Part 9 Nervous System

Name:

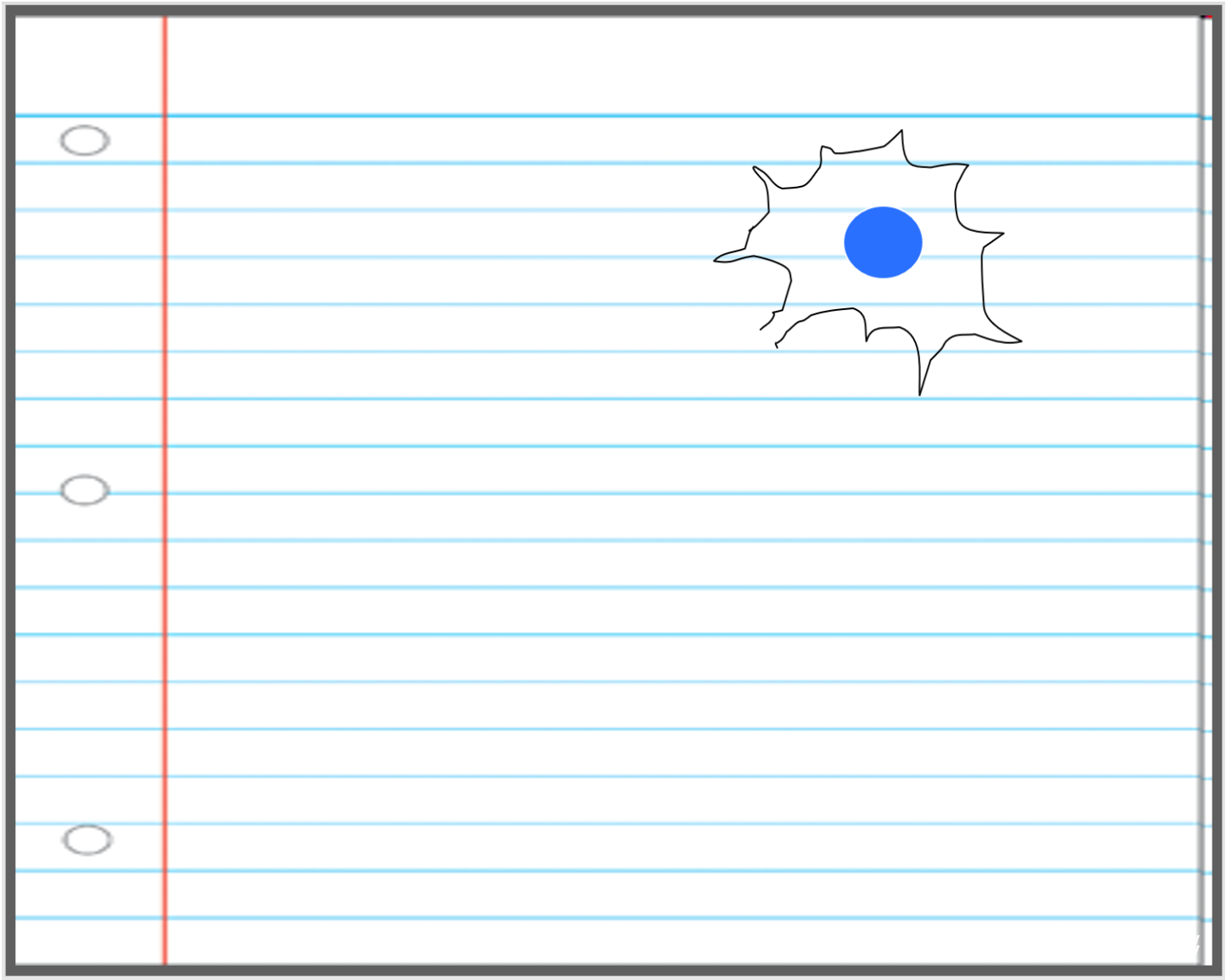
Part 9 Lesson 1 The Nervous System

The nervous system _____ and then _____ out information about your body.
It also monitors and responds to changes in your environment.

While you're using your nervous system for all of your senses…
It's working double controlling all of the things in your body to keep you living?

_____: A specialized cell transmitting nerve impulses.
Electrical and chemical signaling.
-_____l signal: Changes + and – charges from one end of a neuron to another.
-_____signal: Chemicals allow signals to go from one neuron to another by "jumping the gap (synapse)".

Please sketch out a neuron as shown in the slideshow.

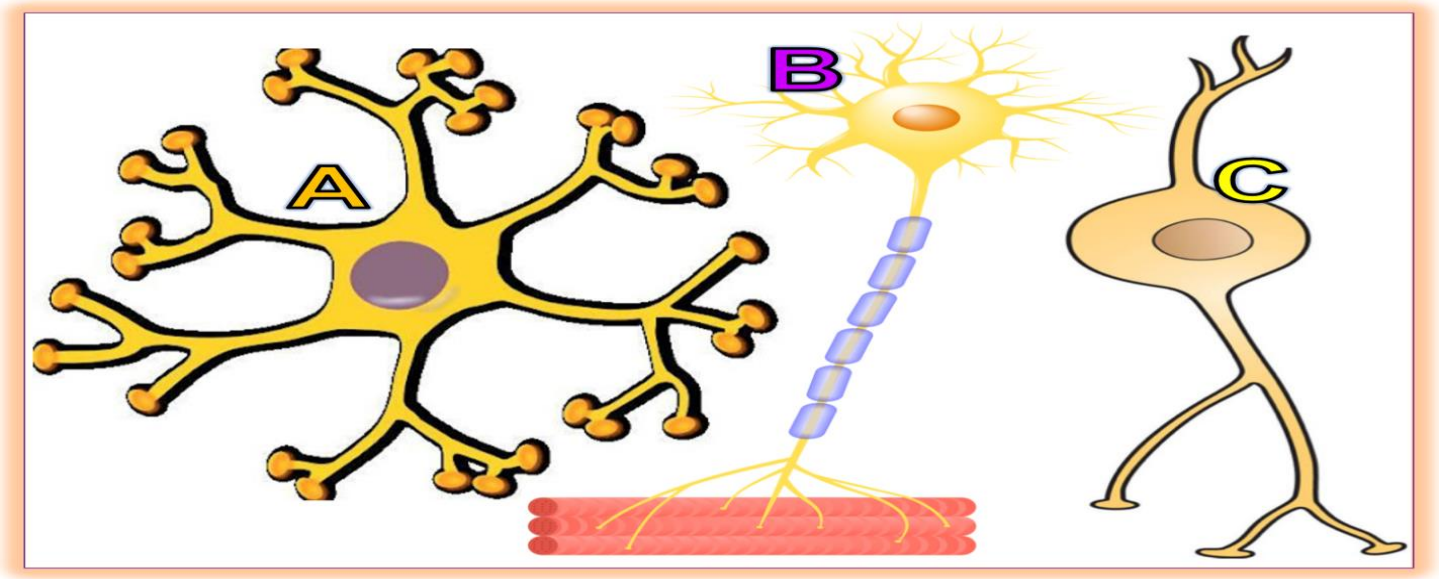


Part 9 Lesson 2 Types of Neurons

There are three types of neurons.

_____ neurons
_____neurons
_____ neurons

Name the three types of neurons shown below



A=	B=	C=

Interneuron: Transmits impulses between other _____. (Brain and Spinal Column)
Complete the diagram as described in the slideshow.

Sensory neuron: Conducts impulses _____ to the brain or spinal cord.

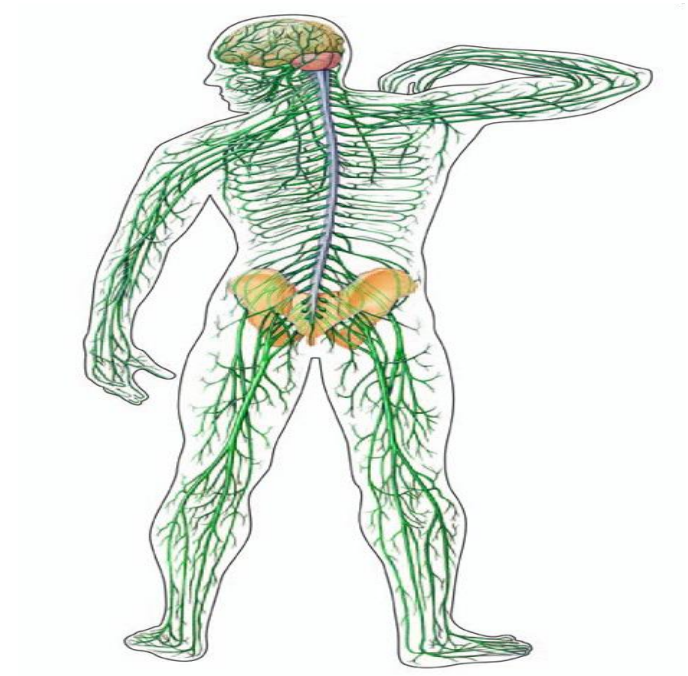
Touch, odor, taste, sound, vision

Motor Neurons: Pathway along which impulses pass from the brain or spinal cord to a _____ or gland.

