1** Demonstrate an understanding of how the origins of food (e.g., where the food is grown, harvested, trapped, fished, or hunted; whether and how it is processed or prepared) affect its nutritional value and how those factors and others (e.g., the way we consume and dispose of food) can affect the environment. Language **Transferable Skills** **A1** Demonstrate an understanding of how the seven transferable skills are used in various contexts; the seven skills are: critical thinking and problem solving; innovation, creativity, and entrepreneurship; self-directed learning; collaboration; communication; global citizenship and sustainability; and digital literacy. **A1.1** Apply transferable skills when reading, listening to, viewing, and creating texts of various forms. **Cross-Curricular and Integrated Learning** **A3.1** Apply the knowledge and skills developed in this grade to support learning in various subject areas and identify some ways this learning can be used in everyday life. **Ontario Language Curriculum Strand B Foundations of Language** **Effective Listening Skills** **B1.1** Use effective listening skills, including asking questions to clarify information and ideas, in formal and informal contexts and for various purposes, including in small- and large-group conversations and various classroom activities.	Students learn that food products made from grains undergo certain processes to become the food we eat. They will learn about foods made from specific grains, such as the ones they are growing in their classrooms. Good in Every Grain videos enhance learning. Students virtually explore advances in innovative farming equipment that save time and effort and, most importantly, protect soil and reduce fuel emissions. Students are challenged to design a farming machine to meet a specific need, such as for seeding. After testing and evaluating their machines, they present their designs to the class and explain the farmer challenges they solve. Presenting their innovations to classmates helps students develop listening and oral communication skills. As presenters, they will be required to develop strategies for explaining their ideas. As audience, students will listen effectively and ask questions to clarify information.

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Lesson 6: Designing an Innovative Farming Machine	**Ontario Science & Technology Curriculum Strand A STEM Skills and Connections; Ontario Language Curriculum Strand A; Literacy Connections and Applications; Ontario Language Curriculum Strand B; Foundations of Language** **Speaking Purposes and Strategies** **B1.3** Identify the purpose and audience for speaking in formal and informal contexts, and use appropriate speaking strategies, including establishing a rapport with the audience, to communicate clearly and coherently. **Word Choice, Syntax, and Grammar in Oral Communication** **B1.5** Use appropriate word choice, including new vocabulary, grammar, and cohesive sentences when speaking and communicating ideas in various contexts, to support audience comprehension. **Agriculture/Agri-Food Themes** This lesson demonstrates processes grains undergo to get from the farm to the table. Students will consider innovative farm machines that support sustainable farming and protect the environment. Although farm machinery can contribute to greenhouse gas emissions, modern innovations and technology advancements allows farm equipment to be part of the solution. Today's machinery is more efficient and less harmful to soil and the environment. More efficient farm machinery means farmers spend less time driving on fields therefore there is less soil compaction and less fuel burned. This leads to healthier soils and, fewer emissions and cleaner air.	Students may have heard that farming machinery is harmful to the environment. They will learn about the technology and practices being applied that make farm equipment part of the environmental solution as they meet the increasing need for food for our growing population.

Lesson	Learning Expectations	Activities and Learnings
Lesson 7: Designing a Healthy Recipe and Conducting Market Research	**Ontario Mathematics Curriculum Strands B Number; C Algebra; D Data; and E Spatial Sense; Ontario Health Curriculum Strand D** **Mathematics** **B1.1** Read, represent, compose, and decompose whole numbers up to and including 1000, using a variety of tools and strategies, and describe various ways they are used in everyday life. **C.4** Apply the process of mathematical modelling to represent, analyze, make predictions, and provide insight into real-life situations. **D1.2** Collect data through observations, experiments, and interviews to answer questions of interest that focus on qualitative and quantitative data, and organize the data using frequency tables. **D1.3** Display sets of data, using many-to-one correspondence, in pictographs and bar graphs with proper sources, titles, and labels, and appropriate scale. **D1.5** Analyze different sets of data presented in various ways, including in frequency tables and in graphs with different scales, by asking and answering questions about the data and drawing conclusions, then make convincing arguments and informed decision. **E2.5** Use various units of different sizes to measure the same attribute of a given item, and demonstrate that even though using different-sized units produces a different count, the size of the attribute remains the same. **Health** **D1.1** Understand food origins, nutritional value, and environmental impact. **D3.1** Local and cultural foods, eating choices. **Agriculture/Agri-Food Themes** Ontario produces several types of grains, which provide us with carbohydrates, protein, fat, and several minerals important for good health. The grain products we love contain refined or whole grains; both are healthy choices and which one a person eats is a matter of preference. People who cannot eat gluten can find gluten-free grain products such as Ontario-grown oats and corn.	Students understand grains are part of a healthy diet and develop a recipe for nutritious bars that contain grains, designing two healthy granola bar flavours to appeal to their target market. Learning in this lesson reinforces earlier lessons that explain the importance of sourcing local ingredients. Students are introduced to the idea of a "unique selling point" that makes their product stand out from their competition. Working in business groups, students design and conduct market research, using closed multiple-choice questions, to compile date on what people would like to buy. They record data using a tally table and construct a pictograph or bar graph to show their results. Students use the compiled data to guide their decisions. The curriculum focus is on Mathematics and Health. Students will exercise their math skills as they compile data gleaned from market research into granola bar products they develop as a nutritious, grain-based snack.

