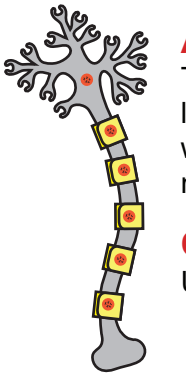
3D Molecular Designs
...where molecules become real ™

Neuron Modeling Kit©

Teacher Notes



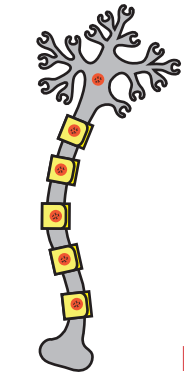
Activity Guide

Thank you for using our tools to help your students visualize the molecular world! The lesson/activity guide for the Neuron Modeling Kit© is intended to help you consider different ways you may use these materials. We encourage you to modify these lessons and activities to meet the learning objectives of your specific students. Enjoy!

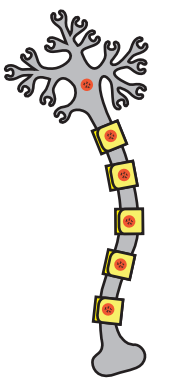
Objectives

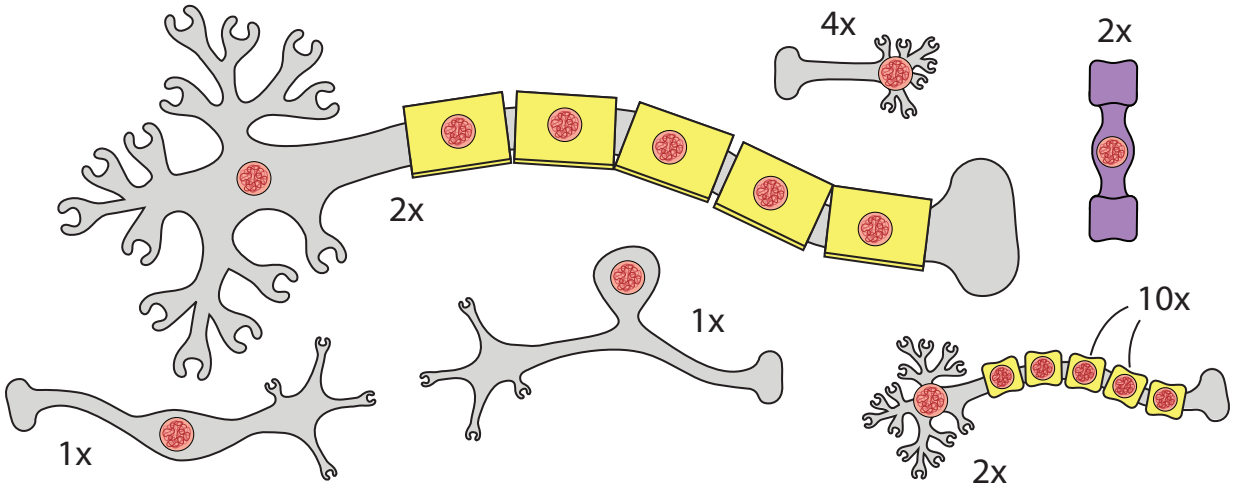
Use the model pieces in the set to:

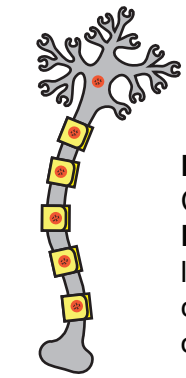
- Construct a model and identify parts of a multipolar neuron.
- Distinguish between four different types of neurons (multipolar, bipolar, unipolar and interneurons).
- Determine the location and function of these four different types of neurons in the human body.
- Describe differences between two types of neuroglia (in this case, cells that compose the myelin sheath) in the central and peripheral nervous systems.
- Utilize the neuron models to construct simple and complex neural pathways.
- Examine and predict the overall effect on neuronal firing at excitatory and inhibitory synapses in the neural pathways constructed.



Materials Needed







Note for Part II - Modeling Reflex Arcs: consider laminating the Cross Section of the Spinal Cord Sheet (page 6) for ongoing use.
Note for Part III - Modeling Excitatory and Inhibiting Chemical Synapses: consider laminating the Neuronal Signaling Simulation Sheet (page 5) so it can be used to model each case (use dry erase markers). Alternatively, you could divide the four cases among your groups of students.

National Standards

Connections to: A Framework for K-12 Science Education

Practices, Crosscutting Concepts, and Core Ideas

Dimension 1: Scientific and Engineering Practices

1. Asking Questions (for science) and Defining Problems (for engineering)
2. Developing and Using Models
6. Constructing Explanations (for science) and Designing Solutions (for engineering)

Dimension 2: Crosscutting Concepts

1. Patterns
2. Cause and Effect: Mechanism and Explanation
4. Systems and System Models
6. Structure and Function

Dimension 3: Disciplinary Core Ideas

Life Sciences

LS1: From Molecules to Organisms: Structures and Processes

LS1.A: Structure and Function

LS1.D: Information Processing

Engineering, Technology, and Applications of Science

ETS1: Engineering Design

ETS1.A: Defining and Delimiting an Engineering Problem

ETS1.B: Developing Possible Solutions

ETS2: Links Among Engineering, Technology, Science, and Society

ETS2A: Interdependence of Science, Engineering, and Technology

ETS2.B: Influence of Engineering, Technology, and Science on Society and the Natural World