*Newton’s Second Law (N2L)*

Lets compare force, mass, and acceleration in the following cases (starting with the middle box)

F

2m

F

m a

F

½ m

Regular bus at double

capacity

Regular bus at regular

capacity

Supercharged bus at regular

capacity

We can see that these three variables are connected. As mass increases, acceleration decreases (because of inertia). By how much will it decrease? Is it proportional? YES!

As mass increases, acceleration will decrease proportionally (with a constant force):

This is N2L! In words;

*a F*

*m*

OR *Fnet*

 *ma*

*“An object will accelerate proportionally to an applied net external force, but inversely proportional to its mass.”*

*Fnet*  *ma* where: F is force in Newtons (N)

m is mass in kg

a is acceleration in m/s2

Unit Analysis:

Eg. A 56N net force is applied to a 26kg box. How fast will it accelerate?

**Activity**

With a partner, find an office chair (with wheels) and an accelerometer. Try to pull the person on the chair with a constant force. Does the person move at constant velocity or accelerate? Explain.