Learning Plan
Secondary

THE ROYAL GROWING SCHOOL GARDENS *Project*

FOR EDUCATORS

Overview

This learning plan is designed as an example guide for teachers to help support planning for using a garden to explore the intersection of agriculture, sustainability, and the environment. It involves theoretical learning, practical gardening experiences, and exploration of the impact of agriculture on society and the environment. The lessons are integrated across multiple subjects, including Science, Social Studies, Mathematics, English, Green Industries, Healthy Active Living, and Health and Nutrition.

The Royal Growing School Gardens Project

SECONDARY LEARNING PLAN

For Educators

Step 1: Designing your garden

- Site Study/Viability Review
  - Where will be placing your garden?
  - Consult resources on where your garden should go!
    - TDSB resources:
      - Stock Tank Garden Planning Template Page 1
      - Stock Tank Garden Planning Template Page 2
    - Barrett Centre of Innovation in Sustainable Urban Agriculture:
      - Community Portal
      - Knowledge Centre
  - Sample Materials list:
    - Stock Tank
    - Soil
    - Compost
    - Gloves
    - Wheelbarrow
    - Seeds
    - Watering Can
    - Shovels, rakes, trowels
- Workshops, expert support and experiences for your students:
  - GTA-based partners:
    - Growing Greenthumbs Toronto
    - FoodShare Toronto
    - Miniikaan
- Other learning plans or garden resources:
  - Nutrients For Life Foundation:
    - Educator Resources
    - E-Lessons
    - Learning Gardens Guide
    - Guide to Vegetable Gardening
  - AgScape/Agriculture in the Classroom Canada:
    - All About Soil
  - 4-H Ontario:
    - Let's Get Growing
  - Good in Every Grain:
    - What's Growing ON?

Learning Plan for Secondary Students: The Royal Agricultural Winter Fair Growing School Gardens Project

Grade Level: 9-12
Duration: 4-6 weeks
Topic Focus: Agriculture, sustainability, local food systems, environmental science
Key Themes:

- Sustainable agriculture practices and technology
- Food security and local communities
- Health and nutrition
- Plant biology
- Soil science
- The role of agriculture in society and economy

Learning Plan Overview

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Objectives:

1. Understand the biology of plants and the importance of soil, water, and nutrients in agricultural practices.
2. Explore sustainable farming methods, including organic farming, crop rotation, and regenerative agriculture.
3. Investigate local and global food systems and the role of urban gardening in food security, and the impact on health and wellbeing.
4. Develop an understanding of the environmental and economic impact of agriculture.
5. Learn practical gardening skills and apply them to create a small garden, reflecting on the broader implications for sustainability.

Week 1: Introduction to Agriculture and Plant Biology

Objective 1: Understand the biology of plants and the importance of soil, water, and nutrients in agricultural practices.

Learning Outcomes:

- Students will be able to describe the essential elements for plant growth and the plant life cycle.
- Students will be able to explain the impact of environmental factors (water, soil, light) on plant development.

Lesson Plan:

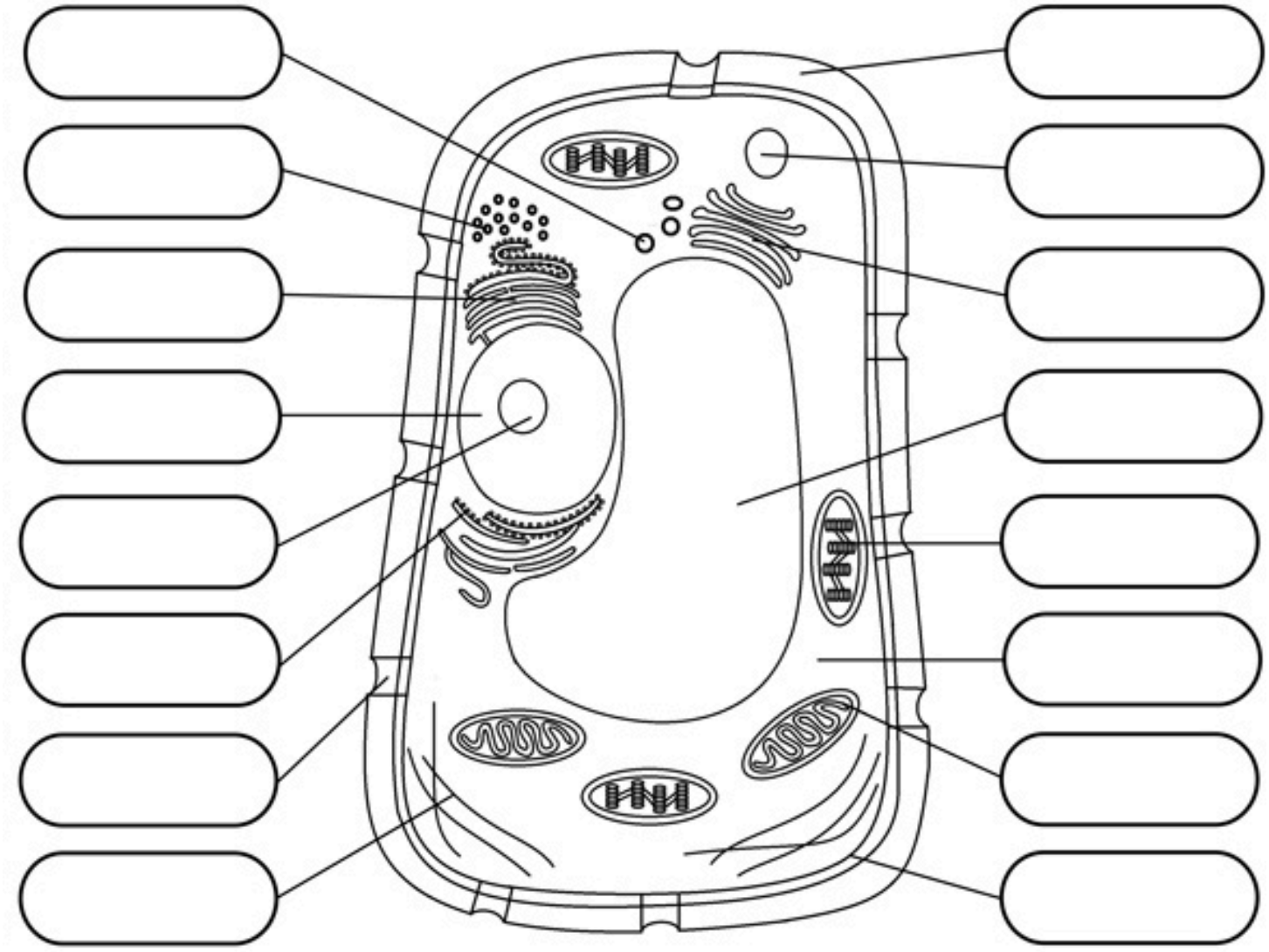
1. **Introduction to Agriculture**:
    - **Discussion**: The role of agriculture in society—past, present, and future.
        i. What is your relationship with food?
    - **Key Concept**: The relationship between humans and agriculture—how agriculture supports societies and economies.
2. **Plant Biology**:
    - **Lecture**: Plant Life Cycle, Photosynthesis, plant structures, the role of soil, and the factors affecting plant growth.
    - **Sample worksheet:** Plant Biology Labelling
        i. Parts of the plant
        ii. Leaf Organelles
        iii. Plant Anatomy
        iv. Plant Life Cycle

