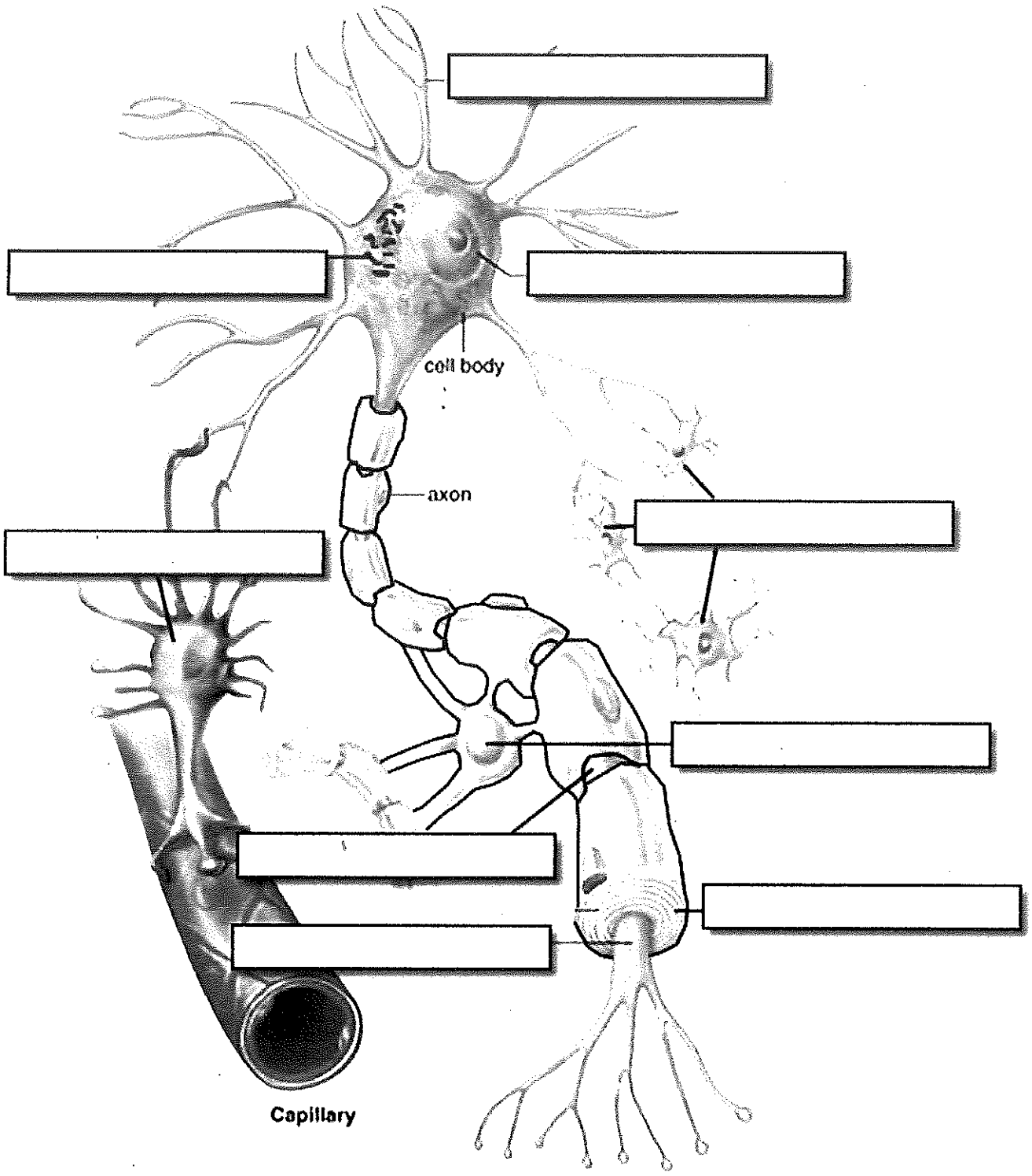
Neuron Label



Name_____

Color the Neuron and Neuroglial Cells

- ☐ Oligodendrocytes (purple)
- ☐ Ependymal Cells (orange)
- ☐ Myelin sheaths (pink)
- ☐ Microglial cells (yellow)
- ☐ Astrocyte (green)
- ☐ Body of Neuron (blue)
- ☐ Capillary (red)
- ☐ Nodes or Ranvier and the Axon (brown)

What is the function of:

1) Oligodendrocytes _____
2) Astrocytes _____
3) Microglial cells _____
4) Myelin sheaths _____

5) Describe the path of a nerve impulse in a neuron starting with the dendrite.

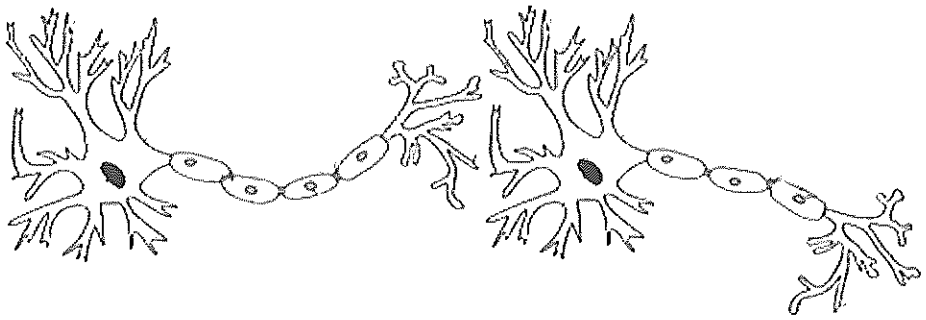
Name:_____Date:_____

The Anatomy of a Synapse

Neurons form elaborate networks through which nerve impulses—action potentials—travel. Each neuron has as many as 15,000 connections with neighboring neurons.

Neurons do not touch each other; instead, neurons interact at contact points called **synapses**: a junction within two nerve cells, consisting of a miniature gap which impulses pass by a neurotransmitter. A neuron transports its information by way of a nerve impulse called an **action potential**. The action potential can originate in the cell body when it has received a stimulus, then it moves down the axon of that neuron. When an action potential arrives at the synapse, it stimulates the release of **neurotransmitters**. These neurotransmitters are released into the synaptic cleft to bind to the receptors of the adjacent cell.

On the image below: Color the cell body and the dendrites blue. ☐
Color the axon (and myelin sheaths) red . ☐
Highlight the synapse with yellow. ☐
Use an arrow to show movement of the action potential. ☐



On a cellular level, the neuron cell has vesicles that contain the neurotransmitters. Each neurotransmitter can carry a different type of message. Some neurotransmitters, like seratonin, regulate appetite, sleep and mood. Serotonin is though to be associated with certain types of depression and anxiety disorders.

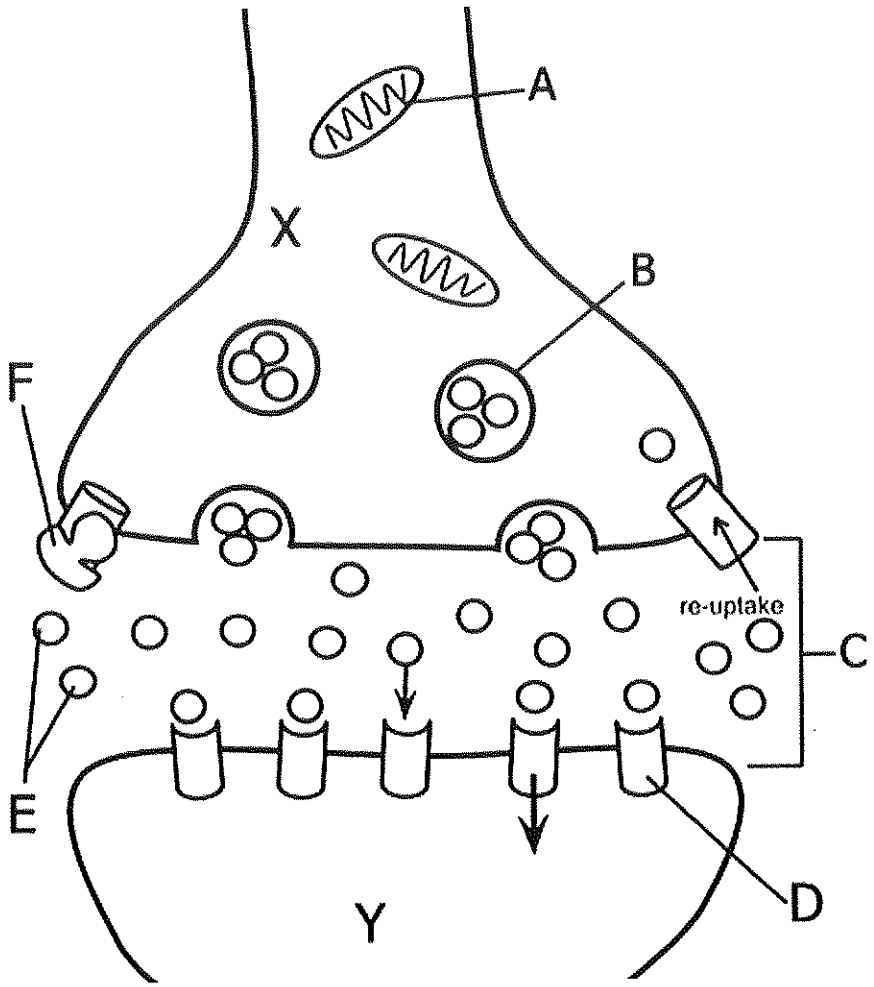
The image below shows how seratonin is released from the neuron and how a drug called SSRI (selective seratonin re-uptake-inhibitors) is used to treat mood disorders. The neuron, like most cells of the body has mitochondria which provide the energy the cell needs to function. Color the mitochondria (A) orange ☐ and the axon on the nerve cell (X) blue. ☐

The axon area contains the vesicles that store the neurotransmitters. These neurotransmitters are released into the synaptic cleft where they cross the gap and land on the receptors of the dendrites of the next neuron.

