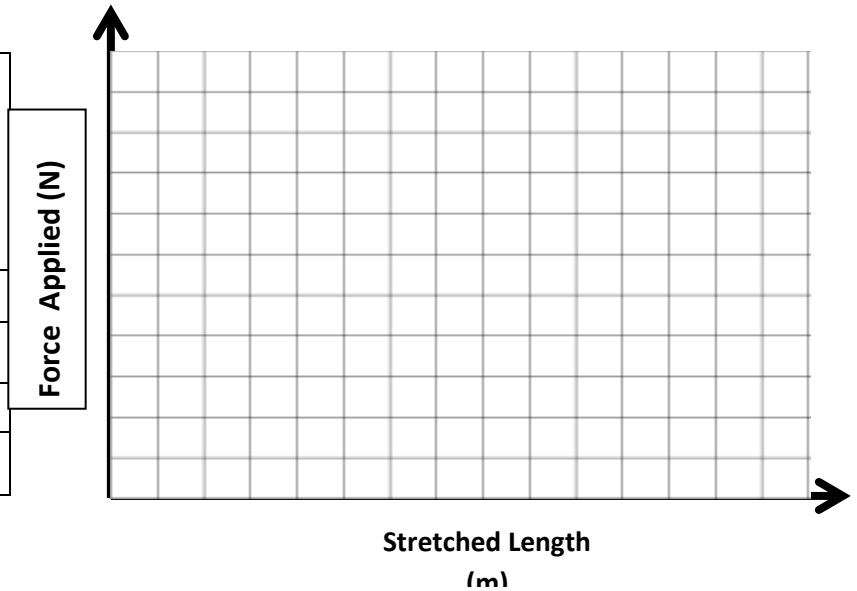
Lab Station 1: Elastic and Spring Force

Force Applied (weight added) (N)	Thin Rubber band Stretched Length (m)	Thick Rubber Band Stretched Length (m)	Material of your choice: Stretched Length (m)
1 Newton			
2 Newton			
4 Newton			
5 Newton			



1) What type of mathematical relationship is demonstrated in Graph I (Look at graph examples at the front of the room)? Why?

2) The slope of your graph represents the Spring Constant of your material. Calculate the Spring Constant (slope) of each of your materials.

3) How does the Spring Constant of a thick rubber band compare to that of a thin rubber band?

4) What does the Spring Constant tell you about the elasticity (stretchiness) of each material tested?

Lab Station 2: Torque Lab

Before you begin:

Q1: At which hook do you think you will need the least amount of force? Why do you think this?

Q2: At which hook do you think you will need the most force? Why do you think this?

Hook	Force (N) to lift/rotate the "arm"
1	
2	
3	
4	

Q3. At which hook was the least amount of force necessary to lift/rotate the arm?

Q4. At which hook was the most amount of force necessary to lift/rotate the arm?

Q5. How can you apply this concept to the design of your prototype of the prosthetic?

Lab Station 3: Friction Lab

Use this equation $\left\{ \mu = \frac{F_f}{W} \right\}$ *to find the friction coefficient between each material and panel board*

Material	Friction Coefficient
Silicone	
Vinyl (Black)	
Polyurethane (White)	
Sandpaper	
Bare Wood	

1. How does the surface type affect the frictional force?

2. How could you use the friction coefficient in your PBL presentation?

Lab Station 4: **Engineering of "Chomper Dinosaur"**

Use and observe how the toy works. Identify each of the following by **writing a brief description**, **drawing, and labeling** each on the diagram.

1) Ventral side

2) Dorsal side

3) Rigid structure (i.e. "bone")

4) Constraints to rigid structure (i.e. "ligament") - green

5) Mechanism for flexion - yellow
   a) Source of force applied (i.e. "muscle")

   b) Transmits force to structure (i.e. "tendon")

6) Mechanism for extension - red
   a) Source of force applied (i.e. "muscle")

   b) Transmits force to structure (i.e. "tendon")

7) What is the type of force used for flexion?

8) What is the type of force used for extension?