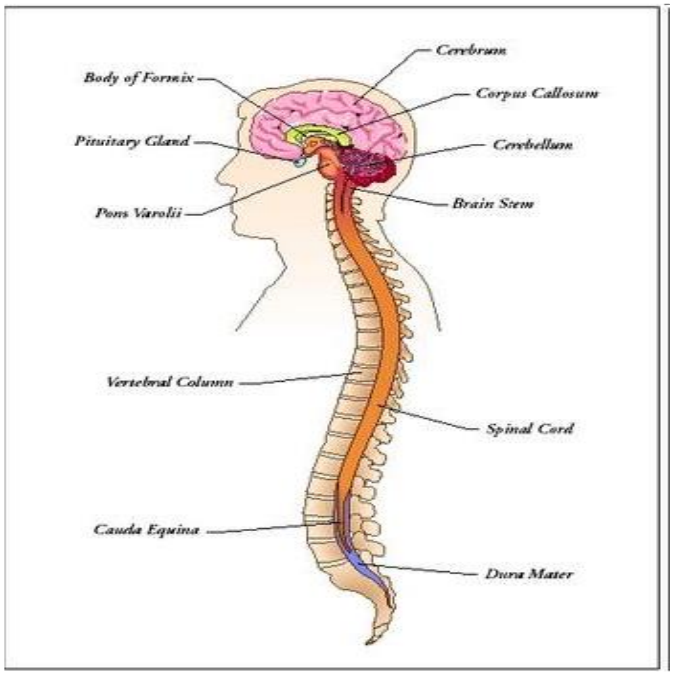
Receptors: Cells that receive messages from your surroundings.
Receptor Cell → Interneurons → Brain → Interneurons → Effector Cell.

The _____ Nervous System: Brain and Spinal Cord → Control center of the body.
_____ Nervous System: Network of nerves throughout body.

◊ The nervous system can be divided into the central nervous system, and peripheral nervous system? Which one is which?



Answer=



Answer=

The _____: An organ of soft nervous tissue contained in the skull of vertebrates, functioning as the coordinating center of sensation and intellectual and nervous activity.

Thick outer layer that comes in contact with the skull.
Watery layer _____ brain
Inner layer clings to the surface of the brain

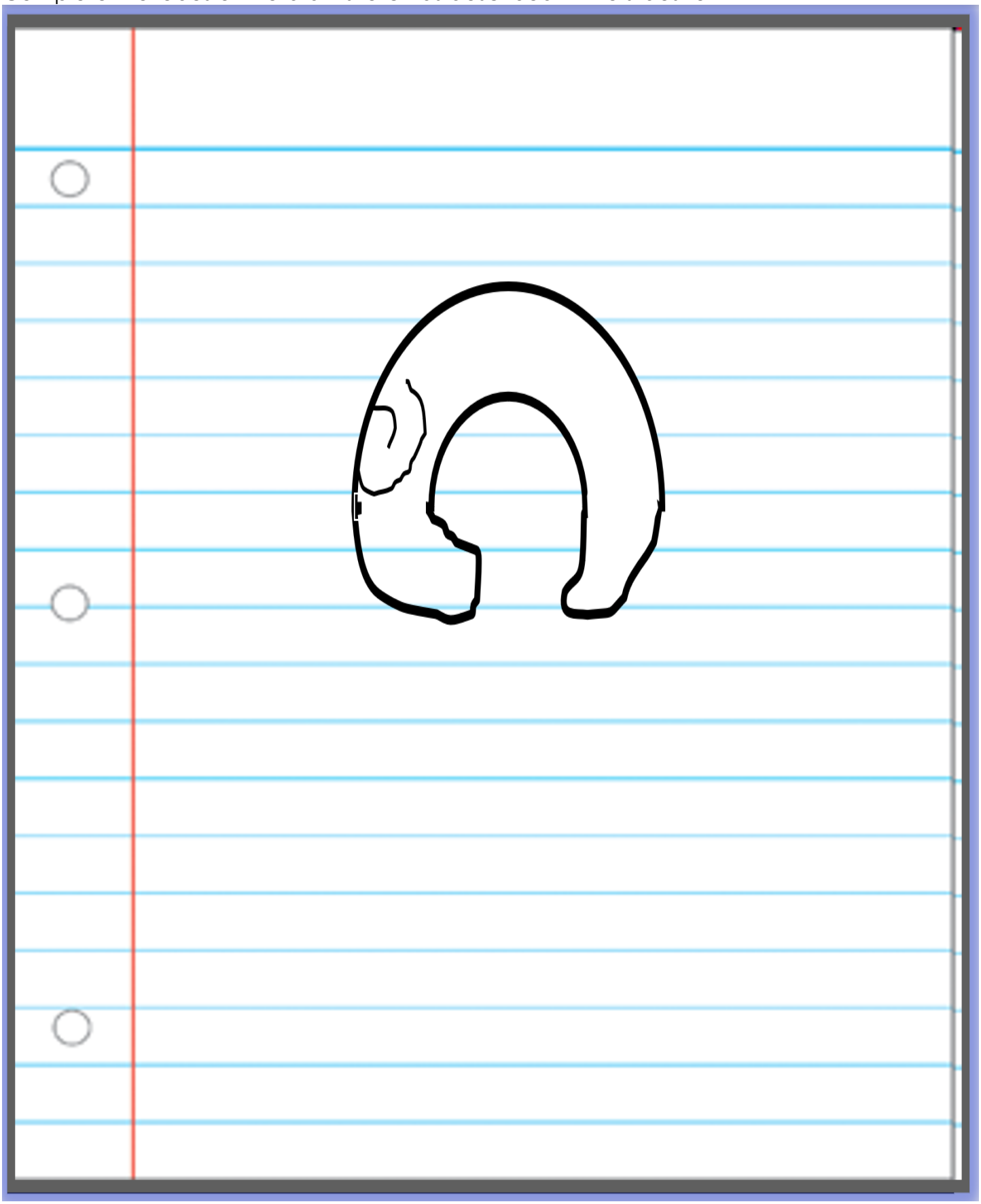
Cerebrospinal fluid (_____) is a clear _____ that surrounds the brain and spinal cord.
It cushions the brain and spinal cord from injury and also serves as a nutrient delivery and waste removal system for the brain.

The brain is well protected by the skull.

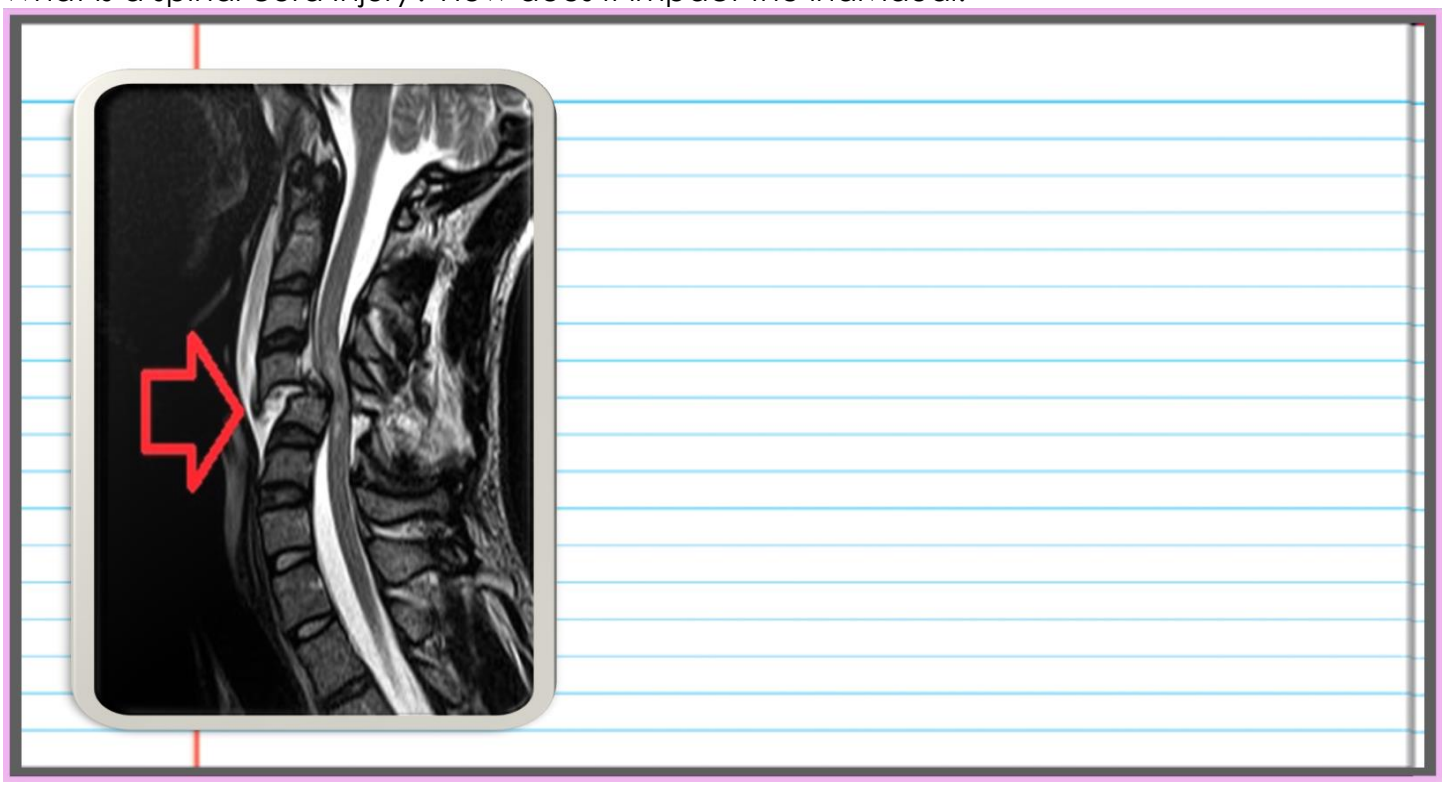
- The brain is also covered in three layers of connective tissue which nourish and protect.