Homework/Extension:

- Research a specific agricultural crop commonly grown in Canada.
    - For example: Corn, Wheat, Canola, Barley, etc.
    - Is there anything unique about its structure/anatomy?
    - Describe the optimal growth conditions for that plant.

Parts of a Plant Cell

Name: Date:

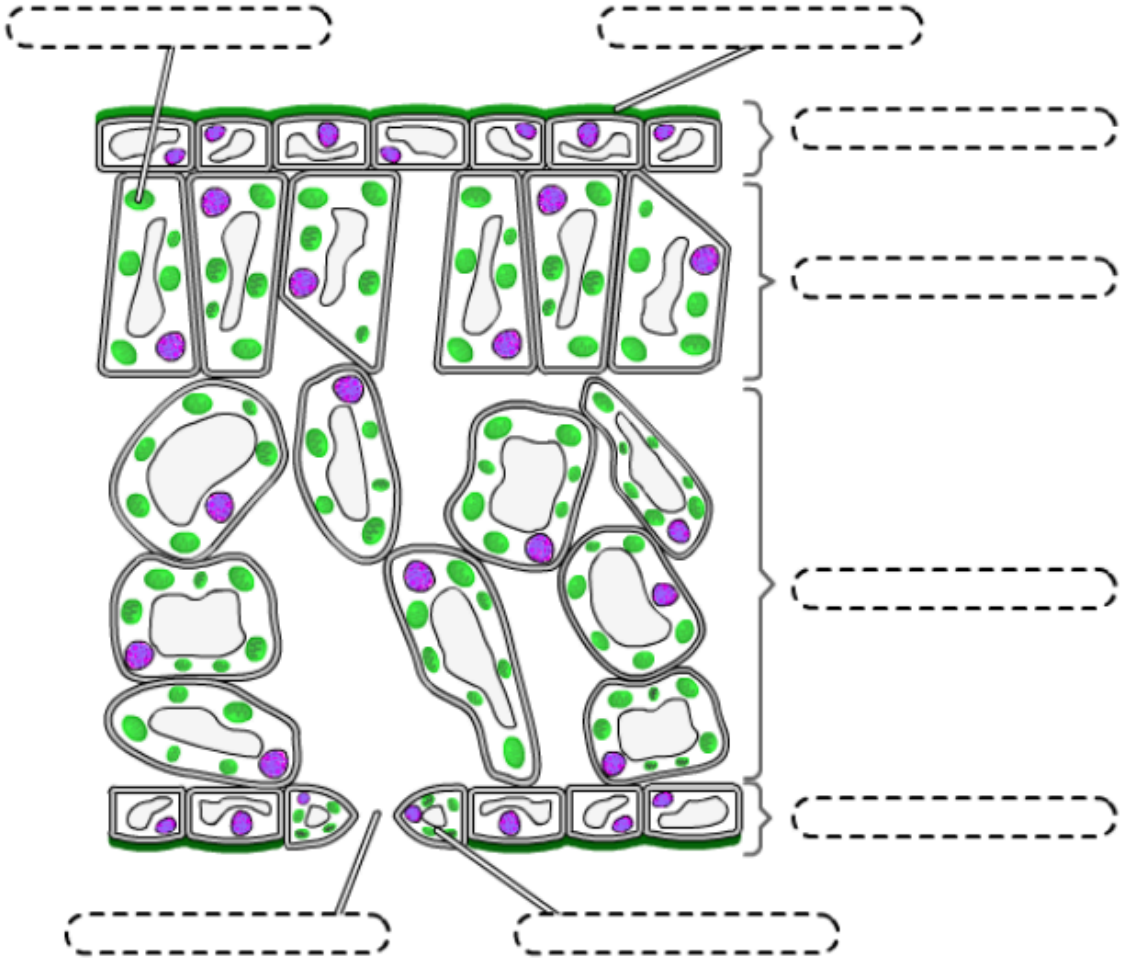


Golgi Apparatus Mitochondrion Ribosome Nucleus Cell Wall
Plasmodesmata Golgi Vesicles Cytoplasm Nucleolus
Chloroplast Central Vacuole Cytoskeleton Smooth Endoplasmic Reticulum
Cell Membrane Peroxisome Rough Endoplasmic Reticulum

Structure of a Leaf

Name: Date:

Label the diagram of the leaf using the word bank below.