Color the axon (X) light blue. ☐ Color the neurotransmitters (E) red. ☐
Color the vesicles (B) pink. ☐ Color the receptors (D) green. ☐
Color the dendrite (Y) yellow. ☐

The neurotransmitters are returned to the original cell through transporters, a process called re-uptake. As long as the neurotransmitter remains in the cleft, the receptors will continue to be stimulated. Certain drugs, called SSRI's can inhibit this re-uptake process, leaving the seratonin neurotransmitter active for longer within the cleft. This has an effect of elevating the person's mood or reducing anxiety and depression. Many anti-depressants are marketed as SSRI's.

Color the transporter (re-uptake area) purple. ☐ Color the inhibitor (F) brown. ☐



Identify each of the letters:

A _____

B _____

C _____

D _____

E _____

F _____

X _____

Y _____

Questions:

1. What is the relationship between a receptor and a neurotransmitter?

2. Where are neurotransmitters stored in the cell?

3. What happens if the re-uptake transporter is blocked?

4. What is an SSRI? What does this type of drug treat?

5. An **agonist** is a chemical capable of binding to a receptor and initiating a reaction. An **antagonist** is a chemical that binds to the receptor but does not cause a reaction, effectively blocking that receptor. Sketch a model (using the one you colored as a guide) to show how an antagonist works.

Name_____ Class_____ Date _____

Chapter 35 Nervous System

Section 35–1 Human Body Systems (pages 891–896)

Key Concepts

- How is the human body organized?
- What is homeostasis?

Organization of the Body (pages 891–894)

1. List the levels of organization in a multicellular organism, from smallest to largest.
   a. _____
   b. _____
   c. _____
   d. _____

Match the organ system with its function.

Organ System	Function
_____ 2. Nervous system	a. Stores mineral reserves and provides a site for blood cell formation
_____ 3. Skeletal system	b. Provides oxygen and removes carbon dioxide
_____ 4. Integumentary system	c. Coordinates the body's response to changes in its internal and external environments
_____ 5. Endocrine system	d. Helps produce voluntary movement, circulate blood, and move food
_____ 6. Lymphatic/immune systems	e. Controls growth, development, metabolism, and reproduction
_____ 7. Muscular system	f. Eliminates wastes and maintains homeostasis
_____ 8. Reproductive system	g. Serves as a barrier against infection and injury
_____ 9. Respiratory system	h. Converts food so it can be used by cells
_____ 10. Excretory system	i. Helps protect the body from disease
_____ 11. Circulatory system	j. Produces reproductive cells
_____ 12. Digestive system	k. Brings materials to cells, fights infection, and helps to regulate body temperature

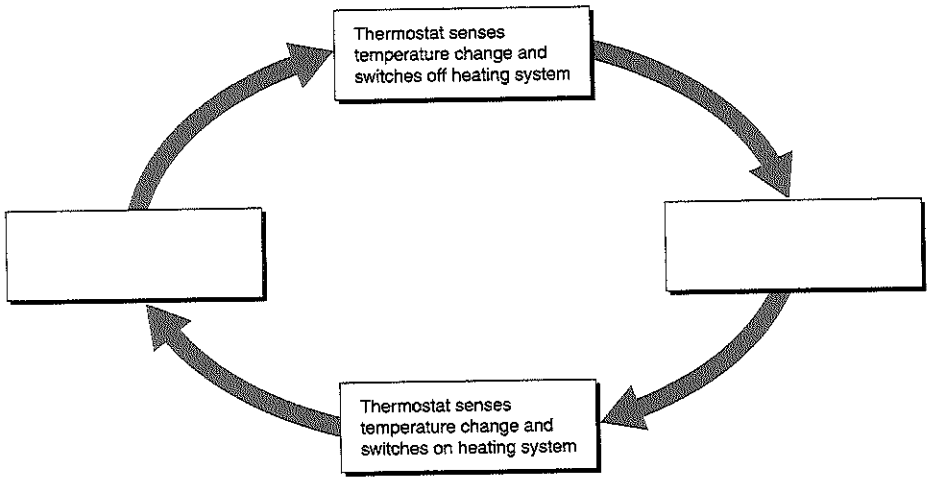
13. What are four types of tissues found in the human body? _____
    _____
    _____
14. The eye is an example of a(an) _____.
15. Circle the letter of the type of tissue that covers interior and exterior body surfaces.
    a. nervous c. epithelial
    b. connective d. muscle

Name_____ Class_____ Date _____

16. Circle the letter of the type of tissue that connects body parts.
    a. nervous c. epithelial
    b. connective d. integumentary

Maintaining Homeostasis (pages 895–896)

17. The process of maintaining a controlled, stable internal environment is called _____.
18. The process in which a stimulus produces a response that opposes the original stimulus is referred to as _____.
19. Fill in the missing labels in the diagram to show how a thermostat uses feedback inhibition to maintain a stable temperature in a house.



20. Is the following sentence true or false? The part of the brain that monitors and controls body temperature is the hypothalamus. _____
21. What happens if nerve cells sense that the core body temperature has dropped below 37°C? _____
    _____
    _____
22. What happens if the body temperature rises too far above 37°C? _____
    _____
    _____

Name_____ Class_____ Date _____

Section 35–2 The Nervous System (pages 897–900)

Key Concepts

- What are the functions of the nervous system?
- How is the nerve impulse transmitted?

Introduction (page 897)

1. What is the function of the nervous system? _____

_____

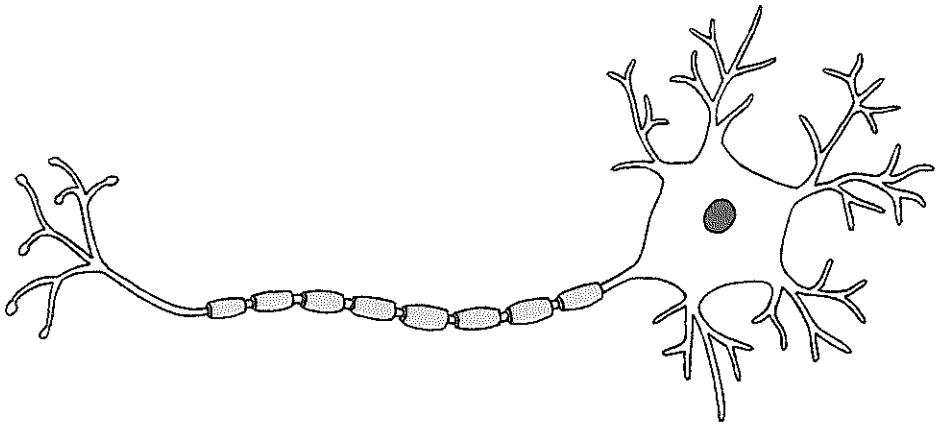
_____

Neurons (pages 897–898)

2. How are neurons classified? _____

_____

3. What are three types of neurons?
   a. _____
   b. _____
   c. _____
4. Is the following sentence true or false? Sensory neurons carry impulses from the brain and the spinal cord to muscles and glands. _____
5. Label the following features in the drawing of a neuron: cell body, dendrites, and axon.



6. What is the function of the myelin sheath? _____

_____

Name_____ Class_____ Date _____

The Nerve Impulse (pages 898–899)

7. The electrical charge across the cell membrane of a neuron in its resting state is called its _____.
8. How does a nerve impulse begin? _____

_____

_____

_____

9. Circle the letter of the choice that describes an action potential.
   a. Reversal of charges due to the flow of positive ions into a neuron
   b. Increase in negative ions in a neuron due to the flow of potassium out of the cell
   c. Change to a negative charge due to the flow of sodium ions out of a neuron
   d. Reversal of charges due to the flow of negative ions into a neuron
10. The minimum level of a stimulus that is required to activate a neuron is called the _____.
11. How does a nerve impulse follow the all-or-nothing principle? _____

_____

_____

The Synapse (page 900)

12. What are neurotransmitters? _____

_____

_____

13. Describe what happens when an impulse arrives at an axon terminal.

_____

_____

_____

_____

_____

Reading Skill Practice

When you read about a complex process, representing the process with a diagram can help you understand it better. Make a diagram to show how a nerve impulse is transmitted from one cell to another. Do your work on a separate sheet of paper.

