

NAME: _____

Section Number: _____

Homework 5: The Earth

Due: in your section on **the week of Feb 25th**. Be neat and concise, show your work, and remember units. An answer without the correct units is wrong.

Suggested reading: Lecture notes 11 and 12, and corresponding chapters from the book.

1 Earth's One Large Moon

a. [1 point] Using Tables E.1 and E.3 in your text, compute the ratio of the Moon's mass to that of the Earth, written as a decimal number (e.g., 0.05).

b. [3 points] Compute the same ratio for the solar system's other planets (the ones with moons), plus Pluto. Use the most massive moon for each planet. Show your work, but also enter the final values in the table.

Planet Name	Moon Name	Mass Ratio
Mars		
Jupiter		
Saturn		
Uranus		
Neptune		
Pluto		

c. [1 point] Which of these bodies have mass ratios at least as large as that computed for the Earth's Moon in part a?

2 [1 point] How do we know what is inside the Earth—i.e., that Earth has a solid/liquid core, mantle, etc?

3 [2 points] Name the three major types of rocks in Earth's crust, and an environment in which each of these rock types would form.

4 [2 points] List at least four independent pieces of evidence for plate tectonics on the Earth. Describe how each observation is explained by plate tectonics.

5 Greenhouse Effect

a. [1 point] The surface of the earth absorbs mostly visible light, but emits infrared light that has a much longer wavelength. Why?

b. [1 point] Does the greenhouse effect change the rate at which Earth radiates energy to space? Explain.

6 Structure of the Atmosphere

a. [2 points] Graph the Earth's atmospheric temperature profile, with temperature on the horizontal axis and altitude on the vertical axis. Label the layers of the atmosphere.

b. [2 points] There are three levels at which Earth's atmosphere approaches or exceeds 0 °C. What is the source of the warmth at each of these levels?

c. [1 point] Do Venus and Mars have the same three warm levels in their atmospheres? Explain.

7 [2 points] Describe four *natural* factors that can lead to long-term climate changes.

8 [1 point] Where did Earth's atmosphere come from?