

Name _____

Generating an Action Potential

For each of the following steps in generating an action potential:

- 1) Describe in words what is happening.
- 2) Draw the lines on the membrane potential graph.
- 3) Draw the plasma membrane of the neuron. Include: phospholipid bilayer, a sodium potassium pump, 2 Na^+ voltage-gated channels, and a K^+ voltage-gated channel. Draw arrows on your diagram to show the direction of movement of Na^+ and K^+ ions. Use different colors for the different ions.

The first one has been done for you as an example

Step 1: Resting membrane potential

The sodium-potassium pump moves 3 Na^+ ions out of the cell and 2 K^+ ions into the cell. This makes the inside of the membrane slightly negative and the outside of the cell slightly positive. Resting membrane potential equals -70 mV.

Graph: Membrane Potential

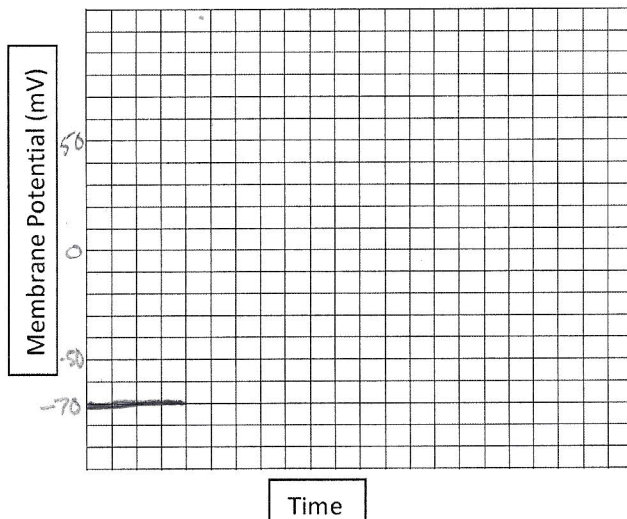
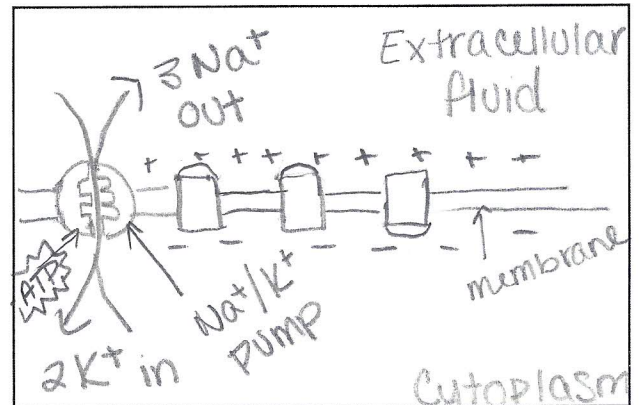


Diagram:



Label: Membrane, Sodium-potassium pump, Cytoplasm, Extracellular Fluid

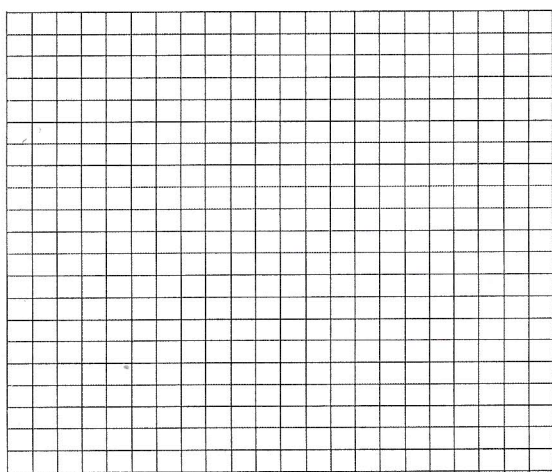
Name _____

Step 2: Reaching Threshold

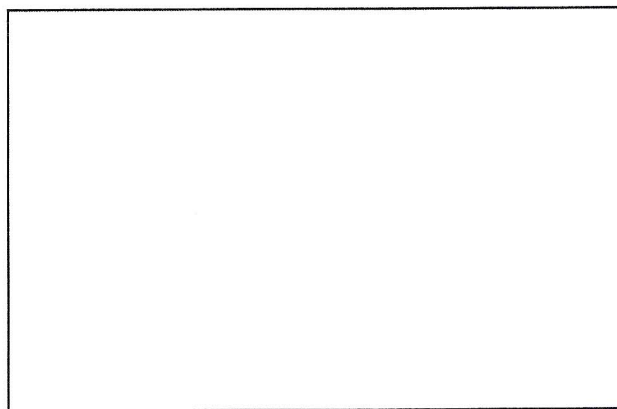
Graph: Membrane Potential

Drawing:

Membrane Potential (mV)



