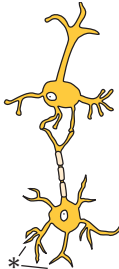
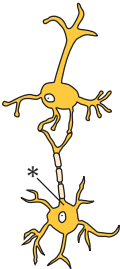
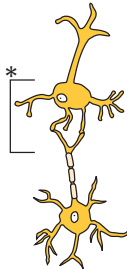
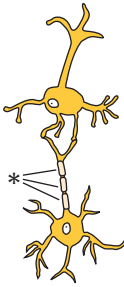


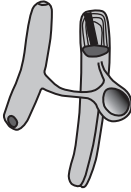
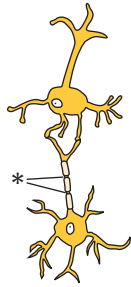


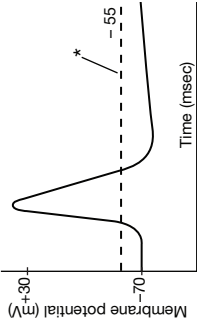
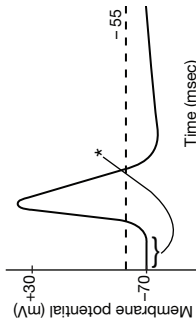
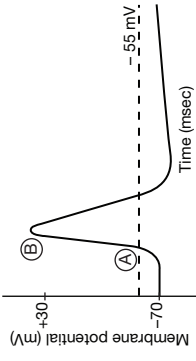
The Nervous System Bingo Choice Sheet

	Function / Bingo Question	Related Figures / Diagrams
Sensory neuron	This type of neuron transmits sensory information to the CNS.	
Central nervous system (CNS)	This is the largest part of the nervous system and the integrating center for neural reflexes. Consists of the brain and spinal cord.	
Peripheral nervous system (PNS)	Consists of neurons that lie completely or partially outside the central nervous system.	
Brain and spinal cord	Receives and integrates incoming information from the CNS neurons to determine whether a response is needed.	
Efferent motor neurons	Output signals travel through these neurons to effector cells to determine an appropriate response, if any.	
Afferent sensory neurons	This type of neuron carries information about temperature, pressure, light, and other stimuli from sensory receptors to the CNS.	
Somatic motor division	Efferent neurons that control skeletal muscles.	
Autonomic nervous system	Portion of the CNS that controls all involuntary functions such as breathing and digestion.	
Interneurons	Neurons that lie entirely in the CNS.	
Nerves	The long axons of peripheral neurons are bundled together with connective tissue into these cord-like fibers that extend from the CNS to targets of the component neurons.	
Sensory Nerve	This type of nerve carries only afferent signals.	
Motor Nerve	This type of nerve carries only efferent signals.	
Dendrites	Highly branched projections of a neuron that receive incoming information from neighboring cells. Their primary function in the peripheral nervous system is to transfer electrical stimulation to the rest of the neuron.	
Axon hillock	Region of the axon where it joins the cell body. Often contains the trigger zone.	
Axon terminal	The distal end of a neuron where neurotransmitter is released into a synapse.	
Synapse	The region where an axon terminal of one neuron meets its target cell. Includes the presynaptic axon terminal, synaptic cleft and postsynaptic dendrite.	
Synaptic cleft	The narrow space between the two cells involved in a synapse.	
Presynaptic cell	The neuron that delivers the signal to the synapse.	

