5 Steps for Tackling the Science Short Answer Prompts on the 2014 GED® Test

1. ***Read the prompt before reading the passages***
2. **Read the passages**
3. **Identify the type of question [e.g. experimental design, v. other]**
4. **If the question is an experimental design question:**
    a. **Explain in detail how the experiment should be designed**
    b. **Connect the design to the hypothesis**
    c. **Provide details on how the data will be collected including how often and how it will be tallied [e.g. data table, chart etc.]**
5. **If the question is not an experimental design question:**
    a. **Explain in detail using information from the passages the specific relationship between the organisms and why it's important**
    b. **Cite multiple pieces from the passages as evidence:**

How to Take Notes:

Using your wipe board write down the following as you read:

☑ What is the topic?
☑ What is the hypothesis? What is the experiment trying to determine? What does the passage tell me about the relationship between the two organisms?
☑ How should/will the data be collected and how often?
☑ Note what the relationship is between the two entities and how/why it's important.

Science Response Checklist:

☑ Did I state the hypothesis [if experimental design]? Did I state what the relationship is that exists between the two organisms?
☑ Did I explain what data would be collected and how often? Did I explain the significance of the relationship between the organisms using pieces of support from the passages?
☑ Did I explain my experimental design? Did I explain what might happen if the relationship is disrupted?

Experimental Design Question*:

A farmer purchased 30 acres of farmland. The farmer calculated that the *average topsoil thickness* on the farmland is about 20 centimeters.

The farmer wants to maintain the thickness of the soil on this farmland by reducing erosion. The farmer plans to test the effectiveness of two different farming methods for reducing soil erosion.

Method 1: No-till (planting crops w/o plowing soil)
Method 2 Winter cover crop (growing plants during the winter that are plowed into the soil in the spring)

The farmer hypothesizes that using either method will reduce erosion compared to using traditional farming methods (plowing and no cover crop)

PROMPT:
Design a controlled experiment that the farmer can use to test this hypothesis. Include descriptions of data collection and how the farmer will determine whether his hypothesis is correct.

Type your response in the box. This task may require approximately 10 minutes to complete.

Example Responses*:

Example #1:
The farmer's hypothesis is to determine which farming method will reduce erosion compared to the traditional farming method. Since the farmer has 30 acres, he could divide his acreage into three parts. On the first 10 acres, he would farm using traditional methods (plowing and no cover crop) and measure the soil thickness each month. The second 10 acres, he would farm with method 1 and the third 10 acres he would farm using method 2, measuring each every month.

Since he knows the average topsoil thickness is 20 centimeters, he would measure the topsoil thickness for each (traditional farming, method 1 and method 2) and put the data into a lab table each month for each method. At the end of the planting season (or one-year) he would have collected enough data to determine which method reduces erosion and therefore which one confirms his hypothesis.

Example #2:
The farmer would have to set up 3 experiments. The first would be a year's worth of traditional farming methods (plowing and no cover crop) on 5 x 5 acres of land. He would have to measure the topsoil in every month throughout the year and record it in a lab table. For the second experiment, the farmer would have to farm a plot of land 5 x 5 acres using a no-till plan. He would have to measure the topsoil every month for a year and record it in a data table.

Finally, the farmer would farm a 5 x 5 acres of land with winter cover crop and measure the topsoil every month and record it in a lab table. At the end of the year the farmer would have to compare the two methods against the traditional method and determine if he is correct.

Other Type of Science Example*:

*Tropical rain forests contain diverse communities of organisms with many interesting relationships. One such relationship connects parasitic fugi and their insect hosts. A type of parasitic fungus, called Ophiocordyceps unilateralis, disperses spores onto the forest floor, but cannot successfully grow on the ground. The fungus requires specific conditions and must grow inside of a specific ant species, called the host, to reproduce. The ants, various species of carpenter ant, make nests in the trees.

O. Unilateralis feeds on and grows inside the insect host, and within a few days the fungus affects the insect's brain. The insect exhibits unusual behaviors such as wandering away from the colony to where light and humidity favor fungal growth. Just before dying, the insect bites into and firmly attaches itself to a plant. Then, the fungus slowly grows outward from the dead insect's head, producing a pod of spores that eventually bursts open. The spores fall to the ground, restarting the life cycle of the fungus.

Though this relationship may sound gruesome, researchers note that these parasitic fungi may help maintain biodiversity in the tropical rain forest. Some parasitic fungi may be host-specific, meaning that a fungus species only infects a particular type of insect. Scientists have observed that if an insect population begins to grow, more fungal infections occur, and then the insect population levels off again. This relationship may prevent overpopulation of the habitat by anyone insect species.

PROMPT:

Deforestation, or clearing away trees, is occurring in tropical rain forests.

Explain how deforestation could disrupt the life cycle of Ophiocordyceps unilateralis in tropical rain forests. Include multiple pieces of evidence from the test to support your answer.

Type your response in the box. This task may require approximately 10 minutes to complete

Example Responses:

Example #1*:

[i]Deforestation destroys the environment where thousands of species of animals flourish including Ophiocordyceps unilateralis. Ophiocordyceps rely heavily on the environment to survive for two major reasons. First of all, Ophiocordyceps often find hosts in carpenter ants, which build their nests high up in the trees of the rain forests. When deforestation occurs, carpenter ants lose their nests and homes which would likely result in the diminishment of their species. This would disrupt the Ophiocordyceps species significantly as Ophiocordyceps cannot survive without a host—without the carpenter ants there would be no Ophiocordyceps. The other reason that Ophiocordyceps would suffer is because without the trees, there would be

nothing for them to climb to reach greater amounts of light and less humidity. While lack of trees would lead to more light reaching the ground, the issue of humidity affecting the Ophiocordyceps exists. With tall trees, the Ophiocordyceps are able to reach heights with less humidity but deforestation would leave the Ophiocordyceps without a way to escape the humidity ultimately slowing the growth of the fungus. In conclusion, deforestation would have a very significant impact on the life cycle of the Ophiocordyceps for without trees there would be no hosts for the Ophiocordyceps to grow and without a way to escape the humidity there would be a slowing of growth.

Example #2:

There is a unique relationship between carpenter ants and Ophiocordyceps unilateralis a parasitic fungus. Ophiocordyceps unilateralis needs the carpenter ants as a host element as well as light and humidity in order to grow. The carpenter ants make their nests in the trees of the rain forests and grow in colonies. Deforestation, or the cutting down of trees, would hurt both species since the ants need the trees to survive and Ophiocordyceps unilateralis needs the ants to survive. If the trees are eliminated then Ophiocordyceps unilateralis cannot rely on its host—the carpenter ant to wander away from the colony to areas that favor light and humidity. It also cannot use the ant as its host since it also requires the ant to bite and attach itself to the plant to produce plant spores to continue its life cycle. Lastly, the carpenter ant populations will not be held in check since Ophiocordyceps unilateralis may prevent overpopulation of the ants. The overproduction of Ophiocordyceps unilateralis could also result in a reduction of other plant species that inhabit the rain forests.

[i] *2014 GED® Test-Science: Short Answer Resource Guide for Adult Educators