



Adapt or Not: How Traits Keep Organisms Alive

From Molecules to Organisms: Structure and Processes



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Grade Level 8th Grade

Subject Science

Essential Question

How do specialized characteristics influence the growth and survival of organisms in their environments?

Summary

This lesson guides students in using evidence and scientific reasoning to explain how adaptations impact the survival and reproduction of different species. Students determine which animals are best-suited to survive in various environments, analyze the effects of the Chernobyl nuclear meltdown on bird populations, and explore a variety of species' adaptations. To conclude the lesson, students create a model of a plant species, determine its characteristics, and examine how specialized structures influence an organism's ability to survive. Students then compare the advantages and disadvantages of their plants' specialized characteristics in different environments.

Snapshot

Engage

Students examine images of animals in various environments and determine whether or not each animal is placed in its preferred environment.

Explore

Students analyze the causes and effects of environmental factors' impact on a species using the real-world example of the Chernobyl nuclear disaster's impact on local bird populations.

Explain

Students watch a video about how adaptations increase an organism's survival.

Extend

Students create a model of a plant species, including its different characteristics, and determine whether it would be able to survive in various environments.

Evaluate

Students summarize, compare, contrast, and evaluate the advantages and disadvantages of specialized characteristics in specific environments.

Standards

Oklahoma Academic Standards for Science (Grade 8)

8.LS1.4: Use arguments based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.

Attachments

- [Biomes and Animal Adaptations—Adapt or Not.docx](#)
- [Biomes and Animal Adaptations—Adapt or Not.pdf](#)
- [Caption This—Adapt or Not.docx](#)
- [Caption This—Adapt or Not.pdf](#)
- [Chernobyl Card Sort—Adapt or Not.docx](#)
- [Chernobyl Card Sort—Adapt or Not.pdf](#)
- [I Think, We Think—Adapt or Not.docx](#)
- [I Think, We Think—Adapt or Not.pdf](#)
- [Justified True or False—Adapt or Not.docx](#)
- [Justified True or False—Adapt or Not.pdf](#)
- [Lesson Slides—Adapt or Not.pptx](#)
- [Plant vs. Biome—Adapt or Not.docx](#)
- [Plant vs. Biome—Adapt or Not.pdf](#)
- [The Great Plant Discovery—Adapt or Not.docx](#)
- [The Great Plant Discovery—Adapt or Not.pdf](#)

Materials

- Lesson Slides (attached)
- Justified True or False handout (attached; one per student)
- Chernobyl Card Sort handout (attached; one per 3–4 students)
- Biomes and Animal Adaptations handout (attached; one per student)
- The Great Plant Discovery handout (attached; one per student)
- Plant vs. Biome handout (attached; one per student)
- Caption This handout (optional; attached; one per student)
- I Think, We Think handout (attached; one per student)
- Easel paper (one paper per group)
- Markers (one set per group)
- Paper clips for envelopes for organizing the Card Sort cards

10 minutes

Engage

Introduce the lesson using the attached **Lesson Slides**. Display **slide 3** and read aloud the essential question, “How do specialized characteristics influence the growth and survival of organisms in their environments?” Display **slide 4** to go over the lesson objectives. Review these slides with students to the extent you feel necessary.

Move to **slide 5** and give each student one copy of the attached **Justified True or False** handout. Introduce the [Justified True or False](#) strategy.

Share with students that they should determine if the animals on each of the following slides belong in the environment they are pictured in. On their handouts, students should identify the animal and environment in the image, then determine whether the resulting statement is true or false. Students should justify their choice in complete sentences on the handout.

Display **slide 6** and allow students a few minutes to complete the process for the first image. Repeat this process for **slides 7–10**. The animals and environments listed on the slides include:

- Slide 6: penguin, rainforest
- Slide 7: chimpanzee, Arctic
- Slide 8: dolphin, ocean
- Slide 9: walrus, grassland
- Slide 10: camel, desert

After students have completed their responses individually, have them find an [Elbow Partner](#) and discuss their responses. Invite students to share out their responses. Then, review the correct responses on **slides 11–15**.

15 minutes

Explore

Transition through **slides 16–17** to introduce the events of the 1986 Chernobyl nuclear meltdown. Display **slide 18** to share an image of the Zone of Alienation. Share that this zone was a restricted, 30-kilometer area around the Chernobyl nuclear power plant that became largely uninhabitable due to dangerous radiation levels following the nuclear disaster.

Organize students into groups of 3–4 and give each group one copy of prepared **Chernobyl Card Sort** sets. Tell students not to open their set until you finish sharing the procedures for the activity.

