

80. Foil Boat Buoyancy Competition

Classroom Activity - To build a foil boat that can carry the biggest payload value



Grade(s): 5 and 8

Strand(s): Understanding Structures and Mechanisms (Grade 5); Understanding Matter and Energy (Grade 8)

This task addresses the following grade 5 overall expectations:

- investigate forces that act on structures and mechanisms;
- identify forces that act on and within structures and mechanisms, and describe the effects of these forces on structures and mechanisms.

and the following grade 5 specific expectations:

- follow established safety procedures for working with tools and materials;
- use scientific inquiry/research skills to investigate how structures are built to withstand forces;
- use a variety of forms (e.g., oral, written, graphic, multimedia) to communicate with different audiences and for a variety of purposes;
- identify external forces acting on a structure and describe their effects on the structure, using diagrams.

This task addresses the following grade 8 overall expectations:

- demonstrate an understanding of the properties and uses of fluids.

and the following grade 8 specific expectations:

- follow established safety procedures for using apparatus, tools, and materials;
- use a variety of forms (e.g., oral, written, graphic, multimedia) to communicate with different audiences and for a variety of purposes;
- determine the buoyancy of an object, given its density, in a variety of fluids.

Assessment Categories:

- Knowledge and Understanding
- Thinking and Investigation
- Communication
- Application
- Teambuilding skills

Type of Activity

Classroom/Science lab

80. Foil Boat Buoyancy Competition

Preparation

Time frame: ~90 Minutes

Team Size: 5+

Roles: Captain, Accountant, Chief Architect, Builders, 2 designated

Coin Loaders

(Members may have more than one role)

Materials - per team

- Instruction sheet (You're reading it)
- \$0.75 in coins (1 quarter, 3 dimes, 4 nickels)
- pieces of aluminum foil (~6" x 12")
- A design sheet Loads of Pennies will also be provided to each team during load testing

Activity Description:

1. Briefing on Buoyancy formula and other relevant factors such as structure (15 Minutes)
2. Competition rules plus Question and Answer period (5 minutes)
3. Pick up Materials (team captain and accountant only) - (5 minutes to settle)
4. Final questions (5 minutes)
5. Start design and boat construction
6. 10 minute (Half-time) warning
7. 5 minute warning
8. 1 minute warning

9. Stop building (20 minutes elapsed) ■

10. In reverse of completion order the team will load boats with coins until they sink - Maximum 5 coins at a time and the account will keep a tally.

11. Final Tallies

12. Winner declared and celebration

Note your team can deliver their finished boat and design to the Launching area at anytime.

Teams can win additional bonus "silver" by:

1. Completing Quickly (\$0.25 for first, \$0.15 for Second, \$0.10 for Third \$0.05 for fourth)
2. Have "good" design drawings (\$0.20 or \$0.10)
3. Having an innovative or pleasing boat (\$0.20 or \$0.10)
4. Accurately accounting (\$0.20) for +/- \$0.01

Teams are penalized for the following actions:

1. Delivering after the allotted time (20 min) and warning (1 Min) (\$0.10)
2. No design Drawing (\$0.05)
3. Over counting (\$0.05 per \$0.01 miscount) - undercounts will be penalized at equal value.
4. You can exchange a piece of used foil at the cost of \$0.20 - you can buy one for \$0.75
5. Interfering with other teams (Teacher's discretion)