Time



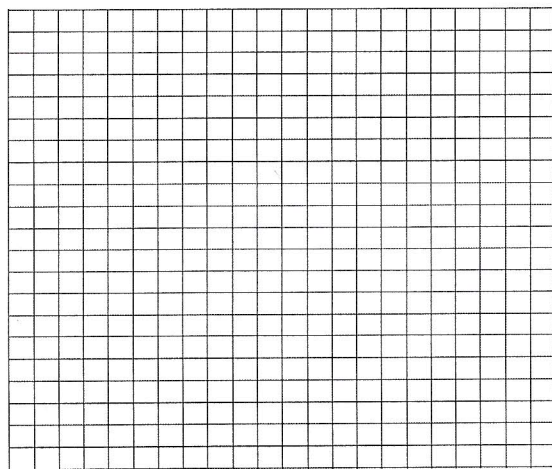
Label: Na⁺ voltage-gated channels

Step 3: Depolarizing phase

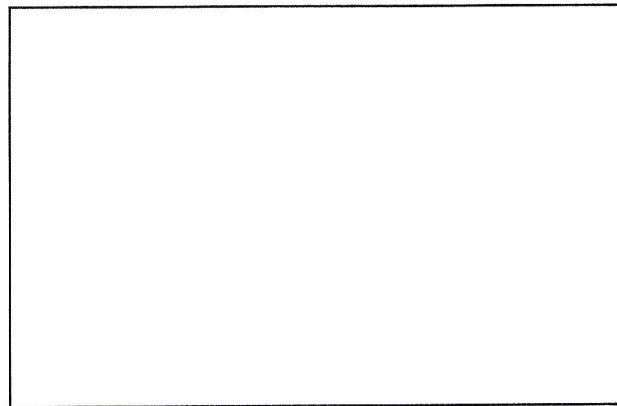
Graph: Membrane Potential

Drawing:

Membrane Potential (mV)



Time



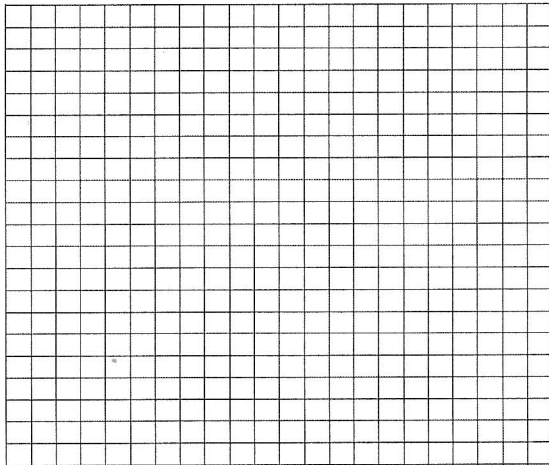
Label: Na⁺ voltage-gated channels

Name _____

Step 4: Repolarizing phase

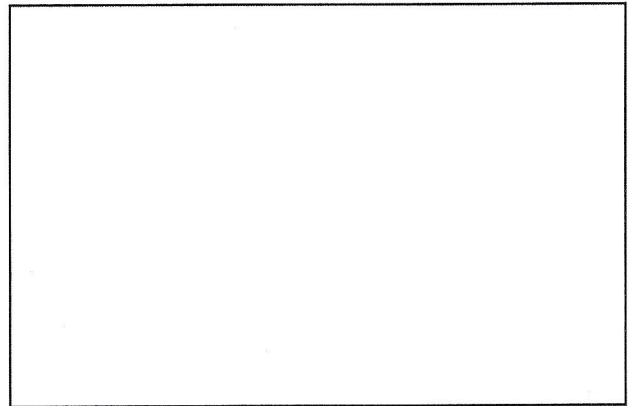
Graph: Membrane Potential

Membrane Potential (mV)



Time

Drawing:

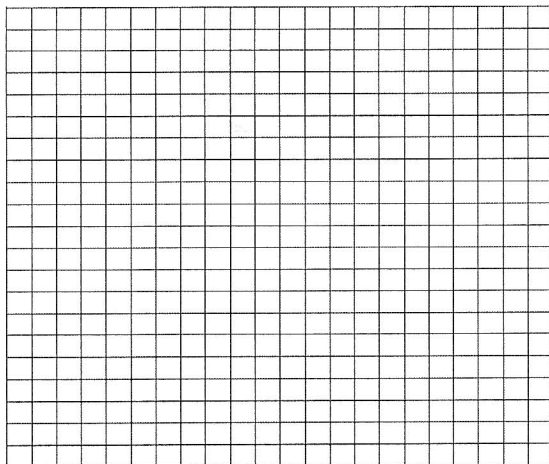


Label: K^+ voltage-gated channels

Step 5: Back to resting potential

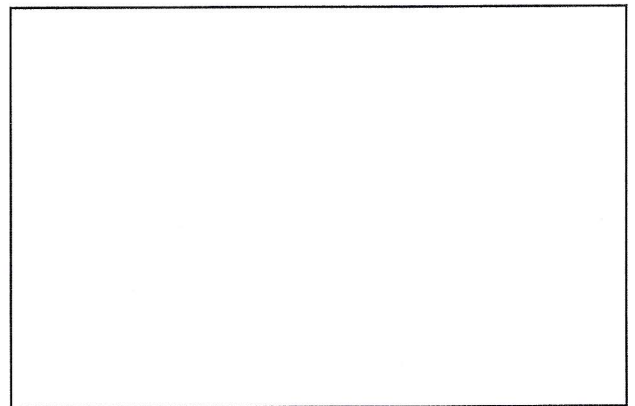
Graph: Membrane Potential

Membrane Potential (mV)



Time

Drawing:



Label: Membrane, Sodium-potassium pump, Cytoplasm, Extracellular Fluid