

Model Ecosystem Project 2022

Name: _____

Due Date: November 13th 2023

Your Goal: To make an ecosystem (diagram/ model) showing how an ecosystem works. It must contain at least three types of each of the following: abiotic elements, plants, herbivores, carnivores, and omnivores. Organism numbers must have the necessary resources in the ecosystem to maintain its carrying capacity.

Part A – The Ecosystem

Method

1. Choose an ecosystem (forest, desert, coral reef, ocean, rocky shore, grassland, mountain, savanna, prairie, arctic, Alpine, pond, etc.) to study independently. Focus your research on the main biotic and abiotic elements in the ecosystem. Do some research as to what plants and animals live in the ecosystem and how they interact with each other (in other words, who eats who!) Record all sources! Make sure all organisms are from the same local on earth – not just from the same type of biome (hint – polar bears and penguins are not in the same ecosystem). Remember to list all sources appropriately as you work.
2. Create a T-chart (sample below) or graphic organizer to help you sort your findings into the following categories: 1) Abiotic; 2) Biotic [Plants and Animals (herbivores, carnivores, omnivores)]. Be as specific as you can when naming your elements (i.e Toucans vs bird, Maple Tree vs tree – try to find scientific names for Level 4).

Abiotic	Biotic				
	Plants	Animals/Fungi			
		Herbivores	Carnivores	Omnivores	Decomposers

3. You need to find a minimum of **at least 3 abiotic elements, 3 plants, 3 herbivores, 3 omnivores, 3 carnivores and 3 decomposers** in the ecosystem.
4. Once you have gathered all of the information, begin to create your model ecosystem.
5. You can start by drawing or creating the landscape. This is best done by coloring in the background or the inside of the box (for the model). You may want to color in paper and cut it out to stick into the model box. Then draw or colour in a cut out the various animals and plants. Cut them out and stick them onto the background as they would interact. You must **LABEL** each element in your ecosystem and on the model. Be specific as to the Genus and Species. (Example: Rabbit - *Sylvilagus floridanus*).



Model Ecosystem Project 2022

Part B – Interactions in the Ecosystem

Throughout this unit, we have been examining how all organisms interact with the living and non-living elements in an ecosystem. We have discussed and investigated predator/prey relationships as well as food chains and webs. Now it is time to put that knowledge into practice and explore some of the interactions between different components in your ecosystem apply it.

Your Goal: Using the model ecosystem you have just created, you will generate a complete food web.

Method

1. Using your model, show **1 food web that contains at least 10 elements**. You must include a producer, a primary consumer, a secondary consumer and a decomposer. They must be realistic feeding relationships! (You may need to add an element to your ecosystem model). Remember, a food web contains many food chains; make sure your consumers have a variety of food to eat. Remember to include decomposers to complete the cycle of life.

2. For each element in your food web, add to their labels whether it is a producer or consumer. Each consumer must be labelled as an herbivore, carnivore, omnivore, or decomposer. If you add predator/prey or symbiotic relationships, that would be great.

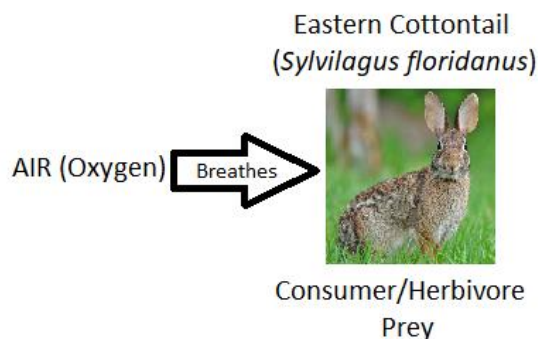
Eastern Cottontail
(*Sylvilagus floridanus*)



Consumer/Herbivore
Prey

3. Begin constructing your food web. Draw all the connections within your web using an arrow between the elements to show there is interaction and pointing to where the energy is going. Write the type of interaction that is occurring on each line. On the diagram you could draw arrows to show the interactions. If you are doing the model you can hang some of the creatures from the roof of the box with fishing line.

4. Your model ecosystem should include several biotic and abiotic elements and demonstrate the interactions between the biotic and abiotic elements (using arrows).



Model Ecosystem Project 2022

Resources Page

Some Helpful Websites to Explore:

- <http://www.windows.ucar.edu/tour/link=/earth/ecosystems.html&edu=elem>
- <http://www.teachersdomain.org/collection/k12/sci.life.oate.human/>
- <https://www.canadiangeographic.ca/kids>
- <https://askabiologist.asu.edu/explore/biomes>

If you used the websites above, check them off – add any other sites that you use below:

Make sure you include all the resources that you use – bookmark all things on a Google Doc or make a list on your device/PowerPoint.

