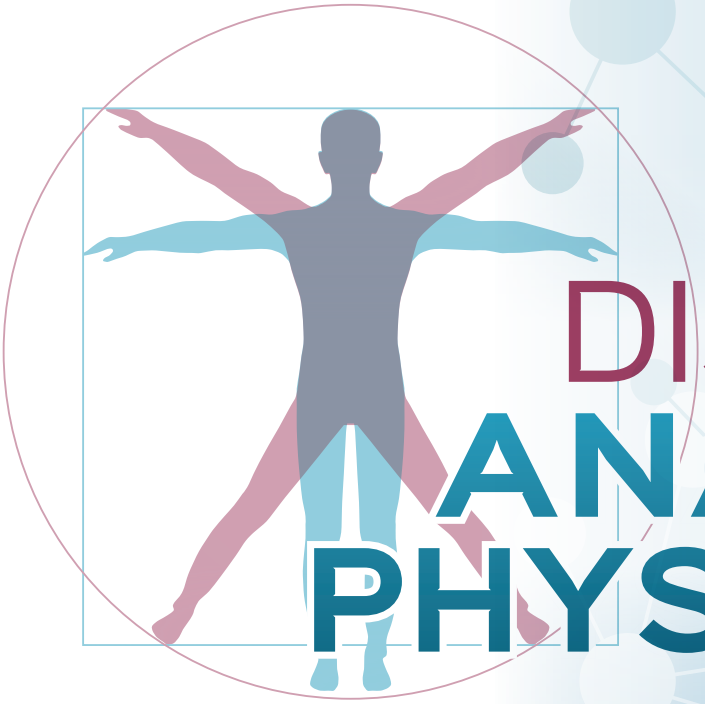

DISCOVER ANATOMY & PHYSIOLOGY

STUDENT GUIDEBOOK

Luke & Trisha Gilkerson

Discover Physics: Student Guidebook

Journey Homeschool Academy

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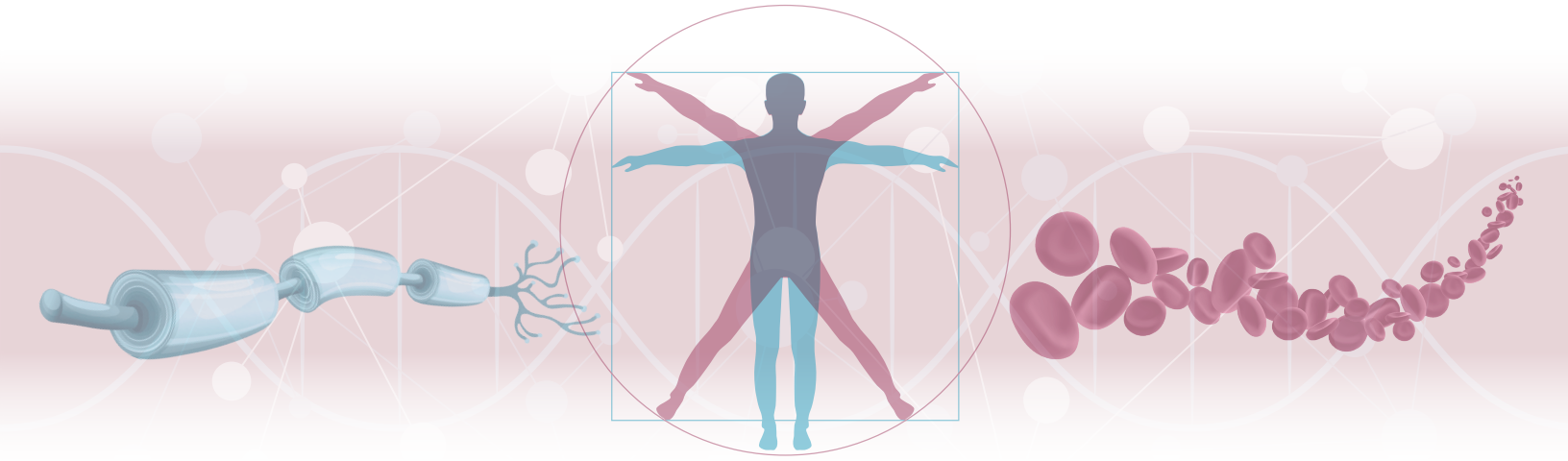


LESSON 12

THE NERVOUS SYSTEM: WIRED FOR ACTION

Introducing the nervous system—God's high-speed communication network that keeps your body running with incredible precision. You'll discover its major divisions, see how it gathers information, makes decisions, and responds, and then zoom in to meet the tiny messengers called neurons and their support team, the neuroglia.

Vocabulary

Action potential

Afferent pathway

Astrocyte

Autonomic nervous system

Central nervous system (CNS)

Depolarization

Efferent pathway

Interneuron

Microglia

Motor neuron

Nervous system

Neurotransmitter

Oligodendrocyte

Parasympathetic division

Peripheral nervous system (PNS)

Repolarization

Resting potential

Schwann cell

Sensory neuron

Somatic nervous system

Sympathetic division

OUTLINE & NOTES

LESSON 12A: THE NERVOUS SYSTEM: WIRED FOR ACTION

I. Purpose of the Nervous System

A. Your body's _____ and _____ center

B. Constantly sends _____ with instructions and makes _____

C. Works with the _____

1. Endocrine system = _____
2. Nervous system = _____

II. Divisions of the Nervous System

A. _____ nervous system (CNS)

1. _____ = control tower for _____ , _____ , and _____ information
2. _____ = superhighway relaying messages between the _____ and the _____

