

Name \_\_\_\_\_  
Date Due \_\_\_\_\_

**Title: Effect of Fatigue on Muscle Action**

**Introduction:** Much of the work of the body depends on the contraction of skeletal muscles. There are several factors that influence these contractions. One of them is temperature. In warm conditions blood vessels dilate supplying muscle cells with the nutrients and oxygen required for the production of the ATP used in a contraction. In cold conditions blood vessels constrict interrupting the flow of oxygen and nutrients. With a limited supply of reactants, ATP production slows making muscle contraction more difficult.

Another factor that influences muscle contraction is fatigue. Fatigue occurs when a muscle loses its ability to contract due to a lack of ATP. When enough oxygen is not present, the body will convert from aerobic respiration to anaerobic respiration. During anaerobic respiration only a small amount of ATP is produced along with lactic acid. Muscle fibers will not respond to stimulation in the acidic conditions. In certain cases the muscle may become fatigued and cramped resulting in uncontrolled stimulation of the muscle. During a cramp, the contraction is sustained, involuntary and painful.

**Learning Target: Determine the effects of fatigue on muscle action. (skill)**

**Materials:**

Spring clothespin and clock with second hand

**Procedure:**

1. Grasp a clothes pin between your thumb and index finger. Keep your 3 other fingers out stretched. **Never let your fingers curl or you will skew your results.**
2. Count how many time you can completely open and clothes the clothes pin in 20 seconds. Repeat the squeezing fest for 9 more 20 second trials. **Do not rest between trials.**
3. Record your results in Data Table 1 and on the Smartboard.
4. Record the class data in Data Table 2.

**Data:**

**Table 1:** Effect of Fatigue on Muscle Action  
(Group Data)

Trial	Number of actions in 20 seconds	Trial	Number of actions in 20 seconds
1		6	
2		7	
3		8	
4		9	
5		10	

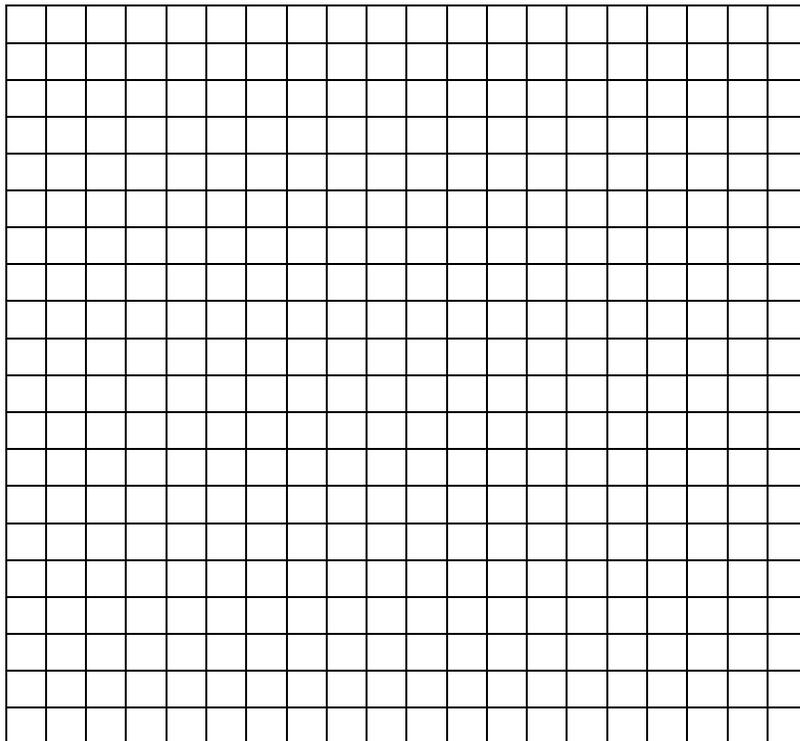
**Table 2:** Effect of Fatigue on Muscle Action  
(Class Data)

Trial	Number of actions in 20 seconds	Trial	Number of actions in 20 seconds
1		6	
2		7	
3		8	
4		9	
5		10	

**Analysis:**

Make a line graph of the class results from the data table

1. You choose an appropriate scale for you graph- use up at least ½ of the graph area.
2. Place trials 1-10 on the x axis.
3. Label the x axis "Number of Trials".
4. On the y axis, use numbers to represent numbers of actions performed.
5. Label the y axis "Actions Performed".
6. Plot a point for each trail's result.
7. Draw a line connecting the points.
8. Give the graph a scientific title.



See page 185 in your text

9. What is fatigue?
10. What usually causes fatigue?
11. Use the graph to determine what effect fatigue has on muscle action.
12. What is a cramp?
13. Cold temperatures decreases muscle action. Provide an example.