Name _____

Date _____

Submarines

Unafraid of the dark? Not bothered by tight spaces? Okay with being deep underwater? If so, life aboard a submarine might be for you. A submarine (or "sub" for short) is a boat that can dive deep into the ocean. Once there, it can stay submerged for days, weeks—even months at a time. Pretty incredible, huh? Subs have several key components that enable them to accomplish this amazing feat.

Hull

A sub's hull contains everything (crew, engine, supplies, equipment) inside the sub. The hull is shaped like a tube, which allows the sub to glide through the water. Made of steel or titanium, sub hulls are super strong. They need to be. That's because there's a lot of pressure underwater. The deeper the sub goes, the higher the pressure becomes.

Planes

Birds have wings. Subs have planes. The planes look and act like wings. The sub's planes can be tilted to change the direction the sub moves through the water. By tilting the planes down, the pilot can make the sub point up. By tilting the planes up, the pilot can make the sub point down.

Tanks

While the planes help the sub point up or down, it's the tanks that control how *buoyant* the sub is. The tanks can be filled with air or water. If the sub wants to float at the surface, the tanks are filled with air. If the sub wants to dive deep underwater, the tanks are filled with water.

Engine

Subs don't use gas engines. That's because gas engines need air to work. Instead of gas engines, subs use electric motors. In more advanced subs, nuclear power is used.

Tower

Subs are shaped like tubes. But they *do* have a single tower that pokes up from the top. This tower is very important, as it contains the sub's navigation system. This gives information to the sub pilot about the sub's precise location, as well as the location of the objects around it

1) As used in paragraph 1, the word **components** means

A. parts

B. rules

C. wings

D. buttons

2) Which of the following is NOT discussed in the passage?

A. the engine

B. the hull

C. the planes

D. the propeller

3) According to the passage, a sub's hull MIGHT be made of

A. wood

B. iron

C. titanium

D. silver

4) Using the information in the section titled "Hull" as a guide, which of the following statements is correct?

A. The pressure at 58 meters below sea level is **lower** than the pressure at 71 meters below sea level.

B. The pressure at 389 meters below sea level is **lower** than the pressure at 340 meters below sea level.

C. The pressure at 9 meters below sea level is **higher** than the pressure at 28 meters below sea level.

D. The pressure at 195 meters below sea level is **higher** than the pressure at 198 meters below sea level.

5) Imagine the sub pilot wants to make the sub dive. How does he or she do this?

A. Tilt the planes down and fill the tanks with air.

B. Tilt the planes up and fill the tanks with air.

C. Tilt the planes down and fill the tanks with water.

D. Tilt the planes up and fill the tanks with water.

6) Read the following sentence. Then answer the question below.

Neither electric motors nor nuclear power plants need air to work, which makes them perfect for use underwater.

If added to the passage, where would this sentence fit best?

A. in the section titled, "Hull"

B. in the section titled, "Planes"

C. in the section titled, "Engine"

D. in the section titled, "Tower"

7) As used in the section titled "Tower," which of these words is closest in meaning to **navigation**?

A. shape

B. location

C. tube

D. submarine

8) What part of the submarine do you think is most important? Explain your thinking.

Answers and Explanations

1) A
Core Standard: Craft and Structure

component *(noun):* a part, element, or ingredient.

In paragraph 1, we read that "Subs have several key components" that enable them to go underwater. In the remainder of the passage, we learn about the various parts that enable them to go underwater. Using this information, we can understand that components are parts. Therefore **(A)** is correct.

The passage does not provide evidence to support choices **(B)**, **(C)**, and **(D)**. Therefore they are incorrect.

2) D
Core Standard: Craft and Structure

To answer this question, we need to use the process of elimination. The passage talks about the hull, planes, tanks, the engine, and the tower, in that order. It does not mention the propeller. Since we are looking for the exception, choice **(D)** is correct.

The passage does discuss the engine, hull, and planes. Therefore choices **(A)**, **(B)**, and **(C)** are incorrect.

3) C
Core Standard: Key Ideas and Details

Under the section titled "Hull," we read: "Made of steel or titanium, sub hulls are super strong." This lets us know that choice **(C)** is correct.

The passage does not provide information to support choices **(A)**, **(B)**, and **(D)**. Therefore they are incorrect.

4) A
Core Standard: Integration of Knowledge

In the section titled "Hull," we learn that "The deeper the sub goes, the higher the pressure becomes." Since choice **(A)** presents a case in which this is true, it is correct.

Choices **(B)**, **(C)**, and **(D)** each present a case in which violate the principle stated in the passage. Therefore they are incorrect.

5) D
Core Standard: Integration of Knowledge

In the section titled "Planes," we learn that "The sub's planes can be tilted to change the direction the sub moves through the water. By tilting the planes down, the pilot can make the sub point up. By tilting the planes up, the pilot can make the sub point down." In the section titled "Tanks," we learn that the tanks "control how buoyant the sub is...If the sub wants to float at the surface, the tanks are filled with air. If the sub wants to dive deep underwater, the tanks are filled with water." By tilting the planes up, the pilot makes the sub point down. By filling the tanks with water, the pilot makes the sub dive deep underwater. This supports choice **(D)**. Therefore it is correct.

The passage does not provide evidence to support choices **(A)**, **(B)**, and **(C)**. Therefore they are incorrect.

6) C
Core Standard: Integration of Knowledge

In the section titled "Engine," we learn that gas engines are not used in subs because they "need air to work." Since the sentence in question speaks directly to why electric motors and nuclear power is used in place of gas engines, we can understand that this information would fit best in this section. Therefore choice **(C)** is correct.

The passage does not provide evidence to support choices **(A)**, **(B)**, and **(D)**. Therefore they are incorrect.

7) B
Core Standard: Craft and Structure

In the section titled "Tower," we learn that the tower "contains the sub's navigation system. This gives information to the sub pilot about the sub's precise location, as well as the location of objects around it." The passage states that the navigation system gives information about the location of the sub as well as the the objects around it. This lets us know that the word "navigation" is closest in meaning to location. Therefore choice **(B)** is correct.

The passage does not provide evidence to support choices **(A)**, **(C)**, and **(D)**. Therefore they are incorrect.