Checklist

Use the following questions to help you develop a good project.

- ☐ Is your name on the front of the project?
- ☐ Is the ecosystem type identified?
- ☐ Is the model a 2D/3D representation of a specific ecosystem?
- ☐ Are all the elements included? (at least 3 abiotic, 3 plants, 3 herbivores, 3 omnivores, 3 carnivore and 3 decomposers)
- ☐ Are the elements correctly labelled? Each element must be labelled with its name and roles both on the web and the model.
- ☐ Are the food web elements correctly labelled? Each element must be labelled with its function.
- ☐ Are the relationships between the parts (if any) shown correctly? Are there connections within your web using an arrow between the elements to show there is interaction?

Model Ecosystem Project 2022

Part C – Explanation Writing Piece

Your Goal: Compose an Explanatory writing piece that explains model ecosystem and food web – each should be at least a paragraph. This is a report.

Method

1. You need to include an Explanatory writing piece that provides the following information:
 - a. Title (Name of Ecosystem)
 - b. Definition – What it is (A Grassland ecosystem is...)
 - c. Components or parts – What it consists of (elements in your ecosystem)
 - d. Operations – How it works (the food web)
 - e. Application – What it's used for
 - f. Human Positive Assistance – Who is trying to help with conserving, preserving and protecting this environment – Private individuals, private companies, government organizations, NGO's – what can Grade 7 students do to help?
 - g. Additional Fun Facts (Optional)
 - h. Resources

Explanatory Writing Checklist

	Met	Not Yet Met
Content		
Title is interesting and appropriate.		
Does my first paragraph provide a definition of my ecosystem?		
Does my second paragraph explain the major interactions?		
Details are logically developed and specific.		
Does my final paragraph give the applications?		
Ending leaves the reader with a clear understanding.		
Style and Organization		
Is it all written in an impersonal third person style without using 'I'?		
Nouns are specific.		
Format is clear and easy to read.		
Conventions		
Information is easy to read, with clearly marked divisions.		
Sentences are complete, spelling is accurate, and few errors present.		

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Model Ecosystem Rubric (Part A, B, C)

Level 1	Level 2	Level 3	Level 4
Knowledge and Understanding (Knowledge of model or prototype)			
Is missing either abiotic or biotic elements in the ecosystem.	Includes a few biotic and abiotic elements in the ecosystem. Elements may be unbalanced/unnecessary	Includes a balance of biotic and abiotic elements in the ecosystem.	Includes a balance of biotic and abiotic elements in the ecosystem and includes only necessary items.
Several required elements are missing.	All but 1 of the required elements are included in the food web.	All required elements are included in the food web.	The food web includes all required elements as well as additional information, 5 or more food elements are displayed on the food web.
Thinking and Investigation (Use of critical/creative thinking processes, skills, and strategies: Creativity, Application of prior knowledge and skills)			
Few or no labels were present on the model/web.	All required organisms are labelled with a name. Most web organisms are labelled as producer or consumer.	All required organisms are labelled with a name. All web organisms are labelled as producer or consumer. Most web consumers are labelled as an herbivore, carnivore, omnivore, or decomposer.	All required organisms are labelled with a name. All web organisms are labelled as producer or consumer. All consumers are labelled as an herbivore, carnivore, omnivore, or decomposer.
There are producers and consumers in the ecosystem but not in ample quantity to be self sustaining.	There are producers and consumers in the ecosystem and is should sustain itself for 2 weeks.	There are many producers in the ecosystem - enough to support the needs of the consumers comfortably for 2 weeks.	The energy needs of producers and consumers have been carefully considered and both will survive easily beyond 2 weeks.
Communication (Expression and organization of ideas and information in oral, visual, and/or written forms)			
Student uses vocabulary and terminology of the discipline with limited effectiveness	Student uses vocabulary and terminology of the discipline with some effectiveness	Student uses vocabulary and terminology of the discipline with considerable effectiveness	Student uses vocabulary and terminology of the discipline with a high degree of effectiveness
The model is distractingly messy or very poorly designed. It is not attractive.	The model is acceptable attractive though it may be a bit messy.	The model is attractive in terms of design, layout and neatness	The model is exceptionally attractive in terms of design, layout, and neatness.
Application (Transfer of knowledge and skills to unfamiliar contexts: Creativity, Application of prior knowledge and skills)			
Cannot accurately illustrate or illustrates few interactions between the biotic and abiotic elements in the ecosystem.	Can accurately illustrate some of the interactions between the biotic and abiotic elements in the ecosystem.	Can accurately illustrate the interactions between the biotic and abiotic elements in the ecosystem.	Can accurately illustrate the interactions between the biotic and abiotic elements in the ecosystem using technical terms.