Action Potential Worksheet

1. Explain how an action potential and graded potential are different.

2. Describe the following in your own words
   a. resting potential
   b. depolarization
   c. hyperpolarization
   d. repolarization
   e. threshold

3. What triggers an action potential? What happens to the membrane to trigger an action potential?

4. What is a positive feedback loop? How does a neuron create a positive feedback loop?

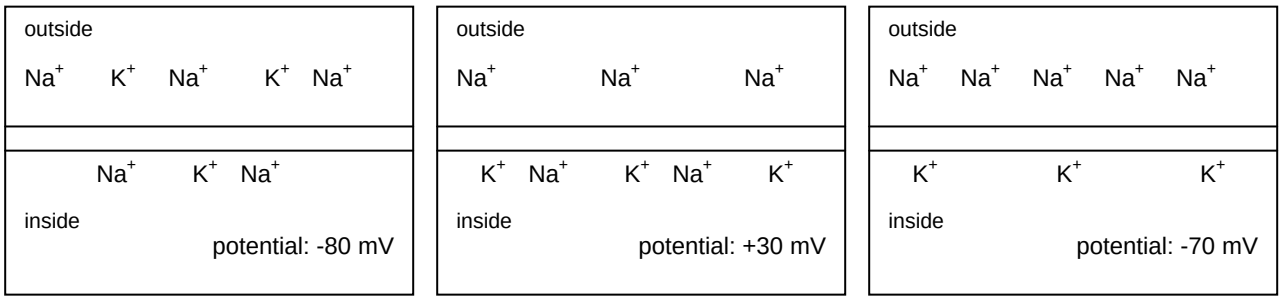
5. What is the role of the voltage-gated sodium channels for producing an action potential?

6. What is the role of the voltage-gated potassium channels?

7. What would happen if the voltage gated sodium and potassium channels opened
   a. at the same time?
   b. further apart? (longer delay)

8. What is the absolute refractory period? What is the relative refractory period?

9. Consider the following three diagrams of a nerve cell membrane. They show resting potential, depolarization, and hyperpolarization. Figure out which one is which, then draw them in the order they occur in a cell that undergoes an action potential



10. Graph the following set of voltage and time data. Time in milliseconds should be on the x-axis and membrane potential in millivolts should be on the y-axis. Label
    a. absolute refractory period
    b. action potential (AP)
    c. depolarization
    d. graded potential
    e. hyperpolarization
    f. relative refractory period
    g. repolarization
    h. resting membrane potential

Potential (mv)	-70	-70	-65	-70	-70	-60	-70	-70	-50	+30	-65	-75	-78	-71	-70
Time (ms)	0.2	0.5	0.7	1.0	1.5	1.7	2.0	2.5	3.0	3.5	4.0	4.2	4.5	5.0	5.5