

BiodiverCity!



Goals & Take-away lesson	Students will explore the concepts of biodiversity and monoculture: <ul style="list-style-type: none">- in their urban ecosystem- in the broader food system
Age	Grade 6
Time	60 minutes
Location	Indoors and/or outdoors
Subject	Science & Technology Extensions: Art, Math, Language
Curriculum Links	Grade 6, Science and Technology, Ontario 2007 <u>Understanding Life Systems:</u> <ul style="list-style-type: none">1.1 Analyse a local issue related to biodiversity1.2 Assess the benefits that human societies derive from biodiversity3.2 Demonstrate an understanding of biodiversity as the variety of life on earth3.3 Describe ways in which biodiversity within species is important for maintaining the resilience of those species3.4 Describe ways in which biodiversity within and among communities is important for maintaining the resilience of these communities
Materials	Whiteboard/blackboard Dry eraser marker/chalk Food plant cards: 120 plant variety cards (potato, cucumber, pepper, corn) Available for download at http://www.kidsgrowing.ca/tool-kit/lesson-plans-worksheets Conditions Spinner – drought, frost, raccoon, blight Tomato plant visuals displaying the varieties Other fruit or vegetable biodiversity visuals (posters?) Seeds, pots & soil Samples for class tasting: local tomatoes vs. imports, from Leamington (local), California and Mexico (imports).

Procedures

1. Discussion: Urban Ecosystems

10 Minutes

- **What is an ‘ecosystem’?**
 - An ecosystem is “a natural unit consisting of all plants, animals, and micro-organisms in an area, functioning together with all of the non-living physical factors of the environment.”
 - Explain that there are many types of ecosystems (i.e. rainforest, arctic etc.) and that our urban setting is one. You could emphasize the fact that these ecosystems are not independent from one another but that they are all connected.
- **Introduce the concept of variety:** Students brainstorm in pairs for 1 minute the name of all the plants, animals, insects, and other living things they know that live in our urban setting. Ask them to come up with an example of a relationship between 2 or more things.
- On the board, take up examples as a whole class and list more examples to expand on the variety of species that live in our ecosystem – there’s more than meets the eye!
- Explain that this variety of living things (or life) is **‘biodiversity’** e.g. “Can you imagine a world where there is only one type of tree? Or dog?”
- Discuss the relationships between living things. Make it visual by drawing lines to connect the items on the board. *EX: Squirrels eat acorns from trees.*

2. Activity: Urban Garden Challenge Game – Interspecies Diversity

20 Minutes

- Tell students they will be playing a game where they are all **urban gardeners and they get to choose what to grow** in their garden plot. Do not tell them the purpose of the activity at this stage.
- **Give each student 4 plant cards.** Half the class should receive a variety of plants, while the other half should receive 4 of the same plant cards.
- Tell the class that they will have an opportunity to trade cards, and then we will spin the Condition Spinner to mimic some of the random conditions that may affect a farmer’s crop.
- **ROUND 1:** Give them an opportunity to **trade with their classmates** (1 minute). Let them know they don’t have to trade if they don’t want to.
- Stop them and ask one student to spin the **Conditions Wheel**. Each “condition” kills at least one plant variety. Students with that variety must hand in their cards.
 - **Debrief:** “Raise your hand if you lost your whole crop; only have one card left; only 2 left...”
- **ROUND 2-3** (the 2nd or 3rd year of growing): Students exchange cards for 1 minute, spin the Conditions Wheel, students hand in their “dead” plant cards, etc.
- **Final Debrief:** Ask why the students with more cards were more successful.
 - Those students with more varieties of plants are also going to have **more plants in their garden** that they can harvest and eat from.

- Growing a large variety of different food plants **increases your chance of having a successful food crop** should something unexpected come up like a drought.
- It's also good to plant **different types of a specific food plant species**, for example different types of tomato plants. This is because **some plant varieties are 'stronger' than others** and can tolerate different conditions, and therefore are more likely to survive.

4. Discussion: Food Systems and Monoculture

15 Minutes

- “Of all of the varieties we just saw, how many can you buy at your local grocery store? How many types of potatoes can we buy at the store?”
- There are approximately 7500 tomato varieties and 3000 potato varieties; why can we only access two or three?
 - Are they the varieties that **taste best?** Not necessarily!
 - Certain varieties are easier to store and ship
 - Big food retailers (like McDonald's) only buys one variety
 - Did you know: 81% of tomato varieties no longer exist!
- On the board, write AGRICULTURE and then MONOCULTURE. Ask the class to define these words.
 - The agricultural practice of **monoculture** means growing one food plant variety in a large area (so it **reduces biodiversity**). This is very commonplace in Canada and around the world, and it is how we get most of our food.
- Ask the class again what **dangers** they might foresee with this continued practice
 - Lose all your crop = farmer's livelihood and cities' food supply (Did you know: Toronto only ever has 3 days worth of food at one time)
 - Pests, disease = more pesticide use = immunity
 - Soil degradation
- What are some **possible solutions?**
 - Plant a vegetable garden
 - Buy from small organic farmers who grow uncommon varieties (farmers markets, CSAs)
 - Ask local grocers if they would supply more diverse varieties

5. Activity: Measuring Distance and Weight of Food Shipments

20 Minutes

- Tell the students that we will be looking more closely at what's involved in shipping produce in order to have a better understanding of monoculture. They will have to present to the class about their strategy and their findings.
- Divide students into **4 groups** and tell them to assign roles to each member of the group (measurer, calculator, scribe, presenter, supporter, etc.):
 - Give 3 of the groups: **an instruction sheet, a map, a ruler, a calculator, and some scrap paper** = These groups will investigate transport distances from production site (California, Mexico, and Leamington to market (Toronto)).

- Give 1 group: **an instruction sheet, a scale, a calculator, a bunch of tomatoes, and some scrap paper** □ This group will investigate the weight of a shipment of tomatoes.
- Background information required:
 - Approximately 9,100 boxes of tomatoes are shipped in a regular semi-truck. Each box contains 10 kg. of tomatoes.
- Give the groups 10 minutes to solve their measurement problems and prepare to present. Circulate to help/encourage them as needed.
- Each group presents their results and attempts to answer the question: “How do your findings help explain the practice of monoculture?”

6. Activity: Planting Diversity

20 Minutes

- Divide students into 4 groups
- Each group will mix soil and plant either tomatoes or basil (there should be 2 varieties of each)