Unit 4: Newton’s Laws
**Newton’s 2nd Law**

Ex. A 5.0 kg block is pushed to the right along a frictionless track with a force of 10.0 N. What is its acceleration?

Newton’s 2nd Law:

Stated as a formula:

Note that…

Ex. A 650 kg car accelerates at 4.0 m/s2 south. What is the net force acting on it?

Ex: A 1500 kg ice cream truck accelerates from rest to a top speed of 45 km/h in 8.0 s. What was the net force acting on the truck?

**To find Fnet when many forces act on an object:**

**To find Fnet when two forces work together …**

Ex: The Batmobile exerts a force of 8.50x103 N east, while friction pulls back on it with a force of 1500 N. If it has a mass of 1250 kg, what is its acceleration?

Ex. Stan and Kyle are pushing a 75 kg sled along a frictionless ice rink. Stan pushes with 55 N and Kyle pushes with 45 N. Find the sled’s acceleration.

**Worksheet 4.1**
Newton’s 2nd Law

1) For each of the following diagrams determine the magnitude and direction of the net force.

FN = 100 N

Ff = 20 N

Fg = 100 N

Fapp = 20 N

FN = 600 N

T = 400 N

Ff = 75 N

Fapp = 250 N

Fg = 600 N

Fg = 150 N

FN = 200 N

FN = 200 N

FN = 150 N

Ff = 55 N

Fapp = 120 N

Ff = 80 N

Fapp = 60 N

Fapp = 60 N

Fg = 200 N

Fg = 200 N

Fg = 150 N

2) Use the information given for each diagram to fill in all missing blanks.

FN = \_\_\_\_\_

FN = \_\_\_\_\_

FN = 49 N

Fapp = 240 N

Ff = 80 N

Fapp = 20 N

Ff = 20 N

Fapp = 70 N

Ff = 20 N

Fg = \_\_\_\_\_

Fg = \_\_\_\_\_\_ N

Fg = 49 N

m = 12 kg
a = \_\_\_\_\_\_\_ m/s2

m = \_\_\_\_\_\_\_\_\_
a = 4 m/s2 right

m = 5 kg
a = \_\_\_\_\_\_\_ m/s2

FN = 500 N

FN = \_\_\_\_\_

FN = 160 N

Ff = 125 N

Ff = \_\_\_\_\_\_

Fapp = 200 N

Fg = \_\_\_\_\_\_

Fg = \_\_\_\_\_\_

Fg = \_\_\_\_\_

m = \_\_\_\_\_\_
a = \_\_\_\_\_\_\_ m/s2

m = 40 kg
a = 4 m/s2 right

m = 8 kg
a = \_\_\_\_\_\_\_ m/s2