Part 9 Lesson 3 Lobes of the Brain

Complete the lobes of the brain sketch as described in the slideshow



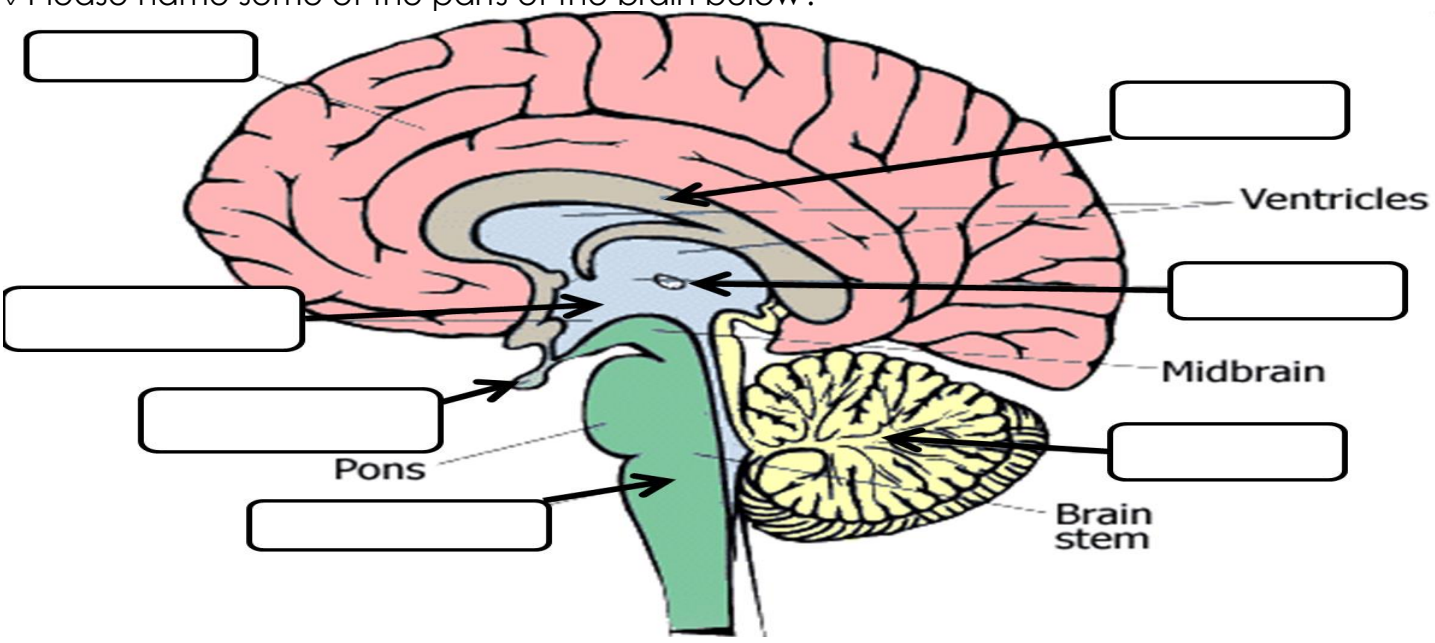
What is a spinal cord Injury? How does it impact the individual.



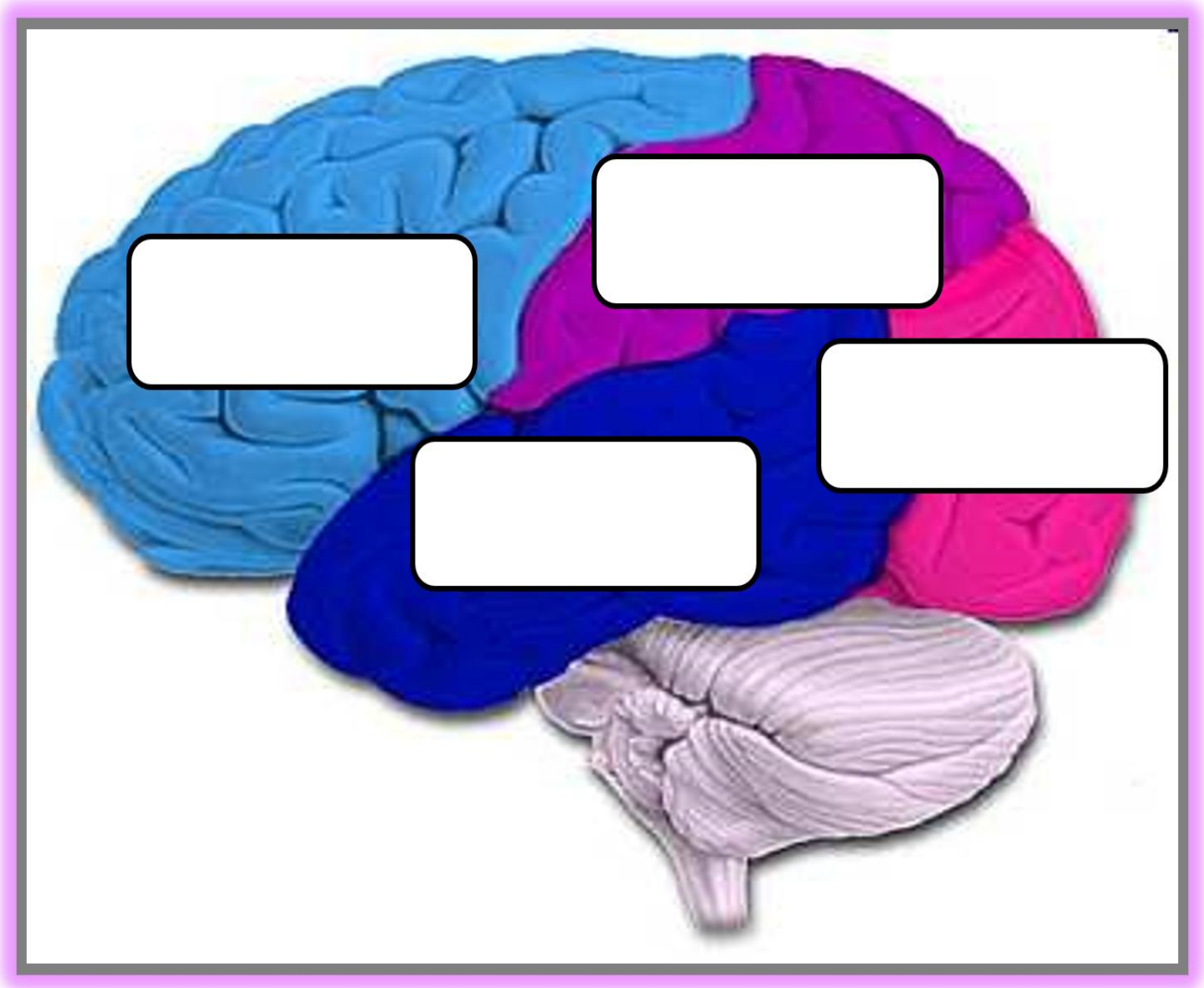
Thalamus: Lobed mass of _____ buried under the cerebral cortex. It is involved in sensory perception and regulation of _____ functions.
Also controls sleep and awake consciousness.

Corpus Callosum: Thick band of nerve fibers that divides the cerebrum into _____ and _____ hemispheres.
Allows communication between both hemispheres.

◊ Please name some of the parts of the brain below?



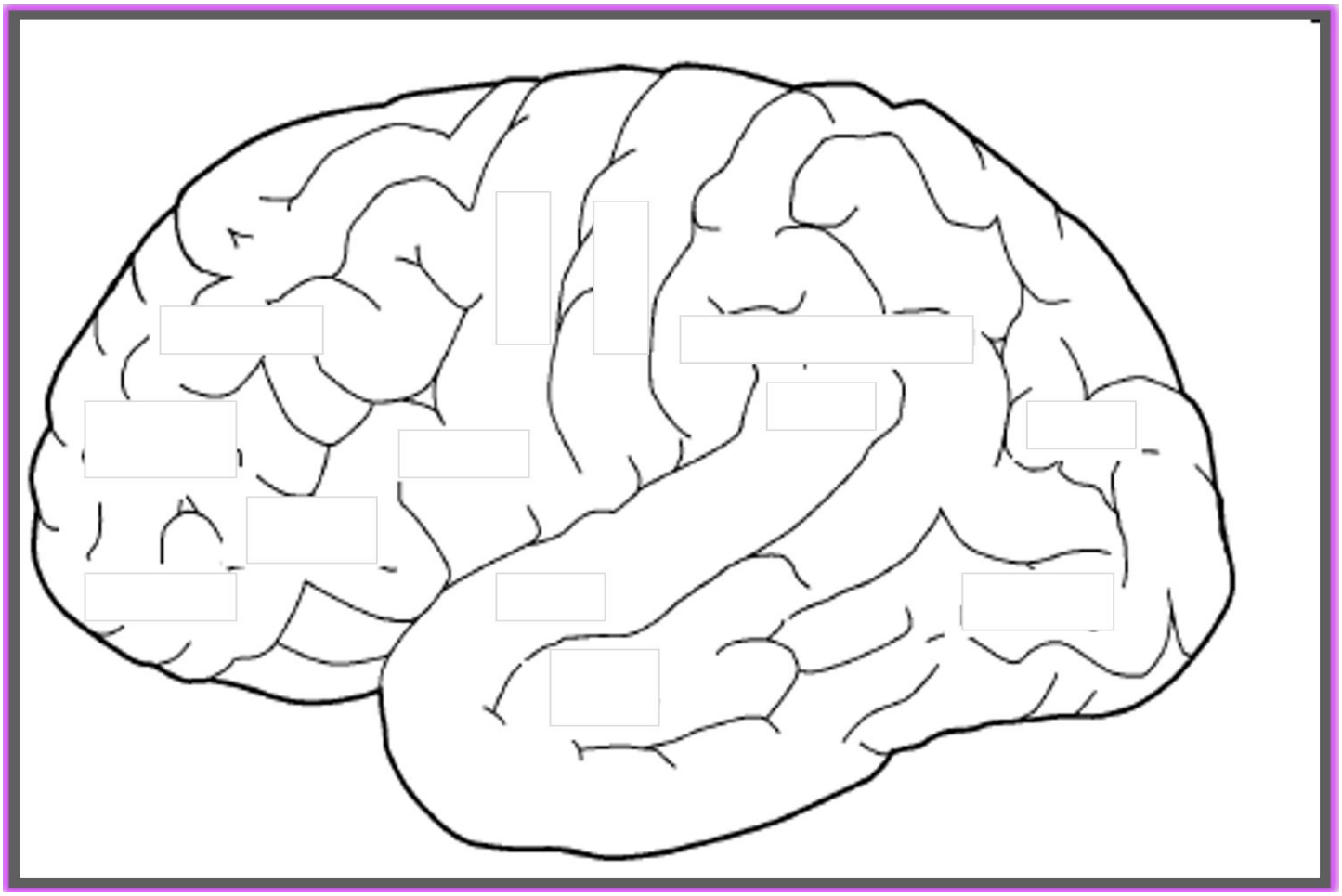
The brain is divided into four sections, known as lobes. Name them below



