

12th Grade

English WEEK 1: Fall Semester

Before Reading

In what ways does water (or lack of it) impact your life on a day-to-day basis? Write a thoughtful paragraph in response to this question. Support your answer with examples and explanations that show an awareness of your dependence on natural resources.

Read

- Read “Water Is Everything!”
- Highlight the text as you read for main ideas and important details.

After Reading

Answer questions 1-10. Your answer to question #10 must be in ACE IT! format (see attached).

More Reading

- Read “How We Ruined the Oceans”
- Annotate the text of the article as you read with both a highlighter and a pen/pencil. Highlight information that you find interesting and important. Write comments about what you have highlighted, such as why it matters, what it relates to, and any other thoughts or questions that come to mind.

Writing

The following prompt relates to both the reading passages as well as your own ideas about what you have read. Your paragraph should be as clearly focused, well organized, and carefully written as you can make it.

The article “Water is Everything” begins with a simple statement: “Water is vital for our existence.” With that in mind, write a paragraph in which you predict what the future holds for our oceans. Cite quotes or references from the texts as evidence in support of your prediction. Explain your evidence clearly and tell how it supports your claim. Begin your paragraph with a topic sentence, argue your point thoroughly, and end with a concluding sentence.

Water Is Everything!



Water is vital for our existence. Not only do we drink it for survival, the majority of the human body is also composed of water. The earth's weather patterns are closely linked to water too, as they are determined by the complex patterns of changes and movement of water in the atmosphere. Since the ocean covers 70% of the earth's surface, it plays a major role determining what happens in the environment. One of its most important roles is distributing the heat around the world; it soaks up energy in the form of heat, and releases it more evenly across the earth.

Water and Temperature

Since the ocean is so effective at absorbing heat, the first few meters of the ocean's surface hold as much heat as the earth's entire atmosphere. But how does water control the earth's weather? First, it's important to know that the temperature of the water in the ocean and its salt content affect the water's density. So the saltier or the colder the water, the denser it is. Denser water sinks to the bottom of the ocean, while less dense water floats at the surface. The temperature of water is closely related to ocean currents, since the former affects the latter.

Ocean Currents

Simply put, ice triggers the movement of ocean currents. As water freezes in the North and South Poles, the water surrounding the ice becomes saltier and colder, since the salt leaves the water upon freezing. The ice then cools the water surrounding it. The cold, salty water then sinks due to its increased density. Once it gets to the bottom of the ocean floor, it has to move somewhere, so it travels horizontally to spread out over the surface of the earth. This is cold current. Warm water replaces it on the surface and moves to the North. This motion is called the global conveyor belt. The global conveyor belt is a global-wide current that circulates cold and warm water around the earth. So, the warm water that replaces the cold on the surface travels northward, increasing the temperature of the Atlantic Ocean. That's why countries that border the Atlantic Ocean are relatively warmer than landlocked countries during the wintertime.

However, the cold water doesn't always stay at the bottom of the ocean. Instead, it comes up at different places around the globe called upwelling. Since the ocean floor contains many nutrients important for survival, the cold water that rises to the surface brings these nutrients with it, attracting all forms of life. Usually every level of the food chain is present at these upwellings, making them great spots for fishing. In fact, upwellings are common in areas where winds blow water away from the surface. In coastal areas, sometimes winds (called longshore winds) blow perpendicular to the land over the ocean, pushing the warm water away from the coast. This allows the cold water at the bottom to rise up and replace the warmer water. Therefore, some coastal areas are effective places to fish due to the upwelling that attracts more fish to the area.

The Global Conveyor Belt

As previously mentioned, the global conveyor belt describes the current that runs throughout the earth's waters, driven by the cold waters at the poles. The "belt" starts in the North Atlantic Ocean, where the cold water that surrounds the ice sinks, and starts to flow around the world. A current is created as warm water rushes to the surface to replace the sinking cold water. The cold, dense water moves southward in between the continents toward South America and Africa—and as it passes the equator, the water warms. As the water passes Antarctica, it is re-cooled by the ice near the South Pole. It continues to move on from there and splits into two paths: one that veers off toward the Indian Ocean, and the other toward

the Pacific Ocean. These two paths gradually warm up as they travel northward, causing them to rise to the surface (which, as we know, is called an upwelling). The currents eventually return to the North Atlantic, where the journey begins again. Although the path of the global conveyor belt can be quickly explained, the actual travel time occurs very slowly—the waters travel at slow speeds when compared to tidal currents.