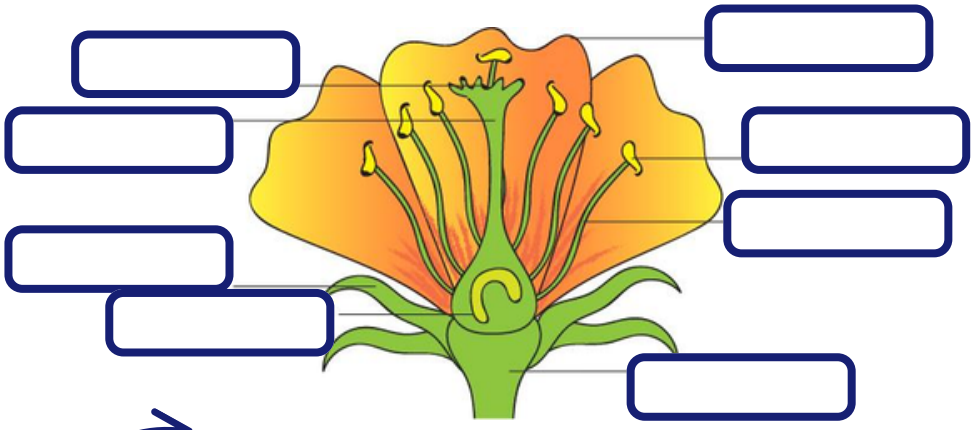


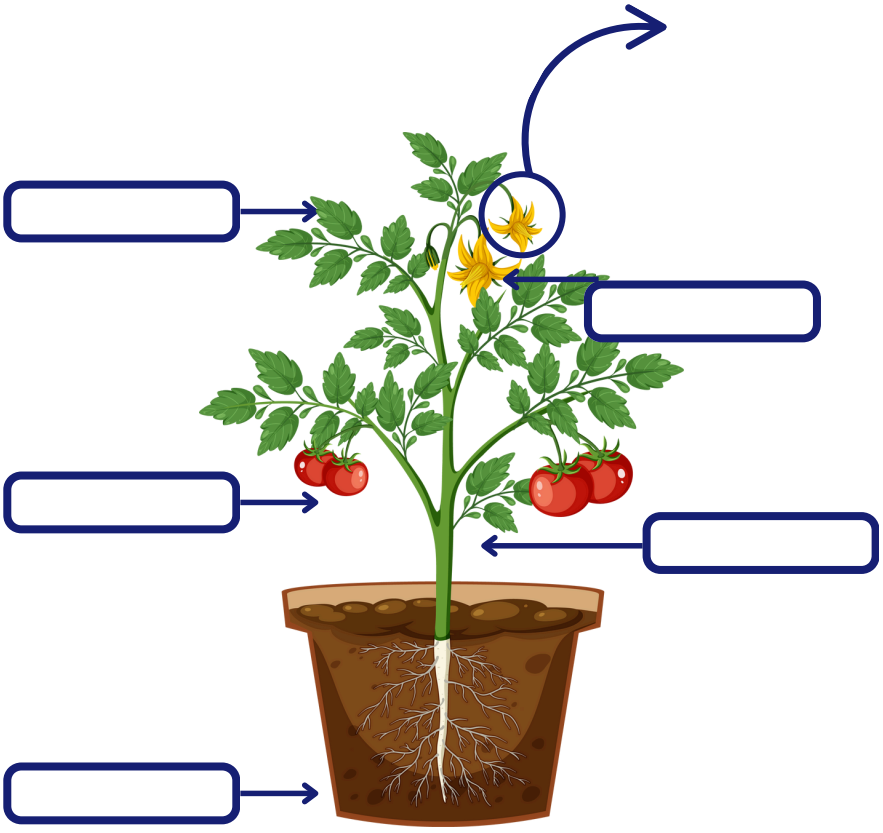
stoma
spongy mesophyll
upper epidermis
waxy cuticle
guard cell
chloroplast
lower epidermis
palisade mesophyll

Plant Anatomy

Name: Date:

Look at the tomato plant. Write the correct labels for each part of the plant. Use the word bank at the bottom to help you.



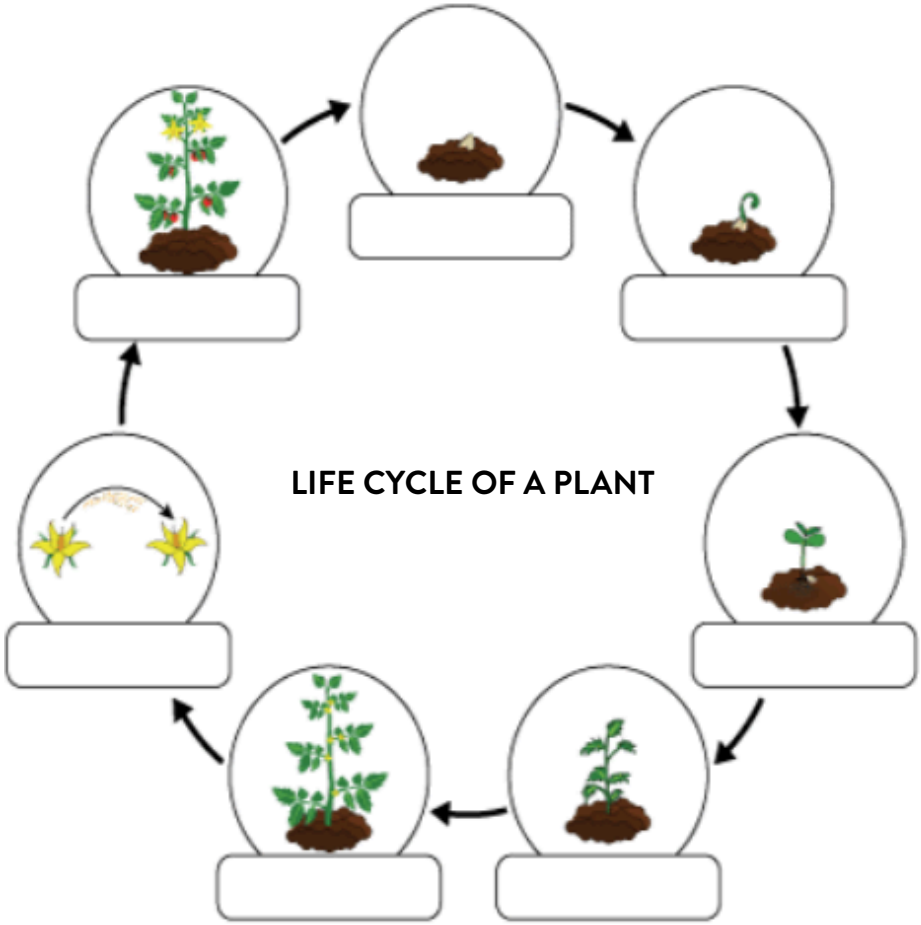


leaf	anther
roots	style
sepal	stigma
flower	petal
filament	
fruit	
stem	
ovary	
receptacle	

Plant Life Cycle

Name: Date:

Write the correct labels for each part of the plant life cycle.



pollination
sprouting
seedling
planting
mature plant
fruiting
germination

How does the needs of the plant change throughout its life cycle?

Week 2: Sustainable Agriculture Practices

Objective 2: Explore sustainable farming methods, including organic farming, crop rotation, and regenerative agriculture.

Learning Outcomes:

- Students will analyze and evaluate various sustainable agricultural practices, such as crop rotation, organic farming, and permaculture.
- Students will explore the environmental impact of different farming methods.

Lesson Plan:

1. **Introduction to Sustainable Agriculture**:
    - **Lecture**: What is sustainable agriculture? Discuss methods like organic farming, agroecology, and regenerative agriculture.
    - **Discussion**: Some of the environmental costs of industrial agriculture, including soil degradation, pesticide use, and water pollution. Discuss the ways in which farmers in Canada are combatting these issues.
2. **Worksheet: Sustainable Farming Case Study Analysis**:
    - Students will research and present case studies of successful sustainable farming practices in Canada (e.g., vertical farming, hydroponics, community-supported agriculture).
        i. What might be the barriers before your method being implemented on a wide-scale?

Homework/Extension:

- Write a report on how your garden could incorporate more sustainable practices, including cost, benefits, and challenges.

