

**Introduction:**

When designing with materials usually material properties determine the geometry of the artifact being designed. Understanding the system forces are useful to develop the correct material dimensions for an optimal designs.

Goal:

Design and build a racer boat that is powered by a mousetrap. Your design will be assessed based on the distance traveled and its cost effectiveness.

Material:

You will be given a mousetrap to make sure everyone uses the same amount of power by the mousetrap.

You will provide other materials for your own design. Remember... you are not being assessed based on who spends the most on material.

Keep a detailed list of material used in your design (you are going to need it).

Procedure:

1. A single mousetrap must power the device.
2. The dimensions of the boat should not exceed 12"x12"x12".
3. Boat may not receive a push to start moving forward.

Report:

1. A description of your boat:
 - Discuss the features you used to satisfy different aspect of the design and the reasoning behind them.
2. There must be multiple trial testing where you will record the time and distance traveled. This will allow you to make any necessary modifications or adjustments to your design before the final testing. Remember, it is very likely that your first trial will NOT work. Make sure you document your observations and modifications for all trials you conduct.
3. Your report must be typed and include all relevant tables, figures, and charts.
 - Calculate average speed, average acceleration, and mass of your boat. Come up with the equivalent force that pushed your boat forward.
 - Using excel, represent the speed and acceleration in graphs.

ENGR 10

4. Make a list of all items you used to make your boat. Then, list the price of each item and calculate cost per meter of your boat. This is the total cost divided by the total distance traveled.
 - Anything you buy comes with a receipt... save your receipt and use them (you must turn in a copy of your receipts with your report). The mousetrap costs 50 cents. You can account 10 cents for each piece of household material used.