

LESSON PLANS

LESSON #1: THE INVISIBLE WORLD OF PLANKTON

3RD > 5TH
GRADE

LEARNING OUTCOMES

Complete a pre-assessment T/F quiz.

Listen to the book, [Ocean Sunlight: How Tiny Plants Feed the Seas by Molly Bang and Penny Chisholm](#).

Watch "[Secret Life of Plankton](#)" video.

Explore [Plankton Chronicles website](#) and sketch inspiring plankton focusing on form and line.

Create translucent class mural "The Invisible World of Plankton".

Reflect on pre-assessment T/F and correct wrong answers.

TIME REQUIRED FOR LESSON: 1 eighty minute period or 2 forty minute periods

BIG IDEA

Students will gain new understanding, appreciation and emotional connections to phytoplankton by making the invisible visible through a series of lesson plans and interactive puzzle game experiences.

BACKGROUND

Phytoplankton are an essential organism in our worlds aquatic ecosystems. They are the base of the ocean and freshwater webs of life. They absorb up to half of our worlds CO₂ and create almost half of our worlds fresh oxygen on a daily basis. Human beings have an impact on this otherwise invisible organism, through the daily choices that they make such as polluting our water with plastic and oil and our air with carbon. These organisms have a direct impact on humanities ability to thrive by providing us with the air that we breathe and the food that we eat.

You can help us build a more informed FUTURE TOGETHER as Climate Change, Healthy Oceans & Waterways, and Sustainability become some of the most pressing issues of our time. The University of Maine in collaboration with the University of California Santa Cruz have created an innovative Art & Science multimedia exhibit / puzzle to educate and engage our communities across the country. This timely and unique mobile system is called [Oceanic Scales](#).

ESSENTIAL QUESTIONS

What are phytoplankton?

What do they look like?

Why are they important to us?

MATERIALS/SOURCES

- T/F quiz (PDF here)
- Book: [Ocean Sunlight - How Tiny Plants Feed the Seas by Molly Bang and Penny Chisholm](#)
- Video: http://www.ted.com/talks/the_secret_life_of_plankton
- Website: <http://planktonchronicles.org>
- Materials: fine black sharpies (preferably) and/or markers, overhead film projector paper (cut into 4 pieces each, around index card size)

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. Students will watch a short video (6 min) called “The Secret Life of Plankton”. This video visually examines the bizarre and fascinating invisible phytoplankton through a high powered microscope.

DISCUSS/EXPLORE

Students will work individually or in partners to explore the Plankton Chronicles website and choose 2-3 images of plankton to sketch in line drawing form on transparent film with sharpie.

SHARE/EVALUATE/REFLECT

Students will compile their plankton drawings in a mural, either on a window or on butcher paper. Students will re-evaluate their T/F quiz in the post-assessment column. Teacher will facilitate a conversation about each statement and ask students to think-pair-share the proof they learned during the lesson.

EXTENSIONS

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

- Look for plankton in water samples through a microscope, use model magic to build plankton sculptures
- Build their own 3-D plankton forms in [Google Sketch-up](#) on computers or [123D Sculpt+](#) on I pads
- Plot a bar graph from data collected or play the carbon cycle online game here: http://www.windows2universe.org/earth/climate/carbon_cycle.html
- Role play the motion based on their carbon atom’s story of movement, split up to research deeper into fossil fuels, global warming, or climate change focus on human impact and choices.

CONNECTIONS TO STANDARDS

3rd Grade:

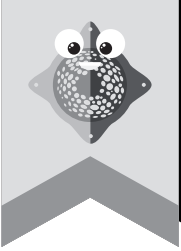
- NGSS.3-PS2-1 Science investigations use a variety of methods, tools, and techniques.
- NGSS.3-ESS3-1 Science affects everyday life.
- CCSS.ELA-LITERACY.RI.3.7 Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur)

4th Grade:

- NGSS.4-PS3-4 Science affects everyday life.
- NGSS.4-LS1-1, 4-LS1-2 A system can be described in terms of its components and their interactions.
- CCSS.ELA-LITERACY.RI.4.7 Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.
- 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-LS2.A, LS2-1 Interdependent Relationships in Ecosystems: A system can be described in terms of its components and their interactions.
- NGSS.5-ESS1-1 Natural objects exist from the very small to the immensely large.
- NGSS.5-ESS2-1 A system can be described in terms of its components and their interactions.
- CCSS.ELA-LITERACY.RI.5.9 Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.



THE INVISIBLE WORLD OF PHYTOPLANKTON

NAME _____



TAKE A GUESS AT THESE PHYTOPLANKTON FACTS - TRUE OR FALSE?

- Everything is connected!
- Humans breathe in oxygen and breathe out carbon dioxide.
- Plants breathe in carbon dioxide and breathe out oxygen.
- Phytoplankton are tiny tiny plants that live in water.
- 1/2 of the oxygen you breathe comes from phytoplankton.
- Zooplankton are a rare breed of zebras recently found in Africa
- Marine snow is snow that falls in the ocean.
- Phytoplankton are a type of algae.
- There are thousands of different species of phytoplankton that are invisible to the human eye.
- It matters to humans if phytoplankton are living healthy in our oceans and freshwater.
- Phytoplankton are the base of the food web.
- Phytoplankton are photosynthesis machines.
- WRITE YOUR OWN:

T or F
(true or false)



OTHER INTERESTING FACTS / ACTIVITIES:

- 1.
- 2.
- 3.

GO TO: <http://planktonchronicles.org> and explore the short videos and information about plankton.
Choose 1-3 images of plankton to draw and label on transparent paper with a sharpie.