

A Designed Organism

Strands	Life Systems; Ecosystems
Topic	Applying knowledge of life science, ecosystems, and the needs of organisms to create a new creature
Primary SOL	LS.9 The student will investigate and understand how organisms adapt to biotic and abiotic factors in an ecosystem. Key concepts include c) adaptations that enable organisms to survive within a specific ecosystem.
Related SOL	LS.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which b) a classification system is developed based on multiple attributes. LS.8 The student will investigate and understand interactions among populations in a biological community. Key concepts include d) symbiotic relationships; and e) niches.

Background Information

Adaptations are structures, functions, or behaviors that allow an organism to survive in its habitat or biome. This project is meant to be a culminating activity that allows for creativity and the application of technical knowledge. After the introductory review, students will prepare a concept map or other graphic organizer showing a plan for their newly designed creature.

Briefly review the needs of living things, features of biomes, the niche concept, and symbiosis. Review the meanings of the terms *ecosystem*, *biome*, *habitat*, making sure students understand the distinction between these terms (“Biomes of the World” lesson). Review examples of specific adaptations of organisms. You may want to brainstorm a story about an imaginary creature, pointing out its adaptations to specific environmental factors.

Materials

- Reference resources
- Graphic organizers completed in “Biomes of the World” (LS.9abc) lesson
- Internet resources approved by teacher
- Photographic resources displayed for each biome
- Colored pencils
- Copies of “Designed Organism Rubric” (attached)

Vocabulary

abiotic, adaptation, biome, biotic, ecosystem, function, habitat, niche, organism, structure, symbiosis

Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

1. Have each student select an ecosystem, biome, or habitat he/she would like to use in this activity. Distribute copies of the “Designed Organism Rubric,” and go over the steps for designing a new creature.
2. Have students brainstorm the imaginary creature’s features that could enable it to survive in the chosen ecosystem. Adaptations should be specified for feeding, movement, and protection. A symbiotic relationship should be included.
3. Go over the ratings in the rubric so that students understand the task.
4. Have students perform steps 1 through 5 on the rubric, using a concept map or other graphic organizer as they organize their thoughts.
5. Have students draw and label a diagram showing the organism’s adaptations (step 6).
6. Have students write a summary describing ecosystem, the adaptations of their designed creature, and exactly how the adaptations enable it to survive.

Assessment

- **Questions**
 - What aspects of the habitat did you take into account when creating your organism? What special adaptations did you include to enable your organism to feed? To move? To protect itself?
 - What is your organism’s niche? What led you to choose this role for your organism?
 - How does your organism live in symbiosis with another organism in its environment?
- **Journal/Writing Prompts**
 - Based on your knowledge of the different biomes, explain adaptations that might be found in an organism capable of surviving in the tundra.
 - Describe the most creatively designed organism presented in class today. What made this creature the most successful or unique?

Extensions and Connections (for all students)

- Have students share their designed creatures with classmates and try to classify each other’s creatures into kingdom and phylum.
- Have students create a herbivore and provide information about a new plant and a new predator for the imaginary creature.
- Have students compare and contrast their imaginary creature with real organisms.
- Referring to the variety of the imaginary creatures, discuss with students the concept of biodiversity.

Strategies for Differentiation

- Have students create the classification scheme for their designed organism.
- Rather than designing an imaginary species, have students select from pictures of unfamiliar animal species and decide appropriate biome based on visible traits.
- Rubric may be differentiated according the level of student ability.

Designed Organism Rubric

Design a new organism that is adapted to an ecosystem, biome, or habitat of your choice.

1. Choose and describe an ecosystem, biome, or habitat.
2. Describe the needs of your organism and how these needs are met in its ecosystem.
3. Design and describe three adaptations that allow the organism to survive within its ecosystem. Adaptations should be specified for *feeding*, *movement*, and *protection*.
4. Describe your organism’s niche and how the organism interacts with other things.
5. Describe a symbiotic relationship for your organism.
6. Make a labeled diagram of the organism you have designed and described.

Category	Exceptional (4)	Very Good (3)	Acceptable (2)	Poor (1)
Biome Description	Ecosystem description totally accurate; all details included	Ecosystem description mostly accurate; a few details missing	Ecosystem description somewhat accurate; several details missing	Ecosystem description very weak on details
Needs of Organism	How needs are met completely realistic; all details included	How needs are met mostly realistic; a few details missing	How needs are met unclear; several details missing	How needs are met not included; very weak on details
Three Adaptations to Biome	Adaptations completely described; all details included	Adaptations mostly described; a few details missing	Adaptations somewhat described; several details missing	Adaptations not or poorly described; how this organism would survive is unknown
Niche	Niche descriptions accurate; all details of interactions included	Niche descriptions mostly accurate; a few details of interactions missing	Niche descriptions somewhat accurate; details of interactions missing	Very weak on niche descriptions; no interactions described
Symbiosis	Partnership is reasonable; details of relationship well described	Partnership is reasonable; details of relationship partly described	Partnership is possible; details of relationship not identified	Partnership not possible; details of relationship not identified
Creativity	Unique details make organism stand out.	Some details about organism are unique.	A few details are unique, but organism is much like an existing organism.	Organism is like an existing organism, with few or no new features.
Diagram	Detailed; in color; adaptations labeled and described	Detailed; adaptations labeled and described	Labeled drawing	Basic sketch