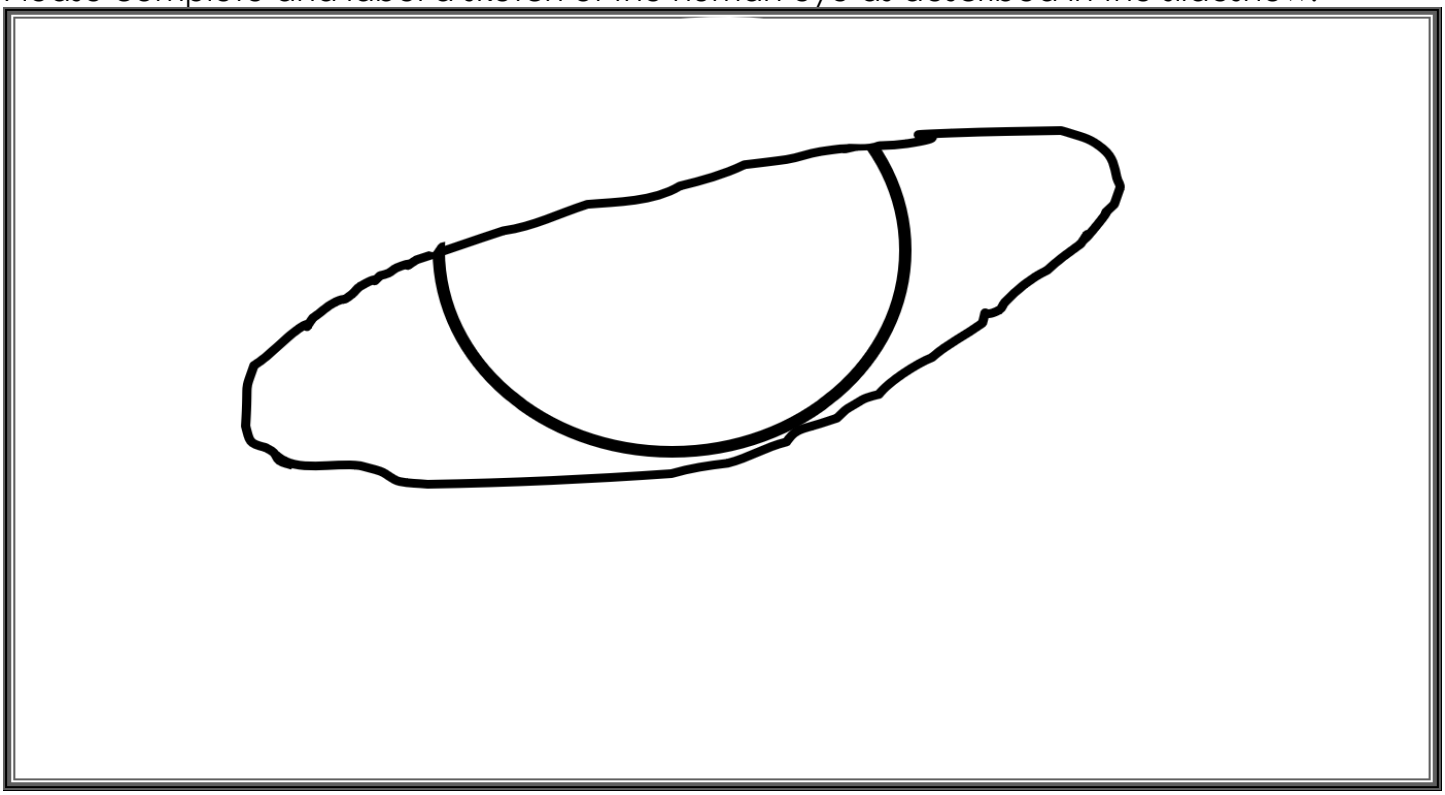
_____ Lobe- associated with reasoning, planning, parts of speech, movement, emotions, and problem solving
_____Lobe- associated with movement, orientation, recognition, perception of stimuli
_____ Lobe- associated with visual processing
_____ Lobe- associated with perception and recognition of auditory stimuli, memory, and speech

_____: Learning, Intelligence, emotions, personality, Judgment, and all voluntary activities of your body.
_____: Connects brain to spinal column and controls all involuntary activities.
_____: Thick band of nerve fibers that divides the cerebrum into left and right hemispheres.
_____: Controls motor movement, coordination, balance.
_____: Lobed mass of grey matter buried under the cerebral cortex. It is involved in sensory perception and regulation of motor functions.

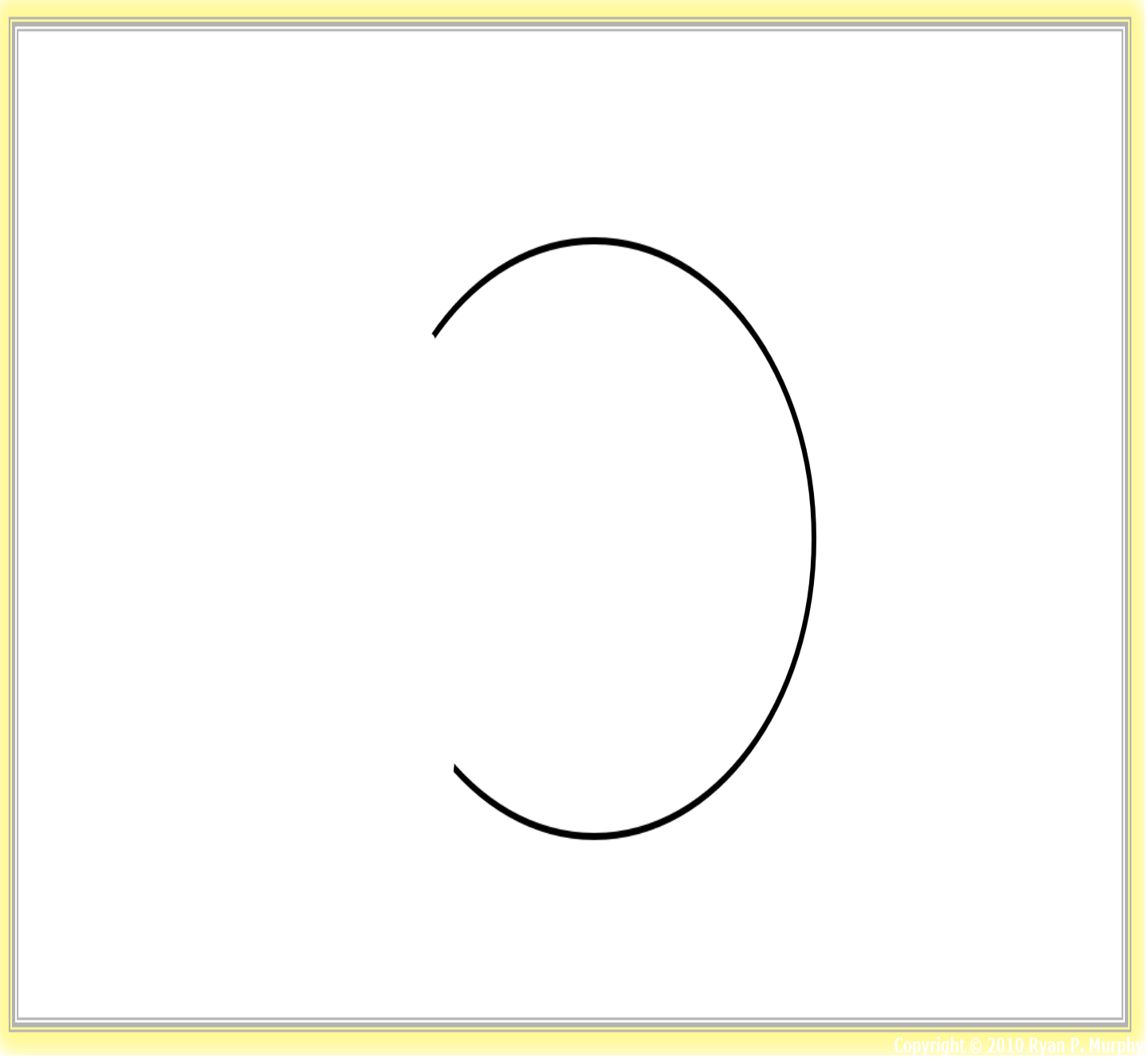
Part 9 Lesson 4 and 5 Sensory Organs "Eyes"



Please complete and label a sketch of the human eye as described in the slideshow.



Complete and label the sketch of the eye as described in the slideshow.



Rod and Cones: The two types of _____ in the eye.