Ocean Currents and Climate

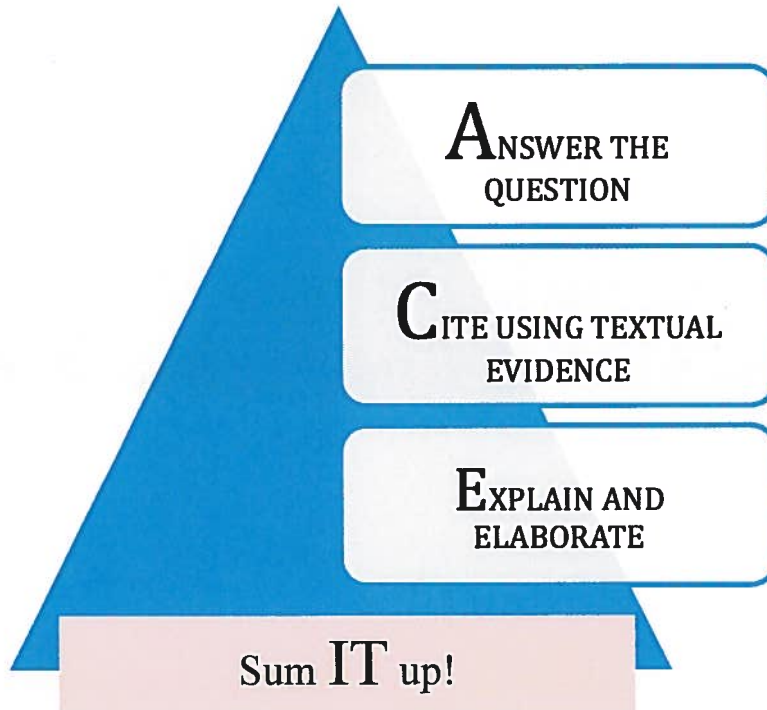
The effect that ocean currents have on the earth's climate is still being studied by scientists around the world, but we know a few things for sure. The ocean plays a huge role in redistributing heat around the globe, like we previously explained. However, there are certain ocean currents, like the Gulf Stream (which is part of the global conveyor belt) that have a direct effect on the climates of countries they pass. The Gulf Stream travels past the Caribbean and Florida, carrying warm water, then turns off to the right toward Europe—specifically England and Ireland. That's why the northeastern part of the United States and Canada has a cooler climate; the Gulf Stream doesn't bring warm water to its shores, causing colder temperatures. And since the direction of currents is always affected by wind direction (like we previously described with upwellings), climate is indirectly affected by wind as well.

Global Warming

The gradual increase of the earth's temperature has been a topic of much debate for several years as scientists discover more and more about the phenomenon. Global warming is caused mainly by an increase in carbon dioxide levels in the atmosphere. This increase can potentially cause the ice caps in the North and South Poles to melt, disrupting the global conveyor belt. Even though the phenomenon is called "global warming," it is more accurately described as climate change—if the ice caps melt, there will be less dense water to move around the globe. And if there's less dense (and therefore cold) water to circulate around the earth, the Gulf Stream will be slowed down. This will result in a cooling of the Caribbean and Western Europe. So, even though we call it global warming, it can also result in colder temperatures in some areas. That's why we must always be careful to take care of the environment—the earth's temperature is carefully maintained by specific mechanisms. We sure wouldn't want to disrupt them!

Written Response Success!

ACE IT!



- **A**nswer the question, including name of text & author (or name of historical event & important player(s), or specific step of a science experiment, etc.) in the first half of the sentence.
- **C**ite a quote or reference from the text. First introduce the quote or evidence. Last, include page or paragraph number at the end in parentheses.
- **E**xplain, elaborate and comment on how the quote or information supports the topic sentence [2 sentences].
- **IT** is necessary to conclude/sum up your written response.

Name: _____ Date: _____

1. Cold water rises from the bottom of the ocean to the surface of the ocean at different places around the globe. What is this process called?

- A) global warming
- B) climate change
- C) upwelling
- D) cold water current

2. How does the author describe the global conveyor belt?

- A) the cooling of the Caribbean and Western Europe
- B) the role the ocean plays in redistributing heat around the globe
- C) a globe-wide current that circulates cold and warm water around the earth
- D) cold water rising from the bottom of the ocean to the surface of the ocean at different places around the globe

3. Ocean currents have an effect on the earth's climate.

What evidence from the passage supports this conclusion?

- A) Some ocean currents, like the Gulf Stream, have a direct effect on the climates of the countries they pass.
- B) The gradual increase of the earth's temperature has been a topic of much debate.
- C) Cold water does not always stay at the bottom of the ocean.
- D) As water freezes in the North and South Poles, the water surrounding the ice becomes saltier and colder.

4. Based on the passage, why is the global conveyor belt important?

- A) It helps the ocean absorb heat from the countries which it surrounds.
- B) It circulates the warm and cold water that regulate the temperature of the earth.
- C) It helps the polar ice caps stay frozen. This ice triggers the movement of ocean currents.
- D) It is the cause of upwellings that provide nutrients to various forms of life in the ocean.

5. What is this passage mostly about?

- A) the effects of global warming on the future of the planet
- B) the human need to stay hydrated
- C) the excellent fishing on the Gulf Stream
- D) the role of the ocean's currents in maintaining the earth's temperature

6. Read the following sentences from the passage: "Water is **vital** for our existence. Not only do we drink it for survival, the majority of the human body is also composed of water."

As used in the passage, what does the word "**vital**" mean?

- A) unimportant
- B) essential
- C) additional
- D) minor

7. Choose the answer that best completes the sentence below.

When ice freezes, the water around it becomes saltier and colder. _____, its density increases.

