Unit 4: Newton’s Laws  
**Tension**

**Tension** occurs within a material that is being…

It is an internal force that acts \_\_\_ \_\_\_\_ \_\_\_\_\_\_\_\_\_ along a rope (string, chain, etc) in \_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_.

Consider two carts attached by a rope being pulled along a flat surface. (Friction is negligible.)

If m1 is pulled to the right by a force of 40.0 N find:

1. The acceleration of the carts.

**NOTE**: tension…

1. The tension in the spring connecting them.

**NOTE**: Since it cancels out of the total Fnet equation, we will only consider the forces acting..**.**

**NOTE**: Since tension acts on both masses equally we can use…

m2 = 6.0 kg

m1 = 4.0 kg

Consider two equal masses hanging from a pulley.

Diagram the forces acting on the entire system.

With pulley problems it is sometime easier to “*unfold*” the rope as shown.

m1

m2

m1

m2

6.0 kg

4.0 kg

Ex: The two masses shown hanging from a frictionless pulley are released at rest. Find

1. The acceleration of the system.
2. The tension in the string.

**NOTES:** 1. When solving for acceleration of the whole system we consider \_\_\_\_\_\_\_\_\_\_\_\_\_

2. When finding T we only use \_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_.

Ex: A mass on a frictionless table is attached to a hanging mass over a frictionless pulley as shown. Find:

1. The acceleration of the masses.
2. The tension in the rope.

8.0 kg

6.0 kg

Ex2: If the same system has a friction force of 25 N acting on the 8.0 kg mass find:

1. The acceleration of the masses.
2. The tension in the rope.

8.0 kg

6.0 kg