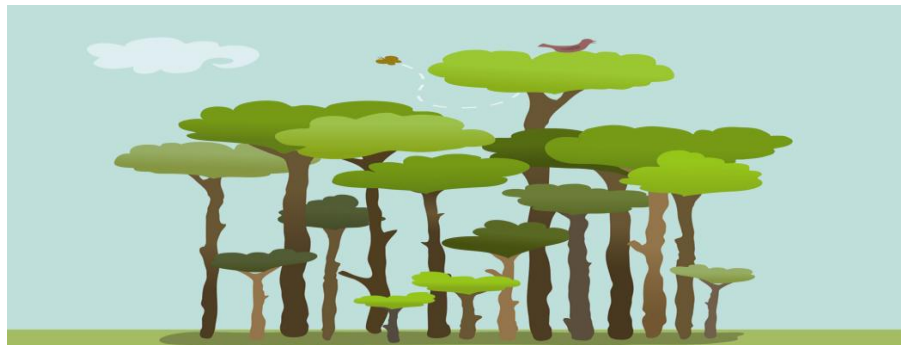


- These challenges are optional and can only help your grade. You can earn up to 6 points on your quarter 2 average.
- These challenges will be scored as a 3,2,or 1. You may resubmit your work until you earn a 3.
- The last date to submit these assignments is January 13.
- Be sure to give MLA citations for all of your sources!
- Be creative with the format of your project. Typed reports on white paper are okay, but more exciting, colorful, interesting projects really give the chance for you to show off how you incorporate your personality into the things you've learned.
- If you have an idea for a project not on this list, just ask. As long as it's challenging and relevant I'll probably approve it.



SECTION 1

- Velocity and acceleration vectors in real life - Vectors are used to report on the motion of ocean currents, forecast the weather, be strategic in sailing or kite boarding competitions, and many other applications. Research and report in detail on at least two real life ways that vectors are used.
- Research and report on various speed records that machines (planes, motorcycles, cars, roller coasters, etc.), humans and animals have set. Compare them. Create a chart or graph to compare several record setters and then describe the background information to go with each of them.

SECTION 2

In Section 2, every choice asks you to describe situations “in terms of the scientific concepts we’ve discussed this quarter”. Below is a list of the key terms from the quarter. **You should accurately and thoroughly incorporate almost all of these terms in your project for full credit.** Be sure you not only use the terms, but make it clear that you understand them. Some examples - if you include a picture of a woman running in a Nike ad:

Poor description: There is friction.

Decent description: Friction occurs between the runner’s sneakers and the ground.

Excellent description: Sliding friction exists between the runner's sneakers in the ground, allowing the shoes to grip the road so the runner can push off the ground to go forward. This friction is helpful to the runner. There is also fluid friction between the runner and the air, which is not helpful to the runner because she has push against the air as she runs.

Terms from Quarter

2:

- | | | |
|--|---|---|
| <input type="checkbox"/> Speed | <input type="checkbox"/> Unbalanced force | <input type="checkbox"/> Newton's 3rd Law of Motion |
| <input type="checkbox"/> Velocity | <input type="checkbox"/> Inertia | <input type="checkbox"/> Air resistance |
| <input type="checkbox"/> Acceleration | <input type="checkbox"/> Gravity | <input type="checkbox"/> Terminal velocity |
| <input type="checkbox"/> Scalar | <input type="checkbox"/> Friction (static, sliding, fluid, rolling) | <input type="checkbox"/> Centripetal force |
| <input type="checkbox"/> Vector | <input type="checkbox"/> Momentum | <input type="checkbox"/> Law of universal gravitation |
| <input type="checkbox"/> Average speed | <input type="checkbox"/> Mass | <input type="checkbox"/> Orbit |
| <input type="checkbox"/> Instantaneous speed | <input type="checkbox"/> Acceleration | <input type="checkbox"/> Revolution |
| <input type="checkbox"/> Constant speed | <input type="checkbox"/> Newton's 1 st Law of Motion | <input type="checkbox"/> Weight |
| <input type="checkbox"/> Variable speed | <input type="checkbox"/> Newton's 2nd Law of Motion | |
| <input type="checkbox"/> Force | | |
| <input type="checkbox"/> Point of reference | | |
| <input type="checkbox"/> Balanced force | | |

