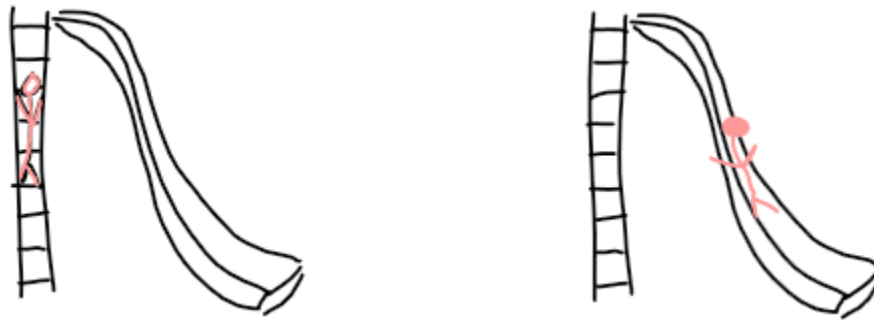


## Up and Down Lab

### Lab Objective

The purpose of this lab was to **calculate the work and power** that it took for me to climb up a slide, and compare it to the power that it took for gravity to bring me down. I climbed up the slide, while measuring the time it took me to do so, then slid down while also measuring time. To calculate the work, I found out my force, as well as the distance I climbed. I then plugged these two variables into the equation **work = (force)(distance)**. To calculate the power, I divided the work by the time that it took me to climb up, or go down the slide.



### What's my Force of Gravity?

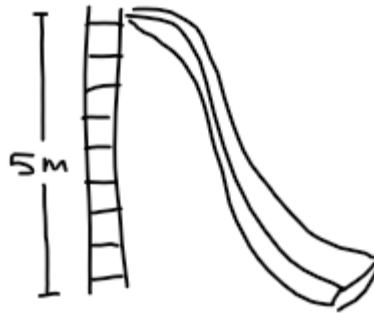
First, I had to find my **force of gravity** (in newtons) from my weight. To do so I divided my weight by 2.2 to get my mass in kg.

$$\frac{145 \text{ lb}}{2.2} = 65 \text{ kg}$$

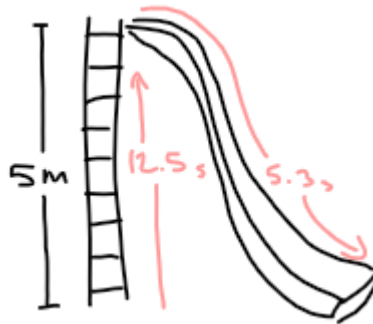
Next, I had to convert my mass to newtons. An online calculator (and my own math) told me that I weigh **645 newtons**.

## The Action

The next step was to climb up, then slide down the slide. But before that, I measured the **height** of the slide to be **5 meters**.



I then climbed up the slide in **12.5 seconds** and went down the slide in **5.3 seconds**.



## How much work did it take to climb up?

The next step was to find out how much **work** it took for me to climb up the slide.

$$\begin{aligned}\text{work} &= \text{force} \cdot \text{distance} \\ &= 645 \cdot 5 \\ &= 3,225\end{aligned}$$

It took **3,225 joules** for me to climb up the slide.

## How much power did it take to climb up?

Using the amount of work, I figured out the **power** that it took for me to climb up the slide.

$$\begin{aligned}\text{power} &= \frac{\text{work}}{\text{time}} \\ &= \frac{3,225}{12.5} \\ &= 258\end{aligned}$$

It took **258 watts** to climb up the slide.

### How much power did gravity use?

Using the amount of work, I calculated the **power** it took for **gravity** to pull me down the slide.

$$\begin{aligned} \text{power} &= \frac{\text{work}}{\text{time}} \\ &= \frac{3,225}{5.3} \\ &= 608 \end{aligned}$$

It took **608 watts** for gravity to take me down the slide.

### Review

Overall, the lab went very well. I was able to successfully measure the amount of work and power it took me to climb up the slide, as well as the amount of power it took gravity to pull me down. It took 258 watts of power for me to climb up the slide, while it took 608 watts for gravity to pull me down. Looking at these numbers, I can see that gravity is more powerful than I am when it comes to sliding down slides.