**Common units:**

We use units everyday, and may not realize it. They give us reference for quantities.

A. If you are driving at 60 mph, how many feet/second are you traveling?

B. If you are driving t 60 mph, how many meters/second are you traveling?

a. Given your answer of meters/second, how many kilometers/second would that be?

b. Given your answer of meters/second, how many millimeters/second would that be?

C. If you are driving at 60 mph, how many furlongs/fortnight are you traveling?

**Units of convenience:**

A. 1 Empire State Building is 1 Empire State Building tall. Shocking! But it provides a common reference for a give scale (skyscraper scale) for approximately how tall other things are.

a. So, if the Empire State Building is 1,250 feet tall, how many Empire State Buildings tall is the world’s tallest structure, the Burj Khalifa, which is 2,722 feet?

To start:



b. The tallest building in Wyoming is White Hall, a dorm on the UW campus. It is 200 feet tall. How many Empire State Buildings is White Hall?

B. Another unit of convenience, or hilarity, is the Smoot. This unit was used to measure the bridge between Boston and Cambridge, Massachusetts as a college prank. The group chose Oliver Smoot, and had him lie down, and marked off how many Smoots the bridge was. The bridge was 364.3 Smoots ± 1 ear, because they wanted to account for the error of their measurement.

a. If Oliver Smoot was 5’7” tall, how many feet long is the bridge? (Not accounting for ± 1 ear…)

b. If Oliver Smoot was 1.70 meters, how many meters long is the bridge? (Not accounting for ± 1 ear…)

C. Either by yourself or with a partner, choose something that is not a ruler to measure something with. Say 1 hand, or a length of hair, or 2 shoe lengths, 1 house key length, or something else, and measure something in the class with it (your desk, the length of the room, the height of your friend, etc.). Also, name your unit!!!

1. Tell how many units the object you measured is.
2. Convert that number to a standard U.S. unit, like feet or inches.
3. Convert the unit from ‘a.’ to a metric unit (so for length, it would ne meters, centimeters, millimeters, etc.).

**Approximation and unit cancellation (dimensional analysis)**

D. Gas mileage as reciprocal area. Example of how units can be useful, confusing and non-intuitive at the same time. A physical explanation exists, but it takes a little while to see it.

D. Estimate how long it would take for a bird to poop in your mouth if you were lying on the ground with your mouth open.

Helpful hints:

We can estimate that there are 300 billion birds on earth.

The radius if the earth is 6371 km.

The surface area of a sphere is: Asphere = 4πr2

Do birds sleep? How many hours a day does that leave them awake and pooping?