Sustainable Farming Case Study Analysis

Name: Date:

Sustainable Farming initiative:
(vertical farming, hydroponics, no-till farming, etc.)

Definition:

Environmental Benefits:

Sustainable Farming Case Study Analysis

Examples of this method in use:

What might be the barriers to more wide-spread use of this method?

Sources:

Week 3: Soil Science and Water Management

Learning Outcomes:

- Students will learn about soil properties, the importance of soil health, and how to manage water for agricultural use.
- Students will conduct a soil analysis and develop strategies for water conservation in gardening.

Lesson Plan:

1. **Soil Composition and Health**:
    - **Lecture**: Explore the components of soil, soil types (loam, clay, sandy), and the role of soil in supporting plant growth, including nutrients required for plan growth.
        i. Access resources about the nutrients in soil here
    - **Practical Lab**: Soil Science Hand Texturing Experiment University of British Columbia, Soil4Youth
        i. Explore the components of soil, identifying composition from feel and interaction with water.
    - AND/OR: Ecosystem Explorers Experiments: Soil and Water pH Testing
        i. Explore properties of soil and water.
2. **Water Management**:
    - **Lecture**: Explore the water cycle, irrigation systems, and the importance of water conservation in agriculture. Irrigation systems include:
        i. Rainwater collection and distribution
        ii. Drip Irrigation
        iii. Scheduled Irrigation
        iv. *Some practices are explored here:* Konstantinos Chartzoulakis and Maria Bertaki. "Agriculture and Agricultural Science". *Procedia.* 4 (2015). 88 – 98
        v. Water Conservation Practices, OMAFA
    - **Activity**: After studying the water cycle, design a rainwater collection system or discuss different types of irrigation systems that could be used in your garden or at your school.
3. **Worksheet**: Research assignment: "Soil & Water Worksheet".
    - Soil Analysis in my Region and Water Conservation Strategies
    - Identify the soil types in your local community and analyze the implications on agriculture/growing in your area. Propose a sustainable water management plan for agricultural use in your area.

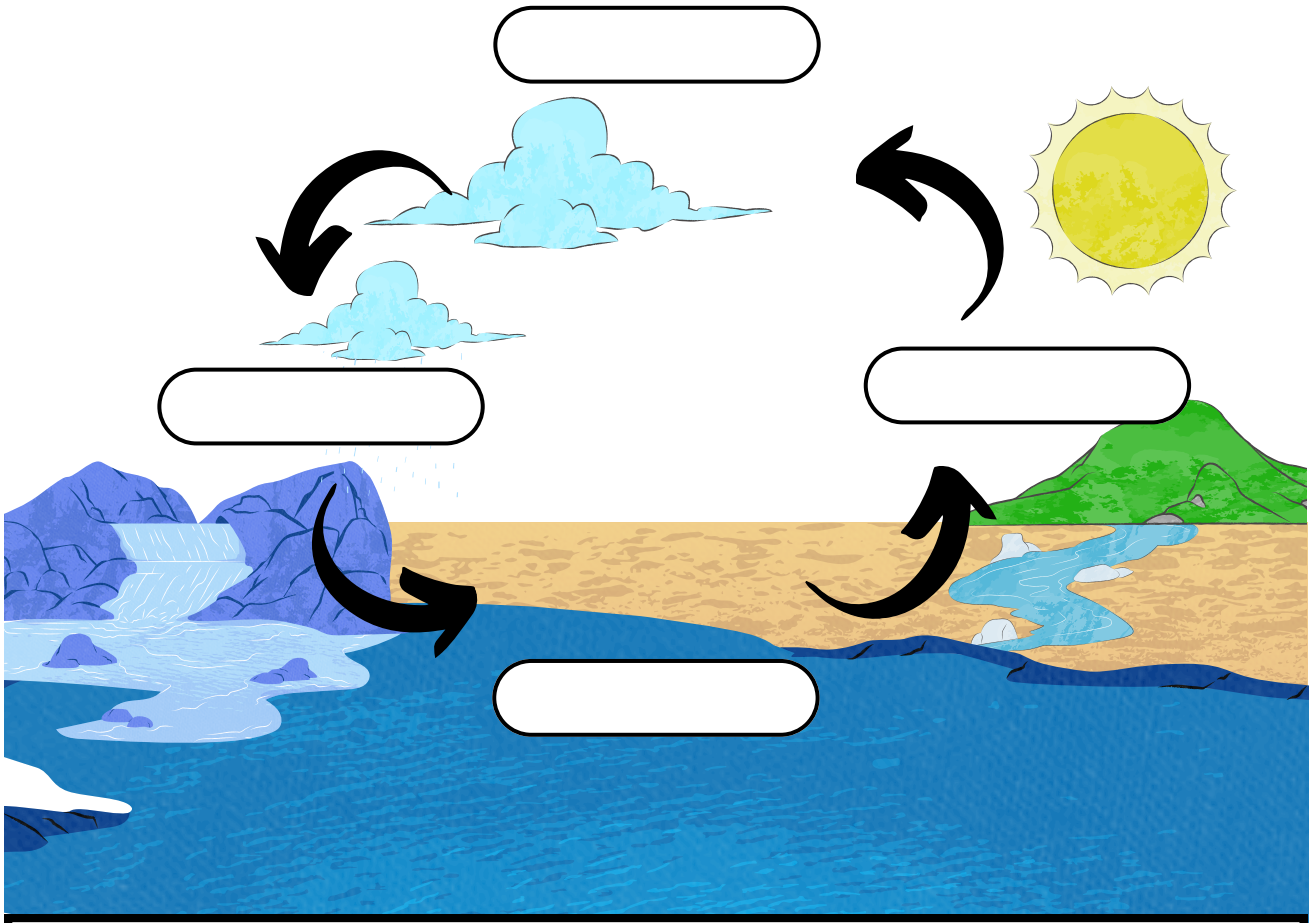
Other resources to explore:

1. Soil pH protocol
2. Testing Water Quality Lesson Plan: Ontario Teachers' Federation
3. Educational Videos: Toronto and Region Conservation Authority

Water Cycle

Name: Date:

Complete the picture of the water cycle, by filling in the blank with the correct word.
Explain each step in the box below.



CONDENSATION-

PRECIPITATION-

COLLECTION-

EVAPORATION-

Soil & Water Worksheet

Name: Date:

Based on this map, identify the soil types in your local community.

