

2007 UAH REGIONAL SCIENCE OLYMPIAD

OCEANOGRAPHY

INSTRUCTIONS

WRITE YOUR GROUP NUMBER ON THE ANSWER SHEET NOW!

Write your answers ONLY on the answer sheet.

If you are writing more than what fits in the space you are given, you are either writing too large or writing too much.

High School groups: make sure you complete the additional five (5) questions on the last page.

For middle school groups, the test is worth ___ total points. For high school groups, the test is worth ___ total points.

The exam ends at 1 p.m. You may take the exam with you when you leave.

Our names are **Thomas** and **Cody**. Ask a question if you need to. Good luck!

Required words: "This event emphasizes the use of process skills to complete tasks related to physical oceanography." In the case of a tie, the following questions will be used in order to break the tie: 19, 12, 2, 11, 16. To appreciate the Earth's hydrosphere, students must understand basic geography, climatology, properties of water substance, and surface features and processes. A bit of all these will be tested on this exam.



**2007 UAH Regional Science Olympiad
OCEANOGRAPHY**

WRITE YOUR ANSWERS ON THE ANSWER SHEET.

You may take this exam with you when you leave; do not write your answers on it!

1. Water temperature is crucial to the ocean cycle. At what temperature do Fahrenheit and Celsius thermometers give the same reading?

2. Which of these directly affect the density of ocean water?
 - (a) temperature
 - (b) salinity
 - (c) pressure
 - (d) all of the above
 - (e) only temperature and salinity

3. What is the thermocline?

4. Waves are primarily generated by _____.

5. Which would freeze first if the temperature falls below 32°F, fresh water or salt water?

6. What is the difference between a “spring tide” and a “neap tide”?

7. What is the Gulf Stream, and where is it found? (“A type of airplane” is NOT the right answer.)

8. The ocean has good “long-term memory” because of its high “specific heat.” What do scientists mean when they say this? (Be scientific!)

9. The Coriolis effect deflects moving objects to the _____ in the Northern Hemisphere.

10. The greatest control on Earth's tides is the:

- (a) Moon.
- (b) Sun.
- (c) seasons/time of year.
- (d) rotation of Earth on its axis.

11. What was responsible for the December 26, 2004 tsunami in the Indian Ocean?

12. During the tsunami, waves over the open ocean only reached a few feet in height while waves came on shore exceeding 30 feet in height. Why does wave height increase near the shore?

13. Why is a strong hurricane often associated with a storm surge at landfall?

14. What percentage of the Earth's surface lies within the tropics (between 30°S and 30°N)?

**High School Groups: don't forget
Questions 15-19 on the next page!**

— HIGH SCHOOL GROUPS ONLY —

15. Say massive global warming occurs, all the ice on Greenland melts, and all that fresh water drains into the North Atlantic Ocean. What might happen to the ocean currents and circulation in the North Atlantic if this were the case?

16. Why does a decrease in westward wind (wind from the east to the west) in the Equatorial Pacific Ocean often lead to El Niño conditions?

17. Suppose you have a 1.5 acre (65,536 sq. ft.) fish pond on your farm. You want to improve the looks of your pond and the habitat for your trout, so you plant a 1 square foot patch of pond lily. A year later you notice that the area of the pond lily has doubled. At this rate, how long will it be until the pond is covered with lily pads?

18. Earth is (almost) a sphere, and this means the surface can become distorted when displayed on a flat map. On the map provided, draw your best attempt at the line that would represent the *shortest distance* that the Queen Mary 2 could travel between Miami, Florida and Southampton, England.

19. Also, given the nature of Atlantic Ocean currents, would Queen Mary 2 travel faster from west to east or east to west? (Assume that the power output of the ship's engines does not change).