

JUNK BOX WARS

BATTLE OF THE BOATS

Goal:

To create a boat that will travel the most distance in the shortest amount of time.

Competition Rules:

Each team will be provided with a junk box filled with materials that could be used to create your boat. Each team will receive only one set of materials. Your team may use all or part of the materials in the junk box and are not allowed to share materials with other teams. All unused materials should be saved in case repairs are needed during competition.

Teams will be allowed time to build and test their boat. Competitors are allowed to bring research and diagrams to help them build their machine. After the time is up, all machines will be impounded and no changes will be allowed.

Boat Requirements:

Your boat must be powered by the air stored in a balloon. It may not be aided by a helping hand or other energy source. At least half of your boat must be above the water. Height will be measured from the bottom of the hull to the top edge of the boat. Objects extending past the top level will not be included in the height.

Testing Procedure:

Each team will be allowed 5 minutes to "power up" their boats. Teams are not allowed to add additional air during the race. No air pumps are allowed.

Each team will be allowed two trials with 5 minutes allowed between trials to "power up" the boat and to make repairs or adjustments using materials left over from construction. No new construction or major design changes are allowed.

The farthest distance and fastest velocity out of the two trials will be considered for final results. If the boat fails to move no points will be awarded for that trial. The lightest machine will be declared the winner in case of a tie.

Possible Supplies:

Styrofoam cups
Dowel rods
Aluminum Foil
Straws
Spools

Film canisters
Rubber bands
Plastic containers
Milk cartons

Masking tape
Glue
Index cards
Paper
Pipe cleaners

Balloons
Craft Sticks
Modeling Clay

SAMPLE SCORE SHEET



BATTLE OF THE BOATS Score Card

Team Member: _____

Mass of Boat = _____ g

Trial 1 Time = _____ sec

Trial 2 Time = _____ sec

Trial 1 Distance = _____ m

Trial 2 Distance = _____ m

Trial 1 Velocity = _____ m/sec

Trial 2 Velocity = _____ m/sec

Assessment:

1. Rank order of farthest distance. (10 pts)

Winner 12 pts
Next 3 10pts
Next 3 9pts
Next 3 8pts
Last 2 7pts

2. Rank order of fastest velocity. (10 pts)

Winner 12 pts
Next 3 10pts
Next 3 9pts
Next 3 8pts
Last 2 7pts

3. Boat Moves (5 pts)

4. Use of class time, proper safety, etc. (5 pts)

5. Ingenuity of design/approach. (10 pts)

6. Planning Log-Documentation of the thinking that went into your choice of design: control of variables, theoretical basis for design decisions. This will be your portfolio component for the project. (20 pts)

7. Self and Group Evaluation (10pts)

Competition Timeline:

October 13/14 – Introduction to Project - Receive junk box

October 19-22 – Time to work on project during class

October 25/26- COMPETITION Day – BRING SWIMSUITS



Names:

BATTLE OF THE BOATS Planning Log

Stage 1: Brainstorming

Write down any ideas that you have about how to complete the challenge successfully. Include sketches and materials you have in mind.

List variables that you think you need to control? How are you going to control these variables?

Stage 2: Research

Find out what there is to know about this challenge.

1. Write down questions you want to research. (How does a boat float? How do I make a boat move fast? How do I make a boat travel far? Etc.)
2. Do the research and record what you learn.
3. Go back to Stage 1 and in a **different color**, make any changes/additions to your original ideas after learning this information.

Stage 3: Design

1. Make drawings and identify the materials you will need to make your apparatus.
2. Come back to this design and make changes in a **different** color while working on Stage 4.

After Stage 4 and editing your drafts above, sketch the final version of your design below.

Stage 4: Construction and Testing

1. Construct your design.
2. Carry out trials and record the raw data from your trials below (include date of trial).
3. After each trial, write one suggestion to improve your design.
4. Then go back to Stage 3 and make changes/additions to your design in a **different color**.



**BATTLE OF THE BOATS
Group and Self-Assessment**

In each of the 2 categories, give a score (0-5) **and comment** on why the score is deserved.

Names (Your name first)	Comment on work completed & time spent (5pts) (1= negligible contribution, spent little time on tasks, relied totally on others. 5= went above and beyond on their part of the project)	Score	Comment on Teamwork & attitude (5pts) (1= tardy, no enthusiasm held the team back. 5= went above and beyond, helped others, brought a positive attitude to the project, led by example)	Score	Total Points

BATTLE OF THE BOATS PROJECT RUBRIC



BATTLE OF THE BOATS Score Card

Team Members: _____

Mass of Boat = _____ g

Trial 1 Time = _____ sec

Trial 2 Time = _____ sec

Trial 1 Distance = _____ m

Trial 2 Distance = _____ m

Trial 1 Velocity = _____ m/sec

Trial 2 Velocity = _____ m/sec

Distance Rank (Circle one):	Overall Winner	12pts
	2nd – 4th Place	10pts
	5th – 7th Place	9pts
	8th – 10th Place	8pts
	11th – 12th Place	7pts

Velocity Rank (Circle one):	Overall Winner	12pts
	2nd – 4th Place	10pts
	5th – 7th Place	9pts
	8th – 10th Place	8pts
	11th – 12th Place	7pts

Boat Moves (out of 5 pts): _____

Safety, Use of time, etc (out of 5 pts): _____

Documentation (out of 20 pts): _____

Ingenuity of Design/Approach (out of 10 pts): _____

TOTAL POINTS (out of 60pts): _____

Comments:

*** Self and group evaluation separate

JUNK BOX WARS

TEACHER: _____

SECTION: _____

TEAM NAME: _____

TEAM MEMBERS: _____

Water Boat Junk Box War – 6 junk boxes for each class will be needed, each junk box will need the following items:

- 2' Dowel rod
- 10 Straws
- 2 Film canisters
- 4 drink lids
- 2 food dishes
- 1 roll of tape
- 20 Index cards
- 5 Pieces of paper
- 10 Pipe cleaners
- 8 Styrofoam cups
- 3 balloons (12 inch)
- 20 craft sticks
- 3 feet Aluminum foil
- 1 Stick of modeling clay
- 1 Tennis ball can
- 5 Glue Gun Sticks