

ASTRONOMY 20 (LLOYD)    **STUDY GUIDE EXAM #4**    FALL 2019  
**Tue. Dec. 10 & Thu. Dec. 12**

**Notes:** You may use notes written on **one** 3x5 inch file card, written in your own hand.

**The Seasons** (Astropedia Ch. 2: Seasons; Reader 12 & 15, Lecture-Tutorial, "Seasons", "Path of the Sun")

1. Explain why it is incorrect to believe it is hot in summer because the Earth is closer to the Sun in summer.
2. What form of the Sun's energy does the most heating of the Earth?
3. Use the Crocodile Principle to explain why it is warmer in summer than in winter.
4. Explain why it is always hot in the tropics and always cold in the polar regions.
5. Explain why the seasons are opposite in the Southern Hemisphere.
6. When are the longest and shortest days of the year in the Northern Hemisphere?
7. Discuss how the directions of sunrise and sunset vary over the course of the year.
8. What happens at the **equinoxes** and **solstices**?

**The Earth** (Astropedia Ch. 5 thru "Environmental Change on Earth",. Lecture-Tutorial "Earth's Changing Surface"; Reader 49)

1. Explain how plate tectonics gives rise to volcanos, earthquakes, and moving continents.
2. Discuss what happens to the brightness of the Sun as it ages and how this affects the Habitable Zone.
3. Explain how CO<sub>2</sub> is put into and taken out of the atmosphere. Explain how the CO<sub>2</sub> thermostat regulates the temperature.
4. Discuss how the Continuously Habitable Zone is related to the search for Earth-like planets in the Galaxy.

**Jupiter and Saturn** (Astropedia Ch. 7)

1. Diagram their internal composition and structure of these two planets.
2. Compare the theories of formation of these planets.
3. Compare the composition of the atmosphere and the clouds.
4. Relate the formation of rings to the concept of the Roche limit (tidal stability limit).
5. Discuss the role shepherd moons in forming narrow rings.

**Uranus and Neptune** (Astropedia Ch. 7)

1. Describe the internal composition of these planets and the composition of their atmospheres.
2. Compare the Great Dark Spot with the Great Red Spot.
3. Compare their axes of rotation and their magnetic fields.

Photo ID

Identify photos of the 15 largest planets and moons (Reader page 1.1).