

HOW MUCH GARBAGE IS THAT?!

GRADES 6-12

This activity was designed as a companion for the music video “Isle of Plastic.”

BACKGROUND

The Great Pacific Garbage Patch (GPGP) is a mass of accumulated trash in the Pacific Ocean, between California and Hawaii. The garbage patch was created by trash being carried by the North Pacific Subtropical Gyre, a circular ocean current formed by the Earth’s wind patterns and rotation. The circular motion draws in debris to the calm center of the gyre, trapping the debris there. Garbage accumulates, as much of it is not biodegradable; instead, it just breaks into smaller and smaller pieces. This is why the Great Pacific Garbage Patch is not viewable from space: many of the microplastics found in the patch can’t be seen by the naked eye. This also means it’s difficult to determine the true concentrated area of the plastics. Estimates range from 700,000 km² to 15,000,000 km² (http://www.ourmanly.com.au/Lifestyle/garbage_patch.aspx) with a weight of 3.5 million tons. There are five major subtropical oceanic gyres: the North and South Atlantic Subtropical Gyres, the North and South Pacific Subtropical Gyres, and the Indian Ocean Subtropical Gyre.

Plastic is a product derived from petroleum, a valuable, non-renewable resource. Plastic packaging offers both costs and benefits to the economy, our health, and the environment. While plastic is flexible, lightweight, convenient and cheap, it creates pollution, uses a high amount of energy in its production, and can migrate into food. Contrary to popular belief, plastic is not recycled into another similar product (e.g., a recycled Coke bottle doesn’t become a ‘new’ Coke bottle). The processing of used plastics costs more than making new plastic, which can often lead companies toward using new plastic. The following activity will help students comprehend the extensiveness - the size and weight - of the garbage in the Great Pacific Garbage Patch.

MATERIALS

Calculator

Any photos the teacher finds helpful

TEACHER PREPARATION

Determine weight equivalents of various objects, such as the 747 airplane and school bus (see Weight Equivalents chart at right).

Example:

7 billion pounds of plastic in GPGP /19,000 pounds (per school bus) = ~3,684,210 school buses

Similarly, determine how many “Iowas” the garbage would cover. Have fun with this! For instance, look up the size of your school district, county, and county seat for close-to-home comparisons.

INSTRUCTIONS

1. After watching the Isle of Plastic music video, show students a picture of the Great Pacific Garbage Patch region in the Pacific Ocean, such as the photo below. Explain how the currents in the Pacific Ocean circulate.
2. Recall from the song that the Garbage Patch between the continental United States and Hawaii is 3.5 million tons. Discuss this amount of weight in relationship to common objects and the previously calculated equivalents. Depending on your class, you can have them do these calculations individually or together as a class.

WEIGHT EQUIVALENTS

Estimated Area of GPGP: 22,000 mi²

Area of Iowa: 56,270 mi²

Area of the Mall of America: 0.25 mi²

Area of the Iowa State Fair: 0.7 mi²

Area of Des Moines: 83 mi²

1 ton=2,000 pounds

3.5 million tons=7 billion pounds

Weight of an empty 747 airplane:

358,000 pounds

Weight of an empty school bus: 19,000 pounds

Weight of a John Deere combine:

8,930 pounds

Weight of a basketball: 1.5 pounds

Weight of a horse: 1,100 pounds