_____ are more numerous (120 million) and work well in dim light.

_____ see color (6-7 million – macula) and don't work well in dim light.

Part 9 Lesson 6 and 7 Observation

Observation: Anything you can_____, (Using your senses).

Our perceptions are not photographs, they are _____- something that our minds manufacture.

-What we perceive is partially determined by what we _____ or _____.

-Constructive perception has survival value - it helps us make sense of the world.

-So, seeing is not necessarily believing. USE YOUR JOURNAL!

Part 9 Lesson 7 Observation Continued

Please make some notes in the boxes below about each of the pictures in the short 30 seconds you have to observe.

Street Scene with Van…	The Shed Scene / Crime Scene…
Messy Bedroom Scene…	Roadway Scene
Kids in the line…	Ocean view scene…
Big Scissors Scene…	Man with rubble…
Waterpark Scene…	Skittles…

Part 9 Lesson 8 Smell and Taste

Big questions associated with memory.

- How are memories formed? (_____)
- How are memories retained? (_____)
- How are memories recalled? (_____)

Encoding is an active process and there are many types.

There may be different levels of processing which occur, and some are deeper than others. Distractions can alter processing.

Smell: To _____ the scent of (something) by means of the olfactory nerves.

To smell…

Inside your nose is a patch of neurons that come in contact with the air.
They have _____ projections called cilia that maximize surface area with air.
Odor molecules binds to cilia and the message is sent via the neurons.

To Taste…

We must smell.
75% of what we perceive as taste comes from our sense of smell.

Volatile (evaporates) molecules from the food travel up the nasal cavity to nose.

Smelly Belly Activity

Which trial group are you_____?

Class divides into trial one and trial 2 by counting off.
A.) Ones will sample first, two's will run the trial and then switch.
B.) Samplers approach a station 1-12 and sit down. Servers are welcoming and kind.
C.) If it is a smell bag they close their eyes and smell the contents of the paper bag and then make a guess by marking the appropriate box for that station. (crush jelly beans to release volatile molecules.)
D.) If it is a taste station they close their eyes and pinch their nose as they chew and swallow one bean. Only remove pinched nose until after the jelly bean is consumed. Mark appropriate box with your guess.

	Apple	Buttered Popcorn	Licorice	Bubble-gum	Juicy Pear	Very Cherry
#1 Smell						
#2 Taste						
#3 Smell						
#4 Taste						
#5 Smell						
#6 Taste						
#7 Smell						
#8 Taste						
#9 Smell						
#10 Taste						
#11 Smell						
#12 Taste						

Put your guess above and below each box.

Where you more successful on your smell guesses or your taste?_____

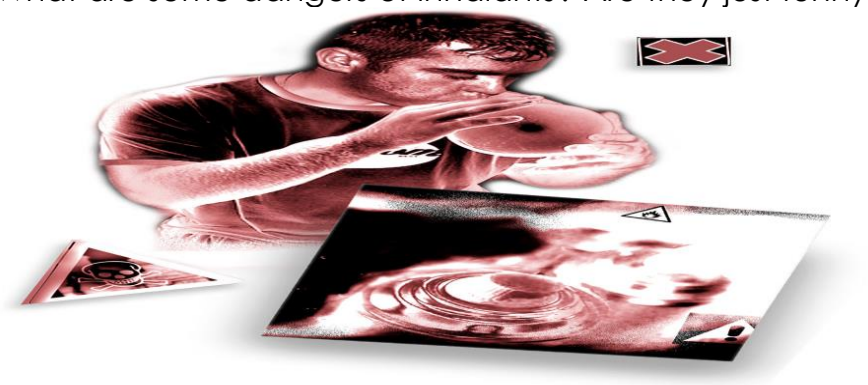
Was the trial accurately conducted. Where did it succeed, and where did fall short?_____

How are smell and taste connected?_____

Inhalant abuse may result in serious and sometimes irreversible damage to the user's heart, liver, kidneys, lungs, and brain.

Brain damage may result in personality changes, diminished cognitive functioning, memory impairment, and slurred speech.

What are some dangers of inhalants? Are they just funny air?



Part 9 Lesson 9 Hearing

Hearing…

-The hearing system is based solely on _____ movement. (Not chemical such as smell and taste).

-Sound occurs when it _____ in matter. (Solid, Liquid, Gas).

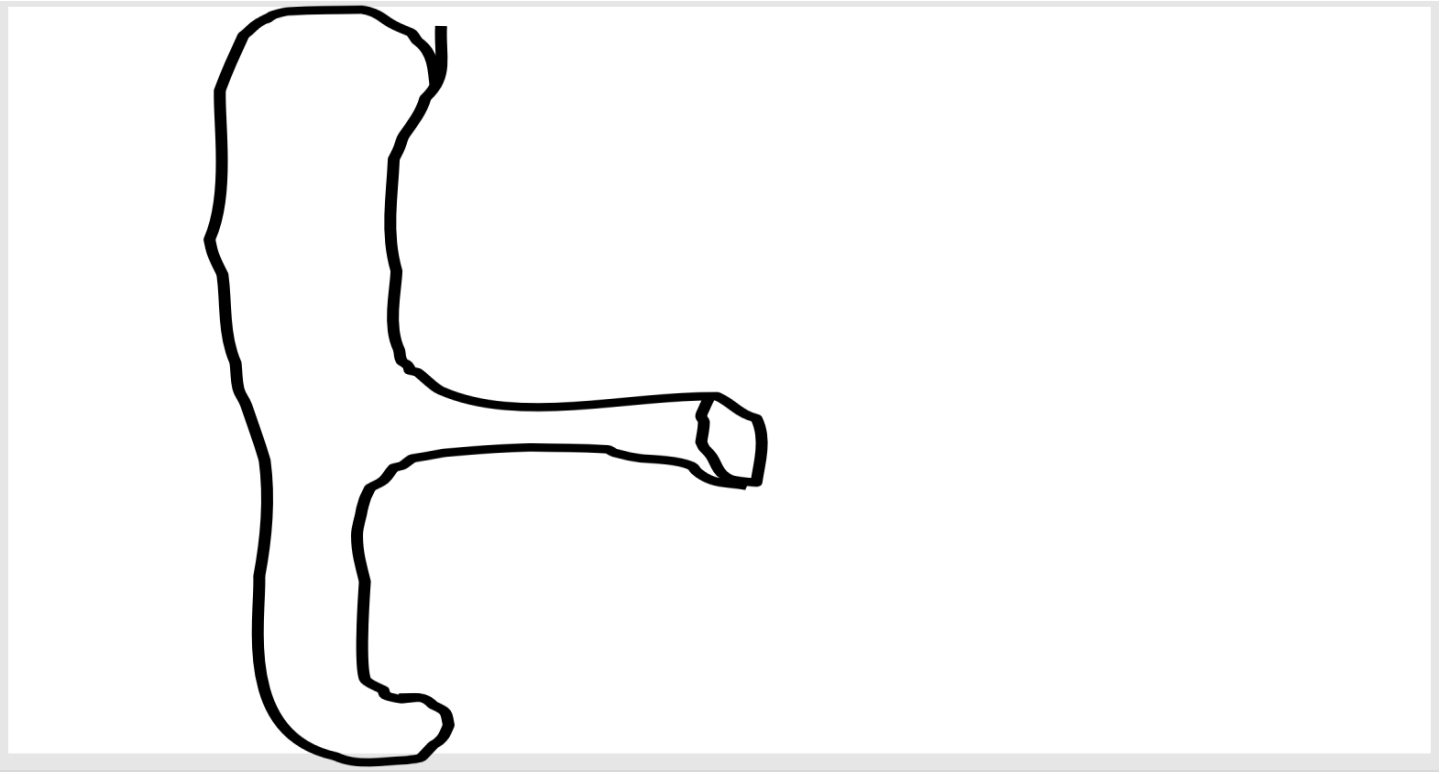
To hear, you must…

-_____ the sound waves into the hearing part of the ear.

-Sense the fluctuations in _____ pressure.

-Translate these fluctuations into an _____ signal that your brain can understand.

Complete and label a sketch of the human ear as described in the slideshow.



