



# Speculative Evolution

## Lesson Topic

Forces of Evolution/Evolution Unit

## RIEL Biology Element

Multiple Modalities

## Time Required

One class period

## Standards Addressed

- SC.912.L.15.13 Describe the conditions required for natural selection, including: overproduction of offspring, inherited variation, and the struggle to survive, which result in differential reproductive success.

## Science and Engineering Practice

- Asking Questions
- Developing and Using Models
- Analyzing and Interpreting Data
- Constructing an Explanation

## Lesson Summary

The focus of this lesson is to allow students the opportunity to synthesize a model of a fictitious animal based on a current living animal species. In this lesson, students will apply their knowledge of evolution and adaptations to discuss, design, and synthesize their own fictional animal species through speculative evolution. The final student artifact will include a drawing and description of the fictitious “evolved” animal on either a whiteboard, poster, or lab table.

By having the student’s read the various texts and discuss the adaptations, the students are engaged in literacy practice. Then, the students will emphasize questioning by discussing how adaptation relates to the habitat. Further, by designing a model of their fictitious animal, the students are engaged in an SEP while using a kinesthetic approach that highlights both creativity and science content.

It should be noted that allowing emerging bilinguals to work together with peers that share their native language is important so that the process of translanguaging can serve as an aid to their concept design and explanations.

The students will be engaged in discovering various animal species as part of this activity. During the process of observing various adaptations, the students will be asking scientific questions about the role that these adaptations play in the specific species. They will also be constructing a model of their fictitious animal species and be required to construct an explanation as to how this animal evolved and the selective pressures that led to these changes and speciation.

These SEP’s connect to the RIEL element of Multiple Modalities because the reading of text, the design of the model, the drawing of the model, and the writing of their descriptions utilize different skills and senses to maximize learning of the content.

## Materials

- Computers, internet access, smart phone, or library resources
- Website: [Wildlife Fact Sheets | Nature | PBS](#) or pre-printed wildlife fact files from a reliable source.
- Markers, fluorescent chalk markers (to write on lab tables), or colored pencils
- Whiteboards, poster paper, or lab tables
- Optional “Evolve an Animal” Word document

## Before the Activity

- [Wildlife Fact Sheets | Nature | PBS](#)
- [The Future is Wild: Speculative Evolution of the Future. Size comparison - YouTube](#)

## Lesson Activities

- 1. Introduction.** Begin the lesson by reviewing the concept of evolution and adaptation and how specific selective pressures can lead to a species changing over time to adapt to their environment. Present the words “Speculative Evolution” on the board or projector. Introduce the idea of speculative evolution to the students by showing them a website or video clip that relates to this concept in order to get the students interested.
- 2. Student exploration.** Allow students to explore some various animal species. This can be accomplished in many ways based on available resources. Examples include allowing students to work in groups of 2-3 on a computer and access a reliable wildlife website such as Nature PBS’s Wildlife Fact Sheets: [Wildlife Fact Sheets | Nature | PBS](#), printing color wildlife fact cards, or allowing students to utilize their phones to access a source that provides them with various species. Make sure that the information that you provide to the students includes grade level appropriate text and information that relates to the various species adaptations, habitats, and current threats to the species. Highlight to the students that adaptations are influenced by many factors including, but not limited to, predation, climate, competition, available resources, and disease.

## Content Learning Objectives

- Students will understand how selective pressures can lead to phenotypic changes in a population over time.
- Students will read about a specific animal species, ask questions about its adaptations, and propose possible evolutionary adaptations that might arise in this species over time.

## Teacher Notes

- This lesson would fit best near the end of an evolution unit, after students have become familiar with the general concepts and vocabulary that relate to forces of evolution.
- Example YouTube video on fictitious speculative evolution: [The Future is Wild: Speculative Evolution of the Future. Size comparison](#)

## Lesson Activities

3. **Brainstorming.** Students are placed in their respective groups. Be mindful of allowing emerging bilinguals to work together with students that share their home language so that translanguaging can be incorporated into the concept development. Instruct the students to choose one of the species that they reviewed together during the “student exploration” phase. Have students discuss some of the adaptations that this species has and why it is important. Next, have them brainstorm a fictitious animal that is related to this species that is a result of “speculative evolution”.
4. **Concept development.** The student groups should make sure that their new animal species has at least three key adaptations that aid in its survival in its future habitat.
5. **Animal design.** Students will then sketch the animal on the whiteboard, poster, or lab table nursing the drawing materials provided. Students should include a written description of their new fictitious animal on the drawing surface. Their description should include the following:
  - a. Description of adaptations and how these benefit the animal in its specific, future environment.
  - b. One disturbance or environmental change that led to this animal’s evolution.
  - c. Use at least three key terms from the unit in their descriptions and have the students write the key term in a specific color.
6. **Submit work.** Have students take a photo of their final design and text and have them upload to your specific learning platform (ex. Canvas).

## Teacher Notes

- Optional “Evolve an Animal” document can be placed at every student group station to assist them in concept development and animal design. This can be modified based on teacher implementation of the activity.



Name: \_\_\_\_\_

Date: \_\_\_\_\_

# Evolve an Animal Student Sheet

1. **Identify** each animal at your lab table. It is ok if you do not know the specific species.
2. **Discuss** adaptations that the animal has that help it to survive in its environment.
3. **Describe** what type of environment this animal probably lives in.
4. **List** at least 3 adaptations this animal has with the fluorescent chalk marker under the animal.
5. **State** what type of habitat this animal lives in.
  - a. To the left of the animal, **choose an extinct species** that is closely related to your currently living species and sketch or provide a picture.
  - b. To the right of the animal, **create a future species** based on “speculative evolution” and sketch a picture. Be creative!
6. **Describe** what selective pressures caused this animal to evolve. Use at LEAST 3 key terms and write these terms in **YELLOW**.
7. **For extra credit**, write the common name AND the scientific name of each of the 3 animals. You may use your phone to search. No help from me!
8. **Take a picture** of your finished work, submit the photo to Discussion Thread on Canvas.



Name: \_\_\_\_\_

Date: \_\_\_\_\_

# Examples of Prior Student Work

bigger wings  
bigger talons  
bigger beak  
Horn to breathe  
flippers to help swim  
flop to keep warm  
So they fly  
talons to grab prey  
beak to break open shells  
bigger different beaks because bigger or stronger wings

Blue Crab  
Salt Water to Fresh Water  
Sand to rocks  
Water to land  
The Population Changes, and genes that improve survival and reproduction will become more common while genes that are disadvantages survive and reproduce

Quagga  
OKAPI  
Large ears.  
Dark body.  
Brown and white stripes.

large Ears - hearing  
Fur - Keep warm  
strong legs - run and chase prey

Shark  
fins - sharp teeth  
Gills  
The shark needs to move quickly to avoid getting prey and this includes escaping predators and simulating the pollutants or sharks use for their survival - toxic herbs

Also because of the difficult for sharks to find suitable mates  
Shark Scientific name  
Common name  
Dance Bie.  
Goby Garcia

Quagga  
Large ears.  
Dark body.  
Brown and white stripes.  
Divergent selection pressure has shaped the evolution of giraffe and Okapi important vision genes. THE NEED TO EAT AND BREED. Developed white stripes to resemble stripes of light coming through the trees.



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