Name_____ Class_____ Date _____

Section 35–3 Divisions of the Nervous System

(pages 901–905)

Key Concepts

- What are the functions of the central nervous system?
- What are the functions of the two divisions of the peripheral nervous system?

Introduction (page 901)

1. What is the function of the central nervous system? _____

_____

_____

The Central Nervous System (page 901)

2. The central nervous system consists of the _____ and the _____.
3. Is the following sentence true or false? Three layers of connective tissue known as meninges protect the brain and spinal cord. _____
4. The brain and spinal cord are bathed and protected by _____.

The Brain (pages 902–903)

Match the part of the brain with its function.

Part of Brain	Function
_____ 5. Cerebrum	a. Coordinates and balances the actions of the muscles
_____ 6. Cerebellum	b. Regulates the flow of information between the brain and the rest of the body
_____ 7. Brain stem	c. Controls voluntary activities of the body
_____ 8. Thalamus	d. Controls hunger, thirst, fatigue, anger, and body temperature
_____ 9. Hypothalamus	e. Receives and relays messages from the sense organs

10. The two hemispheres of the brain are connected by a band of tissue called the _____.
11. Identify the four lobes of the brain.
    a. _____ c. _____
    b. _____ d. _____
12. Is the following sentence true or false? The left hemisphere of the cerebrum controls the body's left side. _____
13. Is the following sentence true or false? The outer layer of the cerebrum is called the cerebral cortex. _____
14. What is gray matter, and where is it found? _____

_____

15. The two regions of the brain stem are the _____ and the _____.

The Spinal Cord (page 903)

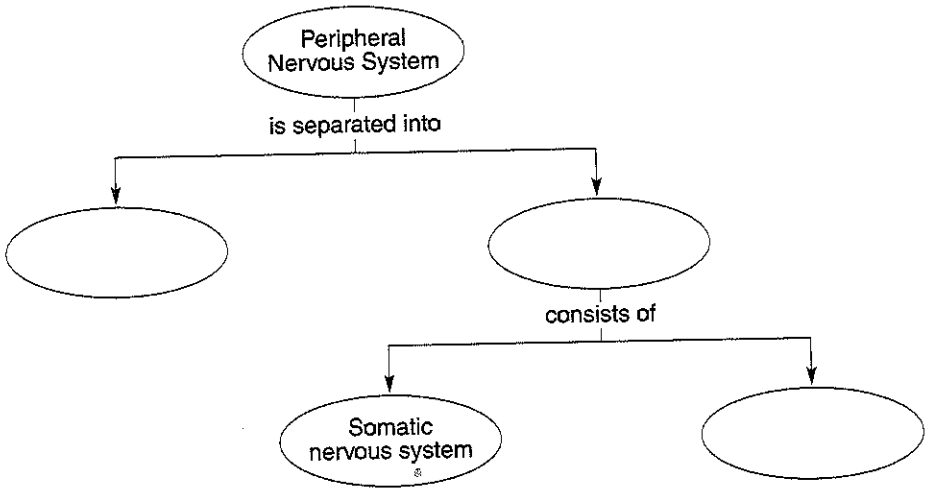
16. What is the advantage of a reflex? _____

_____

_____

The Peripheral Nervous System (pages 903–904)

17. Circle the letter of each choice that is part of the peripheral nervous system.
    a. cranial nerves
    b. spinal nerves
    c. ganglia
    d. spinal cord
18. Complete the concept map.



19. Circle the letter of each activity that is controlled by the somatic nervous system.
    a. Beating of the heart
    b. Lifting a finger
    c. Wiggling the toes
    d. Pulling foot away from tack
20. What does the autonomic nervous system regulate? _____

_____

_____

21. Why is it important to have two systems that control the same organs?

_____

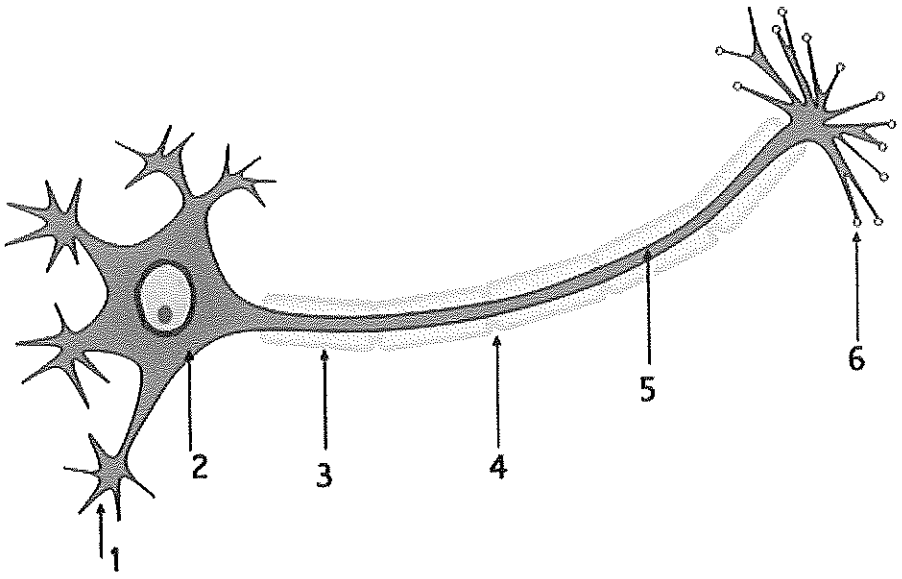
_____

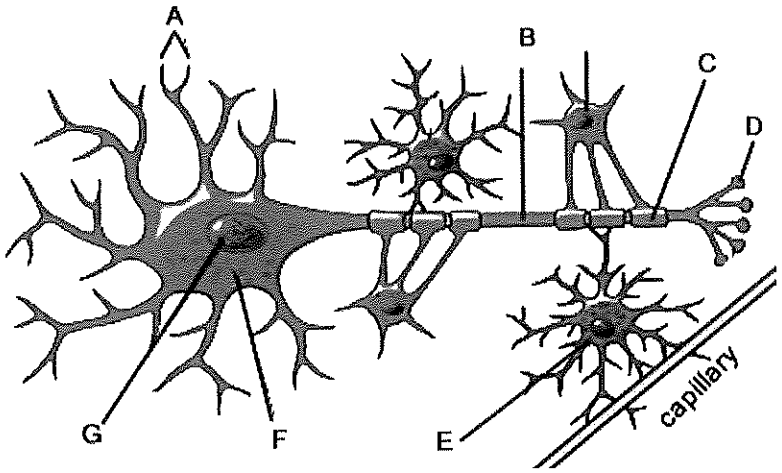
Name: _____

Nervous System Review (9-1 to 9.10)

1. The skeletal muscles are controlled by the _____nervous system.
2. The smooth muscles and glands are controlled by the _____ nervous system.
3. Neurons are composed of a network of fine threads called _____
4. The nervous system consists of two parts, the brain and spinal cord make up the _____ nervous system, and the nerves throughout the body make up the _____ nervous system.
5. _____are cells found between neurons and blood vessels.
6. Neurons consist of a cell body, axons, and _____, which receive information.
7. Neurons that have a single process extending from the cell body are classified as _____, if they have two processes, they are classified as _____
8. White matter is composed of axons that are sheathed in _____
9. Two ions necessary to create an electric current in a nerve fiber are potassium and _____.
10. The _____ function of the nervous system refers to information being interpreted so that the brain can make decisions.
11. The junction between two communicating neurons is called the _____
12. Acetylcholine, serotonin and endorphins are all forms of _____
13. The _____arc refers to a simple nerve pathway that would be involved with involuntary actions (like knee-jerk, or withdrawal)
14. Groups of neurons that perform a common function, such as the storing of procedural memory (tying your shoe) are called neuronal _____.
15. _____cells help destroy bacterial cells and cellular debris.
16. There are 31 pairs of _____ nerves.
17. These types of neurotransmitters increase membrane permeability, thus increasing the chance that threshold will be achieved. _____
18. When a threshold is achieved, an event called the _____ potential occurs.
19. Gaps in the myelin sheath are called Nodes of _____
20. These support cells are responsible for secreting the myelin sheaths: _____
21. A nerve impulse is received by the dendrites and then travels down the _____
22. There are twelve pairs of _____ nerves.
23. This neurotransmitter stimulates the muscles to contract. _____
24. These cells form a membrane that covers specialized brain parts: _____
25. These cells have the same function as oligodendrocytes, but are packed within the myelin: _____

Labeling





Hemisphere Dominance Inventory

1. ____ If you had to give someone directions to your house, which of the following methods would you most likely use?
a. Write a paragraph that explains where and when to turn
b. Draw a road map

2. ____Which of the following are you better at solving?
a. Jigsaw puzzle b. Crossword puzzle

3. ____Do you remember faces easily? a. Yes b. No

4. ____Do you think you'd earn higher grades in a geometry class or in an algebra class?
a. geometry b. algebra

