

Grade 9: Earth, Space and Physical Science (ALL LEVELS)

EPHS SUMMER ASSIGNMENT for 2011

GSE: PS3 (9-11) POC –9 Apply the concepts of inertia, motion, and momentum to predict and explain situations involving forces and motion, including stationary objects and collisions.

Students demonstrate an understanding of forces and motion by...

9a explaining through words, charts, diagrams, and models the effects of distance and the amount of mass on the gravitational force between objects (e.g. Universal Gravitation Law).

9b using Newton's Laws of Motion and the Law of Conservation of Momentum to predict the effect on the motion of objects.

Introduction:

Grade 9, Earth, Space and Physical Science focuses on the study of your physical environment. Although it can be quantitative at times, it is richest with the concepts that explain the essence of the mechanical universe. You probably already know some of these concepts already, but perhaps your understanding is, at times, incomplete. In September, we will start to look at some introductory detail that provides the capacity for a thorough explanation of how mechanical systems operate, and thereby expands your grasp of the physical realm.

During the summer, you are charged with initiating the process with respect to some system/phenomenon that is of particular interest to you now.

Your assignment is to photograph a system or event, either naturally occurring or human-made, and then to construct a 1000 word response in a minimum of three paragraphs, that carefully analyzes it with respect to basic physics.

Once you select the topic, your research can come from anywhere (Google to an owner's manual). Make sure you use appropriate scientific vocabulary in your writing.

Photograph: You have considerable freedom with this, here are a few guidelines:

- 1) A photo should be taken with a camera of a force in action (example: a dog running, a car stopping, amusement park ride, etc.)
- 2) You only need one photo and it should be attached to your written paper.
- 3) Feel free to manipulate the prints with Photoshop, PicNik, or other tools on the computer. If you are using film, you can also use the workstations at the local drugstores.
- 4) Artistic creativity counts, but this is not a photography assignment. Have fun with it.

Analysis:

Your response is limited to 1000 words because this is an exercise in exploring basic physics principles of your subject, not a fully integrated analysis of every single detail that might be mentioned. Remember that the goal of the entire assignment is for you to explore something of personal interest, and to discover how fundamental physics is involved. Some guidelines:

- 1) Double spacing, 12 point font, and one inch margins are to be used.
- 2) Grammar and spelling are considered.
- 3) General composition and sentence structure are assumed to reflect that of a high school student.
- 4) The foundation of your paper should be how one of Newton's Laws applies to your photo. Feel free to pick one of the three laws.
- 5) Here is a word bank of some vocabulary that may be applied to help you with your writing.
 - force
 - speed
 - acceleration
 - mass
 - Newton's first law
 - Newton's second law
 - Newton's third law
 - action
 - reaction
 - inertia
 - potential energy
 - kinetic energy
 - power
 - work
 - friction
 - momentum
 - motion