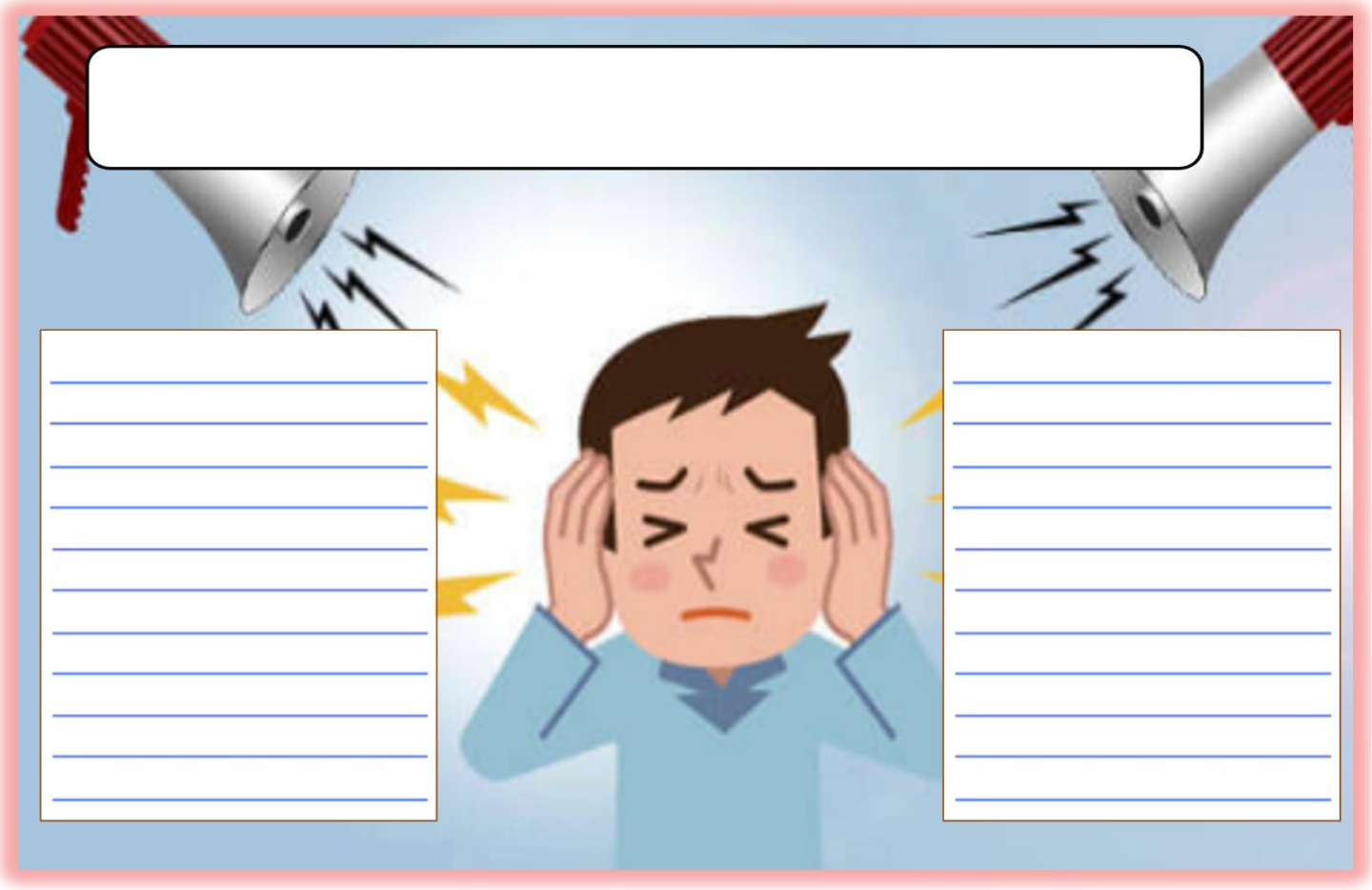
- _____: A tiny bone that passes vibrations from the hammer to the stirrup.
- _____:A spiral-shaped, fluid-filled inner ear structure; it is lined with cilia (tiny hairs) that move when vibrated and cause a nerve impulse to form.
-_____: (Also called the tympanic membrane) a thin membrane that vibrates when sound waves reach it.
- _____: A tube that connects the middle ear to the back of the nose; it equalizes the pressure between the middle ear and the air outside.
  - When your ears pop as you change altitude (going up a mountain or in an airplane), you are equalizing the air pressure in your middle ear.

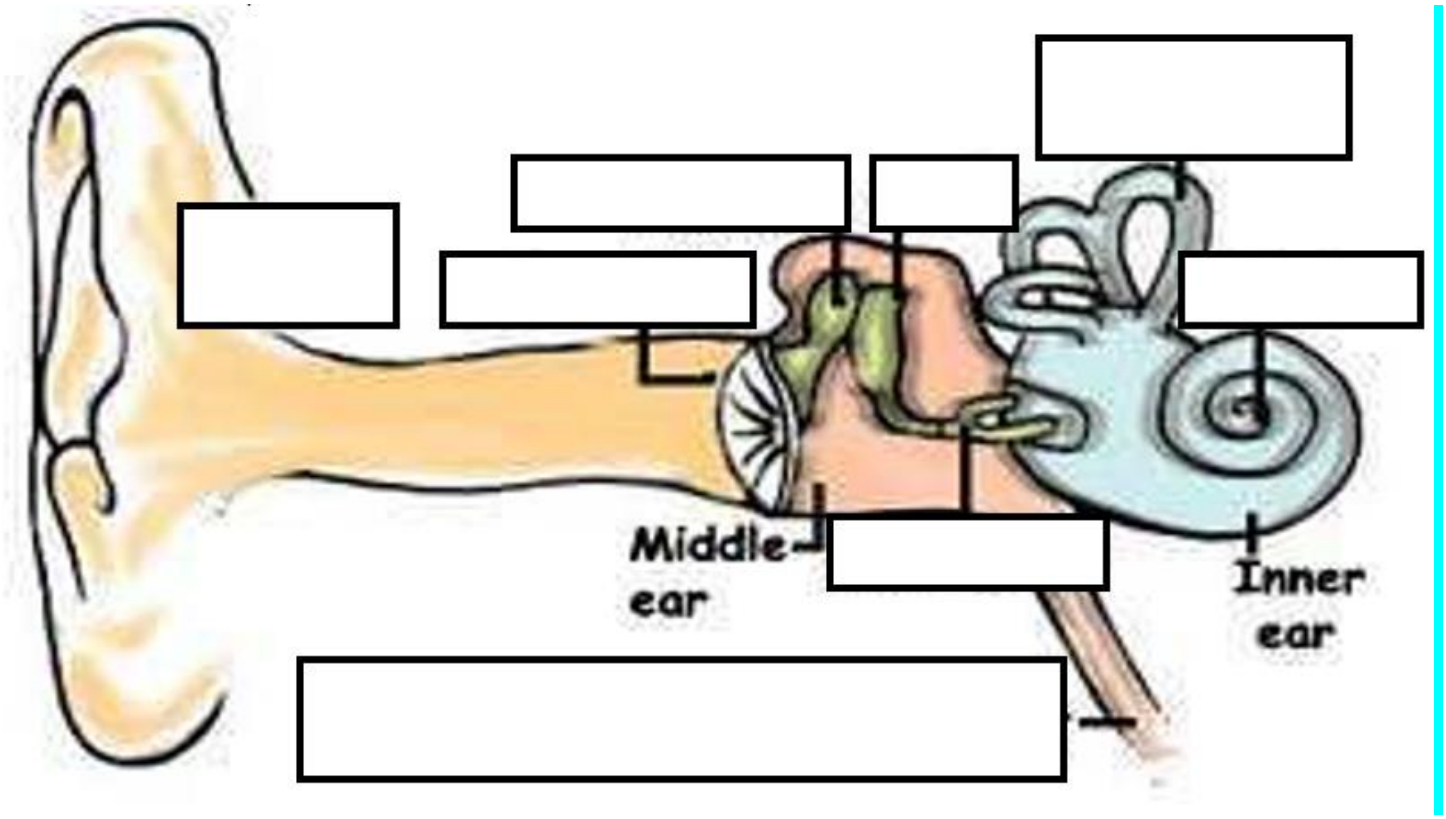
when sound waves reach it.
-_____: A tube that connects the middle ear to the back of the nose; it equalizes the pressure between the middle ear and the air outside.
  - When your ears pop as you change altitude (going up a mountain or in an airplane), you are equalizing the air pressure in your middle ear.

- _____A tiny bone that passes vibrations from the eardrum to the anvil.
_____These carry electro-chemical signals from the inner ear (the cochlea) to the brain.
_____The tube through which sound travels to the eardrum.
_____The visible part of the outer ear. It collects sound and directs it into the outer ear canal
_____Three loops of fluid-filled tubes that are attached to the cochlea in the inner ear. They help us maintain our sense of balance.
_____A tiny, U-shaped bone that passes vibrations from the stirrup to the cochlea. This is the smallest bone in the human body (it is 0.25 to 0.33 cm long).

Sounds that are too loud or that last a long time can cause Noise-induced hearing loss (NIHL). Our sensitive hair cells convert sound energy into electrical signals that travel to the brain and can become damaged. Once damaged, our hair cells cannot grow back.

What are some of the dangers of listening to loud sounds or music?





_____: A tiny bone that passes vibrations from the hammer to the stirrup.
_____: A spiral-shaped, fluid-filled inner ear structure; it is lined with cilia (tiny hairs) that move when vibrated and cause a nerve impulse to form.
_____: (Also called the tympanic membrane) a thin membrane that vibrates when sound waves reach it.
_____: A tube that connects the middle ear to the back of the nose; it equalizes the pressure between the middle ear and the air outside.

Part 9 Lesson 10 Times have Changed

-Choose a partner for this project that was not next to you during random order collection.
-Keep your random test order hidden from your new partner / listener.
-Listener should keep eyes closed during each drop and until pennies have been collected.
-Old and new pennies look differently.
-Tester and listener must communicate for each drop. Tester says "dropping" and listener says "drop away." -Listener can open eyes when tester says pennies have been collected and mark their guess on the listener spreadsheet.

Listener

Trials	1	2	3	4	5	6	7	8	9	10
Old										
New										
Correct √ Wrong X										

The number correct out of 10. ____ / 10

Tester (Make random "Old" or "New" 1-10)

Trials	1	2	3	4	5	6	7	8	9	10
Old										
New										

Collect the class data. Total score of class divided by the number of students.
Total Score _____ / number of students_____ = _____ Average

Did we answer the problem? Can you determine the age of a penny by the sound that it makes when dropped? **Use data in your response.**

Finding Standard Deviation and Variance.

- Standard variation is the square root on the variance.
- Variance: The average of the squared differences from the mean.
- The mean / average was… _____
- Everyone calculate how far away <u>their</u> data was from the mean / average.
  - Ex.) The mean was 80 and I got 60 so I was 20 from the mean.
- To calculate the variance, take each difference, square it, and then average the result as a class.
  - Ex) 22 + 4.52 + 1.52 + 3.52 + (rest of class)

Divide by total # of students = variance

- The Standard Deviation is just the square root of the Variance.
  - So square the variance that we found.

