

## Photo Description



A big ship floats on water. The ship is black and red. It has tall parts that stick up. The ship carries heavy things from place to place.

## Scientific Phenomena

The Anchoring Phenomenon is buoyancy - how heavy objects can float on water. This massive cargo ship floats because it displaces (pushes away) a volume of water that weighs more than the ship itself. The ship's hull is designed with a hollow shape that spreads the weight over a large area, allowing the upward force of the water (buoyant force) to support the downward force of gravity pulling on the ship.

## Core Science Concepts

1. Buoyancy and Floating: Objects float when the water pushes up harder than gravity pulls down
2. Forces: Gravity pulls the ship down while water pushes it up
3. Materials and Properties: Ships are made of metal but have air inside to help them float
4. Motion and Transportation: Ships move through water to carry people and things

### Pedagogical Tip:

Use a clear container with water and various objects (cork, coin, plastic toy) to let students predict and test what floats. This hands-on experience helps them understand that floating isn't just about weight, but about how weight is spread out.

### UDL Suggestions:

Provide multiple ways for students to explore floating: tactile water play, visual diagrams showing forces with arrows, and kinesthetic activities where students act out being "pushed up" by water while "pulled down" by gravity.

## Zoom In / Zoom Out

1. Zoom In: At the molecular level, water molecules are constantly moving and bumping into the ship's hull, creating pressure that pushes upward against the ship from all directions underwater.
2. Zoom Out: This ship is part of a global transportation system that moves goods across oceans, connecting continents and allowing people worldwide to share resources and products.

### Discussion Questions

1. "What do you think would happen if we put a hole in the bottom of the ship?" (Bloom's: Predict | DOK: 2)
2. "Why do you think this heavy ship can float but a small rock sinks?" (Bloom's: Analyze | DOK: 3)
3. "What other things have you seen that float on water?" (Bloom's: Remember | DOK: 1)
4. "How do you think people figured out how to make ships float?" (Bloom's: Evaluate | DOK: 3)

### Potential Student Misconceptions

1. Misconception: "Heavy things always sink"  
Clarification: Heavy things can float if they are shaped to spread their weight over a large area and displace enough water
2. Misconception: "Ships float because they are made of wood"  
Clarification: Modern ships are made of metal but float because of their hollow shape filled with air
3. Misconception: "The ship sits on top of the water"  
Clarification: Part of the ship is actually underwater - the ship settles into the water until it displaces enough water to balance its weight

### NGSS Connections

- Performance Expectation: K-2-ETS1-1 - Ask questions, make observations, and gather information about a situation people want to change
- Disciplinary Core Ideas: K-2-ETS1.A
- Crosscutting Concepts: Cause and Effect

### Science Vocabulary

- \* Float: To stay on top of water without sinking
- \* Sink: To go down under the water
- \* Heavy: Something that weighs a lot
- \* Push: To use force to move something away
- \* Ship: A big boat that carries things across water

### External Resources

Children's Books:

- Float by Daniel Miyares
- Who Sank the Boat? by Pamela Allen
- Ships and Boats by Karen Bryant-Mole

YouTube Videos:

- "Why Do Ships Float?" by SciShow Kids - Simple explanation of buoyancy for young learners (<https://www.youtube.com/watch?v=f49ELYzZVZI>)
- "Sink or Float?" by Peekaboo Kidz - Interactive guessing game about floating objects (<https://www.youtube.com/watch?v=uOJNxRjneGU>)