

Learning Outcomes:

Nature of Science	Students should be able to design, plan and conduct investigations; explain how reliability, accuracy, precision, fairness, safety, ethics, and selection of suitable equipment have been considered
Physical World	Students should be able to design, build, and test a device that transforms energy from one form to another in order to perform a function; describe the energy changes and ways of improving efficiency

The science department at your school is hosting the 1st Annual Mousetrap Powered Car Competition. The goal of the competition is to construct a mousetrap car that travels the farthest distance. You will work in groups to design a mousetrap car that you think will travel the longest distance. After analysing competing designs, your team will modify and improve your initial design to build an even better performing car.

Your group will design a mousetrap-powered car given the success criteria listed below. Constraints are limitations to a design solution.

- Each car can have no more than seven different materials.
- Two of the materials must be a mousetrap and string. The car must be powered by the mousetrap only.
- Criteria are the goals of a design solution. Criteria are used to evaluate the success of a design.
- The criteria for this challenge is to build a car that travels the farthest in a straight line.

Brainstorm your design.

Use the questions below as a guide while you work.

- What forces will oppose the motion of the car?
- How can you minimize the forces that will oppose the motion of the car?
- How can the energy of the mousetraps be transferred to the car so that it moves?
- How will your design ensure that the car moves efficiently?
- How will your design ensure that the car meets the criteria?

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JC Science 2017 Specification

- Make detailed drawings of your proposed design.
- Be sure to show how energy will be transferred in the car. Build your mousetrap-powered car.
- Test your car against the cars designed by other groups.
- Analyse each group's test run to determine the best characteristics of each that can be added to your design to better meet the criteria.
- Take notes on each group's run.
- Use your observations and notes to make modifications to your mousetrap-powered car that your group thinks will improve the car's success.

Test your car again to determine a class winner.

- Analyse your design, your car, and its success. Use the points below to help with your analysis.
- How well did your design meet the criteria? Explain.
- How did your group's mousetrap-powered car compare with the cars of the other groups?
- Suggest reasons why your car performed better or worse than the cars designed by other groups.
- Think about how well each group's car performed. Based on everyone's results, how do you think the best mousetrap-powered car can be redesigned to be even better? Be specific.