

### Unit 3: Newton Scooter Project

In Chapter 14, you are learning about Newton's Laws of Motion. To demonstrate what you are learning, you will plan, design, build, and present a Newton Scooter demonstrating Newton's 3<sup>rd</sup> law. Your presentation will have many components, such as evidence of planning, a design sketch, pictures or videos of your built vehicle and appropriate calculations (weight and speed). You will be allowed to work with a group of 2-3 people; no group should be larger than 3 people.

#### Project Rules:

- All planning and designing phases **MUST** be approved by Ms. Perry before your vehicle is built.
  - Do not buy the materials or start building until Ms. Perry approves your design.
- The vehicle must have an action-reaction mechanism.
  - You will need to research types of this mechanism.
- The vehicle must be built **FROM SCRATCH**.
  - It may not come in a kit to build or bought already assembled.
  - You may use parts of a kit for wheels and structure, but the mechanism must be built by you or your group.
- Your vehicle must travel a minimum of 1.5 meters.
  - Plan for both carpet and cement, as the terrain will be dependent on weather.
  - It must also cross the finish line.
- You or any member of your group may **NOT** interfere with the movement of your vehicle.
  - No pushes at launch time or help to cross the finish line
- Your vehicle cannot use electricity or the pull of gravity to move your vehicle.

#### Project Hints:

- Research methods to decrease/increase friction. You may want to incorporate some of these.
- Use recycled materials from home (toy parts, balloons, straws, paper towel rolls).
- Be creative with your project title, design and build of your vehicle.
- If your vehicle has wheels, **BE SURE TO MAKE AXELS** so that the wheels move.

**FINAL DUE DATE:** \_\_\_\_\_ **Dec. 11** \_\_\_\_\_

## Project Dates and Point Values

December 1<sup>st</sup>

- Choose a group partners.
- Choose a group leader, if you are in a group. This person will be in charge of sharing google docs and such with me.

December 2<sup>nd</sup>

- Do individual research on: What a newton scooter is? What materials are common in most newton scooters? What newton scooter designs seem manageable? What ideas do you, as an individual, have for your project?
  - As you research this, you may create a google doc, but be sure to share it with Ms. Perry.
- This document is worth **15 POINTS!**

December 3<sup>rd</sup>

- Collaboration and Design Day.
  - On this day, you will need to collaborate with group members to create a design everyone agrees with.
    - Your design should include ALL materials that you plan to use to build your Newton Scooter and which group members are responsible for bringing these materials.
    - You may draw your design and write the details about materials on a piece of paper, or make a google doc with your drawing as an uploaded picture.
- This document is worth **20 POINTS!**

December 4<sup>th</sup> – 8<sup>th</sup>

- These are designated for in-class building of Newton Scooter and preliminary testing.
  - You have 3 class periods to build and test, so that you can troubleshoot problems and modify your vehicle as needed.
- You will need to record your steps for building and modifying as you do this.
  - These notes can be handwritten, but will need to be typed up for your final presentation.

December 9<sup>th</sup>

- Newton Scooter Testing Day
  - On this day, you will be responsible for the following:
    - Setting up your vehicle to be tested.

- Determining and recording the time it takes your vehicle to travel 1.5 meters.
- Taking pictures and video of your Newton Scooter for your presentation.
- Answering any questions Ms. Perry or a classmate has about your Newton Scooter.
- Build of the vehicle is worth **40 POINTS!**
- Distance the vehicle travels is worth **15 POINTS!**

December 10<sup>th</sup> and 11<sup>th</sup>

- Google Slide Presentation needs to be made of all components of your project.
  - Title Slide
  - Initial research by all group members.
  - Approved Design
    - Please include why your group chose this design.
  - Steps to building the vehicle.
    - Please include steps for any modifications that were made.
  - Testing Day
    - These slides include pictures and videos of your project.
    - You also need to include distance, time and speed (which means you need to calculate speed).
    - You also need to include mass and a calculation for weight.
  - What this project taught you
    - Explain as a group or individually what this project taught you.
- This Google Slide Presentation is worth **50 POINTS!!!!**

**TOTAL POSSIBLE POINTS FOR THIS PROJECT:**

**140 Points**