## INTERACTIONS IN THE ENVIRONMENT





## 2 Peas and a Dog

Middle School Teaching Resources

## RESOURCE INCLUDES

- ✓ Ontario Curriculum Aligned
- ✓ Detailed Lesson Plans
- ✓ Readings, Videos, Graphic Organizers, Group Work, Projects, Rubrics
- ✓ Hands-On Science Labs
- ✓ MP3 Audio Files
- ✓ Answer Keys
- Quizzes & Unit Test
- ✓ Print & Digital Formats

## INCLUDED LESSONS



- Introduction Science Safety & Unit Vocabulary
- Elements of Ecosystems
- Ecosystems Examples and Interactions
- Energy Transfer and Food Chains
- Biotic Elements Quiz
- Matter Cycling
- Ecological Succession
- Case Study Ecosystem Limits

- Species at Risk & Invasive
   Species
- Human Interactions in the Environment
- Agriculture and Ecosystems
- Indigenous Perspectives
- Case Study Electric Vehicles
- Environmental Protection
- Ecosystem Summative (3 Options)
- Ecosystems Unit Test
- Bonus Files Bill Nye
   Ecosystems Videos

## UNIT ORGANIZATION

## GRADE 7 ECOSYSTEMS ONTARIO CURRICULUM ALIGNMENT

Lesson	2007 Curriculum	2022 Curriculum
1. Safety Rules & Vocabulary	2.1, 2.4	A1.4, A1.5
2. Elements of Ecosystems	3.1, 3.2, 3.3	B2.1, B2.2, B2.3
3. Ecosystems Examples	3.1, 3.2, 3.3	B2.1, B2.2, B2.3
4. Energy Transfer and Food Chains	3.4	B2.4
5. Quiz	3.1 - 3.4	B2.1 - B2.4
6. Matter Cycling	3.5	B2.5
7. Ecological Succession	3.6	B2.6
8. Ecosystem Limits	3.7	B2.7
9. Species at Risk & Invasive Species	2.3	A1.1
10A. Human Interactions in the Environment	3.8	B1.2
10B. Agriculture and Ecosystems	New	B2.8
11. Indigenous Perspectives	3.9	B1.3
12. Environmental Investigation	1.1	B1.1

## CURRICULUM ALIGNMENT

#### **LESSON OVERVIEW**

Lesson	Activity Type	Name	Suggested
Intro	Class Discussion	Unit Vasahulanu	20 2020
& #1	QR Code Scavenger Hunt	Unit Vocabulary	1 – 2 Classes
#2	Whole Class Readings & Videos Cut and Match	Elements of Ecosystems	1 – 2 Classes
#3	Whole Class Readings & Videos Cut and Match	Ecosystems — Examples and Interactions	1 – 2 Classes
#4	Whole Class Readings & Videos Cut and Match	Energy Transfer and Food Chains	1 – 2 Classes
#5	Quiz	Biotic Elements Quiz	0.5 Class
#6	Whole Class Readings & Videos Cut and Match	Matter Cycling	1 – 2 Classes
#7	Whole Class Readings & Videos T—Chart	Ecological Succession	1 – 2 Classes
#8	Videos & Ecosystem Li #8 Case Study		1 Class

### **UNIT PLAN**

### LESSON #1

#### Unit Vocabulary

#### Lesson Overview:

Students will work on reviewing the vocabulary for this unit.

Materials Needed: Photocopy a class set or use the provided Google Slides version of the:

- Vocabulary sheets (QR Code or Non-QR Code option)
- Vocabulary graphic organizer
- Definitions (for IEP and ESL students)
- Definitions Google Slides

#### Teacher Instructions:

- 1. Hang the vocabulary words up around the classroom using the QR code or non-QR code format.
- 2. Divide the class up into groups of 4.
- 3. Have students walk around the classroom or hallway and find the vocabulary sheets. Students need to scan the QR code to uncover the mystery word. Once they have uncovered the mystery word, have them write it on the vocabulary graphic organizer sheet.
- 4. This activity can be done digitally by making a copy of the Google Slides version for each group.

