

Geology 103
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Final Unit Exam Study Guide

Final Exam: 5:15 PM sharp, Wednesday, December 19

- I. Introduction to Astronomy
 - A. What is astrology? How is it different from astronomy?
 - 1. On what is your horoscope/astrological sign based?
 - 2. Is astrology a science?
 - B. What is a constellation?
 - 1. How and why may constellations change over time?

- II. Earth's Place in the Solar System
 - A. Can you describe the following motions of the Earth, and do you know how long each takes?
 - 1. Revolution
 - 2. Rotation
 - 3. Precession
 - B. How may each of the three motions above affect our seasons/climate?
 - C. What is the moon?
 - 1. What is the moon's period of revolution?
 - 2. What is the moon's period of rotation?
 - D. What are the phases of the moon, and what causes them?
 - 1. Can you name and identify which phases would be observable from Earth at various points in the moon's orbit?
 - 2. Which phases could be observed on Earth in the daytime? Which could be observed at night?
 - 3. Which phases occur during the "waxing" period, and which occur during the "waning" period?
 - 4. How long does a cycle of lunar phases take?
 - E. Eclipses
 - 1. What is a solar eclipse?
 - a. During which lunar phase does it occur?
 - b. What do we see, when we observe one on Earth?
 - 2. What is a lunar eclipse?
 - a. During which lunar phase does it occur?
 - b. What do we see, when we observe one on Earth?
 - 3. Why isn't there a solar eclipse and a lunar eclipse every month?

- III. The Solar System

- A. Planetary structures
1. Can you describe the difference between Jovian and terrestrial planets?
 - a. Which planets are Jovian?
 - b. Which are terrestrial?
 - c. What is the composition of each class?
 - d. How do the classes differ in their early evolution?
 2. Can you briefly describe some of the more distinctive features of each of the *nine* planets (...yes...I think there are *nine*!)
 - a. Mercury
 - b. Venus
 - c. Earth
 - d. Mars
 - (1) Is there water on Mars?
 - (2) What is Mons Olympus? Why is it so big?
 - e. Jupiter
 - f. Saturn
 - g. Uranus
 - h. Neptune
 - i. Pluto
- B. Satellites
1. Earth's moon
 - a. How did it form?
 - b. Can you describe some of its distinctive surface features?
 - (1) Maria
 - (2) Highlands
 - (3) Regolith
 - c. What accounts for the vast differences between features on Earth and features found on the moon?
 2. Jovian moons
 - a. What kinds of phenomena have been observed on Io?
 - b. What is meant by the *Galilean* moons? Which ones are they?
 - (1) What types of surface features are seen on each?
 3. Rings
 - a. Which planets have them?
 - b. What are they composed of?
- C. Minor members of the solar system
1. What are the following?
 - a. Asteroids
 - (1) Where are most of them found?
 - b. Comets
 - c. Meteoroids

- (1) What caused the Leonid Meteor Showers in November?

IV. The Sun and Other Stars

A. Measurement Tools

1. What is meant by the *speed of light*? (You need not memorize the numbers!)
 - a. If you are given the speed of light, and an object's distance, can you figure out how long it would take to receive light from it?
2. What is an Astronomical Unit?
3. What is spectroscopy?
 - a. Electromagnetic Spectrum
 - (1) How is visible light different from X-Rays? Radio waves? Ultra-violet? Infra-red?
 - (2) How is (visible) red light different from (visible) blue light?
 - (3) What are the following, and what type(s) of objects emit the following?:
 - (a) A continuous spectrum
 - (b) A dark-line spectrum
 - (c) A bright-line spectrum
 - b. How is spectroscopy used when studying distant stars? What can spectroscopy tell us?
4. Telescopes
 - a. Visible light instruments
 - (1) How are reflecting telescopes different from refracting telescopes?
 - (2) Which type of instrument generally produces better images, and why?
 - (3) Which type of instrument is the Hubble Space Telescope?
 - (4) Why can Hubble capture higher-resolution images than other telescopes?
 - b. What other wavelengths of light do stars emit? What type of instruments can detect these types of energy?

B. The Sun

1. Can you identify the inferred structure of the Sun?
 - a. Which layer is responsible for emitting most of the light we see?
 - b. Which layer gives the Sun its characteristic color?
 - c. What layers are considered the Sun's atmosphere?
 - d. What are granules? Spicules?
2. Solar Activity
 - a. What are the following, and how may they affect Earth?
 - (1) Prominences

- (2) Sunspots
 - (a) How does sunspot activity vary over time?

V. Beyond the Solar System

A. Types of Stars

- 1. Stellar Brightness
 - a. How does a star's absolute magnitude affect its apparent magnitude?
 - b. How does a star's distance affect its apparent magnitude?
- 2. Stellar Distances
 - a. What is a light-year?
 - b. How far is the closest star to the Sun? (You do not have to memorize numbers!)
 - c. How can parallax be used to determine a star's distance?
- 3. Stellar Colors and Temperatures
 - a. How are a star's emission spectrum and temperature related?
 - b. What does the H-R Diagram show?
 - (1) How are main-sequence stars different from Giants?
 - (2) How are main-sequence stars different from Dwarfs?
 - (3) What type of star is the Sun?
 - c. Variable Stars
 - (1) What is an eruptive variable? What may cause this phenomenon?
 - (2) What is a pulsating variable? What may cause this phenomenon?
 - d. Other "Stuff"
 - (1) What is a nebula?
 - (2) How are bright nebulae different from dark nebulae?
 - (a) How are emission nebulae different from reflection nebulae?
 - (b) What may cause a nebula to be bright vs. dark?
- 4. Stellar Evolution
 - a. Stellar Birth
 - (1) Where are stars "born?"
 - (2) What causes stars to form?
 - (3) What is the approximate time required for this stage?
 - b. Protostar Stage
 - (1) What phenomena characterize the protostar stage?
 - (2) What is the approximate time required for this stage?
 - c. Main Sequence Stage
 - (1) How can the main-sequence stage be characterized?
 - (2) What is the approximate time required for this stage?

- (3) What serves as fuel for these stable entities?
- d. Red Giant Stage
 - (1) How can the red giant stage be characterized?
 - (2) What is the approximate time required for this stage?
 - (3) What serves as fuel for these stars?
 - (4) What types of materials are produced by these entities?
- e. Burnout and Death
 - (1) Can you outline the end-stages of development for the following:
 - (a) Small mass stars
 - (b) Medium mass stars
 - (c) Massive stars
 - (2) Which scenario will our Sun likely follow?
 - (3) What is a neutron star? How does one form?
 - (4) What is a pulsar? How does it form? How does it differ from an ordinary neutron star?
 - (5) What the heck is a black hole?

B. Galaxies

- 1. Can you name and identify the four types of galaxies?
 - a. Which are generally largest? Which are generally smallest?
 - b. What type of galaxy is the Milky Way?
 - c. What type of galaxy lies closest to the Milky Way?
 - d. What type of galaxy is most common? What type is least common?

C. The Universe

- 1. What does the universe encompass?
- 2. What is meant by *Doppler shift*?
 - a. What do red-shifted objects imply about the universe?