Name: _____
Date: _____
Period: _____

NEWTON SCOOTERS

For every action there is an equal and opposite reaction!

Introduction:
In this project, you will use Newton's 3 laws of motion to design a vehicle. This vehicle must travel forward 1.5 meters by pushing backward on the floor, the air, or some other object. On the due date, you will demonstrate your vehicle.

Project Rules:

- You must have teacher approval of your plans for construction before you begin
- You must use Newton's 3 laws to make the vehicle move
- Your vehicle must travel forward at least 1.5 meters and stay within a width of 1 meter
- You may not interfere with the vehicle's movement
- You cannot use any form of electricity or pull of gravity (no batteries or ramps)
- A track may be used to guide your vehicle, such as a toy car track or a string.
- The following items are prohibited:
    - Remote controls vehicles
    - Store-bought projects
    - Balloons
    - Batteries
    - Ramps

Methods to Consider:

- Spring-loaded design – Spring pushes against a surface and sends the vehicle forward
- Rubber band – release of tension sends the vehicle forward
- Winding wheels – Unwinding causes forward motion of wheels
- Mousetrap- force from the spring sends car forward
- Clothespin springs
- propellers
- **There are others. You come up with a new method!**

Suggested Material:
You can use recycled materials from home for your project:

- Toys
- Building blocks
- Balloons
- Springs
- Straws
- Bamboo skewers
- Fishing line
- Paper towel rolls
- Mouse traps
- Propellers
- Etc! **Use your imagination**!
- **Do Not** make your car completely from a kit like legos or knex. They will not be accepted.

Be creative and have fun! You don't have to limit yourself to vehicles with wheels. Think of other ways to make your vehicle move 1.5 meters while staying within a width of 1 meter.

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Dues Dates:

Initial sketch and list of materials due on **Tuesday, January 27th**
Final Vehicle due and ready to race on **Monday, February 2nd**
Final Presentation Due on **Thursday February 5th**

1. Draw a sketch of your vehicle: **Teacher initials_____ Date_____**

2. List your materials:

3. Explanation of how you used Newton's three laws: 6 points

1st law:

2nd law:

3rd law:

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Grading (for teacher use only):

Newton Scooter Vehicle:

_____Lab Notebook: Idea #1 (10pts), Idea #2 (10pts), Idea #3 (10pts)
Diagram (w/ measurements), 3rd Law Explanation, Results (w/measurements), Discussion of success & Failure, Suggested improvements (seen in next iteration)
_____Construction of Vehicle (How well it stays together) (10 pts)
_____Traveled at least 1.5 meters (10 pts)
_____Stayed within a width of 1 meter (10 pts)
_____**Total (60)**

Presentation:

_____ Presentation Proposal & Outline Due Friday February 6th

	Exceeds Goal 4	Meets Goal 3	Progressing Toward Goal 2	Limited Progress 1
Engineering Design Process	Poster meets standard, but clearly identifies intermediate steps used through design/test/redesign process	Poster clearly uses EDP to show how final vehicle evolved from the prototype	Poster uses EDP to show steps of constructing final Vehicle	Fails to use 5 major steps in EDP process
Application of Newton's Laws	Meets goal, plus uses scientific/mathematical measurements to explain Newton's Laws	All Newton's Laws of Motion are explained and applied to the Newton Scooter	Newton's Third Law of Motion is applied to the working of the Newton Scooter	Some of Newton's Laws are incorrectly applied
Use of Prior Learning	Meets goal plus integrated prior learning seamlessly into discussion of project	Discussion of Project involves proper use and connection to prior learning, such as friction	Few concepts, such as force and friction are used in the discussion	Fails to use concepts like force and friction in the discussion of the project
Scientific Vocabulary	Meets Goal plus properly uses new vocabulary such as Work and Kinetic Energy	Scientific Vocabulary is used properly throughout poster: Force, Inertia, Friction, mass, etc.	Attempts to use scientific vocabulary properly throughout discussion	Vocabulary either limited or incorrectly applied