

QUARTER PHYSICS PROJECT

2nd Quarter Project = Mouse Trap Car

INTRODUCTION

Each pair of students will be given the basic materials to build a Mouse Trap Car. The only information each group will receive will be the information in this document. Each group must research various methods of building a Mouse Trap Car and decide on the method they will use. The only power to be used to drive the car is the single mouse trap provided to the group. Any additional materials other than those provided are fine, but will not be provided. The overall project is worth 200 points with two parts each worth 100 points.

MATERIALS PROVIDED

1 Mouse Trap	1 m of String	1 Rubber Tube
1 Wood Chassis	1 Straw	1 Extension Arm
2 Front Wheels (small)	2 Screw Eyes	
2 CD Adaptors (for back wheels)	1 Small Nail	

PART I = RESEARCH & DEVELOPMENT PHASE

In this phase, each person in the group will research various Mouse Trap Cars and answer all of the questions on the Research & Development Worksheet. This phase will be worth 100 points and the points for each question are on the worksheet.

Research & Development Worksheet Due on _____

PART II = PRODUCTION & OPERATION PHASE

In this phase, the individuals must present their research to the other person in their group and the group must agree to a single design for the group's car. The group must build the car, test it, and have it completely ready to operate by the due date. This phase will be worth 100 points. Each car that is completed and operational will receive 70 points. The remaining 30 points will be awarded based on how well the car operates.

Production & Operation of Mouse Trap Car Due on _____

Remaining points will be awarded for:

- 10 points if the car travels a minimum of 20 feet
- 10 points if the car travels the 20 feet without hitting either wall in the hallway
- 10 points if the car travels the 20 feet in under 30 seconds
- 5 additional points will be awarded to the car that travels the furthest without hitting anything
- 5 additional points will be awarded to the car that travels the 20 feet in the least amount of time

**REMEMBER THAT NO PART OF QUARTER
PROJECTS CAN BE TURNED IN LATE!!!**

Make sure that you and/or your partner turn in the research phase before the due date!
Make sure that you and/or your partner bring the car to class on the due date!

Physics Project

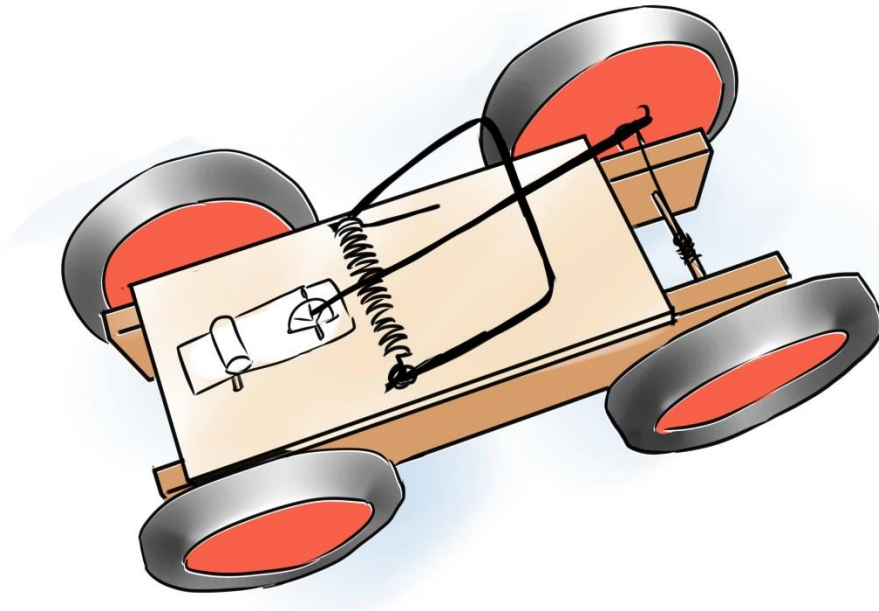
2nd Quarter = Mouse Trap Car

Name: _____

Period: _____ Date: _____

Research & Development Worksheet

- 1) (10 Points) Label the following parts on the mousetrap vehicle shown:
 - a. (2 Points) Chassis
 - b. (2 Points) Axle
 - c. (2 Points) Mousetrap
 - d. (2 Points) Drive Axle
 - e. (2 Points) Lever Arm



- 2) (2 Points) Name and describe two kinds of friction that affect all mousetrap cars.
 - a.

