

# Lesson 1. What's The Story of How Plants and Animals Change Over Time?

## Plan Lesson 1







Adaptation by natural selection is a fundamental concept in biology. It helps to explain the existence of species' physical traits. It also explains the observation that populations of plants and animals have changed over many generations in concert with changes in their environments. Furthermore, it accounts for the emergence and continuing evolution of new species. Faced with evidence of change over time, the question is "How does this happen?" The answer lies in the **mechanism of natural selection**, the focus of this unit.





The lesson focuses on students' recognition that in these scenarios, some traits of animals many years ago are not the same as they are nowadays. This is an important step before they consider an explanation for *how* changes might happen. The lessons that follow will support students as they develop a framework they can use to explain observations of change over time in both plants and animals.

Working in small groups of 4, students observe images of scenarios that depict populations of animals "many hundreds of years ago" versus "nowadays." Students look for differences between **traits** of animals in the population many hundreds of years ago and the same traits in a group of the same kind of animal nowadays. They also compare the **environments** in the same time periods. Students then use their prior knowledge and experience to speculate about what process might explain the change process.

### Learning Targets in this Lesson

- A population is a group of individuals of the same kind in the same environment.
- A trait is a feature or characteristic of an animal or plant such as the color of a daffodil's petals, the shape of a fish's fins or the length of a frog's legs.
- Traits of individuals within a population can change over time.

Sequence of Experiences		
<b>1. Introduce Evolving Minds Unit</b>	 All class	 5 Minutes
<b>2. Many Hundreds of Years Ago and Nowadays Activity</b>	 Small groups	 15 Minutes
<b>3. Record Initial Ideas About Change Over Time</b>	 Individual	 10 Minutes

<b>4. Make Meaning</b>	 All class	 10 Minutes
<b>5. Wrap Up</b>	 All class	 5 Minutes

**Materials:**

For each student:

A science notebook  
 Notebook pages 2-3.

For each small group



2 copies of the Many Hundreds of Years Ago image for the group’s assigned animal (cane toads, owls, guppies, or okapis)  
 2 copies of the Nowadays image for the group’s assigned animal (cane toads, owls, guppies, or okapis)

**Preparation**

- Prepare to give a notebook to each student
- Preview the 4 Many Hundreds of Years Ago and Nowadays scenarios
- Plan how you will assign students to small groups and prepare a list of these assignments.
- Make sure there is one copy of the Many Hundreds of Years Ago image and one copy of the Nowadays image for each pair of students in each group of 4.
- Post chart paper that you will use to record “Take Aways” during the Wrap Up. **At the end of each lesson in the unit, you will add your students’ new understandings of natural selection to this Take Aways Chart.**

**The Lesson**

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<b>1. Introduce Evolving Minds Unit</b>	 All class	 5 Minutes
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Introduce the unit to the whole class in a discussion circle.

Explain that the class is about to start a new science unit called Evolving Minds and that this unit will explore how plants and animals may change over time. Each lesson begins with a question to investigate followed by activities that will help the class figure out an answer to the question. By the end of the unit, students will understand how living things change over time.

Transition to today’s lesson, and tell the class that today’s investigation question is:

- What's the story of how plants and animals change over time?

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## 2. Many Hundreds of Years Ago and Nowadays Activity Small groups 15 minutes

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Introduce the activity to the whole class before asking them to move to small group locations.

### Set the stage

Project the two images of the cane toad scenario.

*On the left, you'll see a group of cane toads. This is a population of cane toads many hundreds of years ago.*

*We call a group of the same kind of animal living in the same place or habitat a "population."*

*There are six individual cane toads shown in this population that lived many hundreds of years ago.*

(You may want to ask students for a few other examples of populations. If you do so, keep this very brief!)

Ask the class to look carefully at the images of cane toads in their environment many hundreds of years ago and a population of cane toads nowadays.

Ask students:

*Are these the same six toads?*

*What was the change in the environment?*

*What was the change in the population?*

Give students a minute to look for differences.

Focus on the cane toads' environment: Ask for a volunteer to describe how the environment has changed over many years in this scenario. [snakes/predators weren't present a very long time ago but they are present nowadays]

Focus on the two populations of cane toads. Ask for a volunteer to describe the change they see in the cane toad population. Some traits students might notice are coloration, length of legs, and eye size. They cannot see behaviors or behavioral traits.

This is a good time to introduce the term “trait.”

*Someone just mentioned that nowadays most cane toads have longer legs than cane toads did many years ago. A feature like the length of legs is what we call a “trait.” A trait is a feature or characteristic of part of a plant or an animal in a population like leg length in cane toads.*

**Start small group work**

Assign students to small groups of 4 and have them move to assigned locations for the activity.

Give both pairs of students in the group a copy of the Many Hundreds of Years Ago image and a copy of the Nowadays image for their assigned animal (cane toads, owls, guppies, or okapis). Both pairs will have the same scenario. The purpose of giving 2 copies per group is to ensure that each pair can see the illustrations; all group members will discuss their responses to the questions.

Explain that there are three questions that the group should discuss and be prepared to answer.

- What was the change in the environment?
- What was the change in the population?
- How do you think this change in the population happened?

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**3. Record Initial Ideas About Change Over Time**



Individual



10 Minutes

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After they have talked about the scenarios within their small groups, ask students to prepare for a class discussion by writing answers to the questions on pages 2 and 3 in their notebooks. Explain they will have 8 minutes for the notebook writing so they will need to get started right away!

Lesson 1: What's the story of how plants and animals change over time?

Circle the group of animals you looked at:



What's going on here?

Compare the picture of the population many hundreds of years ago to the picture of the population nowadays.

The change in the environment was \_\_\_\_\_

\_\_\_\_\_

The change in the population was \_\_\_\_\_

\_\_\_\_\_

Lesson 1: What's the story of how plants and animals change over time?

What's going on?

How do you think this change in the population happened?

I think \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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#### 4. Make Meaning



All class



10 Minutes

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Gather the class in a discussion circle. Ask students to bring their notebooks for reference.

**The purpose of this discussion** is to hear what changes students noticed, and to **elicit** their initial ideas about the process or mechanism for how change happened over time.

*This is an elicitation activity and as such is not the time to teach!*

Have someone from each group very *briefly* share their change-over-time scenarios and ideas. Keep the reporting concise by using the sentence starters below.

We looked at \_\_\_\_\_ (cane toads, owls, guppies, or okapis).

The change in the environment was \_\_\_\_\_.

The change in the population was \_\_\_\_\_.

Also ask groups to explain the change:

*How do you think this change in the population happened?*

**Then move on to the discussion question:**

*In what ways are all these change stories similar?*

Emphasize that this is a time for ideas and all ideas are welcome and valuable.

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#### 5. Wrap Up



All class



5 Minutes

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Ask students what ideas and information they will “take away” from today’s lesson to decide what they should record on the Takeaways Chart.

Listen for these ideas. Use student language as much as possible when you write them on the Takeaways Chart:

- Populations of animals have not always been exactly like they are now.
- Animals have traits that have changed over time, like the length of cane toads’ legs, the color of owl feathers, or the patterns on guppies’ bodies.
- Environments also change over time.

- We have ideas about what happened in the time between a long time ago and nowadays that explains how the changes happened.

Our next question is:

*Is there evidence that tells us what did happen? Next time we'll take a closer look at the traits.*