Outline:

Neuroanatomy

I. Functional Classes (Central Nervous System-Peripheral Nervous System)
   --Sensory Neurons
   --Motor Neurons
   --Other Neurons “interneurons”

II. Morphology (shape)
   --Classes of Neurons
   --Synapses
   --Parts of Neurons
   --Glia Cells
   --Blood-Brain Barrier

Neurophysiology (how neurons work)

I. Neurons are electrical devices

II. Action Potential
   --Resting potential
   --Threshold
   --Ion channels
   --Ion fluxes in action potentials
   --Conduction of depolarization

Neuroanatomy

I. Functional Classes (Central Nervous System-Peripheral Nervous System)
   --Sensory Neurons (internal/external info, transform stimulus into something brain understands)
   --Motor Neurons (send messages to muscles)
   --Other Neurons “interneurons”

II. Morphology
   --Classes of Neurons
Ex. Of Bipolar    (Unipolar are sensory, in the spinal cord (touch))

Multipolar Neuron

neurons are very simple, they just gather information on dendrite and send on axon. Spines involved in learning and memory

--Synapse

  synapse-connection between neurons-only between terminal button and next neuron
  synapse is a place not an object
can occur on dendrite or on cell body (even sometimes axon), often on spines

--Parts of a Neuron

--Glia Cells

5x more than neurons
astrocytes- the sity workers (support, clean up, nourishment)
oligodendrocytes (CNS) and Schwann cells (PNS)-myelination

--Blood Brain Barrier

above, oligodendrocyte
neurons are extremely sensitive, ie to caffeine, heroine, etc. so must protect from chemical attacks.

in all other capillaries there are gaps that let substances come in and out; there are no such gaps in the capillaries in the brain.

Neurophysiology

I. Neurons are electrical devices
   --ions are used, not e- because they would go everywhere in the fluid of the brain. This is a way to channel e- on a molecule (forming an ion)

II. Action Potentials

--Resting Membrane Potential

Sodium has both an electrostatic pressure and diffusive pressure forcing the sodium in. That is why a Sodium/Potassium transporter is needed to keep the concentration of Sodium outside of the cell higher that that inside the cell.

--Threshold

The threshold for action potential generation is shown below. The action potentials are either all or nothing (meaning they die back down as shown below).
--Ion Channels

This action potential has to do with ion channels. Since everything electrical is carried by ions, action potentials must have to do with ions

these are opened by voltage, so called voltage dependent channels

--Ion Fluxes in Action Potentials

--Conduction of Depolarization
as you can see the action potential on an axon stays steady. The action potential or depolarization does not die out due to myelin. There is a slight decremental (dampened) conduction under the myelin sheath but it is such a short distance until the action potential is regenerated at the nodes of Ranvier that the action potential continues unheeded. Only at the nodes can ion exchange occur. Action potentials can go 200 mph!!