 - b.

- 3) (2 Points) Why is it better to have large wheels for the drive axle than it is to have small wheels? Use research and explain your answer.

- 4) (2 Points) How can you reduce the friction of the axles rotating in the chassis? Use research and explain your answer.

- 5) What is an axle-hook? Use research and explain your answer.

Physics Project

2nd Quarter = Mouse Trap Car

Name: _____

Period: _____ Date: _____

6) (24 Points) Using your research, list at least 4 different materials that can be used for each part of the car.

a. (4 Points) Wheels:

i.

ii.

iii.

iv.

v.

d. (4 Points) Lever Arm:

i.

ii.

iii.

iv.

v.

b. (4 Points) Traction for Wheels:

i.

ii.

iii.

iv.

v.

e. (4 Points) Holding Car Together:

i.

ii.

iii.

iv.

v.

c. (4 Points) Chassis:

i.

ii.

iii.

iv.

v.

f. (4 Points) Other Items:

i.

ii.

iii.

iv.

v.

7) (10 Points) From your research, select two mousetrap cars that you think have a good design.

a. (5 Points) Right-click on the picture of the first design you choose and select "copy". Open a blank document on your computer and right click and select "paste". The picture will now be pasted into the blank document. Resize the picture so that it is no larger than 3.5" in either direction. Go back to the website you found the picture on, and highlight the url for that website at the top of the screen. Right-click on the highlighted text and select "copy". Now go back to your picture in your document, right-click the picture and select "insert caption". When the box comes up, select "okay". Now you will see a caption that goes with your picture. Highlight the caption, right-click the highlighted caption, and select "paste". The website should now be the caption for the picture.

b. (5 Points) Follow the same instructions for the last picture and insert the other picture you have chosen. Make sure that both fit on one page, they both have the appropriate caption, and then print them. You will need to turn in the piece of paper with both photos on it as the next page after this one.

Physics Project

2nd Quarter = Mouse Trap Car

Name: _____

Period: _____ Date: _____

- 8) (30 Points) Define each of the following words then explain the definition.
- | | |
|----------------------------|--|
| a. (3 Points) Engineering | f. (3 Points) Potential Energy |
| i. Definition = | i. Definition = |
| ii. Explanation = | ii. Explanation = |
|
 | |
| b. (3 Points) Inertia | g. (3 Points) Kinetic Energy |
| i. Definition = | i. Definition = |
| ii. Explanation = | ii. Explanation = |
|
 | |
| c. (3 Points) Aerodynamics | h. (3 Points) Newton's 1 st Law |
| i. Definition = | i. Definition = |
| ii. Explanation = | ii. Explanation = |
|
 | |
| d. (3 Points) Friction | i. (3 Points) Newton's 2 nd Law |
| i. Definition = | i. Definition = |
| ii. Explanation = | ii. Explanation = |
|
 | |
| e. (3 Points) Energy | j. (3 Points) Bushing |
| i. Definition = | i. Definition = |
| ii. Explanation = | ii. Explanation = |
- 9) (18 Points) On a separate sheet of paper or papers, sketch and label three different designs for your Mousetrap Car. Brainstorm!!! Be creative!!! Use your research!!! Include information on the materials and the major design features of each design. These sketches will go after this page when you turn in your worksheet. Each one is worth 6 points each.

BE SURE THAT YOU COMPLETE ALL OF THE QUESTIONS ON THE WORKSHEET, YOU PLACE YOUR PRINTED PAPER WITH THE TWO PICTURES YOU PRINTED AS WELL AS YOUR THREE LABELED SKETCHES BEFORE THE DUE DATE

R & D WORKSHEET DUE _____