

Lesson 5. How can we show that it takes many generations for the population of piloses to change?

Plan Lesson 5

In the last class, students met a population of piloses and retold the story of how, over many generations, individuals with thinner trunks became more common than those with wider trunks. They agreed on the 6 Key Steps of natural selection in the form of a graphic.

In this lesson, students clarify and consolidate ideas about the role of time and multiple generations in how one of the piloses' traits (trunk width) changed. Working in small groups, students examine pictures showing pilosa populations after the environment becomes hot and dry at three points in time—generations 1, 3, and 5. They are given a set of 12 cards showing the population of piloses in generation 1. They sort the cards into three variants of trunk width—wider, medium, and thinner—and use their data to fill in a graph. Students then count the number of individuals with each trunk variant in the pictures of the 3rd and 5th generation of piloses and use their data to create 2 additional graphs.

By the end of this lesson, students will be able to use graphs to show how, when the environment changes, a beneficial trait variant (thinner trunks) becomes more common in a population of piloses over many generations.

Learning Targets in this Lesson

- Graphs show how the distribution of trait variants (trunk width) in a population (of piloses) changes when the environment has changed.
- The process of natural selection takes many generations.

Sequence of Experiences		
1. Introduction	 All Class	 10 Minutes
2. Graph the Piloses Story	 Small groups	 20 Minutes
3. Make Meaning	 Class Discussion	 10 Minutes
4. Wrap Up	 All class	 5 Minutes

Materials:

For the class

Slide deck for this lesson

For each small group of students

A packet of 12 piloses cards (Generation 1)

Generation 1

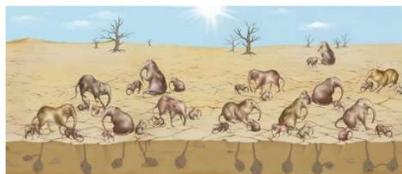


Printed pictures of Generation 3 and Generation 5

Generation 3



Generation 5



For each student

Notebook pages 10-12

Preparation

- For each small group of students, prepare a packet of 12 piloses cards.
- Prepare to project an image of the 6 Key Steps.
- Prepare to project an image of the filled-in graphs for piloses in Generations 1, 3, and 5 alongside the 6 Key Steps.

The Lesson

1. Introduction



All Class



10 minutes

Today's investigation question is:

How can we show that it takes many generations for the population of piloses to change?

Remind students that a generation is an entire group of plants or animals that were born around the same time.

To begin the lesson, project an image of the 6 Key Steps.

Ask volunteers to use the 6 Key Steps to retell the story of how piloses got skinny trunks.

Listen for these ideas:

- **Variation in traits:** Long ago, many piloses had wider trunks and only some had thinner trunks. All of them could get bugs to eat.
- **Environments change:** It got hot and dry, so the bugs went under the ground.
- **Depending on the environment, some trait variants may be beneficial:** Piloses with thinner trunks *could* reach the bugs, so they were healthier. Piloses with wider trunks could not reach the bugs, so they were less healthy.
- **Individuals with beneficial trait variants are healthier and can have more babies:** Healthier piloses with thinner trunks had more babies and babies usually look like their parents so had thinner trunks too.
- **This process happened again and again over many generations:** This process happened again and again over many generations. Eventually, many piloses had thinner trunks and only some had wider trunks.
- **Over time, populations can look very different than they used to look.** Nowadays the piloses' population looks very different than it did many years ago.
- We called this process "natural selection".

Remind students that in L3 they counted hairs on radish plants. They discovered that a graph is a useful way to describe trait variants in a population.

To answer the question in this lesson, you will create graphs that show the trunk widths of piloses in 3 different generations of piloses.

How do the graphs show us that it took many generations for the pilosa population to change?

Listen for ideas such as:

- Piloses with thin trunks were more likely to stay healthy and have babies than piloses with wide trunks.
- Piloses with wide trunks were the most common in Generation 1 and the least common in Generation 5.
- Over time, there are more piloses with thinner trunks.
- It takes many generations for thinner trunks to become much more common than wider trunks.

4. Wrap Up



All class



5 minutes

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:

- Graphs can show how trunk width in a population (of piloses) changes when the environment has changed.
- The process (of natural selection) takes many generations.

Before concluding the lesson, ask students to fill out the questions on page 12 of their notebooks.

Lesson 5: How can we show that it takes many generations for the population of piloses to change?

What do the 3 graphs tell you about how the pilosa population changed?

Our question for the next lesson is:

Do the 6 key steps work for plants, too?