

What is the impact of beach litter?

BACKGROUND

Although marine debris is a major pollution problem of the 21st century, it is a solvable problem. Beach litter can be comprised of marine debris that has been washed ashore, or it can be deposited along the coast by inland storms or human activities. Understanding the causes and effects of beach litter helps us to make environmentally responsible decisions with waste. As we consider the impacts of beach litter, there are a number of ways of visualizing those changes.

Objectives: In this activity, students will construct a web of things that may increase or decrease as a result of beach litter.

After completing this activity, students will be able to:

- List and explain many potential impacts of beach litter.
- Discuss various interpretations of the possible debris impacts.

Materials: Blank wall, bulletin board or a few large tables pushed together
1 per group

Tape or push pins if using a blank wall or board
50-75 per group

1 card labeled “BEACH LITTER”
1 per group

40 cards labeled “MORE” on one side and “LESS” on the other side
1 set per group

35-40 scientific and social impact cards
1 set per group

Subject/Grades Levels: Environmental Science/Grades 5-12 and adult learners

Time required: 1 class period



TEACHER'S NOTES

- Because of space, this activity can be done as a whole class or in large groups (i.e., 3 groups of 10 students in a class of 30). If used with small groups, impact cards and MORE/LESS words can be put on 3 X 5 note cards or small pieces of paper. This avoids the problem of students having to wait for their turn at the table/board, and it also results in many different maps that can be compared in group discussion.
- Use one color paper for the MORE/LESS words and another color for the impact cards.
- While a variety of impact items are provided, feel free to add other scientific and social impacts as appropriate.
- Materials can be laminated for continuous use.

ALIGNMENT

Next Generation Science Standards (for grade 5, middle school and high school):

Disciplinary Core Idea ESS3.C Human Impacts on Earth Systems

Crosscutting Concept CC2 Cause and Effect

Great Lakes Literacy Principles:

#6b,e,f: The Great Lakes and humans in their watershed are inextricably interconnected.

#8f: The Great Lakes are socially, economically and environmentally significant to the region, the nation and the planet.

This activity can be used at various stages of a unit. For instance, it can introduce a new topic and relate it to previous ones or it can be a culminating activity to draw all aspects of a study together.

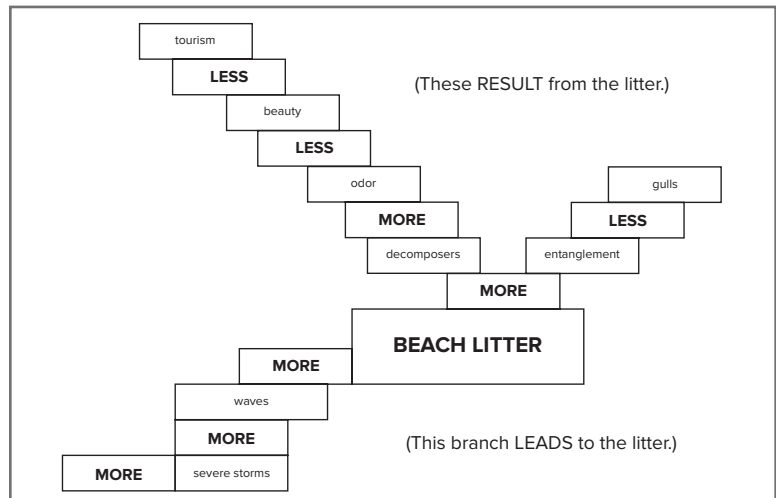
ENGAGE

Pose to and discuss with students the following broad questions: How does litter get onto a beach? What do you think the most common type of litter on a beach is? What is the most interesting piece of litter you have ever seen wash ashore on a beach? Have you ever picked up litter on a beach?

This activity can be done on a beach. You may want to make cards using heavier tag board or use rocks to help hold cards in place so they do not blow away. Remember to remove any materials from the beach when you are finished.

EXPLORE

1. Determine whether the activity will be done as a whole class or in large groups.
2. Assemble materials by placing the MORE/ LESS cards in a pile and spreading out the impact cards. Place the BEACH LITTER label in the center of a large table or board.
3. Invite students to come forward one at a time to select an impact card which is a direct result of a previously placed card. They should then select either MORE or LESS as a connector between the two impacts and place them in the web to show a sequence of events. For example, the first student may decide that BEACH LITTER (center card) leads to MORE ENTANGLEMENT or that WAVES (impact card) cause MORE BEACH LITTER. Students must be able to justify the position of the cards they add and their choices of MORE or LESS impact.

**EXPLAIN**

4. As students use these cards, it will become apparent that there are various interpretations of the impacts. Lead the class in a discussion of all interpretations.
5. If there are multiple groups completing the activity simultaneously, have groups prepare a written or oral presentation of their maps, analyzing the thinking about interrelationships that produced the array.

EXTEND

Lead a class discussion about additional impact cards that could be added to the web.

Lead a class discussion identifying the factors that have an economic impact attached to them. For example, *less tourism* or *more severe storms* might suggest a loss of revenue or increase in expenses.

Have students access the Ocean Trash Index in *Working for Clean Beaches and Clean Water*, the Ocean Conservancy's report summarizing data from the 2012 International Coastal Cleanup. Have them use Excel or other graphing software to create a pie chart that depicts the Top Ten Things Found as percentage values.

<http://www.oceanconservancy.org/our-work/international-coastal-cleanup/icc-2013-report.pdf>

Participate in a beach cleanup and record data about the items collected. Compare your data with those reported by the Ocean Conservancy. Are your top ten items collected similar to those in the Ocean Trash Index?

EVALUATE

A suggested way to use this activity is as a pre- and post-assessment for a unit. Have students construct the web prior to any discussion or activities and then again after learning. Students can take a picture of the concept map created at the beginning of a unit and compare it with the map produced at the end.

Sample evaluation questions

1. Select a chain of at least eight cards. Diagram the chain and give a possible explanation for the links illustrated. Then, trade chains with a partner and have them add two or three additional links.
2. List and discuss potential scientific and social factors which may be affected by beach litter.

ADDITIONAL RESOURCES

The Alliance for the Great Lakes (www.greatlakes.org) facilitates Adopt-a-Beach™ clean-up programs across the Great Lakes.

The Ocean Conservancy facilitates the International Coastal Cleanup, a unified global effort to clean up marine debris, every September. Access past years' data and find out more about participating at www.oceanconservancy.org.

REFERENCES

Ocean Conservancy. 2013. International Coastal Cleanup: Working for Clean Beaches and Clean Water. Available online at <http://www.oceanconservancy.org/our-work/international-coastal-cleanup/2013-trash-free-seas-report.pdf>

BEACH LITTER

MORE

LESS

MORE

LESS

LESS

MORE

LESS

MORE

shipping

odor

**biological
diversity**

severe storms

shoes

flooding

recreation

**water
pollution**

smoking

**longshore
current**

gulls

beauty

recycling

**shoreline
development**

oxygen

lake levels

**lakefront
property**

rain

injuries

disease

biodegradation

**combined
sewer overflow**

decomposers

entanglement

people

sun

waves

cooperation

fish

law

ugliness

debate

plastic

tourism

water

swimming

boating

runoff

fishing