5. ____Imagine that you're vacationing at a resort. Which of the following would you most likely do?
a. Obtain a brochure of local attractions and plan what you'd like to do for the day
b. Drive around without a plan and decide what you'd like to do as you drive along

6. ____Was it usually easy or difficult to learn grammar in school? a. difficult b. easy

7. ____Imagine enrolling in a music course. You and a partner in the course must write a song. Which of the following would you prefer to do?
a. Write the lyrics b. Compose the melody

8. ____When you read a new chapter in a textbook, which of the following are you most likely to do?
a. Skim through the entire chapter first to get a general idea of what the chapter is about
b. Read the chapter from beginning to end without doing much skimming

9. ____ In which of the following English classes would you most likely enroll?
a. Journalism
b. Creative writing

10. ____ Imagine that you volunteered to work for the school newspaper. Which of the following would you rather do?
a. Cut and paste and lay out the stories and decide which stories should appear where
b. Write one or two of the stories

11. ____ After reading a new chapter in a textbook, which of the following would you rather do?
a. summarize the chapter b. outline the chapter

12. ____ if you had an important project due in a class, would you prefer to work? a. in a group b. alone

13. ____Which of the following classroom situations do you prefer?
a. A teacher announces assignments on a weekly basis and sets specific weekly due dates
b. A teacher announces all the assignments at the beginning of the course and allows you to complete them at any time before the end of the course

14. ____ Which of the following statements best applies to you?
a. I'm good at guessing a person's mood by his or her body language
b. I'm not good at guessing a person's mood by his or her body language

15. Which of the following would you rather play? a. Scrabble b. Checkers

16. With which of the following statements do you most agree?
a. We should continue exploring outer space since one day this exploration may benefit us
b. We should continue exploring outer space only if we can be sure ahead of time of certain benefits we would receive

Scoring

How many "a" answers did you have for odd-numbered questions? _____
How many "b" answers did you have for even-numbered questions? _____
LEFT HEMISPHERE TOTAL _____

How many "a" answers did you have for even-numbered questions? _____
How many "b" answers did you have for odd-numbered questions? _____
RIGHT HEMISPHERE TOTAL _____

Left-Hemisphere Dominance (left total = 10 or more)

Your score indicates that you are generally a highly organized person. If you are sloppy, even your mess makes sense to you. When given a job to do, you like to approach the task one step at a time rather than plunging into it. If you are involved in extra-curricular activities, you are probably well-disciplined. For example, if you are a musician, you probably follow a practice schedule well. In the future, you'd probably do well in one of the following area: accounting, engineering, or computer programming

Right - Hemisphere Dominance (right total = 10 or more)

Your total indicates that you use intuition and creativity to achieve certain goals, rather than an outlined, detailed plan of action. You feel that too much planning tends to limit possibilities. If you are involved in extra-curricular activities that require practice or drilling, you perform well when inspired but otherwise do not enjoy the routine of practicing ever day. Chances are good that you are interested in one of the following areas: music, art, athletics.

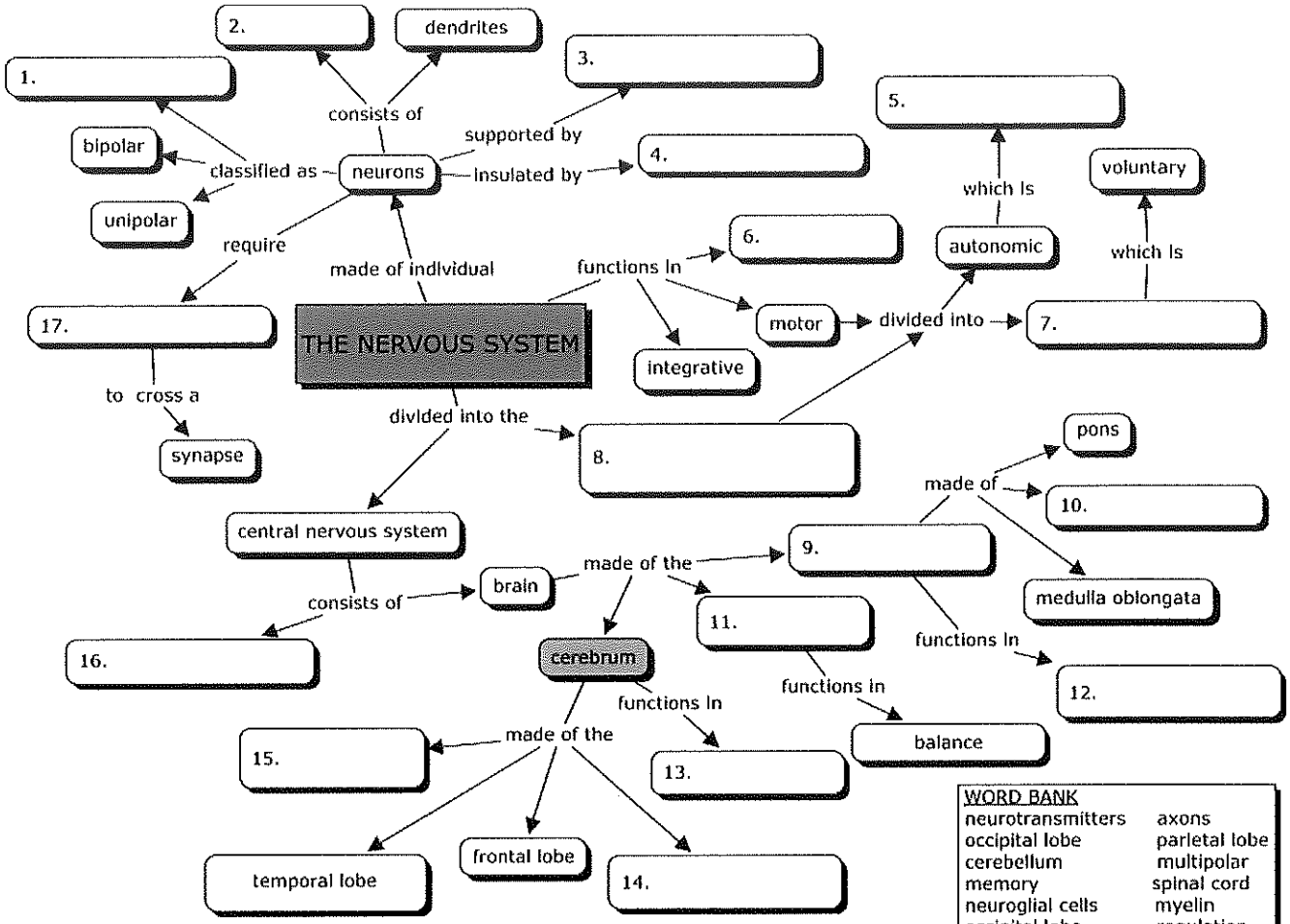
Balanced Hemispheres (both totals = less than 10)

As indicated in the previous descriptions, left-hemisphere people prefer structure; right-hemisphere people do not. Your score indicates that you fall somewhere between these two extremes. When given a job to do, you may prepare yourself by making lists (something a left-hemisphere person would do), but the lists may not be highly organized (which a right hemisphere person may prefer.

LEFT BRAIN FUNCTIONS	**RIGHT BRAIN FUNCTIONS**
uses logic	uses feeling
detail oriented	"big picture" oriented
facts rule	imagination rules
words and language	symbols and images
present and past	present and future
math and science	philosophy & religion
can comprehend	can "get it" (i.e. meaning)
knowing	believes
acknowledges	appreciates
order/pattern perception	spatial perception
knows object name	knows object function
reality based	fantasy based
forms strategies	presents possibilities
practical	impetuous
safe	risk taking

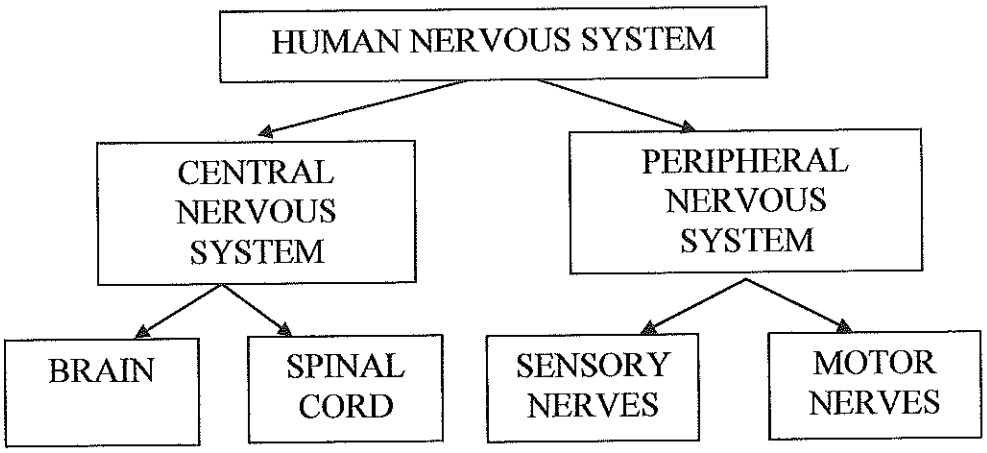
Name:_____ Date:_____

Nervous System Concept Map



WORD BANK	
neurotransmitters	axons
occipital lobe	parietal lobe
cerebellum	multipolar
memory	spinal cord
neuroglial cells	myelin
occipital lobe	regulation
sensory	involuntary
somatic	midbrain
brain stem	
peripheral nervous system	

THE HUMAN NERVOUS SYSTEM



3 Main Parts of the Nervous System

1. Brain
2. Spinal Cord
3. Nerves – Sensory and _____ Nerves

The Neurone

- Nerve cells are called _____.
- A **neurone** consists of a **cell body** (with a nucleus and cytoplasm), **dendrites** which carry electrical _____ to the cell, and a long **axon** which carries the impulses away from the cell.
- The axon of one neurone and the dendrites of the next neurone do not actually touch. The _____ between neurones is called the **synapse**.

