

Text Complexity Analysis Template

Text complexity analysis			
Created by:	Ann-Marie Anderson, Biology Instructor at Bullard-Havens Technical High School	Event/Date:	TeachFest Connecticut Summer Academy, 8/29/2014
Text and Author	<i>Ocean Algae Can Evolve Fast to Tackle Climate Change</i> , reported by Allister Doyle and edited by Rosalind Russell	Where to Access Text	Nature Geoscience 5:346-351
Text Description			
<p>This 14-paragraph edition of a longer article describes the results and background of a one-year experimental study recently concluded at the GEOMAR Helmholtz Center for Ocean Research in Kiel, Germany. The scientists produced evidence that a certain species of phytoplankton can evolve its way out of one of the monumental troubles being caused by climate change, the warming of ocean waters due to acidification. The phytoplankton change through evolution, and thrive. To thrive is positive; the adjustments made by the phytoplankton allow us to hope for other proactive strategies going through this process. Climate change is the most important consideration of our time. The article cautions the reader that what may be a means of survival for the small plankton cannot be a solution for larger marine life forms, which take so much longer to evolve to their surroundings.</p>			
Quantitative			
Lexile and Grade Level	1470 L, 11 th Grade, CCR	Text Length	580 words
Qualitative			
Meaning/Central Ideas		Text Structure/Organization	
<p>The first layer of meaning is that scientists conducted a laboratory test on phytoplankton, producing evidence that they evolve to thrive in warmer ocean water being caused by climate change. They do this by becoming smaller, but growing faster, producing blooms on the surface of the oceans discernible from space as larger than ever before. Good news for all the algae eaters of the world! The second layer of meaning concerns the cause of warming oceans (acidification) and the monumental issue of climate change itself, with all the dire predictions for catastrophic changes in the decades ahead. The third layer of meaning is the debate over whether climate change is due to man-made greenhouse gas emissions or the natural fluctuations of the Earth.</p>		<p>This is a report from a longer article appearing in the current issue of Nature Geoscience, (from the same publishing group as Scientific American.) It has been edited into 14 concise paragraphs. The 1470 Lexile is high; scientific reporting with words like “evolution” and “acidification” are the cause. However, students can learn the meanings of the scientific terms in a short period of class time. The same scientific terms are repeated throughout. What’s left, once students know them, is relatively easy to understand. With only 14 paragraphs to read, a sense of accomplishment is easily attainable. Students will feel they understand some of the insights being made into what is the most important process of our time.</p>	
Prior Knowledge Demands		Language Features	
<p>Students in high school have discussed “Climate Change”, formerly known as “Global Warming”, before, but do they remember the reason the ocean’s waters are warming? The main greenhouse gas, carbon dioxide, dissolves into the oceans and forms a weak acid. The oceans are projected to be 170% more acidic by 2100 compared to the way they were before the Industrial Revolution. And have they studied the predictions for the decades ahead, and the list of the world’s cities projected to be underwater by the middle of this Century? Are they attuned to over 95% of the world’s scientists who conclude that the <u>rate</u> of change is the cause for concern and that these swift changes are due to man-made emissions of greenhouse gases, not natural fluctuations of the Earth?</p>		<p>In addition to certain complex science terms causing a Lexile of 1470, there are just a few other challenging words such as “resilient” and “fish stocks”. The mean sentence length is 24.17 and the mean log word frequency is 3.15. Figurative language includes the phrase “as seen from space”. There are references to global governing bodies, and the world electorate, because accepting human responsibility for these dramatic shifts in weather patterns is the most important cause for present and future generations of the entire planet. We all share one delicate atmosphere! Greenhouse gas dispersion never stops at any border.</p>	

The Earth has a record of fluctuating, but not for changing so drastically, so quickly.

Potential Reader/Task Challenges

The task challenge is to introduce or revisit the meanings of all the scientific terms. The process of evolution is very important to understand, since it is through this process that the subjects of the article, (phytoplankton named *Emiliana huxleyi*), manage to increase in number and thrive, even though the waters are warmer. Differences in evolutionary patterns between various kinds of life must be stressed, however. Phytoplankton reproduce at the rate of 500 generations per year! Polar bears can't do that! So it is important to consider the predictions for catastrophes due to climate change for the years ahead. It is vital to study the root cause of humans' excessive emissions of greenhouse gases as tied to our ever increasing need for energy, to our quest to make life easier and filled with "instant gratification". Finally, reading the entire article published in [Nature Geoscience](#) will provide even more teaching ideas, for enrichment activities.

Big Takeaway

Scientists can design experiments that provide evidence for a sense of hope, that life is remarkable and resourceful, and can evolve to adjust to bad conditions. But humans must accept responsibility for causing these bad conditions in the first place, and work tirelessly to reverse our damage to the atmosphere. Only when a majority of the world's electorate is convinced of this will progress happen. The rate of climate change must slow way down. The quest for a life of ease and instant gratification isn't worth destroying our planet "in an instant".

Vocabulary Analysis Template

	Words that demand less teaching time (i.e. the definition is singular and concrete)	Words that demand more teaching time (i.e. words with multiple meanings and/or that are part of a word family)
Words that can be determined in context	<ul style="list-style-type: none"> • Resilient • Omitted • Microscopic • Phytoplankton • <u>Emiliana huxleyi</u> • Predators • Fish stocks • Droughts 	<ul style="list-style-type: none"> • Acidification, Acid, Acidifying • Evolution, evolve to a smaller size • Scientific Projections • Global Warming • Genetic Changes • Carbon Dioxide • Emissions of Greenhouse Gases
Words that cannot be determined in context	<ul style="list-style-type: none"> • Compared to levels before the Industrial Revolution • Summit 	<ul style="list-style-type: none"> • 170 per cent more • 15 degrees C (59 Fahrenheit) • 95 percent probable • Natural variations