5. Onc def she LESSON

PLANS

the definition

## WHAT'S INSIDE?



#### **ABIOTIC VS. BIOTIC ELEMENTS**







#### Abiotic Elements

Abiotic elements (also called abiotic factors) are non-living parts of an ecosystem. These non-living parts are essential to living elements. These include water, air, soil, rocks, nutrients, sunlight, temperature, weather, and others. The term contains two root parts, "A" which means without, and "Bio" meaning life. Living things need abiotic elements to live, grow, and reproduce.

Examples tempera include o examples

humidity, soil composition, radiation, and pollution. These abiotic elements will affect how living organisms live, eat, reproduce, and develop.

#### Biotic Elements

Biotic elements (also called biotic factors) are living elements of an ecosystem. Examples of biotic elements are plants, bacteria, trees, insects, fishes, and animals. Biotic organisms need water, oxygen, food, energy, and a place to live.

Living things adapt to their environment. Animals that live in cold climates have longer fur than animals that live in warmer climates. A longer coat protects these animals from the cold.

#### 

#### SCIENCE VOCABULARY **WORD #1**

Using a phone or a tablet scan the QR code below the hidden word.



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#### **ABIOTIC VS. BIOTIC SORT AND MATCH**

Cut out the titles and images below. Match the correct title with all , the images that relate. Once checked by your teacher, glue the pieces on to the back of the Abiotic vs Biotic Elements reading.

#### Biotic Elements

Abiotic Elements

















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## WHAT'S INSIDE?

**OMNIVORE** 

**BEAR** 

**RACCOON** 

HUMAN

DOG

BIRD



#### **ECOSYSTEM EXAMPLES ANSWERS**



Pond water has living elements, such as fishes and

plants, and non-living non-

water. Fish need ai carbon dioxide from

#### **CARNIVORE, HERBIVORE OR OMNIVORE? ANSWER KEY**

FI FPHANT



The rain forest ha provide food for a their waste helps nutrients to the tr LION fruit.)

CARNIVORE **HERBIVORE DFFR** POLAR BEAR RABBIT

CODT AND ISNAKE

### **ANSWER KEYS**

part to the other. Food and energy is cre insects or animals. When the animals or

#### Interactions Between Bio and Non-Biotic Compone

Biotic elements interact with living parts abiotic items, such as water, sun, and oxy nutrients from the soil and sunlight to pr and food created by plants

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#### **OWL PELLET LAB**

After you have dissected the owl pellet and completed the lab observation chart, it is time to work on the lab report.



Lab Report Requirements

#### **CASE STUDY: URBAN COYOTES**

Watch the video: "The Rise of the Urban Coyote". As you watch the video, write down any new information you learn about coyotes.



and Notes y this lab? Why or why not? ms did they encounter? any surprises? commend this lab to future students?

LABS & CASE **STUDIES** 

What questions do you still have about this animal?

Level 2	Level 3	Level 4
tudent had some of the materials required for the dissection lab. tudent pated in the did not take active role.	Student had the required materials for the dissection lab. Student participated in the lab, and took on an active role.	Student had the required materials for the dissection lab. Student took on a leadership position during the lab.
report is asing key ents. Some hents are complete.	Lab report is complete. Some elements could use more detail.	Lab report is well—written and organized. Attention to detail is demonstrated.

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## TEACHER FEEDBACK

"This is a fantastic resource! It was an incredible time saver as I was new to teaching intermediate and was a bit overwhelmed with where to start. This resource was very well laid out, clearly followed the curriculum, and included detailed and clear lesson outlines, relevant activities and experiments, and quizzes to check for understanding. It was also very helpful to have the digital and print options for hybrid teaching." - Val C.