- Your dream car – Research two cars that you might be interested in owning. Compare them based on: cost, fuel efficiency, safety equipment, performance, and style. Describe their attributes using the terms listed at the beginning of this section.
- NASCAR & Physics – How are the concepts of physics related to racing? Thoroughly describe the connection between racing and the major ideas from this quarter. As part of this research, choose two or three NASCAR tracks to research. Compare the tracks based on overall length, straightaway lengths, banking angles of the turns. Describe how drivers and race teams set up the cars differently to get the best performance at each track. What advantages does each adjustment give? Describe your answers using the terms listed at the beginning of this section.
- Physics is Everywhere! Select at least five pictures from various sources -newspapers, magazines, online. Describe the pictures using the terms listed at the beginning of this section.
- Physics of Santa – Describe Santa's life and his Christmas Eve journey by using the terms listed at the beginning of this section. (You can do this type of assignment with any character.)

- Sportscaster/America's Funniest Home Video narrator - Create a play-by-play video or storyboard of various scenes (sporting events, traffic, industrial settings, social events, etc.) and describe the physics of what is happening using the terms listed at the beginning of this section.
- How do amusement park designers use physics to create safe and thrilling rides? Describe the physics of the rides by using the terms listed at the beginning of this section.
- What are the physics involved in (skydiving, dancing, cheerleading, skateboarding, snowboarding...) Choose any activity and describe it thoroughly by using the terms listed at the beginning of this section.

SECTION 3

Space Science – Research and report on significant projects/findings that NASA has been involved in during your lifetime. You might want to get into detail about one or two projects, or give more general information and summaries about many projects. Here are a few ideas to get you thinking about topics you might want to look into - What is the most recent information we have about Mars? Why was Pluto kicked off the list as a planet? Can you expect to be able live on any other planets or a least visit them on vacation? How do we get all those great pictures from space? What kind of projects is NASA planning for the future?

SECTION 4

Lab Reports - Design, carry out, and write a lab report for an experiment that you create – IV, DV, controls, constants, data table, graph, conclusions. Experiment must be relevant to topics we have studied this quarter, but not repeat an experiment we have done in class. You must write a brief proposal for your experiment and get it approved by Miss Fogarty and your parent/guardian before you do anything else! The proposal should include location of experiment, materials needed, a general procedure, and safety considerations. This is to ensure that your experiment is safe and appropriate. No permission? No credit. You can work alone or with a (just one!) partner. If you work with a partner, each person must submit their own permission slips and reports. It is up to you to make sure you're splitting the work fairly so that each partner truly earns his/her grade.

SECTION 5

Bridges - There are many beautiful and interesting bridges in this world. Research and build a scale model of a bridge that impresses you.

Your final product must include the following:

- Name of bridge
- Photographs of the bridge
- Type of bridge (beam, arch, suspension, etc.)
- Location of bridge
- Who designed it
- Year construction began & ended
- Cost to build bridge

- Materials used
- Dimension of bridge (span length, height, width, etc.)
- What obstacle the bridge crosses over (name of river, valley, etc.)
- What the bridge connects (i.e. Gold Star connects Groton and New London)
- Description of the live load – who/what travels on top of the bridge
- Description of the environmental loads that affect your bridge
- Three other interesting facts
- Your opinion – is the bridge appealing to the eye? Why? Explain in detail!
- Work Cited to give credit to your sources. You must use AT LEAST THREE sources!
 - Remember to cite sources for all information, pictures, charts, diagrams, webcams, maps, etc.!

Your model of the bridge must include labels of the following:

- Deck/roadway of the bridge
- Parts of the bridge and their function (approaches, deck, guardrails, piers, spans, trusses, abutments, cables, suspenders, towers, anchorages, etc.)
- Where & why the bridge is experiencing tension, compression, bending, shearing, and torsion.

SECTION 6

Other Possibilities:

- Develop a demonstration activity to teach your family/friends about a scientific concept.
- Design an experiment, carry it out, and analyze the results.
- Design and build an invention to make a task easier or safer.
- Read a science magazine article, summarize, and make connections/reflections on what you've read.
- Visit a science center or museum.
- Stargaze with a star chart and catalog what you saw and the significance of those objects.
- Read a book on a science topic or scientist.
- Interview a family member or neighbor who has a career in a scientific field.
- Watch a good science TV program or movie, summarize it, and make connections/reflections on what you've watched.

Scoring note: Points will be awarded based on the amount of effort required to complete the project. For example, watching and summarizing a television show may be worth one point, whereas building a 3-D model or documenting your visit to a science museum could be worth 3 points.