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Postsynaptic cell	The cell that receives the signal from the synapse.	
Satellite cells	Glial cells that form a supportive capsule around nerve bodies in ganglia.	
Schwann cells	Cells that form myelin around a peripheral neuron axon.	
Astrocytes	Highly branched cells that contact neurons and blood vessels. They also take up K ⁺ and neurotransmitters from extra cellular fluid to help maintain homeostasis.	
Microglia	Specialized immune cells that reside permanently within the CNS. They are capable of removing damaged cells and foreign invaders.	
Myelin	Electrically insulating layers of phospholipid membrane that surrounds the axon of the neuron.	
Oligodendrites	Central nervous system glial cells that form myelin around an axon.	
Nodes of Ranvier	Tiny regions or gaps located between axon membranes which play an important role in transmission of the electrical signal.	
Ganglion	A cluster of nerve cell bodies found outside the CNS.	
Mechanically gated ion channels	These ion channels are found in the sensory neurons and open in response to physical forces such as pressure or stretch.	
Chemically gated ion channels	These ion channels respond to a variety of ligands such as extracellular neurotransmitters or intracellular signal molecules.	
Graded potentials	Variable-strength signals that travel short distances and lose strength as they travel throughout the cell.	
Action potentials	Large change in electrical potential across cells that results in transmission of nerve impulses.	
Threshold voltage	The minimum level of depolarization required to initiate an action potential.	

The Nervous System Bingo Choice Sheet

Na ⁺	A rapid influx for this ion depolarizes the cell during an action potential.	
K ⁺	The ion channels of this ion remain open near the end of an action potential, causing the cell to hyperpolarize before returning to resting potential.	
Resting potential	The even distribution of ions across a living membrane.	
Electrical synapses	These synapses pass an electrical signal or current directly from the cytoplasm of one cell to another cell through gap junctions. This occurs mainly in the CNS.	
Chemical synapses	These synapses use neurotransmitters to carry information from one cell to another cell.	
Acetylcholine	This neurotransmitter is found in the membrane of phospholipids, functions in both the CNS and PNS. It is secreted by neurons and binds to receptors that are cholinergic.	
Amine neurotransmitters	These neurotransmitters are derived from single amino acids. Some may also function as neurohormones when secreted by the adrenal medulla.	
Glutamate	The primary excitatory neurotransmitter of the CNS.	
Gamma-aminobutyric acid (GABA)	Serves as the main inhibitory neurotransmitter.	
Adrenergic receptors	Receptors that bind to epinephrine or norepinephrine. Also found in blood vessels and cause smooth muscle constriction (vasoconstriction).	
Cholinergic receptor	Acetylcholine is secreted from this type of receptor and will bind to either an ion channel-receptor or a G protein-coupled receptor.	
Depolarization	A decrease in the membrane potential difference of the cell.	

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Hyperpolarization	A membrane potential that is more negative than the resting potential.	
Enteric nervous system	A network of neurons located in the walls of the digestive tract.	
Sympathetic branch	A division of the autonomic nervous system that is responsible for flight-or-fight response.	
Parasympathetic branch	Division of the autonomic nervous system responsible for daily activities.	
Axonal transport	Movement of material between the axon terminal and the cell body.	
Glial cells	These cells are not directly involved in transmission of electrical signals. However, they provide important physical and biochemical support to neurons.	
Concentration gradient	Difference in the concentration of a substance in two locations across a semipermeable membrane.	
Membrane permeability	This neuron component is much more permeable to K^+ than to Na^+ or Ca^{2+} . Therefore, K^+ is the major ion which contributes to the resting membrane potential.	
Membrane potential	Electrical disequilibrium that results from the uneven distribution of ions across the cell membrane.	
Nernst equation	This equation predicts the membrane potential for a single ion. Gives the membrane potential that a single ion would produce if the membrane were permeable to that ion only.	$E_{ion} = \frac{61}{Z} \log \frac{[ion]_{out}}{[ion]_{in}}$
Local current flow	A wave of depolarization that moves through the cell. Traditionally in biological systems the net movement is toward a positive electrical charge.	
Trigger Zone	The location of the axon where graded potentials are integrated and an action potential will begin provided the signal is above threshold.	
Conduction	The movement of an action potential through the neuron at great speed.	
Norepinephrine	This chemical is secreted by adrenergic receptors. It binds to G-coupled protein receptors on smooth and cardiac muscle, endocrine and exocrine glands in the CNS.	
Adenosine	This nucleotide is secreted by a purine receptor and binds to a G protein-coupled receptor.	
Temporal summation	The sum of graded potentials overlapping in time.	