## INTRODUCTION & LESSON 1

#### SCIENCE SAFETY RULES

#### **SAFETY RULES QUIZ** Complete the following true/false questions on safety:

#### 1. LISTEN

- ✓ To ALL the teacher's
- ✓ Know the location of

#### 2 ATTTRF

- Wear safety goggles
- Tie-up any loose ite
- Wear closed toe, co

#### 3. READ CAREFULLY

✓ Any labels of chemic symbols

✓ The prod

#### 4. T00LS

- ✓ Handle a
- ✓ Inform there is a spill.
- ✓ Do not taste test and

#### 5. CLEAN-UP

- ✓ Thoroughly wash all u
- ✓ Wash hands with sod

COMPICIO	1110 10110	ing in acr	Taise ques	1110113 011 3	arery

- 1. When you clean-up, wash your hands with water.
- 2. Before you begin, you must listen to ALL the teacher's instructions.
- 3. Remember to tie-up any loose items (e.g. hair, clothing, jewellery, etc.).
- 4. Feel free to taste test items in the Science room
- 5. Knowing where the safety eyewash station is located

SCIENCE ire, just make it

sharp objects.

- needed.
- 9. Read labels on chemicals used carefully (e.g., WHMIS symbols)
- 10. Do not tell the teacher if there is a spill or if an item is broken/faulty.

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Biotic	Living elements found in an ecosystem. Example: humans, plants, animals, bacteria, etc.
Abiotic	Non-living elements found in an ecosystem.  Example: water, air, sun, soil, wind, etc.

### SCIENCE VOCABULARY **WORD #1**

Using a phone or a tablet scan the QR code below to find the hidden word.

s within the same species ecosystem. ations co-exist with one and abiotic elements that er to survive. hat has similar climate, soil. together. sphere's conditions (e.g.,

ic area VOCABULARY

th that consists of three and core.

arth that includes all oceans.

to live in an ecosystem.

hutrients and oxygen to an e sun's energy.

ume biotic elements.

only plants.

other consumers.

both plants and other



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## **LESSON 2 & 3**



#### WHAT IS AN ECOSYSTEM?



Fold flap and glue onto paper

#### What is an ecosystem?

An ecosystem is a small or land things interact. It's a communianimals, plants, and their surro water pond with fishes, frogs, be as complex as an entire rain animals, sunlight, and land featu formations.

#### **Abiotic**

Non-Living



Fold flap and glue onto paper

#### **Biotic**

Producers



What are the par

The ecosystem ho components) and consumers, and d

> What is an ecosystem?

What are the two essential parts of an ecosystem?

## ELEMENTS OF **ECOSYSTEMS**

kample under each tab

nd glue onto paper

#### **Biotic**

Consumers



#### **Biotic**

Decomposers



#### **ECOSYSTEM EXAMPLES**



Sketch and briefly explain the ecosystem examples below.

Pond Water



#### Rain Forest

forest is an example of a cosystem. The trees produce that provide food for animals.

