
My NASA Data - Interactive Models

Chlorophyll Concentration and Incoming Shortwave Radiation

Grade Band

- 3-5
- 6-8
- 9-12

Time

- 30 minutes

Directions

1. Using an internet accessible device, students open the link to the [Chlorophyll Concentration and Incoming Shortwave Radiation Interactive Model](#) to begin their exploration of this phenomenon.
2. Distribute the [Chlorophyll Concentration and Incoming Shortwave Radiation Interactive Model Student Sheet](#) (optional). Have students navigate on their own through the interactive model to answer the questions and complete the activities on their student sheet.

Chlorophyll Concentration and Incoming Shortwave Radiation

Flow of Energy into Surface by Shortwave Radiation (Watts per square meter)

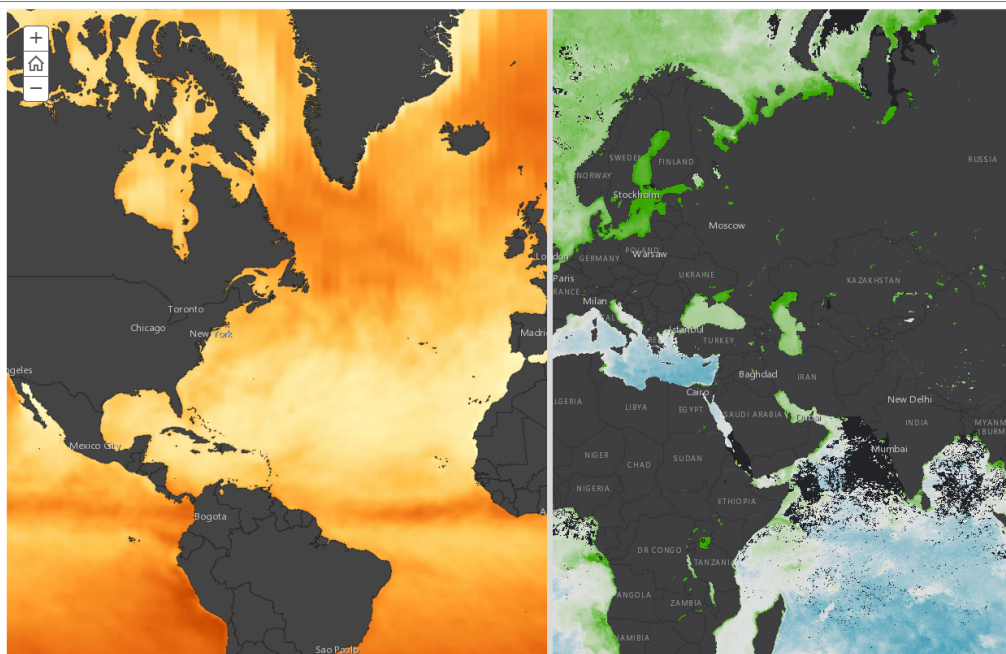
0 200 400

Chlorophyll Concentration (milligrams per cubic meter)

0.01 0.15 20

The map compares incoming shortwave radiation at the surface (solar energy) and chlorophyll concentration during the month of June, 2019.

- Analyze the legend and compare the two datasets on the map using the slider.
- When you are finished, answer the following questions.



CLICK HERE

Teacher Note

At the bottom of the ocean's food chain, phytoplankton account for roughly half of the net photosynthesis on Earth. Their photosynthesis consumes carbon dioxide and plays a key role in transferring carbon from the atmosphere to the ocean. Unlike the plant ecosystems on land, the amount of phytoplankton in the ocean is always followed closely by the abundance of organisms that eat phytoplankton, creating a perpetual dance between predators and prey.

To learn more, visit:

- The [Phytoplankton Distribution Phenomena](#) page for background information

Teachers who are interested in receiving the answer key, please complete the [Teacher Key Request and Verification Form](#). We verify that requestors are teachers prior to sending access to the answer keys as we've had many students try to pass as teachers to gain access.

NGSS Three Dimensional Learning

NGSS Disciplinary Core Ideas

- LS2B: Cycles of Matter and Energy Transfer in Ecosystems
- ESS2A: Earth Materials and Systems

Crosscutting Concepts

- Patterns

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- Systems and System Models

Science and Engineering Practices

- Developing and Using Models
- Analyzing and Interpreting Data
- Constructing Explanations and Designing Solutions

Learning Objectives

- Students will analyze and describe the distribution of phytoplankton over time and space.
- Students will identify patterns in chlorophyll concentration data to formulate their explanations of phytoplankton distribution.
- Students will identify patterns in chlorophyll concentration data to describe the relationship between phytoplankton distribution and incoming shortwave radiation.

Essential Questions

- How does the pattern in the data support the claim that phytoplankton is related to shortwave radiation (solar energy)?
- What scientific reasoning helps explain the patterns in these data?
- Knowing that these data were collected during a summer month, predict what differences you would expect to see in phytoplankton distribution during a winter month.

Google Docs Interactive Files

[Student Sheet](#)