

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

Cross-Curricular Ideas

1. Math - Counting and Measurement: Count the number of tall smokestacks on the ship. Measure how long different toy boats are using non-standard units (blocks, hand-spans). Create a graph showing which classroom objects float vs. sink.
2. ELA - Storytelling and Vocabulary: Write or draw a story about where the ship is going and what cargo it carries. Create a word wall with ship-related words (captain, crew, cargo, anchor). Read and discuss "Who Sank the Boat?" and act out the story with props.
3. Social Studies - Jobs and Communities: Discuss what workers do on ships (captain, sailors, engineers). Talk about how ships bring food, toys, and clothes to stores in our community. Connect to local ports or harbors if your region has them.
4. Art - Design and Building: Design your own ship on paper using shapes (rectangles, circles, triangles). Build floating boats from recyclable materials (milk cartons, plastic bottles, foam) and test them in water. Paint or decorate models of ships.

STEM Career Connection

1. Ship Engineer: A ship engineer designs and builds big ships to make sure they float safely and work well. They figure out the best shape and materials so ships can carry heavy loads without sinking. They work in offices and shipyards where ships are made.
Average Salary: \$80,000 - \$95,000 USD per year
2. Harbor Master/Port Manager: A harbor master helps ships safely come into port and leave again. They know all about water, weather, and how to guide big ships in tight spaces. They work at docks and harbors near the water, watching ships and keeping everyone safe.
Average Salary: \$55,000 - \$70,000 USD per year
3. Naval Architect: A naval architect is like a ship designer who draws plans for new ships using computers. They think about how to make ships float better, go faster, and carry more cargo while staying safe. They work in offices designing the ships that engineers and builders create.

Average Salary: \$85,000 - \$110,000 USD per year

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