Name: Period:

NEWTON CAR PROJECT RESEARCH April 4, 2006

Select a main goal. (If your primary goal is distance followed by engineering creativity, then number distance #1 and engineering creativity #2):

_____ ***Distance*** _____ ***Engineering Creativity***

Gather Information: Use your ***textbook*** as the principal resource to research information about the systems that comprise your car. You will compare and contrast some definitions and statements made in your textbook to those found on websites to determine if they are in agreement. You may use a science dictionary, www.wikipedia.com or www.dictionary.com to gather some information. You will also need the Internet to visit selected websites.

Synthesize: Answer the critical thinking questions.

Design: Refer to the questions and the definitions to help you make decisions about your design.

ENERGY CONVERSION SYSTEM:

Your propulsion system works by changing energy from one form to another. To better design your car, it is important to understand Newton's Laws some basic concepts of motion. Use this website,

http://www.grc.nasa.gov/WWW/K-12/airplane/newton.html

to determine if there is a difference between your textbook's definition of Newton's Laws and Newton's own words.

Newton's First Law:
Textbook:

Newton:

Newton's Second Law:
Textbook:

Newton:

Newton's Third Law:

Textbook:

Newton:

Propulsion:

Energy:

Potential Energy:

Kinetic Energy:

Law of the Conservation of Energy:

Force:

Efficiency:

For each of Newton's Law describe how the textbook definition differs from the website definition.

Most propulsion systems work by converting kinetic energy into potential energy, how can you store as much energy as possible? In other words, how can you get more energy for your propulsion system?

Part of your propulsion system is the projectile that is being propelled. Considering Newton's Third Law, what should you consider when you are selecting the projectile?

What are you using for your propulsion system?

What are you using for a projectile?

Objects in motion on the earth eventually come to a complete stop. Why?

OPPOSING (UNBALANCED) FORCE REDUCTION SYSTEM

A number of forces act to bring moving objects to a stop, slow them down, or make them change direction, "…unless acted upon by and unbalanced force."

Use the textbook to define the following (use a website only as a last resort):

Friction:

Static Friction:

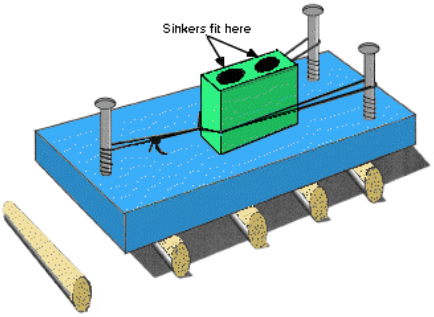
Air resistance:

Aerodynamic:

Use this website, http://www.eskimo.com/~billb/miscon/miscon4.html#fric to find the misconception statement about friction. Copy and paste it here:

1. How does the information from the web page differ from the information from the textbook definitions for static friction? In other words to they agree or do they disagree?

2. I can identify 13 places where friction could occur to help bring the Newton car to a stop. Identify points of friction on the drawing below. Candy for anyone who can identify more!



3. Aerodynamics:
    a. Is the Newton car above aerodynamic?

    b. Does it need to be aerodynamic?

    c. Why or why not?

4. In the following situations, are the forces balanced or unbalanced?

You push a box until is moves.	
You push a box at constant velocity.	
You stop pushing a box, and it stops.	

5. You tap a hockey puck on the ice and tap the same hockey puck on the gym floor with the same about of force. The puck comes to a complete stop without hitting the wall.

    Why does it come to a stop?

    Will the puck travel further on one surface as opposed to another?

    Explain why the puck travels further on one surface as opposed to another.

6. Answer the following;

    1. If an object is at rest, no forces act on it. True False
    2. A force is needed to keep an object moving. True False
    3. Acceleration is the same as speed. True False

DESIGN:

1. List all the design features you used to reduce the forces opposing the forward motion of your Newton car. Indicate whether it reduces friction or air resistance.

Design Feature	Friction/Air Resistance

2. List the materials that you will need to construct this car.

Materials	Tools