

Magnetic Boat Race

Construct small boats with magnetized hulls and measure, graph, and summarize their speeds.

Detailed Description

In pairs, students construct a boat using materials of their choice (styrofoam, wood, clay, soap, etc.). Students then experiment with magnetized iron nails and magnets to determine the effects on propelling the boat through water by following these steps:

1. Hollow out the inside of the boat. Then either bore a small hole lengthwise in its hull and place a magnetized iron nail in the hole, or lay the nail inside the boat.
2. Use a magnet (not to exceed one pound) to pull the ship 10 cm across some type of body of water.
3. Vary and record the size of the nail and measure in seconds the time it takes the boat to travel 10 cm.
4. Vary and record the size of the magnet and measure in seconds the time it takes the boat to travel 10 cm.

Each student then:

1. Develops a line graph showing the results of varying the size of the nail.
2. Develops a line graph showing the results of varying the size of the magnet.
3. Writes a summary of the experiment including how and why the boat's speed varied and what he/she would do differently next time.

Students graded on: group boat; individual line graphs, summary

Time to complete: 2 weeks

Specific Grading Criteria

- Designed boat from original idea and creatively used materials.
- Recorded trials and plotted on line graphs accurately.
- Summarized lab completely and accurately.
- Made accurate analysis of why boat's speed varied.

Productivity Skills

- Contributes to the success of a group.
- Uses critical thinking strategies.

General Grading Criteria

- Followed directions (on time, as assigned).
- Correct mechanics (spelling, punctuation, capitalization).
- Sentences and word choice correct.
- Sentences complete.
- Organized (logical and clear) and easy to follow.
- Complete (included all details).
- Work neatly done.
- Used care in producing products.

Main Standard Assessed

Fifth Grade Science

Standard 5: Understand the basics of magnetism.

Performance Indicators

- A. Know terms magnet and electromagnetism.
- B. Know how a magnet works.

Difficulty: 1

District Code: _____

Other Standard Assessed

Fifth Grade Science

Standard 2: Be able to apply science knowledge and skills to a variety of purposes.

Performance Indicators

- C. Be able to use scientific equipment appropriately (safely, effectively, efficiently, accurately).

Difficulty: .5

District Code: _____

Magnetic Boat Race

Name: _____ Date: _____

Specific Grading Criteria	12	9	6	3	0
• Designed boat from original idea and creatively used materials.					
• Recorded trials and plotted on line graphs accurately.					
• Summarized lab completely and accurately.					
• Made accurate analysis of why boat's speed varied.					

General Grading Criteria	4	3	2	1	0
• Followed directions (on time, as assigned).					
• Correct mechanics (spelling, punctuation, capitalization).					
• Sentences and word choice correct.					
• Sentences complete.					
• Organized (logical and clear) and easy to follow.					
• Complete (included all details).					
• Work neatly done.					
• Used care in producing products.					

Productivity Skills	Yes	No
• Contributes to the success of a group.		
• Uses critical thinking strategies.		

"Goes Beyond" Criteria	12	9	6	3	0
Creativity, extra effort, depth, higher thinking, understanding (Specify)					

Total Points					