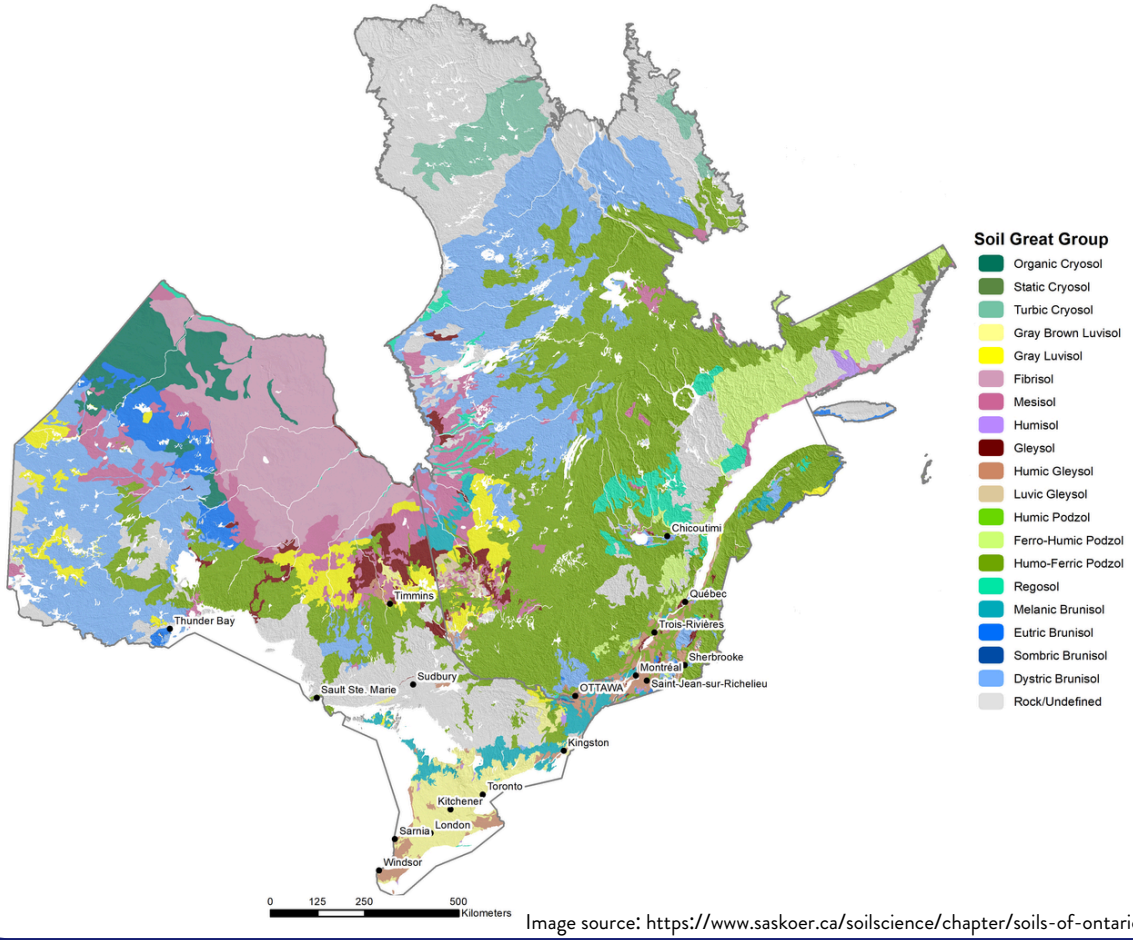


Image source: https://www.saskoer.ca/soilscience/chapter/soils-of-ontario/

Conduct some research and analyze the implications of this soil composition on agriculture/growing in your area.
What crops can be grown? What kind of support do they need?

Soil & Water Worksheet

Propose a plan for water management at the garden at your school. What initiatives could you implement to conserve water? Explain why you believe your proposal would be effective and sustainable.

Week 4: Garden Design and Implementation

Learning Outcomes:

- Students will design a sustainable garden that incorporates their new knowledge of soil, water, and plant biology.
- Students will engage in hands-on gardening, applying sustainable agricultural practices.

Lesson Plan:

1. **Garden Design**:
    - **Discussion**: Principles of garden design—how to create a balanced, sustainable garden with appropriate plant selection, soil management, and water usage.
    - **Activity**: Students will work in groups to design a small garden layout, considering environmental factors (light, space, water access).
    - Students will incorporate sustainable practices they have learned about, like crop rotation, companion planting, water conservation, and organic practices.
2. **Worksheets/Proposals**: "Urban Farm Plan" and Stock Tank Garden Planning
    - Based on their learning, and the attached resource of urban farm planning best practices, students will propose a design for an urban garden, including plant selection, water and soil management plan, and sustainable practices used. They will then map out the planting of crops in a stock tank. (Completed example).
3. **Presentations:**
    - Students will be assigned groups, and collaborate based on their individual ideas to come up with a plan for planting the school garden.
    - In their groups, students will present their garden plans to the class, and together decide how to proceed with your garden,

Homework/Extension:

- Throughout the coming weeks, students will monitor and maintain their gardens, recording observations and preparing to reflect on the success of the garden.

The Royal AGRICULTURAL WINTER FAIR

DURHAM COLLEGE SUCCESS MATTERS | The Barrett Centre of Innovation in Sustainable Urban Agriculture

Name: Date:

Urban Farm Plan

Make a proposal for where you think you could start an urban farm based on the best practices outlined by The Barrett Centre of Innovation in Sustainable Urban Agriculture.
Resources from The Barrett Centre can be found here.

Proposed Site

Where would you like to start an urban farm? Why is this site suitable?	

Best Practices

Water Management What water is already at your site? What strategies will you use to keep the water levels ideal?	
Crop Choice What will your proposed urban farm grow and why?	
Soil Management How will you maintain the health of the soil on your urban farm?	
Sustainable Practices How will you minimize the environmental impact of your urban farm?	
Community Engagement What will you do to connect with the local community?	

Urban Farm Plan

Map

Draw a map of your proposed urban farm, labelling the best practices.

Best Practices – Farm Planning

2023

Craig Kelman

This resource and others are available through The Barrett Centre Urban Agriculture Community Portal.

Introduction

When planning an urban farm, it's important to consider a range of Best Management Practices (BMPs) to ensure that the farm is sustainable, efficient, and profitable. In this document, we will outline a number of BMPs that are relevant to urban farming, including site assessment, water management, crop selection, soil management, sustainable growing practices, community engagement, and business planning. By following these BMPs, urban farmers can establish and operate successful, environmentally friendly farms that contribute to the local community and economy.

Who is this for

This guide is for anyone who is actively starting or planning to start a farm or farm business.

Objective

To develop a comprehensive farm plan that utilizes best practices in sustainable agriculture, with the goal of maximizing crop yields, minimizing waste and resource consumption, and promoting the long-term health and viability of the farm ecosystem.

