

Teacher's Guide for ODYSSEY

March 2012: The Perfect Storm

*Teacher Guide prepared by: Nancy I. Colamussi, Elementary Education, B.S., M.A.
Rocky Point School District, Long Island, New York*

Teacher's Note:

This guide contains project ideas, short answer, extended response, fill-in, and true/false with correction. The variation is designed to have the students think critically, as well as to test their comprehension. An answer key to the short answer sections can be found at the end of the guide.

Extended Response: Comprehension & Critical Thinking

The questions below can be used as written, simply answered in complete sentences or easily transformed into longer essay (ELA) style questions, or even research topics. In any case, have the students support their answers with details from the text or use critical thinking skills to create a thorough and interesting answer. The questions, essays and projects have been aligned with the **Common Core Standards**. Consider the level of your students when deciding how to use the questions.

"Extreme Weather: A Glimpse of Things to Come?" p. 6-10

1. What specifically are scientists referring to when they discuss global warming or the global climate change?
2. What was the Industrial Revolution and how is it theorized to have affected climate?
3. What were the findings of the Intergovernmental Panel on Climate Control concerning the affect of greenhouse gases?
4. How can it be potentially devastating for average global temperatures to climb even a few degrees?
5. Why is it impossible to attribute any single day's event to global warming?
6. How can Texas's hot, dry summer of 2011 be largely attributed to La Nina? What other factors were partially responsible for the record breaking temperatures there?
7. Use the diagram on page 9 to explain the Greenhouse Effect in your own words.
8. What can we expect to see as the first effects of global warming?

Essay: *Write a short essay debating whether or not you think global warming is real. Use information from this article, as well as from any other relevant source. Be sure that you have provided details to support your opinion.*

"Should We Put the Cat in Her Carrier?" p. 11-15

1. What advantages do weather satellites have when tracking storms?
2. How does GOES East and GOES West work together to help track a storm's progress?
3. What do weather satellites use instead of cameras and how do they work?
4. How are the composite images of the storm animations seen on TV created?
5. How do meteorologists determine the size, shape, and path of a hurricane?
6. How do meteorologists get information about the inside of a hurricane?
7. What is the purpose of a 'dropsonde'?

8. How does a WC-130 help to gather data about a storm?
9. Why is it that the forecasts you see on TV are often predicted by a computer?
10. In your own words, how have the advancements in weather tracking technology benefited humanity in general?

"Terrible Twister!" p. 16-19

Read the article in its entirety and then fill in the blanks. Refer back to the text if necessary.

1. A measurement of how much energy is waiting to be released in the atmosphere is known as CAPE, or Convective Available _____.
2. A measurement of how much energy is preventing air masses from rising upwards is _____.
3. Wind _____ are winds that change speed or direction as you go higher in the atmosphere.
4. The three key ingredients for CAPE are moisture, _____, and lift.
5. A _____ is a gigantic rotating thunderstorm.
6. The spinning wind inside the supercell is called a _____.
7. Often, the first sign of a tornado is a whirlwind of _____ dust on the ground.
8. Tornadoes come in many varieties, measured on the _____.
9. Tornadoes are especially difficult to predict simply because of their _____.
10. The _____ is a spiral mass of air (or water) that sucks everything towards its center.

"Know Your Streams" p. 20-22

1. Explain the important role that currents and jets play in the weather we have on Earth.
2. What are the differences between a Subtropical Jet and a Midlatitude Jet?
3. How do jet stream winds that occur several miles above the surface of the Earth still affect our weather down here?
4. What is the Gulf Stream and how does it affect hurricanes in the United States?
5. What is the primary reason for the excessive amount of tornadoes in Tornado Alley?
6. What is an 'atmospheric river' and how do they function?

"The Magic in Weather" p. 30-33

1. Other than forecasting on TV, what are some other career choices a meteorologist can make?
2. How does Gabe Susca-Lopata suggest that reluctant math students defeat the "Math Monster"?

3. What is the importance of weather balloons in weather forecasting?
4. Define the term "helicity" and explain what it indicates.
5. What is the main tool used by severe weather forecasters and what does it determine?

"Beware the Black Blizzard" p. 34-37

Mark the following statements TRUE or FALSE. Provide the correct answer if false.

- _____ 1. The American nickname for a dense cloud of dry particles that blankets an extended area is called a 'black blizzard'.
- _____ 2. Black blizzards are also commonly referred to as 'cyclones'.
- _____ 3. Suspension is a sort of chain reaction that occurs when heavier sand particles are pushed forward and transported during the storm.
- _____ 4. Dust storms can have adverse effects on human health, worsening chronic respiratory conditions like asthma and emphysema.
- _____ 5. "Storm Fever" is an infection caused by a soil fungus (*Coccidioides immitis*) that often follows in the wake of dust storms in Phoenix.
- _____ 6. The threat of dust storms is greatest in Earth's arid regions, or drylands.
- _____ 7. A drought is a period of reduced, irregular rainfall.
- _____ 8. Fertilization is the transformation of fertile drylands into less productive deserts.
- _____ 9. Growing human settlements stress the land and its limited water resources.
- _____ 10. Dust storms are difficult to predict, but the World Meteorological Organization of the United Nations is working to improve global dust and sand forecasts.

Venn Diagram/Essay: *Make a Venn Diagram comparing and contrasting the effects of a black blizzard on rural and urban areas. Use information from this article and acquire further information from other sources, if necessary. Write an essay comparing/contrasting the effects, using the facts you have gathered.*

"Weather or Not" p. 38-39

1. What is 'biometeorology'?
2. What relationship with weather do biometeorologists concern themselves with?
3. What can be some of the negative effects of an approaching or passing low-pressure system on humans?
4. What are some of the positive effects of sunny weather for many people?
5. What is SAD and how can the condition be improved?
6. How does hypothermia occur?
7. How does heatstroke occur and what are the symptoms?
8. Why does Thomas make the statement, "The human barometer is a sensitive instrument; handle with care"?

Personal Response: Think of a time in your life when the weather conditions directly affected your health or the health of someone close to you. Explain the weather using specific details and the circumstances that it caused. How was the situation handled and what was the outcome?

"Day of the Sun" p. 40-43

Project: Read the fictional story, "Day of the Sun". The author was an eighth grade student, who set his story in the year 2032. Make a T-chart with the headings '2012' and '2032'. List the scientific possibilities that the author writes about in this article, and compare them to what is currently possible in this field. Can you envision the author's story as a reality of the future? Why or why not? Write a well-constructed paragraph to answer this question, using details from your T-chart.

ANSWER KEY:

"Terrible Twister"

- | | |
|---------------------------|--------------------------|
| 1. potential energy | 6. mesocyclone |
| 2. convective inhibition | 7. dust |
| 3. shears | 8. Enhanced Fujita Scale |
| 4. temperature difference | 9. small size |
| 5. supercell | 10. vortex |

"Beware the Black Blizzard"

- | | |
|-------------------------|----------------------------|
| 1. True | 6. True |
| 2. False - dust storm | 7. True |
| 3. False - saltation | 8. False - desertification |
| 4. True | 9. True |
| 5. False - Valley Fever | 10. True |