- A) Therefore
- B) On the other hand
- C) In contrast
- D) Especially

8. Explain how ice in the North and South Poles triggers the movement of ocean currents.

How We Ruined the Oceans

The Week 2/14/15

Why are the oceans in trouble?

They can no longer absorb the damage inflicted by the 7 billion people on Earth. Over many decades, the human race has overfished key species to near extinction, and polluted them with carbon dioxide emissions, toxic chemicals, garbage, and discarded plastics. A groundbreaking new study, recently published in *Science*, warned that our oceans are being irreparably damaged by human activity and could be on "the precipice of a major extinction event." Coral reefs, home to a quarter of the ocean's fish, have declined by 40 percent worldwide. Stocks of swordfish, yellowfin tuna, and other large fish that people avidly eat are down by 90 percent. Marine scientists say that if mankind does not dramatically change how it treats the oceans and their inhabitants, many marine species will become extinct — with catastrophic consequences for the food chain. "If by the end of the century we're not off the business-as-usual curve," says Stanford University marine ecologist Stephen Palumbi, one of the report's authors, "there's not much hope for normal ecosystems in the ocean."

How does global warming affect fish?

As the oceans heat up, many species are migrating to cooler waters to survive. Some inevitably will fail in these new habitats. Warmer temperatures also make coral reefs more vulnerable to "bleaching," a chemical process that drains the organisms of their brilliant colors and leads to their death. Other problems are caused directly by the burning of fossil fuels. With oceans absorbing a quarter of the world's CO₂ emissions, they have become 30 percent more acidic, causing inhibited shell growth in coral and crustaceans and reproductive disorders in fish. Power plant emissions — especially from burning coal — put tons of highly toxic mercury in the air, which settles into the ocean. The mercury is taken up by sea creatures and concentrated in predatory species. A recent study found that mercury levels in Pacific yellowfin tuna have been rising at a rate of 3.8 percent a year since 1998. "If it keeps going like that," says co-author Carl Lamborg, eventually almost "every kind of fish is going to be potentially hazardous."

What about plastic?

Our oceans contain an estimated 5.25 trillion pieces of plastic — most of them less than 5 millimeters wide — weighing a total of 269,000 tons. A lot of this detritus, which mostly comes from plastic bottles and discarded commercial fishing gear, has collected in vast systems of rotating ocean currents, known as gyres. The largest such collection, the "Great Pacific Garbage Patch," covers an area twice the size of Texas. The mostly tiny pieces of plastic in this and other patches contain many potentially hazardous chemicals, and are being eaten by fish and birds that mistake them for plankton or small fish. As smaller animals are eaten in turn by predatory fish, the plastic becomes more concentrated and winds up in people who eat seafood.

Can't we remove all the plastic?

No chance. The National Oceanic and Atmospheric Administration estimates that to clean less than 1 percent of the North Pacific it would take 68 ships, working 10-hour days, a whole year. A skimming operation of that scope would also suck up tons of marine creatures. And with global plastic production doubling every 10 years, "there's no way to keep up," says Chris Wilcox of Australia's national science agency. "It would be as if you were vacuuming your living room, and I'm standing at the doorway with a bag of dust and a fan."

How big a problem is overfishing?

Since fishing became industrialized just over a century ago, most commercial species have been reduced by more than 75 percent — and some by 99 percent. As stocks dwindle, fishing fleets are increasingly resorting to "bottom trawling," a hugely destructive technique that involves dragging a large net up to 60 meters wide along the seabed, scooping up everything in its path. Most countries now have fishing quotas, but they're hard to enforce: An estimated 1 in 5 fish sold in a shop or served in a restaurant has been caught illegally.

Why aren't we doing more?

Like global warming, the plight of our oceans is an issue that affects every country in the world. But with each government beholden to its own voters — and its own fishing, plastic, and energy lobbies — it's almost impossible to achieve any consensus. Ecologists insist it's not too late to solve the problems affecting our oceans. Some schemes, such as the introduction of "safe zones" where fish can naturally replenish, have worked on a small scale and could be expanded. The authors of the *Science* study say it's possible to reverse the current crisis, but political will is required. "The next several decades," they say, "will be those in which we choose the fate of the future of marine wildlife."

The dangers of a fishy diet

For decades, doctors and health officials have encouraged people to eat as much seafood as possible because of fish's high levels of omega-3 fatty acids, which are good for heart and brain health. But in recent years that recommendation has been tempered, as emissions from factories and power plants have pushed mercury concentrations in oceans and fish up to potentially dangerous levels. Mercury is highly toxic and can cause neurological damage and accumulate in organs; in children and fetuses, it can lead to long-term cognitive disorders. Last year, the FDA updated its advice on fish to say that pregnant women and children should avoid eating tilefish, shark, swordfish, and king mackerel, and limit their consumption of white tuna — all of which contain particularly high levels of mercury because they're at the top of the food chain. *Consumer Reports* recently criticized the FDA guidelines on fish consumption as inadequate, saying that *anyone* who eats 24 ounces or more of fish per week — or about six servings — "should steer clear of high-mercury choices," and warning people not to eat canned tuna or sushi made from tuna.