Display **slide 19** and introduce the [Card Sort](#) strategy. Tell students that the cards represent a simplified version of the environmental event that occurred in the area surrounding the Chernobyl plant. Share that this event impacted migrating birds that lived in that area. Ask students to organize the cards into two categories: characteristics of the bird population before the meltdown and characteristics of the bird population after the meltdown.

Allow students time to organize their cards. Transition through **slides 20–23** to show students to correct card organization.

Display **slide 24** and encourage students to reflect on the following prompts:

- How did you decide the placement of the cards?
- Because birds migrate, how do you think migrating birds from Chernobyl affected other bird populations?
- Can environmental factors impact a population? How do you know?

Invite students to share out their thoughts and facilitate a whole-class discussion.

10 minutes

Explain

Display **slide 25** and give each student one copy of the attached **Biomes and Animal Adaptations** handout. Tell students that as they watch the video [Biomes and Animal Adaptations](#), they should respond to the following three questions on the handout:

1. How do environmental factors affect where a species can survive?
2. What is an example from the video of a specialized characteristic that increases an organism's chance of survival?
3. Describe an example of a specialized characteristic that was not shown in the video.

Play the video on **slide 26** and have students quietly respond to the questions on the handout. After the video, allow students a moment to finish their responses, then invite volunteers to share out.

30 minutes

Extend

Organize students into groups of four. Display **slide 27** and give each student one copy of the attached **The Great Plant Discovery** handout. Inform students that they should act as a team of botanists who have encountered a new species of plant. Ask students to use the handout to determine the characteristics of their plants.

Give each group one sheet of easel paper. Tell students that they should add the name of their plant, a drawing, and label the characteristics of their plant to the paper.

Teacher's Note: Labeling Posters

Consider labeling each easel paper with a number to help groups identify posters.

Allow students time to complete their posters then have students display them around the room. Invite each group to share the characteristics of their plant with the whole class.

Leave the posters on display and pass out one copy of the attached **Plant vs. Biome** handout to each student. Display **slide 28** and have students write the type of environment displayed on the slide in the left column of the handout. Then, have student groups discuss which group's plant would best survive in this type of environment. Have them record the result of their discussion in the middle column of the handout along with a justification of their choice in the right column.

Repeat this process for **slides 29–32**.

Teacher's Note: Reflective Questions

Consider asking the following questions to engage students in deeper reflection:

- What specific characteristics of the plant your group chose lead you to believe that it can survive in this environment?
- Do you think that any of the class's plant species would survive in this environment?
- What are some characteristics that would help a plant survive in this environment?
- Do you think this plant species requires a lot of rain?

Optional Caption This Activity

If you would prefer an alternative to the Great Plant Discovery activity, consider using the [Caption This](#) instructional strategy to engage students in a reflection of the lesson. Give each student one copy of the attached **Caption This** handout and have them use the strategy and the handout to demonstrate what they learned during this lesson. Have students select an organism, draw the organism on the handout, and identify five characteristics of their selected organism.

15 minutes

Evaluate

Move to **slide 33** and introduce the [I Think / We Think](#) strategy. Give each student one copy of the attached **I Think, We Think** handout. Have students first record their individual responses to the following questions on the slide in the left column of the handout:

- How do the specialized characteristics of your organism influence its growth and survival in the shown environments?
- What makes an organism successful?
- Choose an environment your species wouldn't normally survive in. What mutation would your organism have to develop for it to survive in that environment?

After students have individually responded to each question, display **slide 34** and organize students into pairs. Start the [3-minute timer](#). Have pairs discuss their responses to the questions with each other and record their common responses in the right column. If time permits, invite each pair to share out their responses.

Resources

K20 Center. (n.d.). Caption this. Strategies. <https://learn.k20center.ou.edu/strategy/82>

K20 Center. (n.d.). Card sort. Strategies. <https://learn.k20center.ou.edu/strategy/147>

K20 Center. (n.d.). Elbow partners. Strategies. <https://learn.k20center.ou.edu/strategy/116>

K20 Center. (n.d.). I think / we think. Strategies. <https://learn.k20center.ou.edu/strategy/141>

K20 Center. (n.d.). Justified true or false. Strategies. <https://learn.k20center.ou.edu/strategy/174>

K20 Center. (2021, September 21). *K20 Center 3 minute timer* [Video]. YouTube.

<https://www.youtube.com/watch?v=iISP02KPau0>

Natural User Interface Technologies (NUI TEQ) Chorus Educational K-12 Content. (2023, April 25). *Biomes and animal adaptations* [Video]. YouTube. <https://www.youtube.com/watch?v=ImQz1dVscR0&t=194s>