The Mousetrap Car Physics Analysis Report

Answer the following questions completely (include formulas and/or calculations where appropriate). Your answers may be written (you may print this out) or typed into this document.

Resources:

[www.instructables.com/id/Mouse-Trap-car/](http://www.instructables.com/id/Mouse-Trap-car/),

<http://www.mousetrap-cars.com/construction_tips.htm>,

[http://www.mousetrap-cars.com/dpf.html](http://www.mousetrap-cars.com/distance_pics.htm),

<http://www.docfizzix.com/topics/design-basics/MouseTrap-Cars/mousetrap-propulsion.shtml>

<http://www.docfizzix.com/topics/design-basics/MouseTrap-Cars/mousetrap-distance-basics.shtml>

<http://www.docfizzix.com/topics/picture-gallery/Mouse-Trap-Racers/distance-racers.shtml>

<http://www.docfizzix.com/topics/construction-tips/Mouse-Trap-Cars/>

<http://www.scienceguy.org/Articles/MousetrapCarConstructionArticlePlan.aspx>

<http://engineeringed.usu.edu/Projects/MousetrapCars/Mousetrap%20Cars.pdf>

<http://clackhi.nclack.k12.or.us/physics/projects/mousetrapRacers/2003/Kelly/ppeg.html>

<http://www.codecooker.com/howto/mousetrap/instructions.htm>

<http://www.usd116.org/ums/projects/sciencenet/projects/mtchints.html>

<http://www.instructables.com/id/Mousetrap-Cars/>

<http://transweb.sjsu.edu/mtiportal/research/publications/documents/garrett_morgan/Mouse%20Trap%20Car%20Teacher%20Guide%202009.pdf>

<http://monsterguide.net/how-to-build-a-mouse-trap-car>

<http://www.teachergeek.org/mousetrap_vehicle.pdf>

1. What are the two types of friction that affect the performance of your vehicle?
2. What problems related to friction might you encounter and how would you solve them?
3. What factors must be considered when you decide on the number of wheels you choose in your design?
4. What kind of wheels will you use on each axle?
5. What is the effect on distance when using large vs. small wheels?
6. Which wheel would require more force to make it turn?
7. Explain how Newton's first, second and third laws apply to the performance of the mousetrap vehicle.
8. Describe a 3rd class lever. (Where are the force, load and fulcrum located?)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
9. Write 2-3 sentences about the effect of the length of the lever arm in the pulling force of the vehicle.
10. How is the balance of a wheel, around its center, related to the vehicle’s performance?
11. How does the distribution of weight of the vehicle affect the traction of the wheels?
12. Discuss the major problems that may be encountered in the performance of your vehicle and what you will do to solve them.

**Mousetrap Car Designs**

Find three mousetrap cars on the website that you think have a good design.

**Name of Website:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**URL:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Copy and paste pictures here. (Resize them to make them small enough to fit)

**Name of Website:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**URL:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Copy and paste pictures here. (Resize them to make them small enough to fit)

**Name of Website:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**URL:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Copy and paste pictures here. (Resize them to make them small enough to fit)

**Mousetrap Car Performance.**

If available on the website, copy the information about the above vehicles performance. (Best distances)

**Mousetrap Car Materials.**

Look at the designs on the website and list 3 or more materials that were used for each car.

Wheels: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Grip Material for wheels: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Chassis: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Lever Arm: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Other parts: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Connecting materials (holds vehicle together):\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_