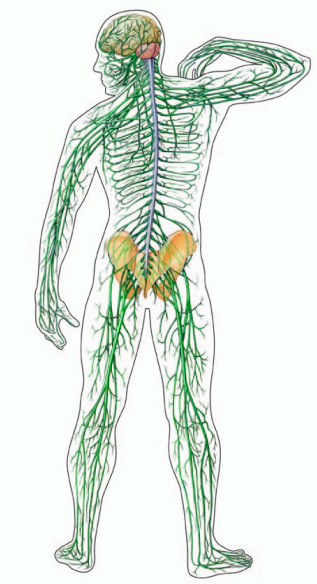
Name: Class: Date:

THE NERVOUS SYSTEM



A. What Does the Nervous System Do?

The nervous system helps your body sense what is going on in your *surrounding*s and respond to them in some way. For example, if you see a baseball that might hit you, you jump out of the way. In that example, your nervous system was involved in many ways. Your eyes saw the ball, your brain determined that the ball might hit you, and your brain told your muscles to make your legs jump out of the way. You sensed and then reacted.

Your nervous system also senses activity that goes on *inside* your body. Most of the nervous system activity inside your body is not under your control: your responses are **automatic**. For example, as you eat your lunch, your nervous system triggers the start of digestion and releases many hormones and chemicals throughout your body to break down your food.

The nervous system has three main jobs:

1. To Sense Things

Your nervous system monitors changes (called **stimuli**) inside and outside the body using receptors in your skin, eyes, nose, mouth, heart, etc.

2. To Interpret Things

Your nervous system takes information collected by the receptors and decides on an appropriate **response**. For example, if receptors in your eye sense a ball coming towards you, your brain interprets the signals and decides whether the ball will hit or miss you.

3. To React to Things

Once your nervous system has decided on a response, it will activate **muscles** or **glands** to carry out that response. For example, ducking out of the way of a fastball. Muscles or glands that cause a response to something are called **effectors**, since they cause an effect.

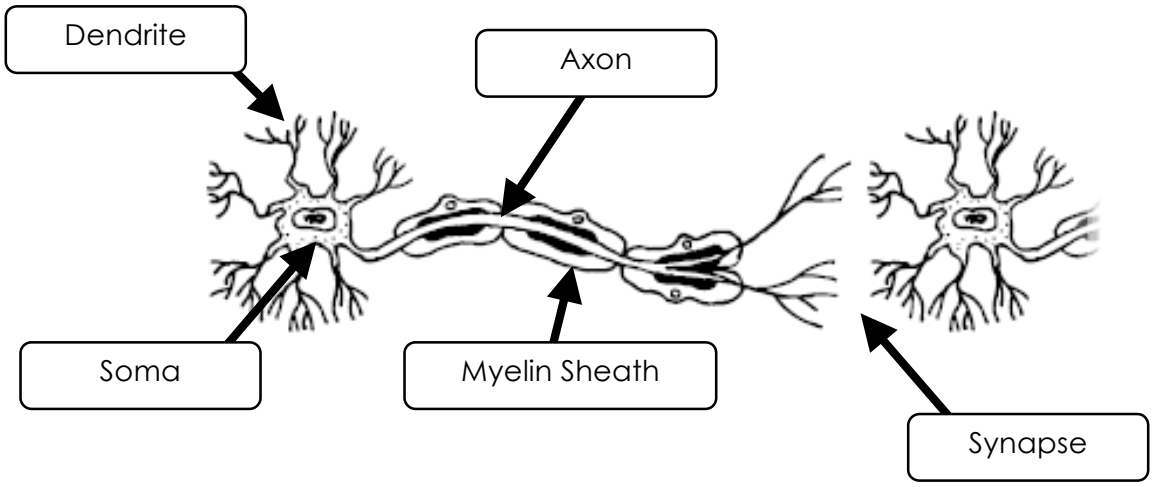
B. What Is The Nervous System Made Up Of?

The nervous system allows all parts of your body to communicate with each other. This is why it resembles an enormous network of telephone wires. The nervous system has 3 parts:

The Brain	The Spinal Cord	Neurons

The brain and spinal cord make up a part of the nervous system called the **Central Nervous System** (CNS). The CNS is involved in interpreting information from our senses and making decisions on how to react. All other neurons throughout the body make up the **Peripheral Nervous System** (PNS).

Neurons are the cells that make up the nervous system. They are specialized to receive and transmit electrical signals called **impulses**. The human body has billions of neurons. In fact, the brain itself contains roughly 100 *billion* neurons! Many neurons can be bundled together to make up long wire-like structures called **nerves**.



Neurons are similar to other body cells in several ways:

1. Neurons are surrounded by a cell membrane.
2. Neurons have a nucleus that contains DNA.
3. Neurons contain cytoplasm, mitochondria and other typical cell organelles.
4. Neurons carry out basic cell processes such as energy production and removing wastes.

However, neurons are **specialized cells** that are different from other body cells in some ways:

1. Neurons have specialized finger-like projects called **dendrites** and **axons**. Dendrites bring electrical impulses *towards* the cell body and axons carry impulses *away*.
2. Neurons can be connected to thousands of other neurons at once.
3. Neurons don't actually touch one another, but are separated by a gap called a **synapse**.

Neurons are classified according to what direction they send information. There are 3 types of neurons, as shown in the chart below:

	What Do They Do?	**Picture**
Sensory Neuron	Send impulses from sensory receptors (in skin, eyes, nose, tongue, ears, etc.) **TOWARDS** the brain and spinal cord	
Motor Neuron	Send impulses **AWAY** from the brain and spinal cord to muscles or glands.	
Interneuron	Found inside the brain and spinal cord. Relay messages BETWEEN sensory and motor neurons. Involved in decision-making.	

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REVIEW QUESTIONS – THE NERVOUS SYSTEM

1. Summarize the 3 main jobs of the nervous system.

2. What is a stimulus?

3. What are effectors? What two things in the body act as effectors?

4. What are the 3 main components of the nervous system?

5. Compare the Central Nervous System to the Peripheral Nervous System.

6. Draw a simplified diagram of a neuron and label it.

7. How are neurons different from other body cells?

8. How are dendrites and axons similar? How are they different?

9. Copy the table on the 3 types of neurons below.