#### **ECOSYSTEMS** -I. which he trees a fruit.) **EXAMPLES AND** INTERACTIONS

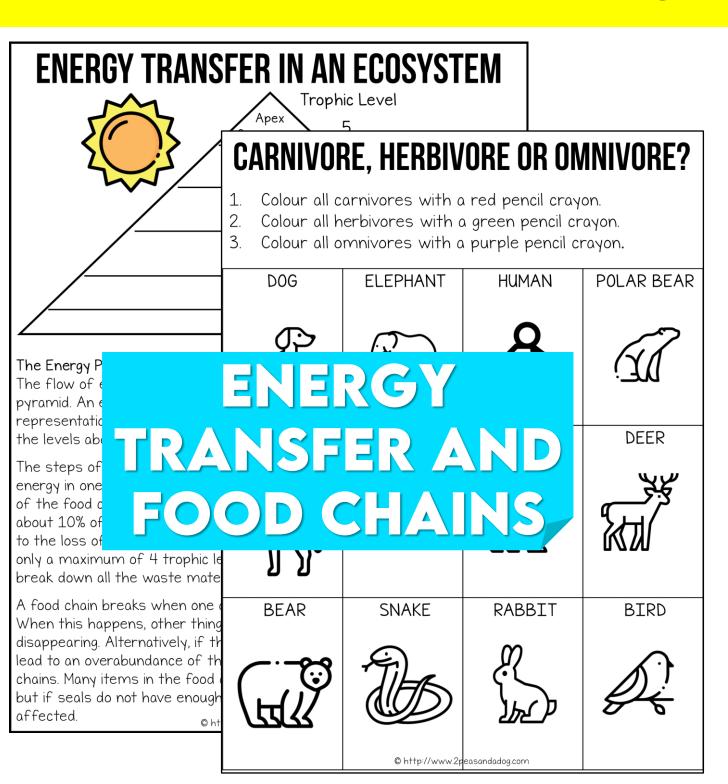
Rain Forest

nimals

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## LESSON 4 & 5



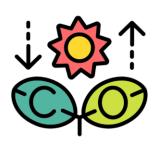


RINTIC	U V661	FICATIO	ON QUIZ /10
Name:			JN QUIZ / 10
Place the following anim	mals in the	correct spac	e on the chart.
□ BACTERIA □ DOG □ CROW □ ELEPHANT □ APPLE TREE		GRASS LION HUMAN RACCOON GIRAFFE	
CARNIVORE	HERB	IVORE	OMNIVORE
	BIO	TIC	
ELEN	1EN	TS	QUIZ
	© http://www.2	!peasandadog.com	

## LESSON 6 & 7



#### MATTER AND MATTER CYCLING



#### Carbon Cycle

The pr

respir of pho

dioxide

the su

into su

humo

carbo

plants

Carbon is a fundamental element of living argon

#### MATTER AND MATTER CYCLING **MATCHING ACTIVITY**

- Cut out, match and paste the terms with their correct descriptions.
- Do not glue the terms down to the page until your teacher checks over your work.

#### Nitrogen Cycle

Nitrogen is an essential element nucleic acids that are important converted into other compounds

Bacteria, such as Cyc compounds through these nitrogen comp plants, they will get their waste or die, b in a process called d

#### Phosphorous Cycle

Phosphorous (also known as pho teeth, cell membranes, and nuc rocks or ocean sediments. Phos and flows into rivers and oceans phosphate from the water. Fish phosphates from the sea. Seaf phosphorous. When animals and phosphates. Decomposition of v the phosphorous back into the and in detergents, however, ove called eutrophication. Eutrophica water, which causes fish to die. does not affect the food chain.

Denitrification convert carbon dioxide into sugar and oxygen How matter's elements and compounds get Condensation

recycled in an ecosystem

## MATTER CYCLING

t has a mass and takes up space

Uses energy from the sun and water to

and plant growth in a body of water

nposes waste and converts it into nitrogen

٦d		
cl SI	Evaporation	Water molecules falling down to the surface (e.g., rain, snow, hail, etc.)
ns n fo	Eutrophication	When nitrogen gets turned into nitrate or ammonia compounds
d W	Photosynthesis	Water becomes heated by the sun and turns into water vapour that rises into the air
s er	Precipitation	Water evaporating from plants
	Biogeochemical Cycling	Is how matter's elements and compounds get recycled in an ecosystem

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#### **ECOLOGICAL SUCCESSION**

#### **ECOLOGICAL SUCCESSION ACTIVITY**

After reading the article on the two types of succession, sort the following

that is previously occupied is ssion usually happens after an resident. This disturbance can

#### ECOLOGICAL Takes longer

SUCCESSION Has pioneer Usually occu

• Occurs afte

• A farmer growing crops is an example of this

PRIMARY SUCCESSION

• A glacier retreat leaving a moraine is an example of this

tation. Over time, the nrubs slowly appearing. as of the forest. reach its climax

th of new plants after a

nassive flooding that has ation. After the floods recede, wing on the site previously

ssion. For example, after fields, new crops are planted

imary succession because the es grow faster with soil and n disrupted by fire, flooding,

lasts for a shorter period of accession usually takes decades primary succession occurs for nousands of years or more.

