

Name: \_\_\_\_\_

Date: \_\_\_\_\_

### Work and Power

Objective: To determine the work and power needed to go up a flight of stairs.

Procedure:

1. Determine the height of a flight of stairs and record in the data table below.
2. Record the time it takes to walk up the flight of stairs. Repeat this three times and record below. Make sure a foot touches every step!
3. Record the time it takes to run up the flight of stairs. Repeat this three times and record below. Make sure a foot touches every step!

Data:

Height of flight of stairs = \_\_\_\_\_ m      Your weight = \_\_\_\_\_ lbs

|         | Time 1 (s) | Time 2 (s) | Time 3 (s) |
|---------|------------|------------|------------|
| Walking |            |            |            |
| Running |            |            |            |

Analysis:

1. Find your average time for walking and running up the stairs.
2. Determine your mass in kilograms. 1 pound is 0.454 kg.
3. Determine your weight in newtons. This is the force you are using to perform work.
4. Calculate the work performed when walking and running up a flight of stairs.
5. Calculate the power exerted when walking and running up a flight of stairs.
6. Complete the charts below:

Girls:

| Name | Force used (N) | Distance traveled (m) | Time (walking) | Time (running) |
|------|----------------|-----------------------|----------------|----------------|
|      |                |                       |                |                |
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|      |                |                       |                |                |
|      |                |                       |                |                |

|                |                         |                |                      |
|----------------|-------------------------|----------------|----------------------|
| Work (walking) | Power (walking - watts) | Work (running) | Power (running - hp) |
|----------------|-------------------------|----------------|----------------------|

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Boys:

| Name | Force used (N) | Distance traveled (m) | Time (walking) | Time (running) |
|------|----------------|-----------------------|----------------|----------------|
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|      |                |                       |                |                |
|      |                |                       |                |                |

| Work (walking) | Power (walking - watts) | Work (running) | Power (running - hp) |
|----------------|-------------------------|----------------|----------------------|
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Conclusion:

Who are the most powerful girls and boys in the class when walking and running?