**Chapter 2: Earth Structure and Plate Tectonics**

**Answers to Study Problems**

1. Estimate the thickness of oceanic lithosphere that is a) 5 million, b) 10 million, c) 20 million, and d) 50 million years old.

Solution:

Thickness (km) = 10 x sqrt(age in millions of years)

1. Thickness = 10 x sqrt(5) = 22.4 km
2. Thickness = 10 x sqrt(10) = 31.6 km
3. Thickness = 10 x sqrt(20) = 44.7 km
4. Thickness = 10 x sqrt(50) = 70.7 km
5. Given the results you obtained in the previous problem, how would you describe a plot of oceanic lithosphere thickness as a function of age of the lithosphere?

Solution:

The plot is not linear. The thickness increases more rapidly at younger ages than at older ages.

1. Near the Hawaiian Islands, the Pacific Plate is moving to the northwest at a speed of about 7 cm (~2.76 in) per year. How far will the Island of Oahu move in 30 million years? Give your answer in km and miles. Compare this with the distance between Los Angeles, CA and New York, NY.

Solution:

Distance (km) = (7 cm/yr) X (30,000,000 yr) x (1 km / 100,000 cm)

= 2100 km

Distance (mi) = (2100 km ) x (1 mi / 1.609 km) = 1305 mi

The distance between Los Angeles and New York is about 3944 km or 2451 mi. This is roughly twice the distance that Oahu would move.