

CoSpaces Ecosystems Project

Your Goal: To research, design, and create an accurate model ecosystem using the virtual reality online program 'CoSpaces'. The ecosystem must contain appropriate abiotic elements, plants, herbivores, carnivores, and omnivores related to your chosen ecosystem.

Part A – The Ecosystem

1. Choose an ecosystem (forest, desert, coral reef, ocean, rocky shore, grassland, mountain, prairie, pond, landfill site etc.) to study. 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 (food chains/food webs)
2. Create a 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. Crows vs bird, Maple Tree vs tree)

Abiotic	Biotic			
	Plants	Animals		
		Herbivores	Carnivores	Omnivores

3. Once you have gathered all of the information, begin to familiarize yourself with the CoSpaces program, by playing around in the space. All elements that you have researched and that are mentioned in your chart (above) and food web (below) should be in the virtual model you create. Each element should be labelled in the program as well, and can be labelled in the text box that each item chosen from the library or uploaded has available.
4. You should use at least one 3D model from outside of CoSpaces (made with Tinkercad, or uploaded from www.thingiverse.com).
5. You should have a minimum of 3 elements coded to be animated in your virtual ecosystem. The more coding and media competency shown in your ecosystem the better.

Part B – Interactions within the Ecosystem

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

1. Using your model create a food web that contains **at least 10 elements**. You must include a producer, primary consumer, and a secondary consumer. They must be realistic feeding relationships! Remember that a food web contains many food chains; make sure your consumers have a variety of food to eat!

2. The elements in your food web should include labels, indicating whether it is a producer or consumer. Each consumer must be labelled as a herbivore, carnivore, omnivore, or decomposer.
3. Begin constructing your food web (completed electronically). Show all the connections within your web using arrows between elements to show there is interaction and what direction the energy is travelling.

For example, label each element like this



Rabbit
Primary Consumer
Herbivore

The Conclusion: Your model ecosystem should include many biotic and abiotic elements and demonstrate the interactions between the biotic and abiotic elements (using arrows)

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

- ✓ Is your name on all parts of the project?
- ✓ Is the ecosystem type identified in the title?
- ✓ Does the CoSpaces virtual ecosystem have an imported 3D design?
- ✓ Does the CoSpaces virtual ecosystem contain a minimum of 3 coded animations?
- ✓ Are all the elements included? [Abiotic, Biotic (plants and animals[herbivores, carnivores, omnivores])]
- ✓ Are the food web elements correctly labelled? Each element must be labelled with its function.
- ✓ Are the relationships between elements shown correctly? Are there connections within your web using an arrow between elements to show there is interaction?

You could be awarded with a bonus if your project is selected to be the Most Scientific, Most Attractive, or has the Best Use of Technology. Students will vote to decide the winner in each category.

CoSpaces Ecosystem Rubric

1	2	3	4
<i>Knowledge and Understanding</i>			
Is missing either abiotic or biotic elements in the ecosystems.	Includes a few biotic and abiotic elements in the ecosystem. Elements may be unbalanced or 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.
<i>Thinking and Inquiry</i>			
Few or no labels were present on the food web or in the CoSpaces environment.	Most web organisms are labelled as producer or consumer.	All web organisms are labelled as producer or consumer. Most web consumers are labelled as herbivore, carnivore, omnivore, or decomposer.	All web organisms are labelled as producer or consumer. All web consumers are labelled as 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 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.
<i>Communication</i>			
The model is very poorly designed. It is not attractive.	The model is somewhat attractive and may be a bit simplistic in design.	The model is attractive in terms of design, layout and neatness.	The model is exceptionally attractive in terms of design, layout, and neatness.
<i>Application</i>			
The CoSpaces model does not contain any imported 3D design, and does not contain the minimum 3 coded animations. Student uses program with limited effectiveness and creativity	The CoSpaces model contains some of the required imported 3D designs, and minimum 3 coded animations. Student uses program with some effectiveness and creativity	The CoSpaces model contains all of the required imported 3D designs, and minimum 3 coded animations. Student uses program with considerable effectiveness and creativity	The CoSpaces model contains all of the required imported 3D designs, and more than 3 coded animations. Student uses program with a high degree of effectiveness and creativity