Neuronal Function

There are 3 processes involved in nerve transmission:

1. Generation of a nerve impulse (**action potential**) of a sensory neurone occurs as a result of a stimulus such as light, a particular chemical or stretching of a cell membrane by sound.
2. Conduction of an impulse along a neurone occurs from the _____ to the cell body to the axon.
3. A **chemical transmitter substance** is released across the _____ to allow the electrical impulses to pass from one neurone to the next. This substance causes the next neurone to be electrically stimulated and keeps the signal going along a nerve.

The Central Nervous System

- The **Central Nervous System** comprises the parts that are enclosed and protected by bone - the Brain and the _____ Cord.
- The **Brain** is composed of _____ of interconnected neurones. It is protected within the _____ or **cranium**.
- The **Spinal Cord** is a bundle of nerve fibres made of many neurones. It is protected by the **vertebral column**.
- **Cerebro-spinal Fluid** surrounds the brain and spinal cord and acts as a buffer against hard knocks or jolts.
- **3 Parts of The Brain**

1. Cerebrum (Forebrain) – the largest section of the brain, which lets us think, interpret sensory messages, carry out voluntary _____ movements, remember and have consciousness
2. Cerebellum (Midbrain) – helps us to keep our balance, and have repetitive muscle control
3. Medulla Oblongata (Hindbrain or Brain Stem) – control the vital functions of heartbeat and _____

The Hypothalamus

- The hypothalamus is a small cluster of neurones deep within the brain. It plays a central role by regulating many vital processes (e.g. regulating body temperature, heart rate, water balance and blood pressure, carbohydrate and fat metabolism, appetite, sleep and sex drive).
- It also links the nervous system with the endocrine system, because it controls the **pituitary gland** which is the master gland of the _____ system.

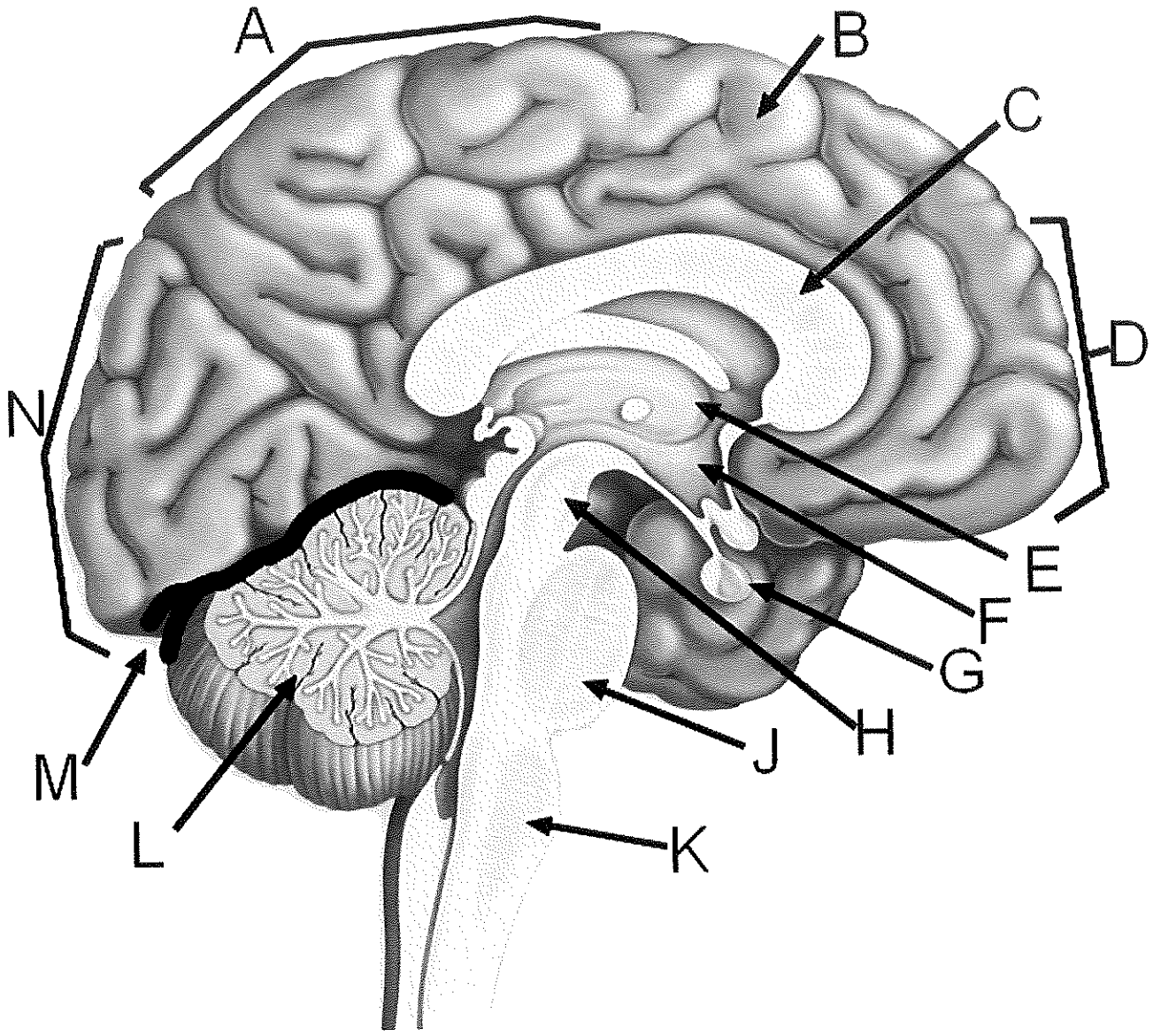
The Peripheral Nervous System

- This is the part of the nervous system that does not include the brain and the spinal cord.
- There are 2 types of nerves – sensory and motor nerves.
- **Sensory Nerves** carry information about the surroundings from the sense receptors in the skin, _____, ears, nose and tongue along the spinal cord to the brain to be interpreted.
- **Motor Nerves** carry messages from the brain through the spinal cord to the muscles and other organs to produce an action.
- Some of the nerves of the peripheral nervous system are under voluntary control (e.g. _____). Other nerves are involuntary or uncontrolled (e.g. regulating heartbeat).

A Reflex Arc

- A reflex arc involves transmission of a nervous impulse or message from sensory receptors to the spinal cord and back to muscles. Later, the message also reaches the brain for interpretation.

Label the brain: *(Scroll down for answers)*



Answers:

A = parietal labe | B = gyrus of the cerebrum | C = corpus callosum | D = frontal lobe
E = thalamus | F = hypothalamus | G = pituitary gland | H = midbrain
J = pons | K = medulla oblongata | L = cerebellum | M = transverse fissure | N = occipital lobe

Structure of the Brain

Read 958-96. Label the correct parts of the brain and spinal cord on the diagram at the left below. Give the purpose/function of each part.