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#### **SECONDARY SUCCESSION**

## LESSON 8 & 9



#### **ECOSYSTEM LIMITS**

All ecosystems have a maximum number of a species that can exist, also called carrying capacity. This is due to limiting factors, such as available

sunlight, climate, temperature, mates. If these essential elem to decline and die off.



Watch the video: "The Rise of the Urban Coyote". As you watch the video, write down any new information you learn about coyotes.



Watch the vide Carrying Capac

explain what h

too many fish

bowl



Watch the video "Limiting Factors in an Ecosystem." Then explain what the limiting factors are in the fish bowl?

© http

What questions

do you still have about this

animal?

## CASE STUDY **ECOSYSTEM** LIMITS

ction or extirpation. ome endangered. c characteristics, which make

**INVASIVE SPECIES** 

Invasive species are living things that are introduced (either accidently or on purpose) to a new area. These new to the area species invade local

native species by taking over

#### **SPECIES AT RISK ASSIGNMENT**



Research a species that is at risk and create poster that describes:

- 1. The designation of the species (extinct, extirpated, endangered, threatened, or special concern)
- 2. The ecosystem that it used to or currently lives in.
- 3. Why it is at risk, and explain how people can help.

h America by settlers as new organisms with them in

heir gardens from other ogweed got to North America.

strangling vine, garlic mustard, zebra mussels and sea

RISK

#### Requirements:

- ☐ Picture (ha

Criteria

Research Information

Picture

- ☐ Source list books used
- ☐ Poster is o

## SPECIES AT RISK finct.

INVASIVE **SPECIES** 

	Not coloured,	Partly coloured,	Attractive,	Very attractive
Overall	difficult to	some areas	mostly	and colourful,
	read.	difficult to	coloured, easy	easy to read.
ppearance		read.	to read most	
			parts.	
•	No sources	Some sources	Most sources	All sources
Sources	provided.	provided.	provided.	provided.

## LESSON 10A & 10B

#### **HUMAN INTERACTIONS IN THE**

**ENVIRONMENT** 

#### **ECOLOGICAL FOOTPRINT ACTIVITY**



An ecosystem is made up of and biotic (living) components. and stability of the ecosysten

microorgani an ecosyste ecosystem,

One signification population of who provide pollination. D a flower to

reproduce animals in t them, food threatened

In reality, in also other animals and ever

Deforestation and Desertificat

The destruction of habitats co that significantly threatens th trees are cut down for timber residential, commercial, or agr

© ht

HUMAN

INTERACTIONS

IN THE





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Go to the website: https://www.footprintcalculator.org/

Answer

ent habits.

#### w many olour in

## ENVIRONMENT Vo

## LESSON #10B **FARMING COMPARISON ACTIVITY** psystems

Monocul AGRICULTURE **ECOSYSTEMS** 

Organic Traditional systems to conventional?

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Google Slides of:

(or watch them together as a

hg - Ecology and Environment

ts complete the Venn

ple answers and have a class

## **LESSON 11 & 12**



#### **INDIGENOUS PERSPECTIVES ON SUSTAINABILITY**

Indigenous Peoples are essential in protecting wildlife and the ecosystem since

they consider themselves part at taught that people should not we example, when they hunt animal food, clothing, tools, and medicine

#### INDIGENOUS PERSPECTIVES ON SUSTAINABILITY

They often be respect for the have lived off properly many their ecosyste conservation of

## INDIGENOUS PERSPECTIVES,

For example, the Northern Cree many geese, they would eventual too many trees, they will lose they only need to take what is not the utmost care so that future

#### Protecting Wildlife and Reducin

One challenge of ecosystem con happens when animals who shar threat to the safety and livelihoo

Wildlife can damage crops and live Predators like wolves can kill catter animals, and insects can eat and retaliate against these animals be natural habitats, affecting the beautiful properties.

