Marine Biodegradable Timeline Activity

OVERVIEW Students will define decomposition and biodegradation, identify marine debris that is biodegradable, put debris items in order of their decomposition rate. Identify and talk about petroleum based plastics and how they never really leave the environment.

LEARNING OBJECTIVES Following completion of this lesson, the students will be able to:

- Describe the impact of marine debris on the plants and animals in the Salish Sea.
- Explain what the term "biodegrade" means, and generally describe how the process works.
- List 2-3 activities they can do to prevent debris from accumulating in the marine environment.
- Describe the importance of treating the beach and Salish sea as the "home" of plants and animals and how to maintain a healthy environment through beach clean-up and other activities.

GRADE LEVELS

2nd - 12th grades

SCIENCE STANDARDS THAT RELATE TO THIS ACTIVITY

1. Life Sciences (Interdependent relationships in ecosystems; 5-LS2-1 Ecosystems: Interactions, energy and Dynamics)
2. Earth and Space Sciences (Human Impact, Human Sustainability; 5-ESS3 Earth and Human Activity).

SCHOOL GROUP PRE-FIELD TRIP WORK

1. Please go through Vocabulary and Concepts list with students prior to the visit. (list included on the last page of this document)

MATERIALS

- Marine debris
- Rope with timeline markers
- Marine biodegradable timeline poster

PREPARATION

Have the Timeline rope laid out before the students arrive

ACTIVITY

1. Meet all attendees and introduce yourself. Have students/adults get in a circle. Provide an overview of the activities they will experience.
2. Ask Some Questions:
   Do you know what marine debris is? Do you know how to define biodegradable? Do you know what it means for something to decay? This gives you an opportunity to gauge what they know already and allows you to fill in the blanks.
3. Discuss the following
   a. Define terms: marine debris –-explain that it is "garbage" in the oceans and near shore; biodegrade;
   b. Plastics, types of plastic and why they do not break down
   c. Provide some interesting facts--
      i. 80% of debris comes from the land
      ii. 20 percent from the water (fishing and boating activities)
      iii. 8.8 million tons of plastic goes into the ocean each year.
   d. Describe different types of debris and the breakdown process.

    e. Describe how the debris impacts plant and animal life. Give examples for 2-3 species. Ask for examples from group (or do this at end).
4. Explain the activity-
    a. that we are creating a visual time line of how long it may take for debris to degrade.
    b. they will go to the rope and stand next to the marker that they think is the length of time it will take for the debris to biodegrade.
5. Give each student a piece of marine debris. Ask students to look at their card/object and think about what it is made of and now long they think it will take for it to degrade. Ask them how their object may harm marine life
6. Ask students to go to the space along the rope that reflects how long they think it will take for their object to degrade.
7. After everyone has a space along the rope…and if there are misplaced items/debris, provide the data so that 3-4 are correctly placed along the time line. Praise students for getting it right and help those to "get theirs right". Continue to everyone is correctly placed.
8. Have the students help you summarize what you see, where they are placed. Ask questions like What decomposes the quickest? What might never decompose? What item surprised you the most? Ask for examples on how the debris would harm sea life.
9. Final Summary—Be sure to do final summary of what was discussed. Provide 3-4 take away points of what they can do!
    a. Ask the students to think about what they could do to:
        i. Prevent Marine debris
        ii. Remove Marine debris to protect plants and animals.
        iii. Recycle plastics and all other recyclables
        iv. Use less plastic

Volunteers: Remember to put kits away neatly and to log your hours under WSP - Whidbey Central/South - E&O, Fort Casey Environmental talk/tour

~Thank you

*http://www.nextgenscience.org/search-standards?keys=&tid%5B%5D=102&tid_3%5B%5D=94

Resources https://marinedebris.noaa.gov/activities-and-curricula

Developed by SWS CEO committee 1/2017

VOCABULARY/CONCEPTS LIST

Biodegradable –Pertaining to substances that can decompose in a natural environment, as opposed to non-biodegradable materials like petroleum based plastic.

Decay –The state of being reduced into original elements, (of organic matter) rot or decompose through the action of bacteria and fungi.

Petroleum based plastics – Plastics, also called polymers, are produced by the conversion of natural products or by the synthesis from primary chemicals generally coming from oil, natural gas, or coal. Petroleum based plastics do not biodegrade. They do degrade, but only into smaller and smaller pieces becoming micro plastic. https://plastics.americanchemistry.com/How-Plastics-Are-Made/

Plant based plastics – Bioplastics are made from natural materials such as corn starch. Most bioplastics are compostable: they decay into natural materials that blend harmlessly with soil. Some bioplastics can break down in a matter of weeks some take much longer and must be composted in an industrial compost facility. Not all bioplastics are 100% petroleum free.

Marine Debris –any trash that is found in the marine environment

Inorganic material - matter not having the structure or organization characteristic of living bodies

Organic matter - matter that has come from a recently living organism, is capable of decay, or the product of decay

ONLINE RESOURCES

NOAA Marine Debris Program: https://marinedebris.noaa.gov/

World Ocean Review: http://worldoceanreview.com/en/wor-1/pollution/litter/

VIDEOS

"A Plastic Ocean"

"Invisible Ocean: Plankton & Plastic"
https://youtu.be/svPaTOjtxJ8