a. cerebellum

b. medulla oblongata

c. thamalus

d. hypothalamus

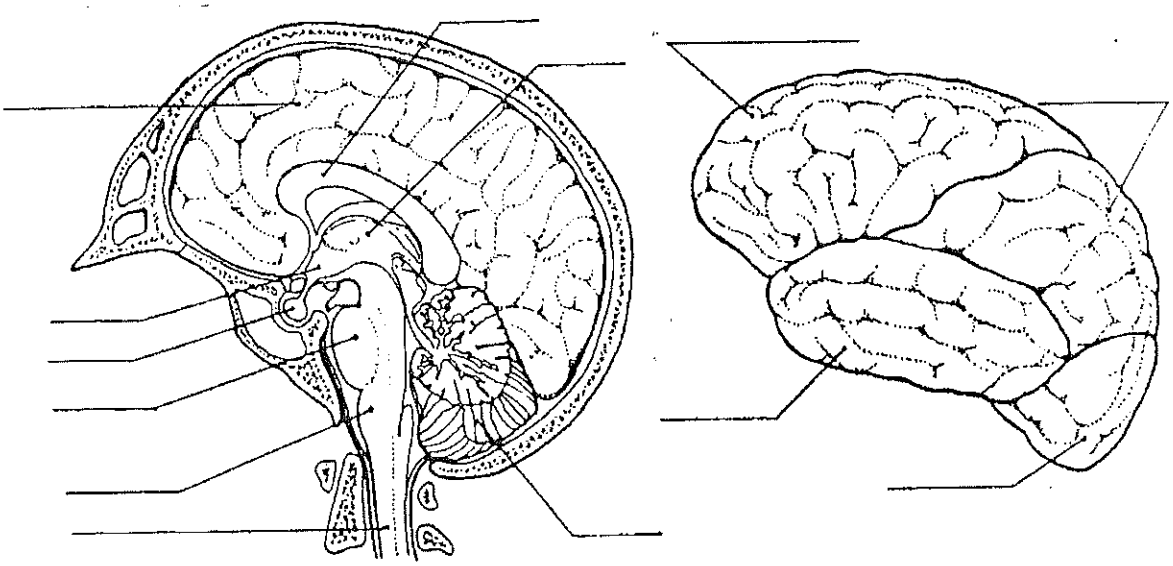
e. corpus callosum

f. pons

g. spinal cord

h. cerebrum

i. pituitary gland



Lobes of the Cerebrum

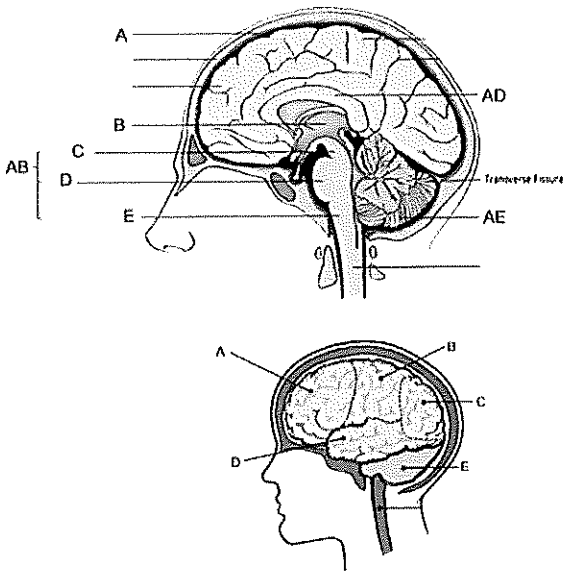
The diagram to the right above shows the four lobes of each hemisphere of the cerebrum: frontal, parletal, occipital and temporal. Label each lobe (page 965). Then, fill in the blanks below with the correct answers.

The _____ lobes control some body movements, reasoning, judgment and emotions. The sense of vision is located in the _____ lobe. The sense of hearing is interpreted in the _____ lobes. The _____ lobes interpret sensations such as pain, pressure, touch, hot and cold.

Name: _____

Central Nervous System Review II (9.11-9-13)

1. The worm-like ridges on the surface of the brain are called _____
2. The thin, web-like membrane between the outer and inner layer of meninges is called the _____ mater.
3. The right side of your brain controls the _____side of your body
4. The _____enlargement of the spinal cord supplies nerves to the lower limbs, whereas the _____ enlargement supplies nerves to the shoulders and arms.
5. The innermost layer of meninges that supplies blood vessels to the brain called the _____ mater.
6. The _____ fissure separates the two hemispheres
7. _____tracts within the spinal cord carry motor impulses to the muscles.
8. The _____ _____ connects the two hemispheres of the brain.
9. The _____ is the major part of the brain that controls higher mental activities, such as learning and making decisions.
10. The _____ is the part of the brain that controls the coordination, balance and equilibrium.
11. _____tracts within the spinal cord carry sensory impulses to the brain.
12. The outermost of the three meninges is the _____ mater.
13. The fluid filled cavities within our brains are called _____.
14. The brain and spinal cord are surrounded (and float within) _____ fluid.
15. The brain _____ consists of the midbrain, pons, and medulla oblongata.
16. The _____ system controls emotional experiences.
17. The _____ oblongata is responsible for regulation of the body, such as heart rate, body temperature and blood pressure.
18. The part of the brain that plays a major role in memory is the _____
19. The master gland of the endocrine system dealing with hormones is the _____ gland
20. Part of the diencephalon, controls basic functions such as body temperature, and hunger: _____



H	Y	P	O	T	H	A	L	A	M	U	S	B	D	X	M
J	M	U	R	B	E	R	E	C	S	S	T	E	M	Y	D
J	M	V	T	B	L	E	F	T	F	W	P	Q	K	I	C
M	U	A	I	P	U	Z	J	B	Q	A	T	E	O	U	E
E	L	C	E	R	E	B	R	O	S	P	I	N	A	L	P
D	L	I	M	B	I	C	C	C	K	L	H	H	N	F	M
U	E	L	L	I	W	L	E	J	A	C	P	E	U	E	E
L	B	T	X	N	N	N	T	C	A	F	T	Y	T	V	R
L	E	A	G	X	D	C	I	R	Z	R	J	D	E	J	A
A	R	W	B	I	W	V	A	D	F	U	U	N	B	I	H
B	E	T	N	Q	R	J	V	B	D	B	T	D	X	Y	F
V	C	G	R	E	W	Z	U	E	A	R	J	U	R	O	Y
C	C	Z	C	X	P	F	S	Y	I	V	P	A	E	W	Q
G	Y	R	I	D	M	C	M	C	I	F	T	C	J	N	W
Z	T	A	N	Q	E	U	L	Y	T	I	H	V	O	H	Z
T	B	R	S	N	S	E	J	E	U	C	N	W	J	Y	T
Q	Y	O	D	O	S	S	H	T	S	B	T	G	V	O	L
I	V	I	L	O	N	G	I	T	U	D	I	N	A	L	U
O	N	L	S	D	N	P	G	T	W	Q	B	V	X	P	M
G	A	N	U	S	U	P	M	A	C	O	P	P	I	H	B
C	Y	C	O	R	P	U	S	O	E	O	J	E	G	R	A
W	G	M	E	L	U	V	Y	A	X	Z	S	C	Q	E	R

Name _____ Date _____

Nervous System

In the space provided, write the letter of the description that best matches the term or phrase.

_____ 1. neuron	a. the difference in electrical charge across a cell membrane
_____ 2. dendrite	b. part of a neuron that conducts nerve impulses
_____ 3. axon	c. the membrane potential of a neuron at rest
_____ 4. nerve	d. nerve cell; transmits information throughout the body
_____ 5. membrane potential	e. bundle of neurons
_____ 6. resting potential	f. part of a neuron that receives information from other neurons
_____ 7. action potential	g. a junction at which a neuron meets another cell
_____ 8. synapse	h. a signal molecule that transmits nerve impulses across synapses
_____ 9. neurotransmitter	i. nerve impulse

Write the correct term from the list below in the space next to its definition.

brain	hypothalamus	reflex
brain stem	interneurons	sensory neuron
central nervous system	motor neuron	spinal cord
cerebellum	peripheral nervous system	thalamus
cerebrum		

_____ 10. carries motor responses from the central nervous system to muscles, glands and other organs

_____ 11. site of capacity for learning, memory, perception and intellectual function

_____ 12. consists of the brain and spinal cord

_____ 13. relays sensory information

_____ 14. dense cable of nervous tissue that runs through the vertebral column

_____ 15. contains neurons that branch throughout the body

_____ 16. carries information from sense organs to the central nervous system

_____ 17. the body's main processing center

_____ 18. regulates breathing, heart rate and endocrine functions

_____ 19. link neurons to each other

_____ 20. collection of structures leading down to the spinal cord

_____ 21. regulates balance, posture and movement

_____ 22. a sudden, rapid and involuntary self-protective motor response

In the space provided, write the letter of the description that best matches the term or phrase.

_____ 23. sensory receptor	a. the lining of photoreceptors and neurons in the eye
_____ 24. retina	b. aids in hearing
_____ 25. rod	c. type of photoreceptor that responds best to dim light
_____ 26. cone	d. runs from the back of each eye to the brain
_____ 27. optic nerve	e. helps maintain equilibrium
_____ 28. cochlea	f. a specialized neuron that detects sensory stimuli
_____ 29. semicircular canal	g. type of photoreceptor that enables color vision

Complete each statement by writing the correct term or phrase in the space provided.

30. The need for increasing amount of a drug to achieve the desired sensation is called _____.

31. A drug that generally decreases the activity of the central nervous system is called a(n) _____.

32. A drug that generally increases the activity of the central nervous system is called a(n) _____.

33. Drugs that alter the functioning of the central nervous system are known as _____ _____.

34. _____ is a set of emotional and physical symptoms caused by removing a drug from the body of a drug addict.

35. _____ is a physiological response caused by repeated use of a drug that alters the normal functioning of neurons and synapses.