Indigenous Peoples have coexist their own needs. Therefore, invocommunities on how to coexist and lessen the HWC.

© htt

- 2. Give an example of how the Cree peoples conserve and manage an ecosystem.
- 3. What is HWC stand for? How can Indigenous Peoples help with this?
- 4. List some of the goals that have come from the Anishinabek and Ontario collaboration process.

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#### **ELECTRIC CARS**

#### THINKING QUESTION

		<b>1</b> -	- LAPECTURIONS	<b>/</b> +
Assess	sment	Below	Meets Expectations	Above

Are electric vehicles a good or bad idea? Explain your thinking.



ectric vehicle at a charging station

a medium—size car would proximately \$1,000 to \$1,200 one year.

# CASE STUDY ELECTRIC VEHICLES

e usually needs z or more

wed to

e of HOV lanes can be a big ver if you live in a busy area s of traffic or commute y to your job by car.

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## **LESSON 13 & 14**



#### **INTEGRATED PEST MANAGEMENT**

What is this topic? Explain.

#### **SHARE YOUR THOUGHTS**



Do you feel the benefits of these environmental initiatives are better than the disadvantages? Explain your thinking.

|--|--|

ADVANTAGES
TO THE ENVIRONMEN

## ENVIRONMENTAL PROTECTION

#### **OWL PELLET LAB**

After you have dissected the owl pellet and

is time to



#### **DESIGN AN ECOSYSTEM ASSIGNMENT**



#### Procedure:

1. Draw 10 biotic elements that contain a minimum of 5 consumers and 3 producers in an ecosystem of your choice (e.g., desert, plains, wetlands, by or why not? oceans, forest, jun

2. On a separate she chart similar to the your chart's categ

# ECOSYSTEM SUMMATIVE (3 OPTIONS)

evel 4

lent had the

ents?

Producers

Herbivores

Omnivores

Carnivores

Scavengers

Decomposers

- 3. On the same sheet as your chart, create a food chain using at least 3 biotic elements that are realistic to your ecosystem.
- 4. Colour your ecosystem neatly and fully using pencil crayons.
- 5. Hand this sheet in with your ecosystem drawing, classification chart and food chain.

lab. Student
participated in the
lab, and took on an
active role.

required
materials for the
dissection lab.
Student took on a
leadership
position during
the lab.

Lab report is complete. Some elements could use more detail. Lab report is well—written and organized. Attention to detail is demonstrated.

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## LESSON 15 & BONUS FILES

#### **UNIT TEST**

**/20** 

Manae.	Clacc.	
Name:	 Class.	

What is an ecosystem? (2 mar

#### **UNIT TEST**

Why are coyotes thriving in urban settings? Explain what you learned about urban coyotes. (5 marks)

What are the differences betw

Select 2 of the following parts consumers, tertiary consumers consumers, producers, and dec

## **ECOSYSTEMS** UNIT TEST

#### **BILL NYE: BIODIVERSITY**

List at least three ecosystems that are mentioned in the video.

#### **BILL NYE: FORESTS**

Statement	True or False	d when describing
½ of the land on Earth is covered with forests.		d when describing
Basement of the forest is called the subfloor.		
The rooftop of the forest is called the canopy.		
The Red Wood tree in is 10,000 years old.	COSYST	MS -

The forest is made up levels (subfloor, floor, understory, and canop

Forests get their energy from

the sun.

**VIDEOS** his video. Decomposers live in the canopy of a forest Red Wood trees are the oldest

trees in the world. Forests supply plastics to make at you are currently doing (or things with. Deciduous trees do not lose their leaves in the winter.

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## LESSON FORMATS





✓ Individual & Whole Unit



DIGITAL

✓ Google Slides

RESOURCE CAN BE USED IN-PERSON OR ONLINE