Oceanography, Chapter 2
Learning Objectives and Study Questions

1. Describe how the inner (terrestrial) planets differ in mass and composition from the outer (Jovian) ones, and relate these differences to the original composition and early history of the solar nebula.

2. Outline the roles that gravity played in both the accretion and subsequent differentiation of the Earth, and describe how it interacted with other processes (e.g., impact heating, liquid immiscibility, and outgassing) to give rise to the layered structure of the planet and its oceans and atmosphere.

3. Relate common time intervals (e.g., days, months, seasons, and years) to the corresponding cycles of motion in the Earth-Sun-Moon system.

4. Differentiate between latitude and longitude and use these coordinates to locate a place on Earth’s surface.

5. Rank the major reservoirs of water on Earth in order from largest to smallest.

1. Based on the dating of meteorites, it appears that the planets in our solar system formed about _____ years ago.
   A. 10,000
   B. 65 million
   C. 540 million
   D. 4.6 billion
   E. 13.7 billion

2. The inner, Earth-like planets are richer in rock and metal than the outer, Jupiter-like ones because:
   A. gravity pulled dense materials in closer to the Sun
   B. the Sun’s heat drove most volatiles (H and He) out of the inner solar system
   C. they formed much later
   D. they orbit more rapidly
   E. collisions drove off most of their large, volatile-rich atmospheres

3. As Earth differentiated, the _____ materials sank to form its core.
   A. oldest
   B. least dense
   C. densest
   D. coolest
   E. youngest

4. Oxygen in Earth’s modern atmosphere is mostly the product of:
   A. photochemical breakdown of water
   B. gases captured from comets
   C. outgassing
   D. respiration
   E. photosynthesis
5. Earth *rotates* on its axis once every:
   A. hour
   B. day
   C. month
   D. season
   E. year

6. When Earth is at the point in its orbit shown in the diagram below, ______ is beginning.
   A. spring
   B. summer
   C. fall
   D. winter
   E. a new year

7. Latitude measures your position on Earth’s surface _____ of the _____.
   A. E or W, prime meridian
   B. E or W, equator
   C. N or S, prime meridian
   D. N or S, equator
   E. Above or below, sea level

8. According to the map on page 42 of our text, the longitude of Hawaii is:
   A. ≈ 15°N
   B. ≈ 15°S
   C. ≈ 165°W
   D. ≈ 165°E
   E. impossible to determine

9. The _____ is (are) the largest reservoir of fresh water on Earth.
   A. oceans
   B. glaciers and ice caps
   C. groundwater
   D. rivers and lakes
   E. atmosphere

10. Earth’s oceans hold about _____% of the water at its surface.
    A. 70
    B. 87
    C. 90
    D. 97
    E. 99.9