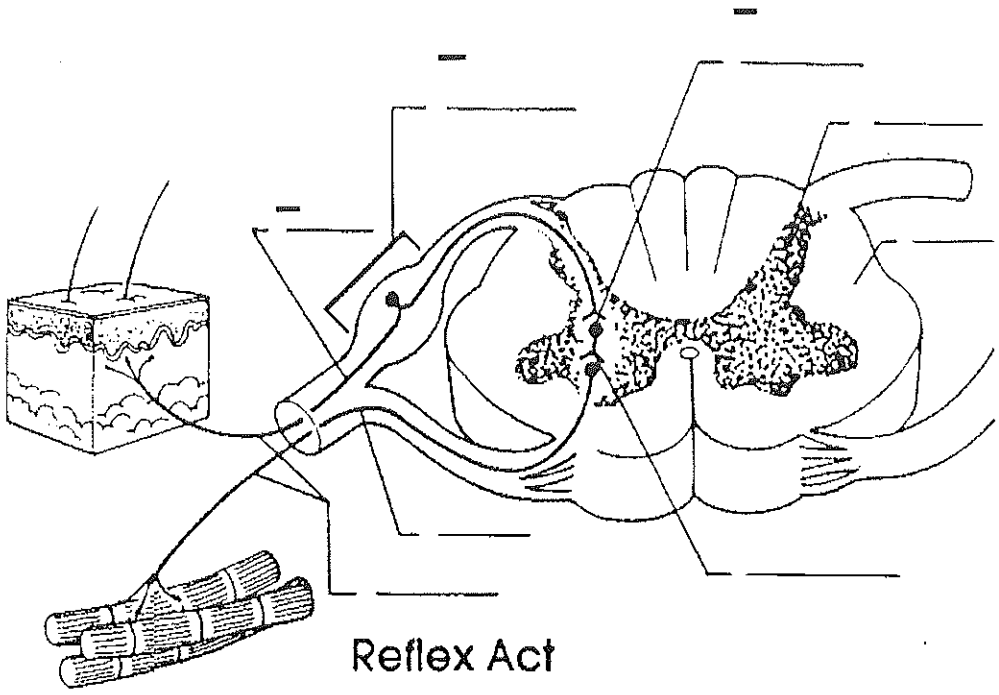
Name _____ **Date** _____

Spinal Cord and Reflex Act

Cross Section of Spinal Cord

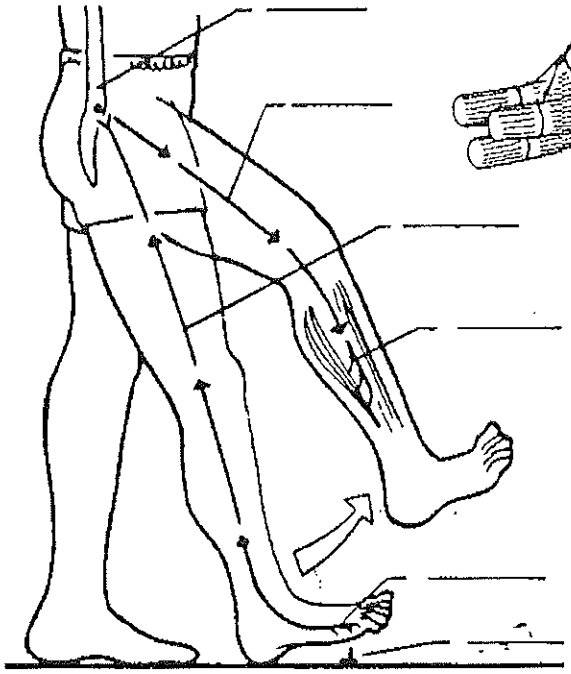
Read pages 906 - 908 in your text. Label the following parts of a spinal cord on the cross-section diagram.

a. white matter
b. grey matter
c. dorsal root ganglion
d. nerve fibers
e. interneuron
f. synapse
g. sensory neuron
h. motor neuron



Reflex Act

Label the following parts of a reflex act on the diagram of a boy stepping on a tack and jerking his leg away.



a. sensory neuron
b. motor neuron
c. stimulus
d. spinal cord
e. receptor (in skin)
f. effector (muscle)

Fill in the blanks with the correct answers.

Suppose you stepped on a tack. You jerked your leg away from the _____ you were aware of what happened. The impulse traveled from the _____ in the skin, along a(n) _____ to a(n) _____; then across another synapse to a _____ neuron. The impulse traveled along this nerve to an _____, muscle in your leg. You jerked your leg away. Only a fraction of a second later, a(n) _____ traveled up your _____ to your _____. But you had _____ reacted. This kind of reaction is known as a(n) _____. reflex acts occur without thinking.

Name:_____Date:_____

Mini – Review Nervous System (9.14 to 9.15)

1. The _____ nervous system consists of the nerves that branch out from the CNS and connect to other body parts
2. The peripheral nervous system is divided into two parts:
Conscious activities are controlled by the _____ nervous system
Unconscious activities, such as heart rate, are controlled by the _____ nervous system
3. There are 8 pairs of _____ nerves.
There are 12 pairs of _____ nerves
There are 5 pairs of _____ nerves.
There are also 5 _____nerves and one pair of _____ nerves.
4. The lumbar, sacral, coccygeal nerves descend from the end of the cord – the cauda _____ which translates to "horse's tail".
5. Spinal nerves combine to form a network known as the _____
6. During high stress or emergencies, the _____ part of the autonomic nervous system will take over.
During resting, the _____ part is active.
7. The sympathetic response is sometimes referred to as FIGHT or _____
8. Each nerve emerges from the spinal cord at points called _____.
9. With the lumbrosacral plexus, what is the large nerve that runs through your pelvis and into your leg _____
Which nearby nerve follows the femur down _____
10. The parasympathetic and sympathetic systems act against each other, one excites and the other _____
11. This group (plexus) supplies the nerves of the neck _____
arm _____
pelvis and legs _____

List by number the 12 pairs of cranial nerves. You have a mnemonic to help you remember there and you will need to be able to list them all on the quiz.

Name _____ Class _____ Date _____

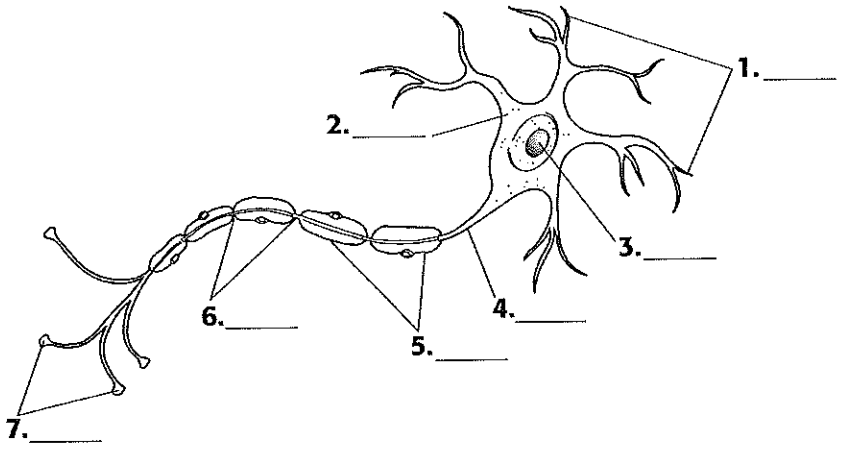
Assessment

Quiz

Section: Neurons and Nerve Impulses

The figure below shows a myelinated neuron. In the space provided, write the letter of the name of the following structures:

a. myelin sheaths
b. axon terminals
c. dendrites
d. nucleus
e. cell body
f. nodes of Ranvier
g. axon



In the space provided, write the letter of the term or phrase that best completes each statement or best answers each question.

_____ **8.** The conduction of nerve impulses is faster in myelinated axons because
a. neurotransmitter molecules are released in greater amounts.
b. the myelin sheath covers the entire axon.
c. nerve impulses "jump" from node to node as they move down the axon.
d. the membrane potential does not change.

_____ **9.** The resting potential of a neuron is usually which of the following?
a. positive
b. negative
c. neutral
d. Either (a) or (b)

_____ **10.** Neurotransmitter molecules are removed from a synapse by
a. being broken down by enzymes.
b. being reabsorbed by the presynaptic neuron.
c. being absorbed by muscle tissue.
d. Both (a) and (b)

Name _____ Class _____ Date _____

Assessment

Quiz

Section: Sensory Systems

In the space provided, write the letter of the term or phrase that best completes each statement or best answers each question.

_____ **1.** Sensory information from the olfactory receptors is processed in which lobe of the brain?
- **a.** parietal lobe
- **b.** frontal lobe
- **c.** occipital lobe
- **d.** temporal lobe

_____ **2.** The area of the eye that contains photoreceptors and neurons is the
- **a.** cornea.
- **b.** lens.
- **c.** retina.
- **d.** iris.

_____ **3.** The cochlea is located
- **a.** in the outer ear.
- **b.** in the taste buds.
- **c.** in the inner ear.
- **d.** on the tongue's surface.

