Teacher's Guide for ODYSSEY

March 2013: Water is Life

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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.

"Water, Water Everywhere" p. 6-9

1. What is the strongest source of water in all the sky that's been observed according to Gary Melnick of Harvard University?
2. What is needed in order to create water?
3. Explain the process that is occurring in the Orion Nebula and tell why it is the fastest way to make water?
4. What are some other less dramatic ways that water can form?
5. What is the hydrological cycle?
6. What water is included when discussing the 'hydrosphere'?
7. Define the oceanic crust and explain its water content.
8. Explain the multi-step process by which fresh water is turned into clean, safe drinking water.
9. How does the subduction cycle allow Earth to be a dynamic planet?
10. How does water cycle through our bodies and cells?

"India, High-Tech and Thirsty" p. 14-19

1. Approximately how much money will India's highly skilled scientists earn the US in technology revenue this year?
2. Explain the water mismanagement situation in India.
3. Why is it usually a preteen girl who must go meet the water tanker?
4. What is the death toll in India that is attributed to poor water and sanitation?
5. Why aren't leaky pipes in India being replaced?
6. How is India's water lost on farms?
7. What are the two main reasons that finding a better way to manage India's water is becoming especially urgent?
8. How does the GLAAS suggest that you personally can play a part in the world's global water crisis?

9. What are some of the methods that experts have put forth in an effort to make the water supply safe and accessible?
10. How is climate change affecting the water crisis?

"All Bottled Up" p. 22-25

1. What is the impact of bottled water on the environment?
2. What are some of the reasons for bottled water's rise in popularity?
3. Is bottled water or tap water more expensive? Which is more strictly regulated?
4. Discuss some of the solutions being used to lessen the impact of bottled water on the environment.
5. How are the water companies BIOTA and Belu Water making their water bottles?

"The Water Walk" p. 26-28

1. The three steps to getting clean water in Kenya are finding a source, getting it to your house, and _____ it.

2. A receptacle for catching and storing rainwater is called a _____.

3. The most common method of purification in Kenya is _____, which kills most germs.

4. Another method of purifying water without boiling is called _____ _____. In the Friends theological College, this system was built by Ben Salai, one of the college's masons.

5. The only danger of a sand filtration system would be if the _____ layer is not skimmed off frequently, it can turn into a breeding ground for germs.

"The Fracas Over Fracking" p. 32-37

1. Define the technology called 'fracking'.
2. In how many states does fracking now take place? Why would some states be better suited for this technology than others?
3. What is an aquifer?
4. What is the main debate between supporters and opponents of fracking? What is your opinion concerning this debate?
5. How can poor well construction on improper drilling or cementing lead to high levels of methane and other light organic compounds in the water?
6. How is it possible that even well-constructed wells can face problems?
7. How much water does fracking require? Why can this be an issue in some regions?
8. Explain how fracking produces dangerous wastewater.
9. How is the wastewater currently being handled?
10. Why is fracking being linked to small earthquakes?
11. How does fracking negatively affect the aesthetics of the land?
12. How can fracking negatively affect human health?
13. Do you feel that the risks of fracking are currently being adequately addressed?

Project: *Use the diagram and information on page 34& 35 to construct your own model of fracking. Be sure to label each component appropriately.*

"Thirteen Eggs to the Rescue" p. 38-40

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

_____ 1. The crystal terrapin is a type of turtle that lives in the waters of Barnegat Bay on the New Jersey shore.

_____ 2. Sedge is one of the barrier islands shielding Barnegat Bay from the Atlantic Ocean.

_____ 3. Barrier islands cause coastal erosion.

_____ 4. Researchers estimate that 95 percent of diamondback terrapin eggs in the Bay never hatch.

_____ 5. In addition to animal predators, humans and boats are destroying good nesting areas.

_____ 6. An arm of the sea that extends inland to meet the mouth of a river is called an inlet.

_____ 7. Saltmarsh grasses and other plants work as filters to help maintain good quality water for the nursery/hatchlings.

_____ 8. To be extirpated means to become globally extinct.
_____ 9. Without the diamondback turtles, the tapestry of the entire Barnegat Bay ecosystem could unravel.

"What You Might Not Know About Fluoride" p. 44-45

1. What does the CDC refer to as one of the 10 great public health achievements of the 20th century?
2. Why was fluoride added to drinking water?
3. How does fluoride help to provide more resistance to acid forming bacteria?
4. What is the CDC's recommendation for fluoride concentration in drinking water?
5. What are some of the reasons that states choose NOT to fluorinate their drinking water?

ANSWER KEY:

"Water Walk"

1. *purifying*
2. *cistern*
3. *boiling*
4. *sand filtration*
5. *silt*

"Thirteen Eggs"

1. *False, diamond terrapin*
2. *True*
3. *False, help prevent erosion*
4. *True*
5. *True*
6. *False, estuary*
7. *True*
8. *False, locally extinct*
9. *True*