Lesson	Learning Expectations	Activities and Learnings
Lesson 8: Making Granola Bars	**Ontario Mathematics Curriculum Strand E Spatial Sense; Ontario Health Curriculum Strand D** **Mathematics** **E2.3** Use non-standard units appropriately to estimate, measure, and compare capacity, and explain the effect that overfilling or underfilling, and gaps between units, have on accuracy. **E2.4** Compare, estimate, and measure the mass of various objects, using a pan balance and non-standard units. **E2.5** Use various units of different sizes to measure the same attribute of a given item, and demonstrate that even though using different-sized units produces a different count, the size of the attribute remains the same. **E2.6** Use analog and digital clocks and timers to tell time in hours, minutes, and seconds. **Health** **D2.2** Apply their understanding of good safety practices by developing safety guidelines for a variety of places and situations outside the classroom, including online. **D3.1** Explain how local foods and foods from various cultures (e.g., berries, curries, chapatis, lychees, kale, lentils, corn, naan, wild game, fish, tourtière) can be used to expand their range of healthy eating choices. **Agriculture/Agri-Food Themes** Grains are important ingredients in many healthy foods. They combine well with other flavours to create imaginative and tasty food.	Students work in groups to follow their recipes as they make their granola bars, which they'll sell in a farm "store." Students review and practise kitchen safety during this activity, such as tying back long hair, rolling up sleeves, wearing an apron, cleaning work surfaces, and washing their hands. They also survey their environment for safety hazards before they cook and learn how to cut food safely. Students measure ingredients carefully, use fractions to halve the required ingredients to make a test batch, and write instructions for making their granola bars, possibly with illustration (photos, videos, apps). Students practise several practical skills in this lesson as they create their grain-based product.

Lesson	Learning Expectations	Activities and Learnings
Lesson 9: Market your Product	**Ontario Mathematics Curriculum Strand F Financial Literacy; Ontario Language Curriculum Strand B; Foundations of Language** **Mathematics** **F1.1** Estimate and calculate the change required for various simple cash transactions involving whole-dollar amounts and amounts of less than one dollar. **Language** **Effective Listening Skills** **B1.1** Use effective listening skills, including asking questions to clarify information and ideas, in formal and informal contexts and for various purposes, including in small- and large-group conversations and various classroom activities. **Speaking Purposes and Strategies** **B1.3** Identify the purpose and audience for speaking in formal and informal contexts, and use appropriate speaking strategies, including establishing a rapport with the audience, to communicate clearly and coherently. **Word Choice, Syntax, and Grammar in Oral Communication** **B1.5** Use appropriate word choice, including new vocabulary, grammar, and cohesive sentences when speaking and communicating ideas in various contexts, to support audience comprehension. **Agriculture/Agri-Food Themes** In this lesson, students describe the benefits of grain as they design and write promotional material and packaging for their granola bars. They will consider how to appeal to people and persuade them to buy their grain-based products.	Students work in groups to determine the selling price of their products, considering what it cost to make each granola bar. They work out how much profit they will make and discuss what to do with it (i.e., donation to a charity, seed money for the next year's project). Students examine promotional material for food in a variety of media (online, in printed magazines, flyers) and design their own written advertisements. They consider how to interest consumers with strategies like special sales, celebrity endorsements, and explaining why their product is better than the competitors. Students create television or radio advertisements, practising good oral presentation skills. Students design sustainable packaging for their products, considering environmental impact and cost. The packaging will apply the logo and branding they designed in Lesson 2. The entrepreneurial approach engages students' growth mindset and develops transferable skills such as critical thinking, problem solving, financial literacy, innovation, and more. Further, students gain opportunities for deep learning and practising skills that last a lifetime, including citizenship, communication, character, critical thinking, collaboration, and creativity. This lesson reinforces the benefits and value of grains learned in the previous lessons.

Lesson	Learning Expectations	Activities and Learnings
Lesson 10: Bake Sale	**Ontario Mathematics Curriculum Strand F Financial Literacy; Ontario Language Curriculum Strand B; Foundations of Language** **Mathematics** **F1.1** Estimate and calculate the change required for various simple cash transactions involving whole-dollar amounts and amounts of less than one dollar. **Language** **Effective Listening Skills** **B1.1** Use effective listening skills, including asking questions to clarify information and ideas, in formal and informal contexts and for various purposes, including in small- and large-group conversations and various classroom activities. **Speaking Purposes and Strategies** **B1.3** Identify the purpose and audience for speaking in formal and informal contexts, and use appropriate speaking strategies, including establishing a rapport with the audience, to communicate clearly and coherently. **Word Choice, Syntax, and Grammar in Oral Communication** **B1.5** Use appropriate word choice, including new vocabulary, grammar, and cohesive sentences when speaking and communicating ideas in various contexts, to support audience comprehension. **Agriculture/Agri-Food Themes** Grain-based products are not only tasty and part of a balanced diet, they are economically good choices.	Students set up their classroom like a market, with promotional materials and examples of students' STEMterprise work on display. Students role-play the shopping experience with their peers, deciding which products to buy and making change before they invite shoppers into their shops This lesson provides an excellent opportunity to invite parents, caregivers, and prominent people to school to hear about what they learned and buy the products. Children from other year groups could also be invited. Students gain practical experience as producers and consumers of grain products.