Example… $\sqrt{6523}$ = 80.76%

Class data Variance

Total from above _____ / number of students_____ =_____Variance
√_____ Variance = _____ % Standard Deviation

We now have a standard to show which scores are high and low and to help answer our problem.

What was your score compared to the Standard Deviation? Were you above or below?____

What problems did you encounter? Are your results accurate or should you throw them out?

Part 9 Lesson 11 Touch and Wrap-Up

Touch Sensations begin as signals generated by touch receptors in your _____.
-They travel _____ made up of bundled fibers that connect to neurons in the spinal cord.
Then signals move to the _____, which relays information to the rest of the brain.
The skin has touch receptor cells that allows you to feel texture.
Deeper receptor cells allow you to feel pressure.
Other receptors respond to heat, cold, and pain.

Note: Thalamus is misspelled as thalmus in the wordbank /puzzle

Across

2. Corpus _____: Thick band of nerve fibers that divides the cerebrum into left and right hemispheres.
4. A spiral-shaped, fluid-filled inner ear structure; it is lined with cilia (tiny hairs) that move when vibrated and cause a nerve impulse to form.
6. _____ Canals - Three loops of fluid-filled tubes that are attached to the cochlea in the inner ear. They help us maintain our sense of balance.
10. _____ Lobe- associated with perception and recognition of auditory stimuli, memory, and speech
11. The _____ helps to focus light on the retina
13. Type of neuron that conducts impulses inwards to the brain or spinal cord.
15. _____ Lobe- associated with movement, orientation, recognition, perception of stimuli
17. A specialized cell transmitting nerve impulses.
18. Lobed mass of grey matter buried under the cerebral cortex. It is involved in sensory perception and regulation of motor functions.
21. A tiny bone that passes vibrations from the eardrum to the anvil.
22. (Also called the tympanic membrane) a thin membrane that vibrates when sound waves reach it.
23. Ear _____ -The tube through which sound travels to the eardrum.
26. This is at the back of the eye. Formed of light-sensitive nerve endings that carry the visual impulse to the optic nerve..
27. These carry electro-chemical signals from the inner ear (the cochlea) to the brain.
29. _____ Sensations begin as signals generated by touch receptors in your skin. -They travel along sensory nerves made up of bundled fibers that connect to neurons in the spinal cord.
30. The _____ of the eye is the black circle in the center of the iris. It is a portal which admits and regulates the flow of light to the retina.

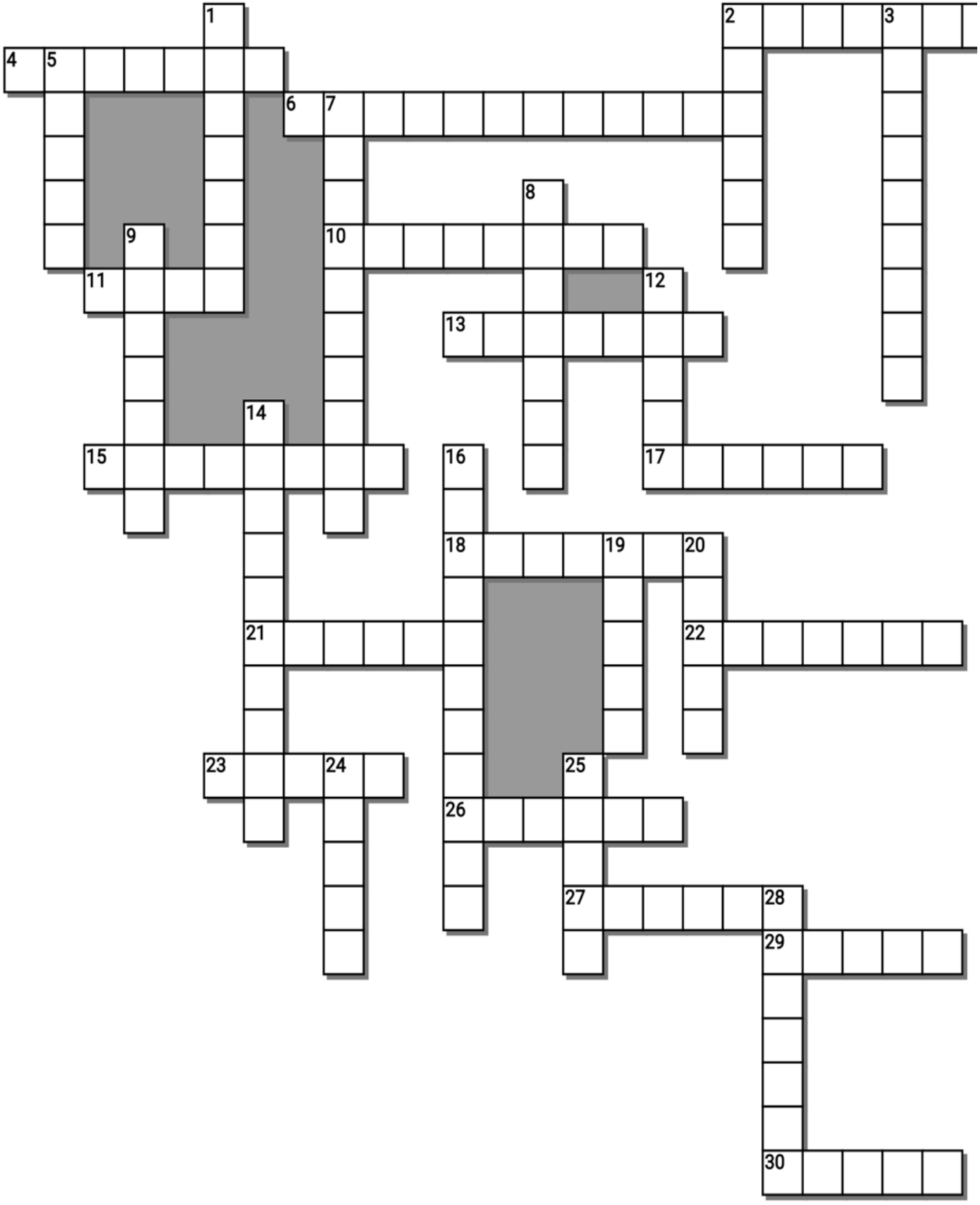
Down

1. This system receives and then sends out information about your body. It also monitors and responds to changes in your environment.
2. The _____ is the clear outer layer at the front of the eye. The cornea helps your eye to focus light so you can see clearly.
3. _____ Lobe- associated with visual processing
5. The _____ Nerve: Each of the second pair of cranial nerves, transmitting impulses to the brain from the retina at the back of the eye.
7. _____ Canal - A tube that connects the middle ear to the back of the nose; it equalizes the pressure between the middle ear and the air outside.
8. _____ Lobe- associated with reasoning, planning, parts of speech, movement, emotions, and problem solving
9. The _____ nervous system (CNS) controls most functions of the body and mind. It consists of two parts: the brain and the spinal cord. The brain is the center of our thoughts, the interpreter of our external environment, and the origin of control over body movement.
12. An organ of soft nervous tissue contained in the skull of vertebrates, functioning as the coordinating center of sensation and intellectual and nervous activity.
14. The _____ System. The nervous system outside the brain and spinal cord.
16. Transmits impulses between other neurons. (Brain and Spinal Column) Complete the diagram as described in the slideshow.
19. _____ Neuron: A Pathway along which impulses pass from the brain or spinal cord to a muscle or gland.
20. Sense of _____: To perceive the scent of (something) by means of the olfactory nerves.
24. A tiny bone that passes vibrations from the hammer to the stirrup
25. The visible part of the outer ear. It collects sound and directs it into the outer ear canal
28. A tiny, U-shaped bone that passes vibrations from the stirrup to the cochlea. This is the smallest bone in the human body (it is 0.25 to 0.33 cm long).

----------Teacher can remove this word bank to make puzzle more challenging----------

Possible Answers

ANVIL, BRAIN, CALLOSUM, CENTRAL, COCHLEA, EARDRUM, EUSTACHIAN, FRONTAL, HAMMER, LENS, MOTOR, NERVES, NERVOUS, NEURON, OCCIPITAL , OPTIC, PARIETAL , PERIPHERAL, PINNA, PUPIL, RETINA, SEMICIRCULAR, SENSORY, SMELL, STIRRUP, TEMPORAL , THALMUS, TOUCH, CANAL, CORNEA, INTERNEURON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Part 9 Review Game

Name

1-20 = 5 pts Lesson 12 Review Game

*20-*25 * = Bonus + 1 pt,

(Secretly write owl in correct space +1 pt)

Score ____ / 100

Final Question = 5 pt wager

GRAIN BAME	TIME TO FOLD THEM	SEE ME HERE ME	I'M THINKING	MASTERMIND Bonus round 1 pt each
1)	6)	11)	16)	*21)
2)	7)	12)	17)	*22)
3)	8)	13)	18)	*23)
4)	9)	14)	19)	*24)
5)	10)	15)	20)	*25)

Final Question Wager _____/5 Answer: _____

Part 9 Nervous System

Name:

