Teacher's Guide for ODYSSEY

November/December 2012: Lost! Our Sense of Space

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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.

"You are Here" p. 4-7

1. What are some of the primary reasons that scientists study 'wayfinding' abilities?
2. How is the technology of IVE (Immersive Virtual Environment) useful?
3. What ability of wayfinding is attributed to the hippocampus?
4. Why do we feel relaxed in natural environments?
5. What does the 'grammar' of an environment refer to?
6. How do architects or city planners use space grammar in their designs?

"Lost!" p. 8-10

1. Explain the condition known as "Developmental Topographical Disorientation".
2. What is spatial cognition?
3. What are some of the specific mental processes that are required simply to get from place to place during your average day?
4. Which part of the brain is responsible for memory?
5. Define the 'cognitive map'.
6. How does the brain create cognitive maps?
7. Why are scientists using rats to find out how the brain creates cognitive maps?
8. What are neurons?
9. What is the brain's limbic system responsible for?
10. Explain how 'place cells' work together to help map environment.
11. How does Dudchenko's theory explain why people often go in circles lost in a snowstorm?
12. What is the function of the parietal cortex?

"Rescue!" p. 11-15

1. According to the search and rescue team, what are some of the reasons that people get lost?
2. Why is it a mistake to depend solely on technology for directions?
3. Explain 'lost person behavior". What factors are considered?
4. What technical skills do search and rescue teams need?
5. What is a Personal Locator Beacon and how is it used?
6. Why are specially trained dogs more efficient than humans when looking for a missing person?
7. How is it helpful for member of a SAR team to work the same area over the course of the years?
8. What is the COSPAS-SARSAT system and how has it saved lives?
9. What tips does this article give for hiking safely?

"When You're at the Wheel" p. 18-21

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

_____ 1. The part of the brain called the hippocampus deals with spatial information so you can navigate while you are driving.

_____ 2. The brain's auditory cortex processes whatever you see.

_____ 3. The back lobes of your brain let you make decisions and allocate attention.

_____ 4. Connected vehicle technology is expected to transform the way we travel, ultimately saving lives, preventing injuries, easing traffic congestion, and improving the environment.

_____ 5. The National Safety Council estimates that cell phone use leads to at least 1.3 million crashes per year.

_____ 6. Navigating a route relies on your sensory memory.

_____ 7. GPS systems actually hinder our ability to learn an environment.

_____ 8. "Interface" refers to the way the brain acquires and processes knowledge and information.

"Too Small, Too Big, Too Frightening" p. 22-23

1. Explain how the word 'phobia' is derived from a Greek God.
2. What is occurring in the body physically and psychologically when a person is having a panic attack?
3. What is the difference between claustrophobia and agoraphobia?
4. List the variety of sources that a phobia can arise from.
5. Throughout evolution, how have fear and anxiety been useful to humans?

Essay: *This article discusses techniques for overcoming anxiety disorders. Write about a personal experience you have had with fear and how you have overcome it, or how you are working to overcome it.*

"The Dragon in the Dungeon" p. 24-28

1. What is the terrain editor and why is it so important to the game?
2. How do programmers simplify the world in the game using artificial intelligence?
3. What is an algorithm (A*)?
4. How is local 'steering' used to tell nonplayer characters how to behave when they get really close to each other?
5. Explain how games have 'bugs' or problems within the computer program.
6. Why do you think that 'gameplay rules out over realism'?

"Navigating Magnetically" p. 32-35
Read the article in its entirety and then fill in the blanks. Refer back to the text if necessary.

1. There are _____ different species of sea turtles in the oceans of the world today.

2. When female Green sea turtles mature, they begin to migrate to the beach where they were born and there they will _____.

3. Sea turtles travel _____ in the vast Pacific Ocean, for 30 days before finally landing on the beach where they were born.

4. The beach where the sea turtle was born is referred to as its _____ beach.

5. Many scientists speculate that, as hatchlings, the sea turtles _____ the unique qualities of their natal beach to ensure their return when it is time to nest.

6. Most scientists also agree that sea turtles use the Earth's _____ field to navigate across vast areas to a specific location.

7. A sudden eruption of hydrogen gas in the Sun's atmosphere is called a _____ _____.

8. Scientists think that when sea turtles tap into the Earth's magnetic field, they create a magnetic _____ of the ocean, one similar to that created by GPS devices.

9. What has surprised researchers the most is the ability of sea turtles to determine their position when traveling _____ and _____.

10. The longest and most spectacular migration is made by young _____ turtles, which, as hatchlings, travel along routes that span more than 9,000 miles.

"Wayfinding in a Satellite World" p. 40-42

1. What is the Polynesian Voyaging Society planning to accomplish?
2. How and why did the materials used to build the 'Hokule a' differ from traditionally used materials?
3. What are some of the things that the voyagers used to determine their position?
4. What is the definition of the term, 'wayfinding'?
5. How is it useful to trust your instincts when wayfinding? Why are modern voyagers less skilled in this area?

6. How was the vision of sailing around the world in the "Hokule a' born?
7. List a few things that the voyagers will try to avoid on their journey.
8. What is the voyage around the world hoping to show society?

ANSWER KEY:

"When You're At the Wheel"

1. *True*
2. *False, visual cortex*
3. *False, frontal lobes*
4. *True*
5. *True*
6. *False, relational memory*
7. *True*
8. *False, cognitive*

"Navigating Magnetically"

1. *seven*
2. *nest*
3. *alone (individually)*
4. *natal*
5. *imprint*
6. *magnetic*
7. *solar flare*
8. *map*
9. *east and west*
10. *Loggerhead*