THE DALLAS WORLD AQUARIUM

Post-Field Trip Lesson Plan: Biodegradation Lineup

Goal: Students will discover how long various items take to biodegrade and will better understand the impact of reducing, reusing, and recycling.

Objectives: Students will work together as a class to form a correct timeline of marine debris biodegradation.

Students will come up with three actions to help reduce marine debris in our oceans.

Science TEKS: 6th Grade – 6.3.A, 6.3.B, 6.3.C

(3) Scientific and engineering practices. The student develops evidence-based explanations and communicates findings, conclusions, and proposed solutions. The student is expected to:

(A) develop explanations and propose solutions supported by data and models and consistent with scientific ideas, principles, and theories;
(B) communicate explanations and solutions individually and collaboratively in a variety of settings and formats; and
(C) engage respectfully in scientific argumentation using applied scientific explanations and empirical evidence.

7th Grade – 7.3.A, 7.3.B, 7.3.C

(3) Scientific and engineering practices. The student develops evidence-based explanations and communicates findings, conclusions, and proposed solutions. The student is expected to:

(A) develop explanations and propose solutions supported by data and models and consistent with scientific ideas, principles, and theories;
(B) communicate explanations and solutions individually and collaboratively in a variety of settings and formats; and
(C) engage respectfully in scientific argumentation using applied scientific explanations and empirical evidence.

8th Grade – 8.3.A, 8.3.B, 8.3.C

(3) Scientific and engineering practices. The student develops evidence-based explanations and communicates findings, conclusions, and proposed solutions. The student is expected to:

(A) develop explanations and propose solutions supported by data and models and consistent with scientific ideas, principles, and theories;

(B) communicate explanations and solutions individually and collaboratively in a variety of settings and formats; and

(C) engage respectfully in scientific argumentation using applied scientific explanations and empirical evidence.

Materials:

"Marine Debris"

- Newspaper
- Nylon fabric
- Aluminum can
- Plastic bottle
- Glass bottle
- Cereal box
- Tin can
- Plastic Straw
- Disposable diaper
- Cigarette butts
- Plastic bag
- Styrofoam cup
- Drink holder
- Fishing line (monofilament)
- Biodegradation Timeline Answer Cards
- Conservation Actions worksheet

Introduction/ Background:

1. Ask the students if they can explain what MARINE DEBRIS is. Listen to their answers. Help the students come up with a definition such as "garbage in a waterway such as an ocean".

2. Ask the students if they can explain what BIODEGRADATION is. Listen to their answers. Help the students come up with a definition such as "a natural breakdown of material over time".

3. Explain to the students that different materials take different lengths of time to biodegrade. Some items break down quickly while others take many, many years. Tell the students that they will do an activity to get a better understanding of how long different items take to biodegrade.

Directions:

1. Set out the 14 "marine debris" items in a pile on a table at the front of the classroom. Explain that these items represent common pieces of marine debris found in the ocean.

2. Ask for 14 volunteers. Invite each volunteer to take and hold one item of "marine debris" and await further instruction.

3. Explain that the students with the marine debris will be creating a timeline. On one end of the line are the items that don't take long to biodegrade. On the other end, items that take a long time to biodegrade.

4. Ask the students to look at the marine debris and to put themselves in line according to how long it takes for the items to biodegrade. Explain that the far left (facing the seated students) is for the items that biodegrade the fastest. The far right should end up with the items that take longest to biodegrade. Allow time for the volunteers to get in order and create their timeline.

5. Start at the first and second marine debris items in the line (the items the students believe would biodegrade the fastest). Ask the class to compare this item with the second item in line.

6. Ask the seated students whether they believe the first item would biodegrade faster than the second. Ask them to raise their hands if they do. Then ask if the second item would biodegrade faster than the first. Have them raise their hands if they do.

7. After the vote, hand an answer card to each of the two students holding the first two items. The answer cards show how long it actually takes for the different items to biodegrade.

8. Have the students holding the two items and answer cards to stand in the correct order. They may have been correct, in which case, they do not need to move.

9. Move to the third item in line. Repeat the vote to discover if the class believes this item takes longer to biodegrade than the second item in line. Again, share the answer cards and have the students holding the marine debris move positions if they were out of order.

10. Repeat the process with each item in the timeline. At the end, the timeline should be in correct order, with volunteer students holding their piece of marine debris and corresponding answer card.

11. Collect the marine debris items and answer cards, thank the students for volunteering, and have them return to their desks.

Wrap-Up/ Discussion

1. Ask the students if they were surprised by how long it took for certain items to biodegrade. Invite them to share examples of anything particularly surprising.

2. Explain that marine debris has become a big problem. Invite the students to describe ways in which marine debris can be harmful.

Example answers: Animals or corals/sea plants can become entangled, pollutants such as oil can impact the lungs and coats of animals living in the water, and ingested marine debris items can make animals sick.

3. Tell the students that they all can make a difference for the oceans and ocean inhabitants. While "saving the Earth" can seem overwhelming, there are simple ways in which we can help and make a difference. If ONE action can impact ONE animal, it is helpful. Small actions by many people can lead to positive large-scale changes.

4. Ask the students to share ways in which they already reuse, reduce, and recycle in their daily lives. Praise and encourage their responses. These actions make a difference.

5. Distribute the Conservation Actions worksheet. Ask the students to complete the worksheet by sharing three ways in which they feel they can help in conservation efforts. When the students are finished, collect the worksheets.

Assessment:

Comprehension of concepts will be evaluated based on observations of the students during the biodegradation timeline activity, participation in lesson discussion, as well as the responses on the Conservation Actions worksheet.

Modifications:

- For students with visual impairment, be very descriptive when explaining what is happening during the biodegradation timeline activity so it is easy to follow. You can also have the students share their answers to the Conservation Actions worksheet orally.

Extension Activity:

The Importance of Rainforests activity

Students will recognize the importance of the rainforests through searching their homes for items that are made from rainforest products. As homework, the students will look for the items on the list and mark where they were seen in the home. *Worksheet included.*