LAB **Work and Power**	NAME: _____
	PERIOD: _____

This lab is designed to help you understand the difference between work and power. To do this you'll calculate the work required to move your body up a flight of stairs. After calculating the work required to make it up the stairs, you'll make two trips, one slow and one fast, so you can calculate and see the difference in power.

SAFETY NOTES:

This lab will require you to "run up the stairs". Move only as fast as you feel is safe. Check the path and make sure it is clear. Don't hurt yourself or others. If you have any health concerns about this activity, don't do it, Your teacher will provide some data for you to use. My initials indicate I have been told and understand the safety notes.

_____
initials

MATERIALS:

Meter stick   Stopwatch

GOALS:

▪ Calculate work and power
▪ Help understand what a difference in power means
▪ Compare work with GPE
▪ Support TEKS 1A, 2B, 2C, 2D, 4A, 4D, 6A

PROCEDURE:

1. The equation for work is force times distance. As you will be lifting your weight, and weight is a force, we must get your weight in newtons. To do this, multiply your weight in pounds by 4.448 and enter the information in the data table. This is the force part of force times distance. If you don't want to use your real weight or don't remember your weight, you can make something up.
2. Next we need to get the distance part of force times distance. Go to the stairwell and measure the height straight up to the next landing. The easiest way to do this is to find the mortar line in the bricks that is even with the next landing and measure from the floor to that line. Enter the distance in the distance table.
3. Compute the work to be done by multiplying force times distance (your weight in newtons X the height of the stairs). Enter this value into the data table.
4. Using the stopwatch, time the time it takes you to walk up the flight of stairs. Enter this time in seconds in the data table
5. Repeat step 4 but "run up the stairs" as fast as it is safe to do so. Enter this time in the data table.
6. Compute the power required to walk and run up the stairs by dividing work by time and enter these values in the data table.
7. Answer the questions following the data table.

Data Table			
Your weight in pounds:		Your weight in newtons: (pounds x 4.448)	
		Stair height in meters:	
		Work in Joules: (weight in newtons X height)	
Time walking in seconds:		Time running in seconds:	
Power in watts: (work divided by time)		Power in watts: (work divided by time)	

CONCLUDE and APPLY:

1. Is the work you did walking and running up the stairs the same?

2. Why?

3. Which required more power, walking or running up the stairs?

4. Why?

5. How much work did it take to get up the stairs?

6. What was your GPE at the top of the stairs? (Multiply your weight in pounds by .454 to find your mass in kilograms then use GPE = mgh)?

7. How do the answers in number 5 and 6 compare?

8. Why?