Index

1. **Site assessment**: Before starting an urban farm, it's important to assess the site to determine its suitability for agriculture. Factors to consider include the soil quality, access to water, sunlight, and drainage.
2. **Develop a water management plan**: Urban farms often face water shortages, so it's important to develop a plan for conserving and efficiently using water. This might include using drip irrigation or collecting rainwater.
3. **Crop Choice**: Not all crops are well-suited for urban farming. Choose crops that are well-adapted to the local climate and soil conditions, and consider factors such as the growing season, water requirements, and market demand.
4. **Soil management**: Urban soil can be contaminated or lacking in nutrients, so it's important to use organic fertilizers and soil amendments to improve its quality. It's also a good idea to use raised beds or containers to help improve drainage and reduce the risk of soil-borne diseases.
5. **Sustainable growing practices**: To minimize the environmental impact of the urban farm, it's important to use sustainable growing practices such as composting, cover cropping, and integrated pest management.
6. **Engage with the community**: Urban farms can be a great way to connect with the local community and promote sustainable agriculture. Consider hosting educational events, volunteering opportunities, or farm-to-table dinners to engage with the community and build support for the farm.
7. **Develop a business plan**: To ensure the long-term viability of the urban farm, it's important to develop a comprehensive business plan that outlines the farm's goals, target market, marketing and sales strategies, and financial projections.

Site Assessment

Conducting a thorough site assessment is an important step in planning an urban farm. A site assessment helps to identify the strengths and limitations of the site and allows the farmer to determine the most suitable crops to grow and the most effective methods of cultivation.

To conduct a site assessment, the farmer should start by collecting information about the site's location, including the climate, average temperatures, and weather patterns. The farmer should also assess the soil quality, including its pH level, nutrient content, and drainage. Access to water, sunlight, and other resources such as electricity should also be considered.

In addition to physical characteristics, it's important to assess the site's social and economic context. This might include the local market for fresh produce, the availability of labor, and the potential for partnerships or collaborations with local businesses or organizations.

By considering all of these factors, the farmer can make informed decisions about the best ways to use the site for urban farming.

Water Management

Developing a water management plan is an important step in planning an urban farm, as water shortages can be a common challenge for urban farmers. A water management plan helps to ensure that the farm has a reliable source of water and that it is used efficiently.

To develop a water management plan, the farmer should start by assessing the farm's water needs based on the crops being grown and the local climate. The farmer should also consider the availability of water from different sources, such as municipal water, rainwater, or grey water.

Once the farm's water needs have been determined, the farmer can implement strategies to conserve water and use it efficiently. This might include using drip irrigation or soaker hoses to deliver water directly to the roots of the plants or collecting and storing rainwater in barrels or cisterns. The farmer should also consider ways to reduce water loss through evaporation or runoff, such as using mulch or installing drip pans under containers.

By developing a water management plan, the urban farmer can ensure that the farm has an adequate and sustainable supply of water, which is essential for the growth and productivity of the crops.

Crop Choice

Choosing the right crops is an important step in planning an urban farm, as it helps to ensure that the farm is successful and profitable. When selecting crops, there are several factors to consider:

1. **Climate and soil conditions**: Choose crops that are well-suited to the local climate and soil conditions. This will help to ensure that the crops have the best chance of thriving and producing a good yield.
2. **Growing season**: Consider the length of the growing season in the area and choose crops that can be grown within that time frame.
3. **Water requirements**: Some crops require more water than others, so it's important to choose crops that are appropriate for the farm's water availability.
4. **Market demand**: Choose crops that are in high demand in the local market. This will help to ensure that the farm is able to sell its produce and generate a profit.
5. **Pest and disease resistance**: Choose crops that are resistant to pests and diseases that are common in the area. This will help to minimize the need for pesticides and other chemicals and reduce the risk of crop failure.

Soil Management

Implementing proper soil management is an important aspect of running a successful urban farm. Urban soil is often contaminated or lacking in nutrients, so it's important to use organic fertilizers and soil amendments to improve its quality.

One way to improve soil quality is to add compost to the soil. Compost is a rich, organic material that is made by decomposing plant matter and other organic materials. It adds nutrients and beneficial microorganisms to the soil, which can help to improve plant growth.

Other soil amendments that can be used to improve soil quality include lime, sulfur, and gypsum. These amendments can help to adjust the soil pH and improve the soil's structure and drainage.

In addition to adding amendments to the soil, it's important to use sustainable soil management practices such as cover cropping and crop rotation. Cover cropping involves planting a cover crop between growing seasons to help improve the soil structure and prevent erosion. Crop rotation involves planting different crops in the same location each year to help reduce soil-borne diseases and pests, and to improve soil fertility.

Sustainable Growing Practices

Using sustainable growing practices is an important aspect of running a successful and environmentally friendly urban farm. Sustainable growing practices help to minimize the environmental impact of agriculture and can also improve the productivity and profitability of the farm.

Some examples of sustainable growing practices include:

1. **Composting**: Composting is the process of decomposing organic matter and using it as a soil amendment. Composting helps to reduce waste, improve soil quality, and reduce the need for synthetic fertilizers.
2. **Integrated pest management**: Integrated pest management (IPM) is a holistic approach to pest control that focuses on using non-toxic methods to prevent pests and diseases. This might include using natural predators, such as ladybugs, to control pests, or using physical barriers like row covers to prevent pests from reaching the crops.
3. **Cover cropping**: Cover cropping involves planting a cover crop between growing seasons to help improve the soil structure and prevent erosion. Cover cropping also helps to suppress weeds and improve soil fertility.
4. **Crop rotation**: Crop rotation involves planting different crops in the same location each year to help reduce soil-borne diseases and pests, and to improve soil fertility.

Community Engagement

Engaging with the community is an important aspect of running a successful urban farm. Urban farms can be a great way to connect with the local community and promote sustainable agriculture, and there are a number of ways to engage with the community:

1. **Host educational events**: Consider hosting workshops, lectures, or tours of the farm to educate the community about urban agriculture and the benefits of locally grown produce.
2. **Offer volunteering opportunities**: Many people are interested in getting involved in urban agriculture, so consider offering volunteering opportunities at the farm. This can be a great way to engage with the community and build support for the farm.
3. **Participate in local events**: Look for opportunities to participate in local events, such as farmers markets or community festivals, to promote the farm and its products.
4. **Partner with local businesses**: Consider partnering with local restaurants or retailers to sell the farm's produce, or to offer farm-to-table dinners or other events.
5. **Communicate with the community**: Use social media and other channels to keep the community informed about the farm and its activities. This can help to build support and engagement with the farm.

Business Plan

A business plan helps to define the farm's goals, target market, and strategies for marketing and sales, and it also includes a financial projection to help the farmer understand the potential profitability of the farm.

