Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Non-Fiction Writing**

***Learning Target: I can explain differences between realistic fiction and non-fiction writing.***

Exercise in Space

1. Why does the video compare being in space to lying in bed?
2. To tell how an astronaut needs sleep
3. To describe how an astronaut floats in space
4. To explain that an astronaut’s work is very difficult
5. To show how an astronaut’s body lacks gravity to help it work
6. Explain why exercise is important for astronauts while they are in space. Use two details from the video to support your answer.

**Diamonds in the Sky**

Stars are not the only objects that glitter in the dark night sky. Scientists have discovered that diamonds are plentiful in outer space. Some of these space diamonds are called “nanodiamonds” because they are incredibly small. A nanodiamond is millions of times smaller than a grain of sugar—more or less the size of a strand of DNA. Nanodiamonds are stardust, created when ancient stars exploded long ago, disgorging their remaining elements into space. Other space diamonds are huge—the size of whole planets—while some may exist in liquid or frozen form. Scientists even suggest that planets in our own solar system may have oceans filled with chunks of frozen diamond “ice.”

Diamonds are so common throughout the universe because they are a pure form of one of the universe’s most common elements: carbon. Diamonds have a number of amazing properties: they are extremely hard and transparent, and can withstand radioactivity, corrosive acids, and other powerful forces. Diamonds conduct electricity more readily than copper, and are also the best natural conductor of heat that we know of—which is why diamonds feel cool to the touch. Like a prism, diamonds produce rainbows from white light. The melting point of a diamond, 7,362 degrees Fahrenheit, is higher than that of any other known substance.

Graphite and diamonds share the same chemistry—both are carbon. The difference lies in the arrangement of the carbon atoms, known as their “molecular structure.” Extreme forces are required to transform dark, soft graphite—the stuff used in pencil lead—into hard, brilliant diamonds. A diamond is formed when carbon is exposed to immense pressure and extreme heat—conditions found hundreds of miles below the surface of the Earth, where most natural diamonds are formed. The heat and pressure squeeze the carbon atoms into a dense, crystalline structure. In the comic books, Superman could create a diamond by simply squeezing carbon in his bare hands, but it normally takes billions of years for carbon to become a diamond.

In space, diamonds are born more quickly. Scientists believe space diamonds often crystallize in no more than a millionth of a millionth of a second, when dust grains containing carbon smash together at extremely high speeds. Another hypothesis for how space diamonds are formed involves the shock waves released by an exploding star, which cook and compress carbon dust until it becomes a diamond.

In the 1980s, geologists discovered microscopic diamonds embedded in meteorites that had fallen out of the sky, some with the same chemistry as natural diamonds found on earth. Scientists believe these diamonds were created when meteorites collided with asteroids in our solar system. Other diamonds found inside meteorites, however, contain a mixture of xenon gas found only in outer space. These diamonds are useful to scientists because they provide clues about the composition of stars and the history of the universe.

A rare form of diamond found in Brazil and the Central African Republic—called a “carbonado diamond” because of its black color—also appears to have extraterrestrial origins. The hydrogen found in these diamonds indicates that they were probably formed in hydrogen-rich interstellar space. Scientists believe that these black diamonds were once the size of asteroids before they exploded upon impact with the Earth’s surface.

Astronomers studying Uranus and Neptune think that diamond icebergs may drift in sparkling diamond oceans on these carbon-rich planets. While this sounds incredible, scientists have discovered that, given the right conditions, it is possible to liquefy a diamond. To test this, nuclear scientists used lasers to recreate the extremely high heat and pressure of Uranus and Neptune. Using a normal diamond, they heated it to a temperature of 50,000 degrees and applied pressure equal to 11 million times the pressure on Earth. Under these conditions, the diamond first melted, then froze into icy chunks. In this way, scientists proved that diamonds can melt, freeze, and behave like water.

Scientists have even discovered a diamond planet in our galaxy, 4,000 light years from earth and about five times larger than our own planet. It is heavier than Jupiter, the largest planet in our solar system. Astronomers believe that this diamond planet formed when the carbon core of a massive star collapsed and became a diamond under intense gravitational pressure.

Besides being beautiful to contemplate, space diamonds teach us important lessons about natural processes going on in the universe, and suggest new ways that diamonds can be created here on Earth.

Diamonds in the Sky

1. Read the sentence from the text. Then answer the question.

*“Nanodiamons are stardust, created when ancient stars exploded long ago, disgorging their remaining elements into space.”*

Based on the context of the sentence, what is the most precise meaning of disgorging?

1. Scattering randomly
2. Throwing out quickly
3. Spreading out widely
4. Casting forth violently
5. Which of the following **best** identifies what the discovery of diamond icebergs teaches us about the nature and properties of diamonds?
6. Diamonds have a changeable matter
7. Diamonds can reach sizes larger and heavier than the earth
8. Diamonds found on earth can originate from distant parts of space
9. Diamonds help scientists better understand the formation of galaxies
10. Read this sentence from the passage.

*“Besides being beautiful to contemplate, space diamonds teach us important lessons about natural processes going on in the universe, and suggest new ways that diamonds can be created here on earth.”*

Explain how information learned from space diamonds can help scientists make diamonds on Earth. Use evidence from the passage to support your answer.

The following paragraph is an excerpt from a student's report about plant life in the southern United States. After reading the paragraph, you will identify details that are unnecessary and explain why they should be removed.

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| **The Invasion of Kudzu**    In 1876, Philadelphia, Pennsylvania, hosted the Centennial Exposition in honor of the country’s 100th birthday. The Japanese constructed one of the most popular exhibits, primarily due to an amazing vine called *kudzu*. For centuries, the Japanese used the pea vine for many purposes, including medicine, but what attracted the Americans the most were the sweet-smelling purple flowers that covered the vine. The warm, moist climate of the southern states—from Georgia to Florida and north to the Carolinas—was the most hospitable part of the US for the vine. Temperatures in Georgia can reach into the 90s, and the humidity is often above 90%. Residents all over the southeast began planting kudzu. The vine’s success caught the attention of many, including Channing Cope who promoted its use for erosion control and animal feed, especially during the Great Depression. Because of the depression, many homes were left abandoned, so there was not anyone to care for them and keep the plants properly groomed. No one predicted, however, that the vine would end up taking over. The vines slowly engulfed pine forests, telephone poles, and even houses, leading to the destruction of native plant life. Pines are not the only trees in the South, however. There are about 250 species of trees in Georgia alone. As kudzu out-competed the local plants, it deprived them of nutrients and, especially, sunlight. Kudzu now covers over 7 million acres of land, and it continues to expand at the rate of 150,000 acres annually. That is almost one foot per day! Attempts to kill it have proven difficult, as it is immune to most herbicides; thus, kudzu continues to smother the southern states. Researchers continue to search for a solution to “the vine that ate the South,” but the answer is nowhere in sight. |

The Invasion of Kudru

In the space below, identify the sentences from the paragraph that are unnecessary, and briefly explain why each should be removed.