

# Boat-a-thon

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## Objective

At the end of this activity the student will be able to design a boat using the scientific method.

## Procedure

Materials will be given to each lab group to design a boat with the greatest buoyant force possible. The boats will be tested by floating the boat and adding mass; the boat that supports the greatest load wins.

Lab parameters are as follows:

- Students may use only the materials listed to build their boats
- Students may omit one item from the list of materials. All others must be included.
- Boats may be no longer than 30cm in any dimension
- When testing the boats, the last mass added to the boat (the one that makes it sink) must be removed from the boat before totaling the mass held by the boat.
- Students can modify their design as many times as they wish, but each modification must be recorded in writing.

## Materials

- Aluminum foil (1/2 meter)
- 6 toothpicks
- 4 craft sticks
- 2 plastic straws
- 30cm of masking tape
- glue
- glass marbles will represent the cargo of your boat and will be used to test the mass your boat will hold.

## Initial Questions

What is the problem you are trying to answer in this lab?

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What is your hypothesis (prediction) to solve this problem?

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## Analysis Questions

1. What was the mass of your boat before testing? \_\_\_\_\_
2. How much mass did your boat hold before it sank? \_\_\_\_\_
3. Did you modify your design after the first trial? \_\_\_\_\_
4. If “yes” to the above question, describe the modifications and the reasons for them. If you answered “no”, explain why your design did not need any modifications to solve the initial problem.

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5. What is the total mass of the boat and the added weight?

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6. How would you modify your boat to improve its performance? What would you have changed, added or omitted?

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7. What was the biggest challenge of making your boat?

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8. What was the independent variable in this activity?

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9. What was the dependent variable in this activity?

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10. When did you use a hypothesis? What was your hypothesis? Did it change as you worked?

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11. How did you collect data? What was your data?

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12. A barge filled with sand approaches a bridge over the mouth of an inlet and cannot quite pass under it. Should sand be added or removed from the barge to get under the bridge? Explain your answer.

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