

Rising Freshmen Summer Homework – Science

Welcome to Golder College Prep! The next year will be full of exciting and engaging classes! Your freshman year of science is all about examining the environment and our relationship with it.

You may find the problems in this packet very challenging, but the goal of everything we do at Golder is to **think**. Learning is a process of growing your brain. You may need to go **find** the answers to questions you don't already know.

Directions: Complete **every** problem to the best of your ability. Write in *complete sentences*, show all math work and *take your time*. When you arrive at school in August, be prepared to discuss the work you did over the summer in class.

Suggestions:

- Each problem has multiple parts – be sure to answer as many parts as you can (they get harder as you go, so challenge yourself).
- If there are words, phrases, or concepts you don't know, *look them up* online. This assignment isn't just about remembering facts—it's about thinking about them.
- Review your homework the weekend before you start at Golder so it is fresh in your mind to discuss when you arrive on the first day. (Your first day will be August 24th!)
- If you are completely stuck and cannot figure out a problem (if this happens, then it should be *after* you have looked online for answers) you must write a minimum of three sentences answering the following questions under the problem part you did not get:
 - What is confusing about the problem?
 - What don't you know?
 - What methods did you use to find it online?

Questions?

If you have any questions while you are working on the problems, please email your future science teachers:

Ms. Rogers at srogers@goldercollegeprep.org

Ms. Whitaker at awhitaker@goldercollegeprep.org

Ms. Velasco at avelasco@goldercollegeprep.org

If you need to look up anything online and you don't have a computer, head to a Chicago Public Library with your library card (it's air conditioned!) or come to Golder's computer lab, which will be open this summer. Call the office to make sure it's open at 312.265.9925.

Have fun with these problems and get ready for an awesome year of science in 2015-16!

Sincerely,

Your future Science teachers

All summer homework can be found at pantherpage.wordpress.com.

Environment Science often uses math to calculate the impact of an event or series of events on the environment and how this affects humans. The following question requires you to use your math skills and determine the environmental impact of “e-waste”. Remember, you will most likely have to do some online searching to find the correct answers to some of the questions.

Question 1:

Approximately 30 million mobile devices were sold in 1998 in the United States. The number sold increased to 180 million devices in 2007.

- (a) **Calculate** the percent increase of mobile device sales from 1998 to 2007.
- (b) Each mobile device sold in 2007 contained an average of 0.03 gram of gold. **Calculate** the number of grams of gold that were used in the production of the mobile devices sold in 2007.
- (c) Assume that the average mass of each mobile device was 0.1 kilogram. The United States Environmental Protection Agency estimates that about 10 percent of the mobile devices sold in 2007 were recycled. **Calculate** the mass (in kilograms) of the mobile devices sold in 2007 that were not recycled.
- (d) Discarded mobile devices become part of the electronic waste stream (e-waste). Mercury is often present in e-waste. **Identify** one negative human health effect, other than death, associated with exposure to mercury.
- (e) Improper disposal of e-waste has harmed human health and caused environmental damage in developing countries.
 - (i) **State TWO** reasons why large quantities of e-waste from the United States are shipped to developing countries rather than being recycled in the United States.
 - (ii) Retailers or manufacturers could take specific steps to dramatically reduce the amount of e-waste. **Describe** a realistic change in current practices that would accomplish this.

Environmental Science also examines current government and business policies to determine their impact on humans. Read the following excerpt of an article and answer the questions that follow. Again, you may need to look online to determine the answers.

Question 2:

Natural Gas from Rock

The Marcellus Shale is a large domestic natural gas reserve that could meet the United States energy needs for 25 years. The 350-million-year-old geologic formation stretches from New York to West Virginia on land that is largely undeveloped. It was once thought that it was too difficult to extract natural gas from the Marcellus Shale, but new drilling technology allows energy companies to tap this vast reserve. The natural gas is removed by a process

called hydraulic fracturing, or fracking. During this process, the shale is drilled and millions of gallons of water, sand, and chemicals are pumped into the shale at high pressure, shattering the shale and releasing the natural gas trapped within. While some of this water remains below ground, contaminated water is also stored in ponds, trucked to wastewater treatment plants, or disposed of by spraying it on nearby land.

- (a) Identify and describe TWO water-related environmental problems associated with fracking.
- (b) Natural gas is considered to be a better fossil fuel for the environment than coal is. Discuss TWO environmental benefits of using natural gas as a fuel compared to using coal.
- (c) Describe TWO environmental drawbacks, not related to water use, of using the fracking process to extract natural gas from shale.
- (d) Describe one economic benefit to society of using fracking to obtain natural gas from shale.
- (e) Nuclear power is an alternative to using natural gas or coal as a fuel for generating electricity. However, there are also problems associated with nuclear power plants. Describe TWO negative environmental impacts associated with nuclear power.

ESSAY Read the following article about deforestation. Type a one-page response to the article and, in your essay, answer the following questions. If you don't know something in the article, look it up.

1. What is deforestation and what are its main causes?
2. Why is deforestation a problem?
3. What makes deforestation hard to solve?
4. What is your opinion on how to fix the problem of deforestation?

The Problem of Deforestation

Deforestation is clearing Earth's forests on a massive scale. It often results in damage to the quality of the land. Forest areas the size of Panama are lost each year. The world's rain forests could completely vanish in a hundred years at the current rate.

Forests are cut down for many reasons. Most of them are related to money or to people's need to provide for their families. The biggest cause of deforestation is farming. Farmers cut forests to make more room for planting crops or grazing livestock. Farmers will each clear a few acres to feed their families by cutting down trees to plant crops.

Logging businesses, which provide the world's wood and paper products, also cut many trees each year. Forests are also cut as a result of growing cities needing room.

As a good example, the nation of Haiti has suffered from deforestation for decades. People use wood as their main source of fuel for cooking. It is estimated that 30 to 40 million trees a year are cut down.

"Deforestation and poverty are very closely linked in Haiti," said Clemente Lalande, a businessman in Haiti. "It has been clearly identified in various studies as one of the main causes of poverty here. It leads to bad soil, lower farm yields, less water, less money for farmers and potentially malnutrition."

As seen in Haiti, deforestation has many negative effects on the environment. Another impact is a loss of habitat for millions of species. 70% of Earth's land animals and plants live in forests. Many cannot survive the deforestation that destroys their homes.

Deforestation also causes climate change. Forest soils are moist, but without protection from sun-blocking trees they quickly dry out. Without trees to complete the water cycle, many forest lands can quickly become barren deserts.

Trees also play a critical role in absorbing the greenhouse gases that fuel global warming. Fewer trees mean more greenhouse gases entering the atmosphere. These additional gases increase the speed and severity of global warming.

The quickest solution to deforestation would be to simply stop cutting down trees. Financial difficulties for governments and families make this unlikely to occur. They need the trees as a way to survive. The people of Haiti need wood to fuel their stoves.

To fight against deforestation, the government of Haiti is trying to plant 50 million trees each year. The global average of forest cover is 9%-12%. Haiti's forest cover is currently around 2%, one of the lowest in the world. By planting so many new trees, Haiti hopes to raise that level to 29%, the forest cover of the neighboring Dominican Republic.

"This is a Haitian problem: every Haitian is guilty. We did not fight to prevent it. We are used to it now. We live with it as a natural problem," Lalande said.