B. _____ nervous system (PNS)

1. All the _____ branching from CNS into _____ of your body
2. Delivers _____ they're needed

III. From Input to Output: The Nervous System's Three-Step Process

A. Sensing

1. Sensory _____ : receptors _____ and send it to the _____
2. _____ pathway = _____ at the brain

B. Deciding

1. _____ : brain or spinal cord _____

   and _____ what to do

2. Decision-making can happen _____ you being _____ of it

C. Responding

1. Motor _____ : sends instructions _____ from the

   _____ to the _____

2. _____ pathway = _____ the brain

IV. Somatic vs. Autonomic Nervous System

A. _____ system

1. _____ control
2. Moves _____

B. _____ system

1. _____ control
2. Keeps heart _____ , lungs _____ , digestion working
3. Has two gears:

   a. _____ = gears you up for action

   b. _____ = calms, restores, and repairs

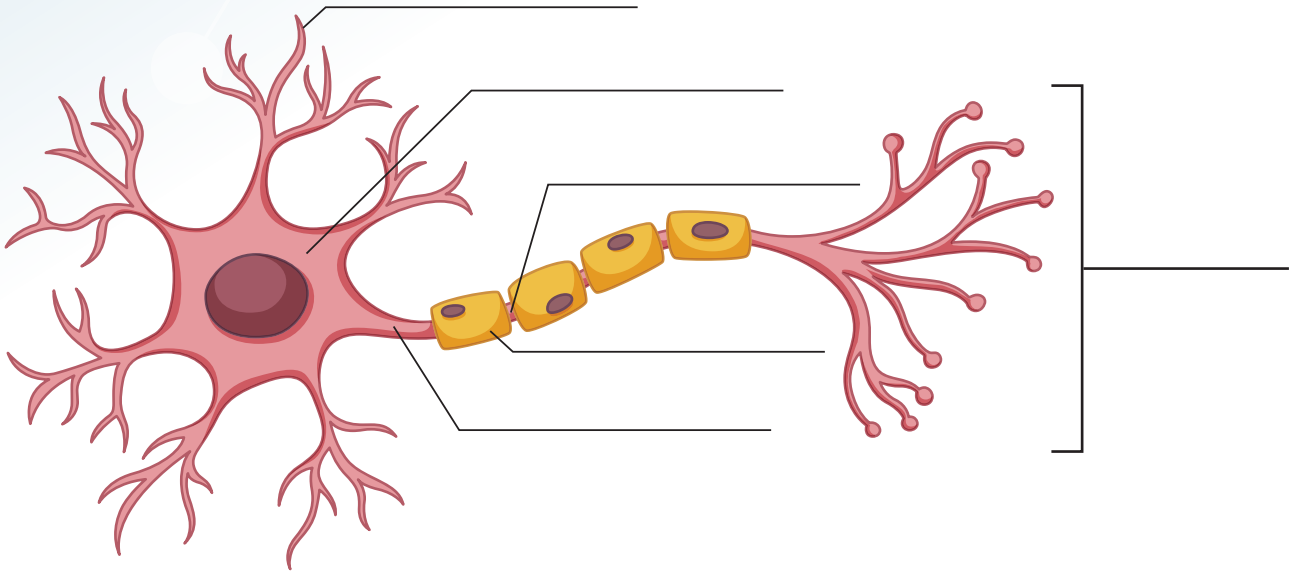
NOTES

OUTLINE & NOTES
LESSON 12B: THE NERVOUS SYSTEM: WIRED FOR ACTION

I. The Building Blocks of the Nervous System

A. _____ —the messengers

1. Neuron _____



a. Dendrites: _____ from other cells

b. Soma (cell body): contains the _____ and decides whether to _____ onward

c. Axon: a long fiber that carries the _____ signal _____ from the soma

d. Axon terminals: _____ sending the _____ to the next cell

e. Myelin sheath: a _____ that wraps axons and ___ _____ transmission

f. Nodes of Ranvier: _____ in the myelin that allow the signal to __ _____ from one gap to the next.

2. Types of neurons

   a. Sensory neurons (afferent)

      (1) Carry information to the _____ and _____

      (2) Detect _____ and _____

      _____ of the body

   b. Interneurons

      (1) Found only in the _____ and _____

      (2) Process _____ , and _____

      how to _____

   c. Motor neurons (efferent)

      (1) Carry _____ from the _____

      out to the _____

      (2) Tell _____ to move or _____ to release chemicals

B. _____ —the support team

1. Astrocytes: _____ neurons, _____ waste, and _____ the environment
2. Oligodendrocytes (CNS) & Schwann cells (PNS): _____ with _____
3. Microglia: look for _____ , clean up _____ , and _____ against infection

II. How Neurons Communicate

A. Neurons send messages in two steps: _____ down the axon, and _____ across the synapse

B. Electrical signaling—the _____

1. Even when _____ , a neuron has a _____ _____ built up called the _____
2. The charge exists because the neuron pumps _____ and _____ , storing up energy.

3. When a _____ , sodium channels open, sodium rushes in, and the charge flips, causing _____ .
4. Almost immediately, _____ flows back out and the neuron _____ , causing _____ .

C. Chemical signaling—_____

1. Neurons _____ ; there's a _____ between them called a _____
   a. Signal arrives at _____
   b. _____ rush in and trigger the _____ to move to the edge of the cell.
   c. Vesicles release _____ into the _____
   d. Neurotransmitters _____ and fit into _____ on the next cell
      (1) If the next cell is a _____ , the signal keeps going
      (2) If the next cell is a _____ or a _____ , a command is given
2. Example neurotransmitters:
   a. _____ : tells muscles to contract
   b. _____ : linked to motivation and pleasure

NOTES