Lesson Topic: Biodiversity and Humans

Objective:
Students will be able to:

1. Define biodiversity and describe how biodiversity is used to evaluate the health of an ecosystem.
2. Give examples of positive and negative effects of humans on biodiversity and ecosystems.
3. Provide examples of solutions to minimize negative human impacts on biodiversity.
4. Discuss effects on humans from negative changes in biodiversity and ecosystem health.

Time Required: 90 minutes

Materials Needed:

- Plastic water bottle, empty frozen food cardboard box, shredded paper, sheets of paper with printing on one side, plastic grocery bag
- Table to display household waste where it can be viewed by students.
- Two signs (Write “recyclable” on one sign and “not recyclable” on the second sign.)

Teacher Preparation:

- Assign a Legends of Learning Quick Play list for the day(s) you will be presenting the lesson.
    - Instructional – Middle School – Biodiversity and Humans
- Assign a Legends of Learning Quick Play list for the day(s) you will be presenting the lesson.
    - Concept Review – Middle School – Biodiversity and Humans
- Make copies of the Biodiversity and Humans worksheet. (1 per student)
- Arrange household waste display where students can view it.
- Hang the two signs in different corners of the classroom.

Engage (20 minutes):

1. Point out the two corners and the labeled signs, then draw students’ attention to the trash display.
2. Explain to students that they will need to decide whether the item presented is recyclable in-home waste collection.
3. They will indicate their choice by moving to the corner with the sign that matches their opinion.
4. Hold up each item and ask the students if they believe the item can be recycled.
    a. Plastic water bottle (yes)
    b. Empty frozen food cardboard box (no, frozen food packaging is treated with a protective coating)
    c. Shredded paper (no, the small pieces can jam machines)
    d. Printer paper (yes)
    e. Plastic grocery bag (no, plastic bags can also jam machines)

Source: Our Everyday Life

5. Explain to students why some of the items are not currently recyclable.
6. Ask students why recycling is important.
    a. Highlight and expand on concepts involving ecosystem protection.
7. Show Plastic Ocean video.
    a. Have the students write down 5 facts from the video.
    b. After the video, ask students to share some of their facts.
    c. Ask the students to define biodiversity if they have not already done so.
    d. Write the word biodiversity and its definition on the whiteboard or interactive whiteboard. (Biodiversity – the variety of species found on Earth in both the land and water)
8. Explain to students that the loss of biodiversity through human actions, such as pollution, threatens global ecosystems and human life.

Explore (30 minutes):

1. Have students sign into Legends of Learning and complete the Instructional playlist.
2. As students complete the assigned games, they will complete the Humans and Biodiversity worksheet.
3. Circulate as students work through the playlist and complete the worksheet. Listen for evidence of understanding and use this opportunity to correct any misconceptions.

Explain (20 minutes):

1. Review the answers to the Humans and Biodiversity worksheet by drawing a labeled two-column chart on the board reflective of the one on the worksheet.
    a. Ask for student volunteers to help place the information from the worksheet in the correct columns to show evidence of understanding positive and negative human impacts on biodiversity.
2. Relate student knowledge to the sorting activity at the beginning of class and the video on ocean ecosystem destruction.
    a. How does recycling material reduce damage to biodiversity? (reduces pollution, conserves resources, reduces the use of fossil fuels)
    b. What is biodiversity an indicator of in an ecosystem? (overall health, stability)
    c. What are some examples of materials essential to human life that depend on healthy ecosystems? (plants that provide medications, food supplies, clean water, clean air, unknown future resources)
    d. What are some examples of human activities that lead to a loss of biodiversity? (pollution, burning fossil fuels, deforestation, overpopulation, intensive farming)
    e. What are some examples of natural activities that lead to changes in biodiversity? (floods, fires, earthquakes, volcanic eruptions)
    f. What is the difference between a renewable and a nonrenewable resource? (renewable has a nearly unlimited supply, nonrenewable has a limited supply)
    g. What are some activities that humans can do to reduce loss of biodiversity and protect ecosystems? (recycle, reuse materials, reduce waste, solar power, wind power, renewable energy sources, pollution control, conservation farming)

Elaborate (5 minutes):

1. Explain to students that certain human activities threaten biodiversity, but humans can take measures to minimize the negative impact on biodiversity.
2. Biodiversity loss is an indicator of ecosystem damage. Remind students that humans are dependent on many different ecosystems for survival.
3. Show the Endangered video, which is a commentary on the many endangered species that are not widely recognized as endangered.
    a. Ask students why it is important that all endangered species be protected. (Biodiversity is essential to survival.)

Evaluate (15 minutes):

1. Have students sign into Legends of Learning and complete the Content Review quickplay list.
2. Analyze student results to access topics for reteaching.

Additional Lesson Strategies:

- To use Legends for additional instruction, create a custom playlist with an instructional game and pre and post assessment.
- To use Legends for a quick formative assessment, create a 5-question assessment in a playlist.
- To use Legends for a student-directed experience, create a targeted freeplay playlist.
- Encourage students to play on their own at home in Legends of Learning: Awakening for a student-driven experience including avatars, battling, and quests all centered around topics they are covering in class.

Humans and Biodiversity

Name:_____

While playing the instructional games in Legends of Learning, sort the information below into the correct column based on whether the action has a positive or negative impact on humans and biodiversity.

Positive Effect	Negative Effect

Water Conservation *Deforestation* *Recycling programs*

Single-use Plastics *Fossil Fuels* *Sustainable fishing*

Soil Erosion *Population Increases* *Conservation Farming*

Renewable Energy Sources *Planting Trees* *Composting Food Waste*

Organic Fertilizers *Species Extinction* *Resource Depletion*

Answer Key

Humans and Biodiversity

Name:_____

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Renewable energy sources	Population increases
Planting trees	Species Extinction
Composting food waste	Resource depletion
Organic fertilizers	

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Renewable Energy Sources *Planting Trees* *Composting Food Waste*

Organic Fertilizers *Species Extinction* *Resource Depletion*