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# **Muscle Fatigue Lab**

Problem: How does muscle fatigue affect the amount of work that muscles can do?

Background: As skeletal muscles contract and relax, they move bones in your body. This work requires energy.

Muscles get energy from ATP molecules made during the process of cellular respiration. During continuous activity, the muscles begin to use up their energy supply and oxygen and start to accumulate waste products. As a result, the muscles become fatigued, losing their ability to contract. In this lab, you will observe how muscle fatigue affects the amount of work that muscles can do. Make a prediction about how exercise will affect the amount of work that muscles can do.

Materials: Stopwatch, Tennis Ball, Sneakers and your Body

Procedure: Work in pairs or trios, but everyone has to do each exercise. You and your partner(s) will take turns

doing the following experiments.

### Finger and Hand Flexors and Extensors

1. Grasp the tennis ball in your **non-writing** hand. A <u>legal squeeze causes a dent in the ball</u> made by using the heel of the hand.

Exercise

1

You are to record the number of squeezes in your Data Table every 10 seconds, but you are NOT TO STOP between trials.

You will be squeezing the tennis ball without stopping for 100 seconds.NEVER STOP SQUEEZING. REALLY SQUEEZE. DO NOT STOP BETWEEN TRIALS.

Person	10sec	20sec	30sec	40 sec	50 sec	60 sec	70 sec	80 sec	90 sec	100 sec

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### Foot Plantar Flexors and Dorsiflexors

1. Stand with your legs shoulder width apart. You will raise your heels and stand up on your toes. And then relax your heels back to the ground. (A calf raise)

Exercise

- 2. You are to record the number of calf raises in your Data Table every 10 seconds, but you are NOT TO STOP between trials.
- You will be performing this exercise without stopping for 100 seconds.
  NEVER STOP EXERCISING. REALLY PUSH IT. DO NOT STOP BETWEEN TRIALS.

## Exercise 3

# Wall sit

Sit against the wall as shown in the picture. Be sure your legs are at a right angle to the wall and your back is flat against the wall. Have one person time you to see how long you can hold the correct position.

	Person 1	Person 2	Person 3			
The state of the s	What did you obs	What did you observe about your time from trial 1 to trial 2?				
	Which muscle gro	oup(s) is/are being tested?				

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# Exercise 4 **Book Hold**

Hold a textbook straight out in front of you (at shoulder height) with your elbow locked out. One person should be the timer and should time how long you can hold the book parallel to the floor, even with your shoulder, and without bending your elbow.

Person 1	Person 2	Person 3

### Conclusion

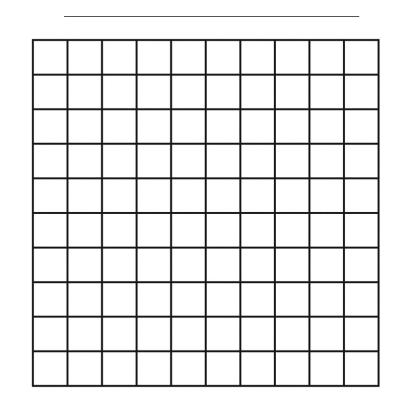
How did your squeezing hand and arm feel towards the end of your squeezing time period?

By looking at your results of your calf raises, pinpoint when you first had a lot of lactic acid buildup. How do you know?

Explain how resting for 10 minutes between trials would have affected your results. What would occur in the body?

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Exercise 1



Exercise 2