

#projectphenomena
more good stories for your sphere

Hilary Peddicord
Education
NOAA Boulder

#Scienceonasphere
@NOAASOS

Definition

Phenomenon-based learning (PhBL or PhenoBL) is a multidisciplinary, constructivist form of learning or pedagogy where students study a topic or concept in a holistic approach instead of in a subject-based approach. PhBL emerged as a response to the idea that traditional, subject-based learning is outdated and removed from the real-world and does not offer the optimum approach to development of 21st century skills.

Phenomena-based Learning & SOS



Hello
my name is



INTERN

The Tortoise (not turtle!) that Crossed the Indian Ocean



Underwater Cabinet Meeting in the Maldives



Can Elephants Sense Tsunamis Before They Happen?



Plastic in the Deepest Part of the Ocean



Singing Sands



This is STEVE,
He's from
Outer Space



Exoplanet Travel Bureau

Take a trip outside our solar system

Explore
THE GALAXY



Book a Flight to
Another Solar
System

Q: Commonalities?

A: Fascinating!

Scientific phenomena makes students wonder and ask questions. So does SOS!

Are these a good fit?

Definitely!

Singing Sand Dunes and FIM Forecast Model: Wind Streamers fit together in a module ...a stretch?

Sure ... so what? Learning excitement is the goal.

Are singing sand dunes memorable?

Yes.

Are phenomena[l] stories engaging?

Most certainly!

What are you waiting for?

SOS has joined the Movement!

https://sos.noaa.gov/education/phenomenon-based-learning/

ENG 中文

What is SOS?

Getting SOS

Education

SOS Explorer

Datasets

Support

Science On a Sphere®

National Oceanic and Atmospheric Administration



Search datasets

Submit

Phenomena

SOS Explorer

Activities

Live Programs

Resources



Phenomenon-based Learning Modules

Phenomenon-based learning is an educational approach that engages students in science. It starts with a "phenomenon," or an attention-grabbing image or video clip that hooks students into the lesson. Ideally, phenomena should be visually interesting and not easily understood at first glance. Instead, phenomena should be complex ideas that get students to ask questions and draw upon multiple areas of science to help answer them.

For example, the [tortoise](#) phenomenon on our site is a wacky story of a giant land tortoise that got washed across the Indian Ocean. The story can't be fully explained without knowing about sea surface currents, wind patterns, and monsoon seasons. In addition, the story is good fodder for discussion about the differences between tortoises (who generally don't swim) and their cousins, sea turtles, who make long migratory journeys across the oceans each year.

On this site, we use datasets from NOAA's Science On a Sphere® (SOS) to help explore and explain science phenomena. Phenomenon-based learning also pairs well with the [Next Generation Science Standards](#).

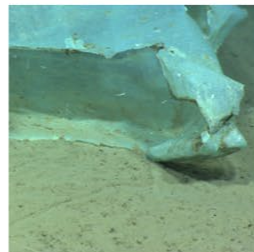
Kindergarten – 12th grade



Can Elephants Sense Tsunamis?



Lightning Lake



Plastic in Mariana Trench

Content

Kindergarten – 12th

3rd – 12th

6th – 12th



The Ocean is Glowing with Microorganisms

Mosquito Bay in the Caribbean island of Vieques literally lights up at night. This is because it is home to almost a million individuals of *Pyrodinium bahamense*, a species of tiny dinoflagellates that you can't see during the day but lights up at night through bioluminescence. Much of the life in the ocean is tiny, from the tiny glowing creatures of the shallow and deep, to phytoplankton that build the base of the marine food web, and chemotrophic bacteria and archaea in hydrothermal vents. Though these organisms might be hard to see, they light up the sea with a deluge of life.

Guiding Questions

- What kinds of microscopic organisms live in the ocean?
- What do these microscopic organisms do for our planet and oceans?
- How does size of different phytoplankton relate to temperature of water they live in?
- Why do deep sea vents host so much life?

Cross-cutting Concepts

- C4: Systems and System Models
- C6: Structures and Functions

Disciplinary Core Ideas

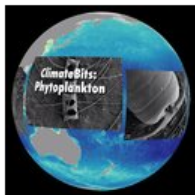
- ESS2.C: The Roles of Water in Earth's Processes
- LS2.B: Cycles of Matter and Energy Transfer in Ecosystems



Photo credit: common domain

Datasets

[Download a playlist for this module](#)



ClimateBits: Phytoplankton

This short film explores more about the importance of phytoplankton to the ecosystem.

Available for: SOS

For SOSx use [Biosphere: Marine Chlorophyll Concentration and Land Vegetation](#)



Deep-Sea Vents: Life Without Sunlight

In contrast to surface level phytoplankton, many tiny organisms live deep underwater near hydrothermal vents. This short film explains why and how life thrives in these areas.

Available for: SOS

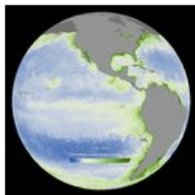
For SOSx use [Deep-Sea Vent Locations](#)



Exploring the Unknown Ocean

This short film dives deep into the mysteries of our ocean, including the tiny organisms that live there.

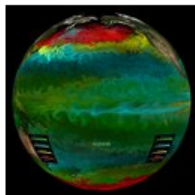
Available for: SOS, SOSx



Ocean Color (monthly) - Real-time

This dataset displays information remotely sensed by satellites that tracks the location and extent of photosynthesizing organisms in the ocean in near-real-time.

Available for: SOS, SOSx



Phytoplankton Model

Phytoplankton are the primary producer for the ocean food web. Though they are tiny they have a huge impact on the ecosystem. Notice where different sized phytoplankton occupy different waters—mostly based on temperature.

Available for: SOS, SOSx

External Resources

- [NASA Earth Observatory: What are Phytoplankton?](#)
- [Phytoplankton Science Careers \(NASA\)](#)

SOS Showcase: Will animals evolve to have larger extremities? Phenomena[!] Storytelling



Phenomena do not need to be phenomenal to be academically productive!
#projectphenomena #phenomenaforngss

sos.noaa.gov/Education/Phenomena