Here are some key elements to include in a business plan for an urban farm:

1. **Executive summary**: This is a brief overview of the business plan, including the farm's mission, values, and goals.
2. **Market analysis**: This section should assess the local market for urban agriculture, including the demand for fresh produce and the competition from other urban farms or other sources of produce.
3. **Products and services**: This section should describe the types of produce that the urban farm will offer, as well as any value-added products or services (e.g. farm-to-table dinners, educational workshops, etc.).
4. **Target market**: This section should identify the specific customers that the urban farm will target, including demographic information and purchasing behavior.
5. **Marketing and sales strategy**: This section should outline the strategies that will be used to reach and engage with the target market, including social media, local events, and partnerships with restaurants or retailers.
6. **Financial plan**: This section should include a detailed financial projection for the urban farm, including projected revenue, expenses, and profit.
7. **Conclusion:** This section should summarize the key points of the business plan and provide any final thoughts or considerations.

Additional Resources

1. The Living Soil Handbook – The No-Till Grower's Guide to Ecological Market Gardening. https://www.notillgrowers.com/
2. The Lean Farm: How to Minimize Waste, Increase Efficiency, and Maximize Value and Profits with Less Work – Ben Hartman https://www.claybottomfarm.com/books
3. Starting a Farm in Ontario - Business Information Bundle for New Farmers – OMAFRA http://omafra.gov.on.ca/english/busdev/newentrant/newent.htm
4. The Market Gardener - A Successful Grower's Handbook for Small-Scale Organic Farming JM Fortier https://themarketgardener.com/books/the-market-gardener/

Week 5: Agricultural Impact on the Environment and Climate Change

Learning Outcomes:

- Students will understand the impact of agriculture on global ecosystems, in terms of climate change, deforestation, and biodiversity loss.
- Students will explore solutions for mitigating agriculture's negative environmental impact.

Lesson Plan:

1. **Agriculture and Climate Change**:
    - **Lecture**: As a class, discuss some of the global environmental impacts of agriculture, including greenhouse gas emissions from livestock, deforestation for agriculture, methane production, soil erosion and impaction, etc.
2. **Biodiversity and Agriculture**:
    - **Discussion**: Explore how and why monoculture farming affects biodiversity and ecosystem health.
    - **Activity**: Research how agroforestry could be a method to reduce deforestation and enhance biodiversity.
3. **Worksheet**: "Agriculture's Environmental Impact"
    - Identify and explain three key environmental challenges in modern agriculture and research and propose sustainable solutions.
4. **Class Reflection:**
    - What are the ways in which individuals can help to minimize our environmental footprint, and take up sustainable practices?
        i. In what ways is local food, and growing locally, beneficial from a sustainability perspective?

Homework/Extension:

- From the three challenges you researched, select one challenge before agriculture today, and write an essay on how climate change could affect agricultural practices in Ontario and propose mitigation strategies.

Additional Resources:

- Canadian Agri-Food sustainability: Report from The Information and Communications Technology Council
- Good in Every Grain: Sustainable Farming Practices

Agriculture's Environmental Impact

Name: Date:

Select three sustainability challenge before agriculture and food production today. Research potential solutions - either ones that are ongoing, or propose some new ideas.

CHALLENGE (BIODIVERSITY, SOIL EROSION/IMPACTION, DEFORESTATION, FOSSIL FUELS, ETC.)	SOLUTIONS (ONGOING OR NEW)

What other solutions would you propose to improve the sustainability of global food systems?

Week 6: Reflection and Presentation of Findings

Learning Outcomes:

- Students will reflect on the impact of their gardening experience and the concepts of sustainability they have learned.

Lesson Plan:

1. **Garden Reflection**: Discuss what worked and what didn't in the garden, and which sustainable principles were easy to implement.
2. **Discussion and Wrap-up**:
    - Reflect on the broader implications of sustainable agriculture in the context of global food security and environmental preservation.

Worksheet: "Sustainability in Practice: My Garden Reflection"

- Reflect on the gardening experience and discuss the importance of sustainable agricultural practices in solving global issues like climate change and food insecurity.
- Reflect on their own experiences with the Garden: Did the experience of planning the garden make them feel more connected to the environment and ecosystem? Why or why not?

Homework/Extension:

- Students will write a final report summarizing their findings, the challenges they encountered, and how they applied sustainable farming practices in their garden.

Assessment and Evaluation

1. **Formative Assessment**:
    - Observations during hands-on activities, group work, and class discussions.
    - Review of worksheets, garden design plans, and case study reports.
2. **Summative Assessment**:
    - Final project presentation, including garden design, sustainability practices, and reflections.
    - Written report on sustainable agriculture practices and their environmental and social impact.

Garden Reflection

Name: Date:

Use this space to reflect on your experiences in the garden.

What did you learn?

Did you feel more connected to food, farming, your community, and/or the environment?

Do you think that you will apply any learning about sustainable practices to your every day life?

List of Worksheets

- Parts of a Plant Cell
- Structure of a Leaf
- Plant Anatomy
- Plant Life Cycle
- Sustainable Farming Case Study Analysis
- Water Cycle Sheet
- Soil & Water Worksheet
- Urban Farm Planning
- Stock Tank Garden Planning
- Agriculture's Environmental Impact
- Sustainability in Practice: My Garden Reflection

Secondary Curriculum Connections

Overview of Ontario Curriculum Connections

Subject	Strand	Course Code(s)	Relevant Expectations (Code)
Science	Sustainable Ecosystems	SNC1W	B1.1, B2.1, B3.1
	Tissues and Systems	SNC2D	B1.1, B2.1, B3.1
	Plant Biology	SBI3U	C1.1, C2.1, C3.1
	Sustainable Agriculture	SBI4U	C1.1, C2.1, C3.1
Geography	Natural Resources	CGC1D	A1.1, A2.1, A3.1
	Global Food Systems	CGD3M	A1.1, A2.1, A3.1
Env. Sci.	Human Impact, Sustainability	SVN3M	A1.1, A2.1, A3.1
Green Ind.	Plant Growth, Horticulture	THJ3M	A1.1, A2.1, A3.1
Health/Nut.	Nutrition & Food Choices	HFN1O	C1.1, C2.1, C3.1
English	Reading	ENG1D/ENG2D/ ENG3U/ENG4U	1.1, 1.3, 1.4, 1.6

	Writing	ENG1D/ENG2D/ ENG3U/ENG4U	1.1, 1.3, 2.3, 2.5
	Oral Communication	ENG1D/ENG2D	2.2, 2.4
	Media Studies	ENG1D/ENG2D/ ENG3U/ENG4U	1.2, 2.2, 3.2, 3.4
Math	Measurement	MTH1W/MPM2D/MBF3C/MAP4C	M1.2, M2.1, MG2.1
	Data Mgmt. & Probability	MTH1W/MDM4U/MBF3C	DL1.2, DL2.3, D1.1, D2.1, D3.1

Science (Biology)

Grade 9 – SNC1W (Science, De-streamed)

- **Sustainable Ecosystems**
  - **B1.1**: Assess the impact of human activity on the sustainability of ecosystems.
  - **B2.1**: Use appropriate terminology in discussions about ecosystems.
  - **B3.1**: Explain the interdependence of organisms in an ecosystem.

