Pre-Test Writing Assessment

Fifth Grade

Informative/Explanatory Prompt

Name _____

Ocean Exploration

Source #1

Oceans: Earth's Final Frontier

In the past 50 years, explorers have set their sights on the stars. Our ships have orbited Jupiter, Saturn, Venus, and Mercury. However, many scientists believe explorers should now turn their attention down instead of up. According to these experts, the oceans are Earth's last unexplored frontier.

Seventy percent of our planet lies under water. This "world ocean" consists of the Pacific, our largest ocean, followed by the Atlantic, Indian, Southern, and Arctic Oceans. We have explored less than 5 percent of these waters. In fact, we have better maps of the surface of Mars than we do of our oceans.

Underwater Geography

What's so exciting about exploring the bottom of the ocean? Actually, the ocean bottom contains as many different features as our continents.

- **Mountains** - The longest mountain range in the world is completely under water. Called the Mid-Atlantic Ridge, it stretches for more than 35,000 miles. This chain of mountains runs across the Atlantic Ocean and into parts of the Indian and Pacific Oceans.
- **Valleys** - The ocean also contains deep valleys. The deepest place on Earth—the Mariana Trench—plunges seven miles below sea level.
- **Seamounts** - The ocean also features unusual forms we do not see on land. Pillars of rock and minerals stretch several stories high. Chimneys spout acid into the water. Seamounts, or underwater volcanoes, spew mud and gas into the sea.
- **Hydrothermal Vents** - These holes on the ocean bottom eject material heated by the earth's core. Vents warm the surrounding waters from a chilly 37 degrees up to 392 degrees. In addition to the vents, the ocean contains hot springs that shoot out 650-degree water—hot enough to melt lead.

Strange Sea Creatures

Many of these unique habitats have alien-like creatures living there. Scientists have discovered 160-foot jelly creatures living around hydrothermal vents. Living near hot springs are 10-foot-tall tubeworms and giant clams. We have learned of these life forms only recently. Many creatures have yet to be found. This makes sense because the ocean is Earth's largest habitat.

Many of these creatures live at the greatest depths, which pose the most dangers to human divers. Some, like the frilled shark, may hold clues to our planet's past.

Measuring more than 5 feet long, the frilled shark swims about 5,000 feet below the surface. Scientists include this creature in a group called "living fossils"—animals similar to those who swam the seas during the time of the dinosaurs.

The deepest ocean-dweller discovered so far might be the fangtooth fish.

Sometimes found only 6,500 feet down, its habitat extends to the icy waters 16,500 feet below the surface. The fangtooth may only be about 6 inches long,

but it looks as scary as its name. Its long, pointed teeth are the largest of any other fish its size.

At 8 inches long, the creepy-looking Pacific viperfish has jagged teeth that look like needles. It swims 13,000 feet down into the darkness, luring its prey with luminous dots on its belly. Most creatures living deep in the ocean have a glow-in-the- dark feature. It can be used to communicate, to attract prey, or for defense. This feature is called bioluminescence, a chemical reaction within an organism that produces light.

Exploring the oceans may lead us to discover many new land forms and animals. Scientists also hope it will help us learn more about the planet, and even about ourselves. Studying hot springs and vents could help us discover new ways to produce energy. Other findings could lead to new medical treatments. We could also study creatures that survive in strange habitats—without heat, light, or oxygen. This could help us discover new ways to survive here on Earth—or even among the stars.

Source #2

Dive Technology

To explore the oceans, divers have to overcome hazards to human life. These include extreme darkness, freezing cold temperatures, and crushing water pressures. Through the years, inventors have tackled these challenges to make advances in underwater technology.

The Aqualung

In the 1940s, ocean explorer Jacques Cousteau helped invent the Aqualung. This device allowed divers to breathe under water. The Aqualung was a metal oxygen tank attached to a breathing tube that controlled the flow of oxygen. It was strapped with a harness to a diver's back. Scientists have since improved upon this invention, now known as SCUBA, for Self Contained Underwater Breathing Apparatus.

The Jim Suit

Even the most experienced scuba divers can go down only 130 feet for 10 minutes. To go beyond these limits, inventors created the Jim Suit. Based on astronauts' space suits, the Jim Suit protects wearers from deadly water pressure and contains built-in oxygen. In 1979, ocean scientist Sylvia Earle tested the Jim Suit in a record-breaking dive. She explored the ocean floor 1,250 feet below the surface for 1½ hours.

The *Deepsea Challenger*

In 2012, filmmaker James Cameron introduced his new invention: a one-person submarine called *The Deepsea Challenger*. Before, the deepest a submarine could travel was 4 miles down. Cameron broke this record when he took *The Deepsea Challenger* to the bottom of the Mariana Trench. Seven miles down, it is the deepest place on Earth.

Cameron's design is an example of advanced technology because it sits vertically in the water. This allows the sub to descend faster, rotating as it goes to keep it on course. *The Deepsea Challenger* has lights, 3-D cameras, and a scooper arm to collect samples. This revolutionary invention could transform ocean exploration.

Source #3

Lights, Camera, Invention!

In 2012, the only vehicle able to take people to the deep sea was almost 50 years old. What would it take to reinvent the **submersible**[1]? As it turns out, a film director.

James Cameron is most famous for award-winning films like *Titanic* and *Avatar.* He sometimes jokes that he makes blockbuster movies to support his passion for exploring the seas. His filmmaking fortune did help him fund his revolutionary invention: *The Deepsea Challenger,* a one-man submersible that in 2012 traveled to the deepest place on Earth. However, Cameron's passion for ocean technology did not begin here.

In 1989, Cameron directed *The Abyss*, a science fiction movie in which characters traveled to the ocean depths. During filming, he introduced new ways of using cameras under water. Later, he controlled his robotic cameras inside the wreck of the sunken ship *Bismarck*. During the making of *Titanic*, Cameron made many dives to the wreck of the actual ship.

In this way, Cameron has been able to make films and advance underwater technology at the same time. He can use his ideas right away and study the results. Perhaps it is this combination of skill and creative thinking that has allowed Cameron to design submersibles in a new way.

With *The Deepsea Challenger,* Cameron has literally "upended" the design.

Instead of traveling horizontally, his sub moves vertically, like a torpedo. This makes the ship much faster. He replaced the heavy steel shell with a lightweight foam structure. This allows the ship to rise quickly from the bottom. And he put the thrusters on the top, rather than the bottom. This prevents the craft from stirring up the seabed. Now the pilot (and cameras!) can clearly see the ocean floor.

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submersible[1]—submarine

Directions:

The passages were about exploring the oceans through technology. Write an informative essay in which you explain how technology has helped explorers overcome challenges related to deep-sea exploration. Use information from the sources in your essay.

Manage your time carefully so that you can:

- Read the passages;
- Plan your responses;
- Write your response; and
- Revise and edit your response..

Be sure to include:

- an introduction
- support for your controlling idea using information from the passages; and
- a conclusion that is related to your controlling idea.

Your writing should be in the form of a well-organized, multi paragraph essay.

Planning Sheet