Power = Work / Time

We'd like to get an idea of how much *power* a typical human (that is…you) is capable of.

You'll climb up stairs and time how long it took you.

All you need to measure the **time** is a watch with a second hand.

The work that you'll do will be calculated by measuring your change in gravitational energy. Pick a campus building that has 2 or 3 stories of stairs. We want to be going up as much as possible. So avoid buildings where there's a long horizontal stretch at the top of one flight of stairs before the next flight. Buildings with stairways like the Ad building or Wyse would be very good.

The work you do when you go up stairs is equal to the gravitational energy that you gain from the bottom to the top.

Gravitational Energy = m * g * h (in Joules)

- m is your mass (in kilograms: 1 kg = 2.2 lbs). Your mass?_____kg
- g is the gravitational acceleration: 9.8 meters/second^2
- h is how high you go up. (See below)

Measure the time *t* in seconds. Power is Energy / time, so will have units of Joules / sec = Watts:

Power = m * g * h / t

Go to your selected building with a partner (though you can also do this by yourself), a ruler, and a watch.

First measure h, the total height you go up. Record the height of one step, and the number of steps. Multiply and convert (if need be) to meters to find the total height that you'll go up. For example: if one step is 25 cm, and there are 60 steps, then the height is:

h = 25 cm * 60 * 1 m/100cm =15.0 m

Grav.E = m * g * h =_____ Joules (=kg*m^2/sec^2)

Now, go up two times: One time climbing briskly, the other time strolling up, timing how long it takes you to climb the height that you just figured out. Please don't bowl anyone over! Use the space below to record your times, and figure out your power in each case.

t_{hard}=____ seconds Power$_{hard}$ = Grav.E / t_{hard}= =_____ Watts (=Joules/sec)

t_{easy}=____ seconds Power$_{easy}$ = Grav.E / t_{easy}= =_____ Watts (=Joules/sec)

Estimate below your level of exertion for both cases above as a percentage of how fast you **believe** you would be capable of going… from 10% (strolling) to 100% (no way you could go any faster!):