Grade 10 – SNC2D (Science, Academic)

- **Tissues, Organs, and Systems of Living Things**
  - **B1.1**: Analyze the interdependence of systems in living organisms.
  - **B2.1**: Use appropriate terminology in discussions about biological systems.
  - **B3.1**: Explain the structure and function of plant systems.

Grade 11 – SBI3U (Biology, University Preparation)

- **Plants: Anatomy, Growth, and Function**
  - **C1.1**: Analyze the economic and environmental advantages and disadvantages of agricultural technologies.
  - **C2.1**: Use appropriate terminology related to plant biology.
  - **C3.1**: Explain the fundamental processes of plant growth and development.

Grade 12 – SBI4U (Biology, University Preparation)

- **Sustainable Agriculture and Forestry**
  - **C1.1**: Analyze the impact of agricultural practices on the environment.
  - **C2.1**: Use appropriate terminology in discussions about sustainable agriculture.
  - **C3.1**: Evaluate the sustainability of various agricultural practices.

Geography

Grade 9 – CGC1D (Geography of Canada, Academic)

- **Natural Resources and Economic Activities**
  - **A1.1**: Analyze the relationship between natural resources and economic activities in Canada.
  - **A2.1**: Use appropriate terminology in discussions about natural resources.
  - **A3.1**: Explain the distribution of natural resources across Canada.

Grade 11 – CGD3M (World Issues: A Geographic Analysis, University/College Preparation)

- **Global Food Systems**
  - **A1.1**: Analyze the factors influencing global food systems.
  - **A2.1**: Use appropriate terminology in discussions about food systems.
  - **A3.1**: Evaluate the sustainability of global food systems.

Environmental Science

Grade 11 – SVN3M (Environmental Science, University/College Preparation)

- **Sustainable Practices**
  - **A1.1**: Analyze the impact of human activities on the environment.
  - **A2.1**: Use appropriate terminology in discussions about environmental science.
  - **A3.1**: Evaluate the effectiveness of sustainable practices.

Green Industries

Grade 11 – THJ3MI (Green Industries, College/University Preparation)

- **Agriculture and Horticulture**
  - **A1.1**: Analyze the factors affecting plant growth and development.
  - **A2.1**: Use appropriate terminology in discussions about green industries.
  - **A3.1**: Evaluate the sustainability of agricultural practices.

Health and Nutrition

Grade 9 – HFN1O (Food and Nutrition, Open)

- **Nutrition and Health**
  - **C1.1**: Analyze the relationship between nutrition and health.
  - **C2.1**: Use appropriate terminology in discussions about nutrition.
  - **C3.1**: Evaluate the impact of food choices on health.

English Curriculum Connections (Grades 9–12)

Grade 9 – ENG1D / ENG1P

- **Reading**

- 1.1: Read and demonstrate an understanding of a variety of literary, informational, and graphic texts.

- 1.4: Identify the important ideas and supporting details in texts.

- **Writing**

1.1: Identify the topic, purpose, and audience for several different types of writing tasks.

2.5: Identify and use appropriate elements of style.

- **Oral Communication**

2.2: Demonstrate an understanding of appropriate speaking behaviour in group and classroom discussions.

2.4: Use a variety of appropriate visual aids to support or enhance oral presentations.

- **Media Studies**

1.2: Interpret media texts, identifying the overt and implied messages they convey.

3.4: Produce a variety of media texts for different purposes and audiences.

Grade 10 – ENG2D / ENG2P

- **Reading**

1.6: Extend understanding of texts by making connections between the ideas in them and personal knowledge and experience.

- **Writing**

1.4: Sort and organize ideas and information to write clear and coherent texts.

- **Oral Communication**

1.5: Develop and explain interpretations of oral texts.

- **Media Studies**

2.2: Identify conventions and techniques used in a variety of media forms.

Grade 11 – ENG3U / ENG3C

- **Reading**

1.3: Identify and explain the effect of specific elements of style in texts.

- **Writing**

1.3: Locate and select information to support ideas for writing.

- **Media Studies**

3.2: Explain how the forms, conventions, and techniques associated with a variety of media genres affect meaning.

Grade 12 – ENG4U / ENG4C

- **Reading**

1.4: Demonstrate understanding of increasingly complex texts by summarizing important ideas and explaining how they relate to the theme or purpose.

- **Writing**

2.3: Revise drafts to improve content, organization, clarity, and style.

- **Media Studies**

1.3: Evaluate how effectively information, ideas, issues, and opinions are communicated in media texts.

Mathematics Curriculum Connections (Grades 9–12)

Grade 9 – MTH1W (De-streamed Math)

- **Measurement**

M1.2: Apply unit conversions and measurement formulas to solve problems.

M2.2: Solve problems involving area, surface area, and volume in real-life contexts.

- **Data Literacy**

DL1.2: Collect and organize data to answer questions of interest.

DL2.3: Interpret and analyze data presented in various formats, including graphs and charts.

- **Probability**

P1.1: Describe the likelihood of various outcomes using probabilities.

Grade 10 – MPM2D / MFM2P

- **Measurement**

MG2.1: Solve problems involving surface area and volume of 3D figures.

- **Data Management**

DM1.1: Collect, organize, and display data using appropriate methods.

DM3.1: Interpret statistical data to draw conclusions.

Grade 11 – MBF3C / MCF3M / MCR3U

- **Measurement**

M2.1: Solve measurement problems in both SI and imperial systems.

- **Data Management**

D1.3: Interpret and analyze statistical data involving central tendency and spread.

D2.1: Make inferences and justify conclusions from data sets.

- **Probability**

D2.3: Determine probabilities using appropriate counting techniques and simulations.

Grade 12 – MAP4C / MDM4U / MHF4U

- **Measurement** (MAP4C)

M1.2: Solve multi-step problems involving surface area and volume.

- **Data Management (MDM4U)**

D1.1: Organize data and display it using a variety of graphical techniques.

D2.2: Analyze data to make predictions and evaluate the validity of those predictions.

- **Probability (MDM4U)**

D3.1: Solve problems involving conditional probability and expected value.