

3RD > 5TH
GRADE

LESSON PLANS

THE POWER OF RECYCLING GRAPH

LEARNING OUTCOMES

Complete a pre-assessment T/F quiz.

Watch video about how plastics are made <https://www.youtube.com/watch?v=lwdUwffecsM> (9 minutes)

Record personal recycling data for 5 days.

Analyze and measure personal data onto a graph using open source software like Desmos.

Reflect on choices and write goals for the future and make corrections to pre-assessment T/F quiz.

TIME REQUIRED FOR LESSON: 1 twenty-five minute class to introduce & 1 50 minute period to make graphs & analyze

BIG IDEA

Students will gain an understanding of how and why recycling helps our environment while recording and comparing conscious choices they are personally making while setting goals for the future.

BACKGROUND

Phytoplankton are an essential organism in our world's aquatic ecosystems as they are the foundation of ocean and freshwater webs of life. Micro-plastics are flooding into our watersheds and oceans at alarming rates. In some areas of the ocean, there are more micro-plastics than there are phytoplankton. Fish mistake the micro-plastics for phytoplankton, eating them and introducing plastic pollution at the base of the aquatic food web. Larger and larger fish and mammals are being found with alarming amounts of plastic in their digestive tracks as more plastic finds its way into our waterways. If we recycle more of our plastic, we can keep it out of our water and away from living systems.

One of the most challenging parts of trying to clean up micro-plastics is its size. Larger pieces of plastic break down into tiny particles over time from exposure to sun, water and air. These particles float in the great oceanic currents known as gyres and get trapped in giant patches of garbage and waste, some estimated to be the size of Texas.

Level 1 of the Oceanic Scales puzzle game app is dedicated to cleaning up plastic and oil based waste from our oceans.

ESSENTIAL QUESTIONS

What is plastic made from?

Why is it so important to conserve fossil fuels?

How do our recycling choices affect phytoplankton?

MATERIALS/SOURCES

- T/F quiz - (PDF here)
- plastics video - <https://www.youtube.com/watch?v=lwdUwffecsM>
- personal recycling data chart and reflection
- Computer and [Desmos](#) software OR
- graph paper, markers/colored pencils, ruler

ACTIVITIES

ENGAGE

Students will begin by taking a short T/F quiz as a preview to the information they will be learning. It is highly encouraged for the teacher to read aloud each question to encourage vocabulary connections. They will then watch the video about recycling.

DISCUSS/EXPLORE

Students will be introduced to the week long homework assignment (preferably beginning Monday and ending Friday) which asks them to record the amount of single use plastic they use each day and whether they recycled it or not. Teacher should check in with students each day to make sure there is follow through.

SHARE/EVALUATE/REFLECT

After students have collected their data for a number of days, allow them to review the types of graphs they are familiar with and introduce them to [Desmos](#) (free, open source software). They will choose a type of graph they think best highlights their data collected (a double bar graph would work well). [Desmos](#) gives the option for student feedback so they can see lots of different strategies for visualizing their data. Students can also use a ruler and graph paper to illustrate their data. They should then answer the reflection questions after they have made their graphs. Teacher can conclude the lesson by facilitating a conversation about each statement on the T/F quiz and asking students to share their personal goals to maximize recycling potential.

EXTENSIONS

There are infinite directions to go from here. Students could:

- Create a class graph to compare lifestyle choices while finding the minimum, maximum, range, mode, median, and mean.
- Participate in the plastic purge!
http://www.rodalewellness.com/health/28-day-plastic-purge-challenge#_a5y_p=4266989

CONNECTIONS TO STANDARDS**3rd Grade:**

- NGSS. 3-LS2-1 Cause and effect relationships are routinely identified and used to explain change.
- NGSS. 3-ESS2-1 Represent data in tables and various graphical displays (bar graphs and pictographs) to reveal patterns that indicate relationships.
- CCSS.ELA-LITERACY.W.3.2.D Provide a concluding statement or section.
- CCSS.ELA-LITERACY.W.3.8 Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories.
- CCSS.MATH.CONTENT.3.MD.B.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs.

4th Grade:

- NGSS. 4-ESS2-2 Analyze and interpret data to make sense of phenomena using logical reasoning.
- CCSS.ELA-LITERACY.W.4.2.E Provide a concluding statement or section related to the information or explanation presented.
- CCSS.ELA-LITERACY.W.4.8 Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.
- CCSS.ELA-LITERACY.SL.4.5 Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes.

5th Grade:

- NGSS. 5-ESS1-2 Represent data in graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships
- CCSS.ELA-LITERACY.SL.5.5 Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes..
- CCSS.ELA-LITERACY.W.5.2.E Provide a concluding statement or section related to the information or explanation presented.