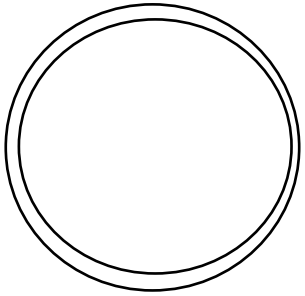
Draw in the ions most highly concentrated outside of the cell, and those inside the cell.

Add the negatively-charged organic compounds (A-) where they should be.

What is the resting membrane potential?

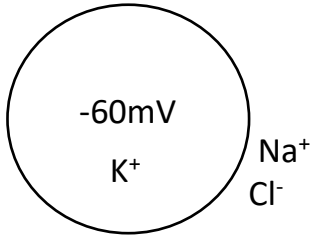


Concentration gradient → force of _____
Describe:

Electrical gradient → force of _____
Describe:

The cell to the right is at resting potential.
Draw & label an arrow for:

- K+ movement along concentration gradient
- K+ movement along electrical gradient
- Na+ movement along concentration gradient
- Na+ movement along electrical gradient



Define these terms:

Polarized:

Depolarized:

Hyperpolarized:

What would be the result (depolarization or hyperpolarization) of the following ion movement:

Sodium into cell: _____

Potassium out of cell: _____

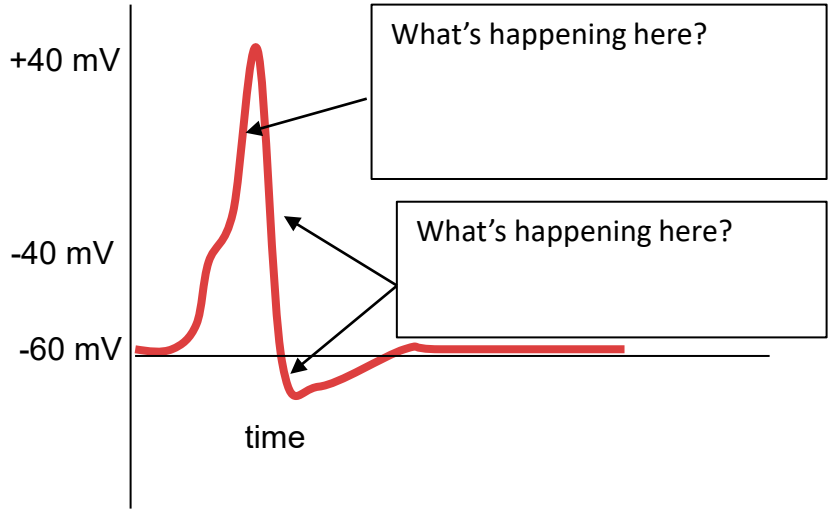
Chloride into cell: _____

Calcium into cell: _____

Potassium into cell: _____

Describe the 2 main ways that the resting membrane potential maintained.

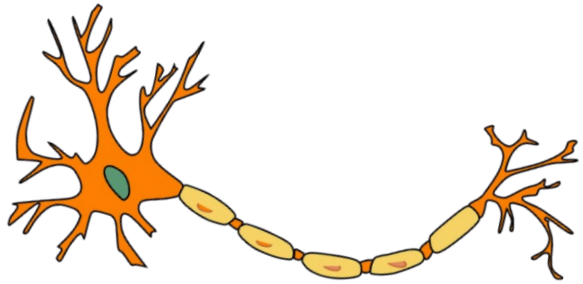
Name: _____ Semester/Year_____



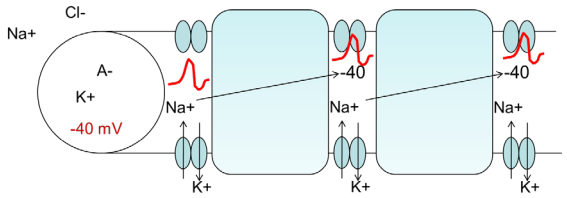
Circle the voltage on the Y-axis that is threshold.
On the graph, draw an arrow pointing to the refractory period.

Name: _____ Semester/Year_____

In the neuron below, mark each place where you would see "Na+ in, K+ out", & the associated change in membrane potential.



Draw your own myelinated axon (example to the right) and show what happens at each node.
How does each successive node reach threshold?



When threshold is reached at the axon hillock, the 1st channels to open are:

_____ .

This causes _____ to rush (*into or out of*) _____ the neuron, and the membrane becomes (*depolarized or hyperpolarized*) _____.

What forces are acting on that ion?

When potassium leaves during the action potential, the membrane becomes briefly (*depolarized or hyperpolarized*) _____, a period of time called the _____ period, after which the cells returns to _____membrane potential.

When the action potential reaches the terminals, _____channels open. That ion causes _____.

Describe what it means that the action potential is "all or none".

Name: _____ Semester/year_____

Draw and describe the difference between the conduction of the action potential in myelinated and unmyelinated axons.

In a given axon, what can vary and what is constant: rate, speed, size?

Constant: _____

Varies: _____

What 2 aspects of an axon determine the speed (conduction velocity) of the action potential?

What can affect the rate of action potential firing (think sensory systems)?

Name: _____ Semester/Year_____

Draw a synapse. Label the pre- and postsynaptic cells and the synaptic cleft. Show calcium entering the terminal to trigger neurotransmitter release. Show neurotransmitter binding to receptors on the postsynaptic membrane.

Draw & describe an ionotropic receptor. Why is it also called a ligand-gated channel?

EPSP stands for: _____

What ion movement could generate an EPSP? _____

Draw a graph of EPSPs leading up to an action potential.

IPSP stands for: _____

What ion movement could generate an IPSP? _____

Draw a graph of IPSPs.

Draw and describe spatial summation.

Draw and describe temporal summation.