_____ **4.** Semicircular canals contain which of the following structures, which are stimulated by changes in the position of the head with respect to gravity?
- **a.** taste buds
- **b.** hair cells
- **c.** the hammer, the anvil, and the stirrup
- **d.** rods and cones

_____ **5.** Sensory receptors are most concentrated in which of the following areas of the body?
- **a.** eyes, ears, and skin
- **b.** muscle tissue of the arms and legs
- **c.** nose and mouth
- **d.** Both (a) and (c)

In the space provided, write the letter of the description that best matches the term or phrase.

_____ **6.** detect movement, pressure, and tension

_____ **7.** located in all tissues except the brain

_____ **8.** are stimulated by light

_____ **9.** located in the tongue and nose

_____ **10.** detect changes in temperature

- **a.** thermoreceptors
- **b.** pain receptors
- **c.** mechanoreceptors
- **d.** photoreceptors
- **e.** chemoreceptors

Name _____ Class _____ Date _____

Assessment

Quiz

Section: Drugs and the Nervous System

In the space provided, write the letter of the term or phrase that best completes each statement or best answers each question.

_____ **1.** Tars, produced from burning tobacco, do all of the following EXCEPT
- **a.** accumulate in the lungs and paralyze cilia.
- **b.** blacken lung tissue and decrease breathing ability.
- **c.** irritate mucous membranes in the mouth, nose, and throat.
- **d.** cause addiction to cigarettes.

_____ **2.** Neurotransmitters called enkephalins
- **a.** prevent pain signals from reaching the brain.
- **b.** cause pain signals to reach the brain.
- **c.** stimulate pain receptors to send impulses.
- **d.** None of the above

_____ **3.** Cirrhosis, a condition in which liver cells are replaced with scar tissue, can develop as a result of
- **a.** alcoholism.
- **b.** using stimulants.
- **c.** malnutrition.
- **d.** smoking cigarettes.

_____ **4.** Examples of psychoactive drugs include which of the following?
- **a.** caffeine
- **b.** alcohol
- **c.** cocaine
- **d.** All of the above

In the space provided, write the letter of the description that best matches the term or phrase.

_____ **5.** depressants

_____ **6.** stimulants

_____ **7.** inhalants

_____ **8.** hallucinogens

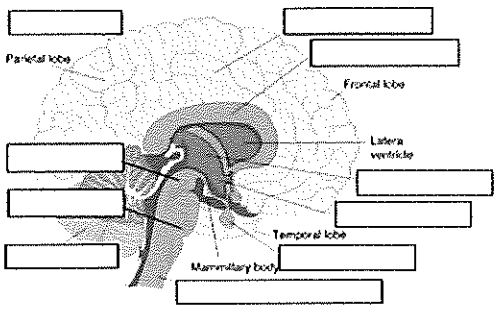
_____ **9.** THC

_____ **10.** narcotics

- **a.** examples include heroin, morphine, and codeine
- **b.** psychoactive effects include sensory distortion, hallucinations, and numbness
- **c.** psychoactive effects include disorientation, confusion, and memory loss
- **d.** risks associated with use include lung damage and loss of motivation
- **e.** examples include tranquilizers and alcohol
- **f.** psychoactive effects include increased activity of the central nervous system

Nervous System - Review Guide

1. Know how the nervous system is organized (autonomic, somatic, central, peripheral)
2. Describe a neuron – be able to label a picture of a neuron (axon, dendrite, nodes of ranvier, cell body, chromatophilic substance, myelin, nucleus)
3. Identify supporting cells of a neuron (neuroglia) and be able to label them on an image (oligodendrocyte, astrocyte, microglial cells, Schwann cells)
4. Define neurotransmitter, list examples of neurotransmitters
5. Distinguish between white matter and gray matter.
6. Describe the events in a nerve impulse. What is an action potential? What ions are necessary? What is a threshold?
7. What happens at the synapse of neuron?
8. What is a reflex? Name two reflexes.
9. Describe the 3 types of neurons: multipolar, bipolar, unipolar
10. Distinguish between the cervical enlargement and the lumbar enlargement. (Where are they located, what do they control?)
11. What is the difference between a gyri, a sulcus, and a fissure?
12. Distinguish between ascending tracts and descending tracts of the spinal cord. (sensory vs motor)
13. Identify the locations of the large fissures of the brain: lateral, longitudinal, transverse
14. Know the layers of the meninges: Dura mater, arachnoid mater, pia mater
15. What connects the two hemispheres of the brain?
16. Be able to label a brain on an image, also know what each area of the brain is responsible for.
17. Know the lobes of the brain and where each is located.
18. Label a picture of the brain stem (diencephalon, thalamus, hypothalamus, pons, medulla oblongata, optic chiasma, pituitary gland)

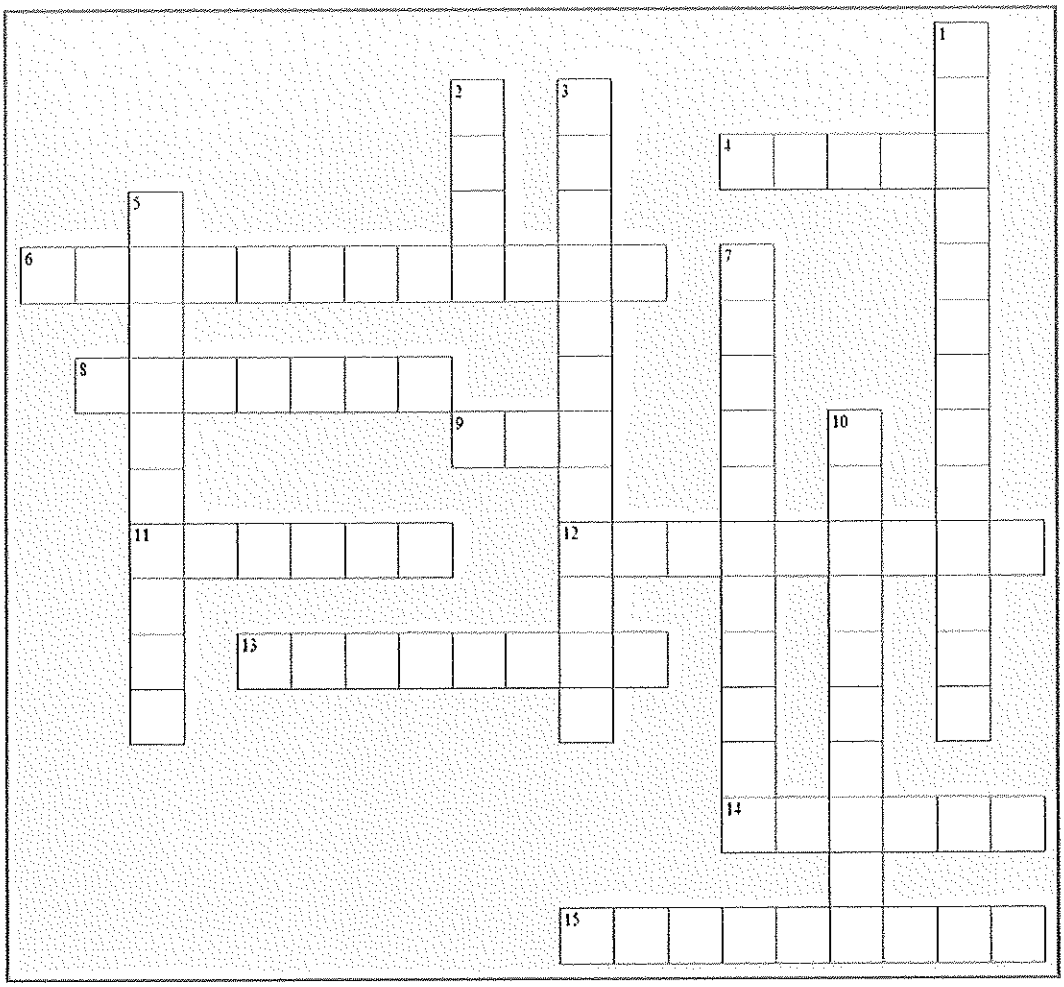


19. Define the four types of memory, describe tasks associated with each.

See also Brain Crossword Puzzle

Name:_____

The Nervous System



Across

4. Descending tracts within the spinal cord carry _____ impulses to the muscles.
6. The thalamus and hypothalamus make up this part of the brain:
8. Ascending tracts within the spinal cord carry _____ impulses to the brain.
9. The innermost layer of meninges that supplies blood vessels to the brain and spinal cord is called the _____ mater
11. Controls emotional experiences and expression; ____ system
12. The thin, weblike membrane between the outer and inner layer of meninges is called the _____ mater
13. The _____ is the major part of the brain that controls sensory functions, motor functions and higher mental activities
14. shallow grooves between the gyri of the brain
15. Consists of the midbrain, pons, and medulla oblongata, connects brain to spinal cord

Down

1. The brain and spinal cord are surrounded (and float within) _____ fluid.
2. The outermost of the three meninges is the _____ mater
3. Responsible for regulation of the body, such as heart rate, body temperature and blood pressure (part of the brain stem)
5. The _____ is the major part of the brain that controls the coordination of skeletal muscles and equilibrium.
7. This part of the brain was named after its shape (a seahorse) and is responsible for memory:
10. Fluid filled cavities within the brain