

# 2010 UAH REGIONAL SCIENCE OLYMPIAD

## DYNAMIC PLANET

### 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 four (4) questions on the last page.

For middle school groups, the test is worth 31 total points. For high school groups, the test is worth 49 total points.

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

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

Required words: This event emphasizes the use of "process skills to complete tasks related to earthquakes and volcanoes." In the case of a tie, the following questions will be used, in order, to break the tie: 12, 5, 9, 2, 13. The textbook "Physical Geology" by Monroe and Wicander was used heavily in the development of materials for this event.



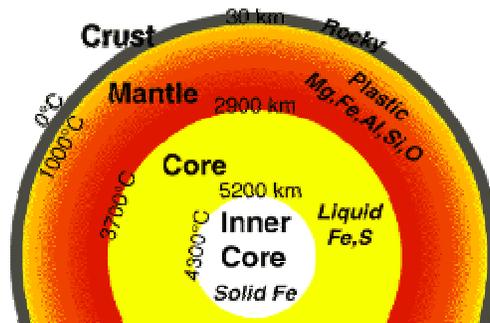
**2010 UAH Regional Science Olympiad  
DYNAMIC PLANET**

**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. Which of these is the most commonly emitted volcanic gas? (1 point)
  - (a) carbon dioxide
  - (b) nitrogen
  - (c) water vapor
  - (d) hydrogen sulfide (H<sub>2</sub>S)
  - (e) sulfur dioxide (SO<sub>2</sub>)
  
2. Which of the following volcanic effects is most dangerous to humans? (1 point)
  - (a) nuée ardente
  - (b) lava flows
  - (c) volcanic bombs
  - (d) pahoehoe
  - (e) pillow lava
  
3. How much more energy is released by a magnitude 5 earthquake than by an earthquake of magnitude 2? (1 point)
  
4. What volcano caused “the deadliest and most economically destructive volcanic event in the history of the United States?” (1 point)
  
5. What is the difference between magma and lava? (1 point)
  
6. The Circum-Pacific Belt is sometimes referred to as the “Ring of Fire.” Why? (2 pts)
  
7. What is the "Moho," and what is its significance? (2 points)

8. Which type of lava flow would be easier to walk on, *pahoehoe* or *aa*? Why? Ignore temperature. (2 points)
  
9. What are “hot spots,” and what does this phrase have to do with the Hawaiian islands? (2 points)
  
10. Why are parts of the eastern United States considered to constitute a hazardous earthquake region? (3 points)
  
11. What evidence do we have that Earth’s outer core is molten, liquid iron? (3 pts)



12. An earthquake has occurred! On your answer sheet, label the locations of: the fault; the fault scarp; the focus; and the epicenter. (4 points)
  
13. How does the theory of plate tectonics account for mountains, volcanoes, and earthquakes? (4 pts)
  
14. An earthquake is estimated to have occurred 400 miles from Chicago and 600 miles from Oklahoma City. On the map on your answer sheet, mark where the earthquake may have occurred. (4 points)

**High School Groups: don't forget  
Questions 15-18 on the next page!**

## HIGH SCHOOL GROUPS ONLY

15. Discuss why insurance companies use the qualitative Modified Mercalli Intensity Scale instead of the quantitative Richter Magnitude Scale in classifying earthquakes. (4 pts)
  
16. Can volcanic eruptions be predicted? What ways can you think of to "predict" when a volcano might erupt? (4 pts)
  
17. The ways that humans can influence the atmosphere, biosphere, and hydrosphere are pretty obvious. What are some of the ways we might alter the lithosphere? (5 pts)
  
18. On the graph provided, trace the evolution of the average global surface temperature on earth for roughly 10-15 years after a major volcanic eruption. Don't forget to explain the major features of your graph. (5 pts)