Exercise “units and velocity”:

(1) If you are running a 5 km distance, and it takes you 2 hours to complete the run, what would be your average running speed in m/hr? [Hint: velocity = (change in distance)/ (change in time)]

(2) If you can throw a baseball 150 mph, how fast is it in m/sec?

(3) West Lafayette to Indianapolis is about 65 miles. You plan to cover this distance in 30 mins. What should your average speed be in m/sec?

(4) There’s a wave with an average speed of 30 m/sec, how far would it travel after 2 hours?

(5) Assume there is a P wave generated by an earthquake 150 miles away from where you stand, and the wave travels with a velocity of 5 km/sec. How many seconds will it take for the P wave to reach you?

(6) An earthquake occurred and caused a strong S-wave. Assume the S wave is traveling with a constant velocity (4.5 km/sec) for 3 mins. How far has the S wave traveled in meters?

(7) A P wave and an S wave were detected following an earthquake. The P wave arrived at 10 seconds after midnight and the S wave arrived 20 seconds after midnight. How far was the station from the earthquake epicenter.

[Hint: the rule of thumb is to multiply the S-P time in sec by 8km/sec to get the distance]

(8) The Earth’s average radius (R) is about 6371 km. If a surface wave travels from the equator to the North Pole, how many miles it is? (Hint: it is a quarter of the total circumference of the Earth = $\frac{1}{4} \times (2 \times \pi \times R)$, $\pi$ = 3.14).