

# Push-A-Cart

**STEM Sims**

### Lesson 3: How is Acceleration Affected by Mass?

Acceleration describes how quickly an object changes its speed or direction. Mass is one factor that affects acceleration. Can you find out how the mass of an object affects its acceleration?

#### Doing the Science

1. Start the Push-A-Cart Simulation.
2. Note and record in Table 1 the mass of the cart and the current force value on the pushing device.
3. Click on the “Push Cart” button.
4. Use the following equation to calculate the acceleration of the cart. Record this value in Table 1.

$$\text{acceleration} = (\text{force})/(\text{mass})$$

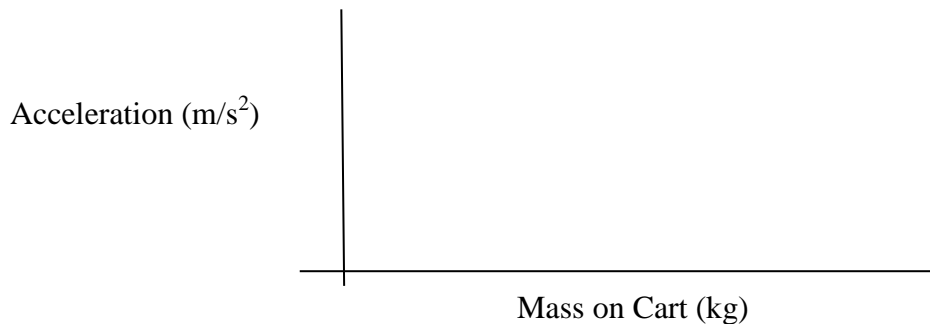
4. Click the “Reset Cart” button to return it to the start position.
5. Click on one brick to add it to the cart. Record in Table 1 the new mass of the cart and brick. Do *not* change the force value.
7. Click on the “Push Cart” button.
8. Calculate and record in Table 1 the acceleration of the cart.
9. Click the “Reset Cart” button to return it to the start position.
10. Repeat steps 5 – 9 for a total of 5 trials.

Table 1.

Trial	Mass (kg)	Force (N)	Acceleration (m/s <sup>2</sup> )
1			
2			
3			
4			
5			

#### Do You Understand?

1. Make a graph of the total mass on the cart versus the acceleration of the cart for each trial.



2. What generalization can you make about how mass and the acceleration of an object are related?