**Kinetic Movement Worksheet**

In your group, choose one person to be the test subject, another to watch the scale, and another to record measurements and values.

**Walking**

1. Measure the mass of the test subject (in kg).

**m = 60 kg**

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1. Have the test subject walk across the scale.
   1. What is the maximum weight recorded?

**W = 120 N**

* 1. Calculate the maximum force exerted on the scale, using Newton’s second law.

**F = m \* a = m \* g**

**F = 120 kg \* 9.8 m/s**

**F = 1176 N**

1. Assuming that the impact of the foot with the ground takes 0.02 seconds, calculate the impulse of the step.

**I = F \* t**

**I = 1176 N \* 0.02 s**

**I = 24 N \* s**

1. Calculate the impact velocity of the shoe with the ground.

**I = m \* ∆v**

**∆v = I / m**

**∆v = 24 N \* s / 60 kg**

**∆v = 0.4 m/s**

**Running**

1. Have the test subject jog across the scale. What is the maximum mass recorded (in kg)?

**W = 240 kg**

1. Calculate the maximum force using Newton’s second law.   
   How does this force compare to that of walking?

**F = m \* a = m \* g**

**F = 240 kg \* 9.8 m/s**

**F = 2,352 N**

1. Assuming that the impact takes 0.02 seconds, calculate the impulse of the step.

**I = F \* t**

**I = 2,352 N \* 0.02 s**

**I = 47 N \* s**

1. Calculate the impact velocity of the shoe with the ground.   
   How does the impact velocity compare to that of walking?

**∆v = I / m**

**∆v = 47 N \* s / 60 kg**

**∆v = 0.78 m/s**