

## Student Review

### Earth Space Systems Semester A 2009 Examination

#### Test Description

Length: 2 hours  
 Points: 61 SR (1 point each), 4 BCRs (4 points each), total points = 78

Unit	Approximate Number of Selected Response Items	Approximate Number of Constructed Response Items
ESS Skills and Processes	13	1
Solar Energy	16	1
Internal Energy	15	1
Planetary Systems in the Universe	17	1
<b>Totals</b>	<b>61</b>	<b>4</b>

#### *Some Vocabulary for the Examination*

The vocabulary list includes words that students may encounter when reading examination items.

#### Skills and Processes

balance  
 conclusion  
 data analysis  
 dependent variable  
 density  
 graduated cylinder  
 hypothesis  
 independent variable  
 pattern  
 prediction  
 procedure  
 ratio  
 scientific model  
 scientific notation

#### Solar Energy

absorption  
 angle of incoming solar radiation  
 astrosphere  
 atmosphere  
 biosphere  
 conduction  
 convection  
 cryosphere

energy budget  
 energy transfer  
 equator  
 equinox  
 geosphere  
 ground cover  
 hydrosphere  
 infrared  
 microclimate  
 Northern Hemisphere-  
 radiation  
 reflection  
 remote sensing  
 revolution  
 rotation  
 seasons  
 solstice  
 Southern Hemisphere

#### Internal Energy

asthenosphere  
 continental collision  
 continental drift  
 convergence  
 divergence  
 epicenter

heat flow  
 Hawaiian Islands  
 Himalayas  
 hot spot  
 island chain  
 Japan-ADD  
 lithosphere  
 magnetic striping  
 mantle  
 mid-ocean ridge  
 oceanic boundary  
 plate  
 plate boundary  
 plate tectonics  
 rift valley  
 San Andreas Fault  
 sea floor spreading  
 seismograph  
 subduction  
 transform boundary

#### Planetary Systems

astronomical unit  
 aurora  
 Big Bang  
 black hole

coronal mass ejection  
 degrees Kelvin  
 elliptical orbit  
 giant star  
 Kepler's Laws  
 lunar eclipse  
 magnetic field  
 main sequence star  
 nebula  
 nebular hypothesis  
 Newton's Universal Law  
 of Gravitation  
 nuclear fusion  
 phases of Moon (new, 1st  
 qrt., full, 3rd qrt.)  
 planetary probe  
 protostar  
 radio telescope  
 solar eclipse  
 solar wind  
 space-based telescope  
 spectrometer  
 sunspots  
 supernova  
 tides  
 white dwarf star

#### Objectives

##### *Earth Space Systems Skills and Processes*

Upon successful completion of the first semester, the student should be able to:

- form a working hypothesis.
- test a working hypothesis.

## Student Review

- identify appropriate methods for conducting an investigation.
- use relationships discovered in the lab to explain observations outside the lab.
- analyze data to make predictions, decisions, or draw conclusions.
- describe trends revealed by data.
- use analyzed data to confirm, modify, or reject a hypothesis.
- interpret graphics such as maps, graphs, and satellite images.
- read a technical selection and interpret it appropriately.
- describe similarities and differences when explaining concepts and/or principles.

### ***Earth Space System Concepts***

#### **Unit 1: Solar Energy**

- describe the spheres of the Earth Space System.
- identify ways that matter and energy are transferred among the spheres.
- recognize ways that natural events affect the spheres.
- explain advantages of having satellite-based views of the Earth and other objects in the Universe.
- explain the effect of various land surfaces on incoming solar energy.
- compare and contrast the effect of land and water surfaces on incoming solar energy.
- explain the cause of the Earth's seasons.
- describe how Sun angle and length of daylight change from season to season at any location.
- relate changes in Sun angle and length of daylight to seasonal temperature changes.
- describe how temperature near various surfaces changes through the day-night cycle.
- compare and contrast the microclimates of two different locations (e.g., Tale of Two Airports).

#### **Unit 2: Earth's Internal Energy**

- explain how variations in heat flow from the Earth's interior affect the circulation of the mantle.
- explain how variations in heat flow from the Earth's interior affect the movement of plates and volcanic activity.
- give evidence to support continental drift, sea-floor spreading, and plate tectonics.
- give examples of Earth features caused by sea-floor spreading and plate tectonics.
- compare divergent, convergent, and transform plate boundaries.
- compare the composition of continental and oceanic crust.
- explain changes in the Earth's surface at subduction zones.
- distinguish between island arcs and island chains.
- describe how island chains are produced by hot spots.
- analyze factors that influence the magnitude and intensity of earthquakes.
- explain how different types of volcanic activity reveal what is happening in the Earth's interior.

#### **Unit 3: Planetary Systems in The Universe**

- identify the astronomical instrument best suited to a particular task in studying the Universe.
- describe the advantage of satellite-based instruments and space probes over ground-based instruments in studying the Universe.

## Student Review

- apply Kepler's Laws to the orbits of objects in our solar system.
- follow the path of energy from the Sun's core to its surface.
- describe the processes that produce and distribute solar wind particles into space.
- analyze the pattern of sunspots on the surface of the Sun.
- compare and contrast the Earth and the Moon in their response to solar wind particles.
- compare and contrast solar and lunar eclipses and relate them to lunar phases.
- explain the origin of astronomical tides.
- analyze the evolution of stars in terms to the relationship between gravity and nuclear fusion.
- classify stars into populations based on their color and brightness.
- compare and contrast the evolution of sun-like and massive stars.
- analyze the role of gravity in the formation of end-products of stellar evolution (e.g., white dwarfs, black holes).
- explain the evidence astronomers use to support the Big Bang Theory.

### Useful Website

This document (Student Review Sheet) can be found on the MCPS science website at:

<http://www.mcps.k12.md.us/curriculum/science/assess/finals.htm>.