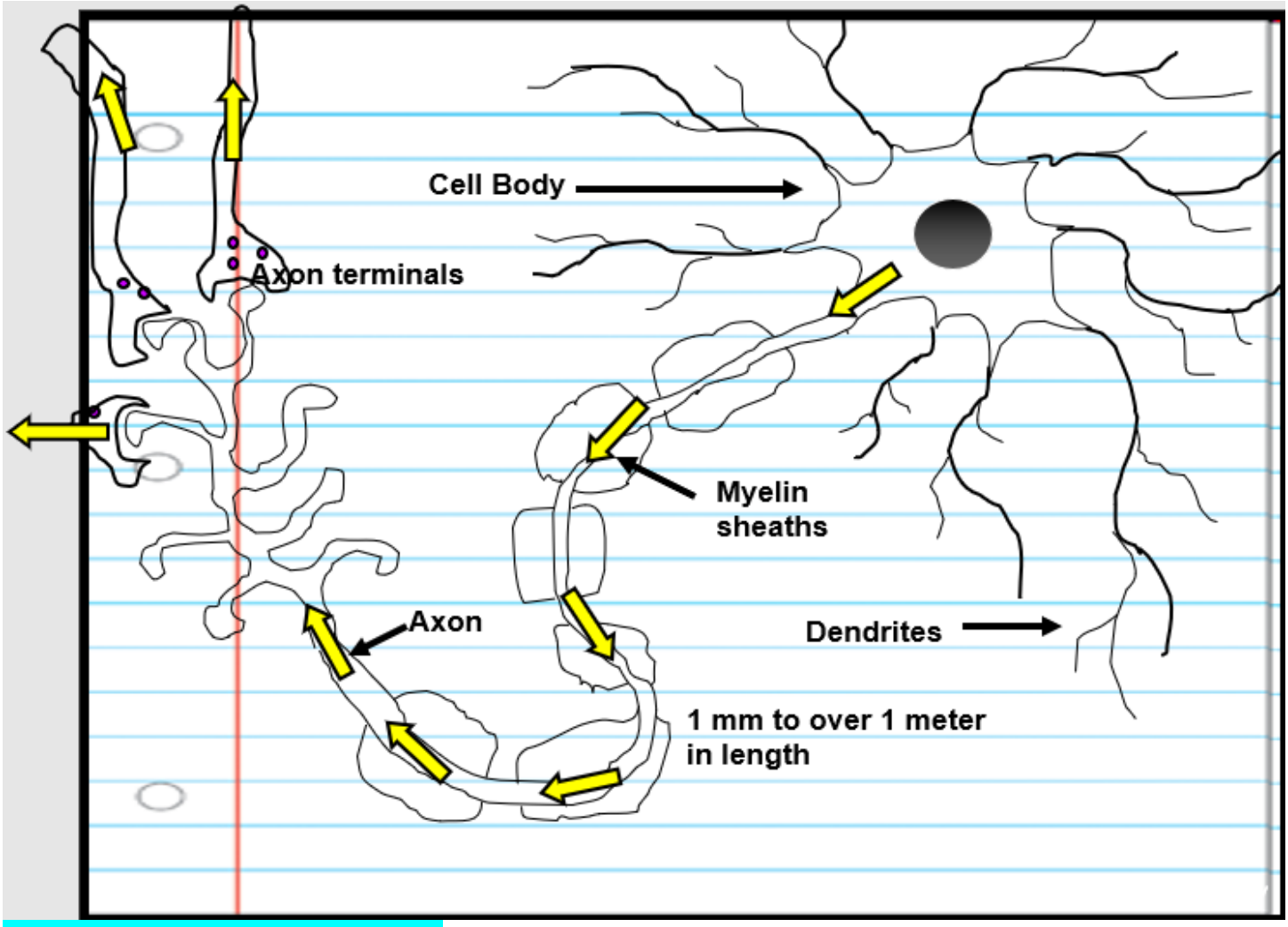
Part 9 Lesson 1 The Nervous System

The nervous system receives and then sends out information about your body.
It also monitors and responds to changes in your environment.

While you're using your nervous system for all of your senses…
It's working double controlling all of the things in your body to keep you living?

Neuron: A specialized cell transmitting nerve impulses.
Electrical and chemical signaling.
-Electrical signal: Changes + and – charges from one end of a neuron to another.
-Chemical signal: Chemicals allow signals to go from one neuron to another by "jumping the gap (synapse)".

Please sketch out a neuron as shown in the slideshow.

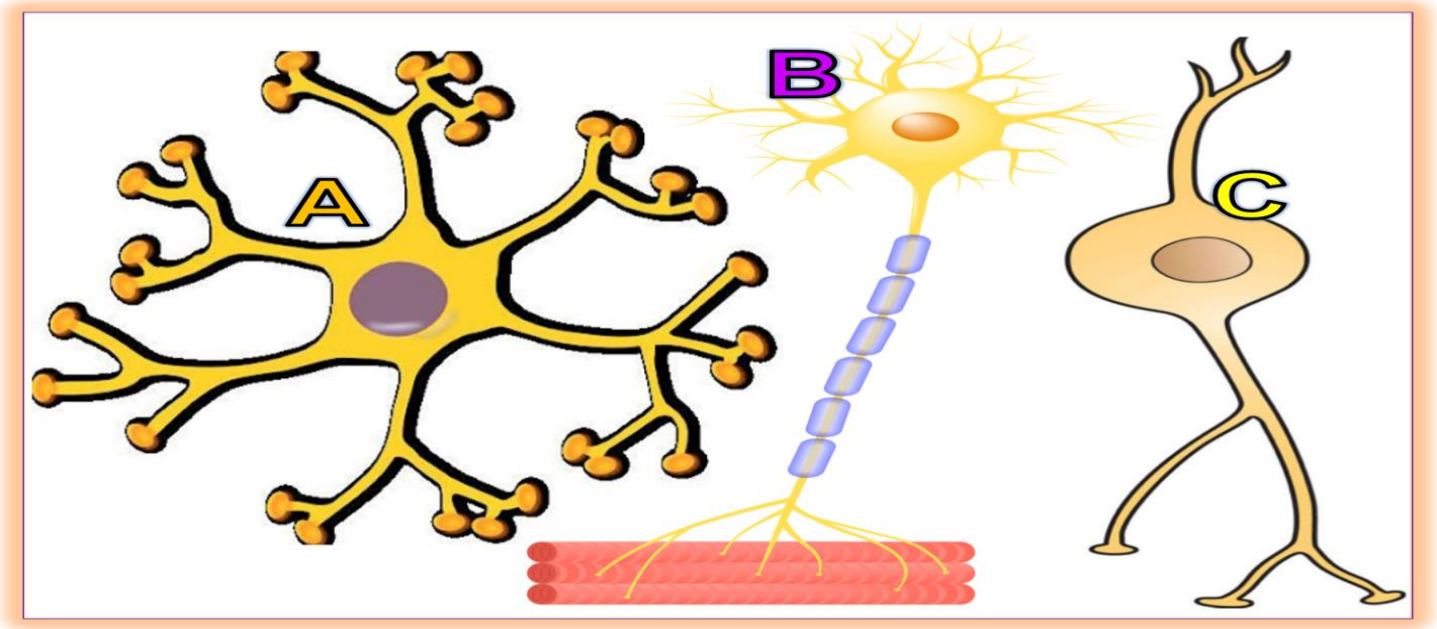


Part 9 Lesson 2 Types of Neurons

There are three types of neurons.

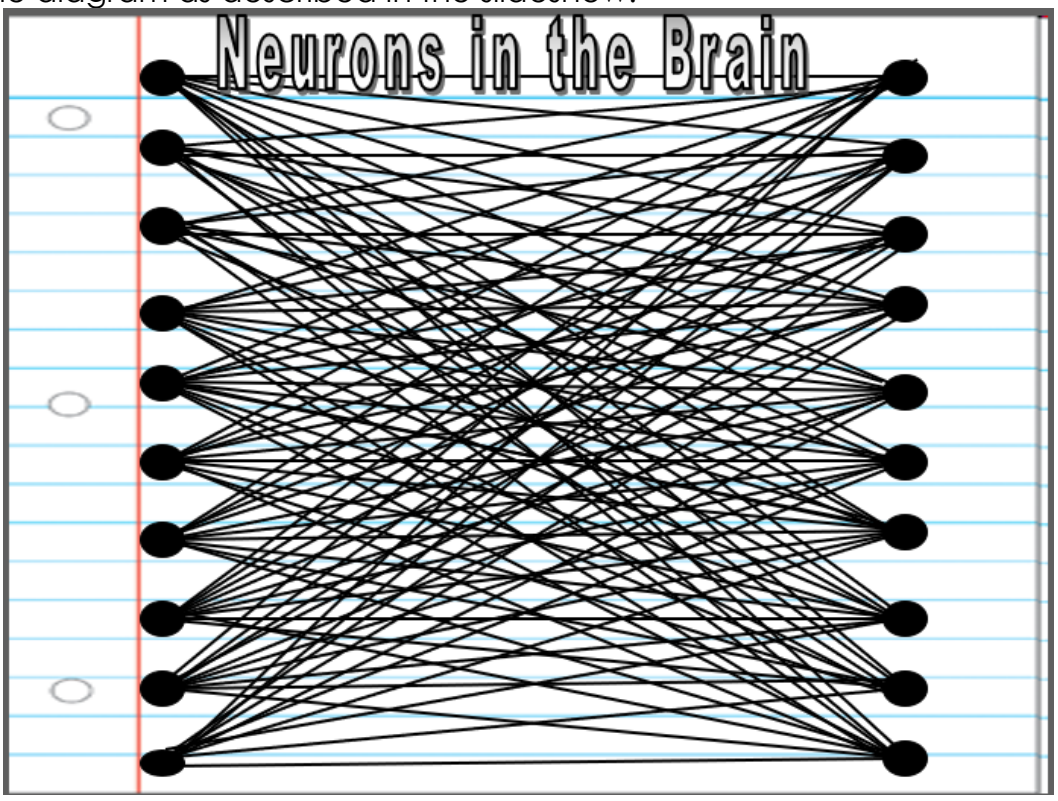
Sensory neurons
Interneurons
Motor neurons

Name the three types of neurons shown below



A= Interneuron	B= Motor neuron	C= Sensory neuron

Interneuron: Transmits impulses between other neurons. (Brain and Spinal Column)
Complete the diagram as described in the slideshow.



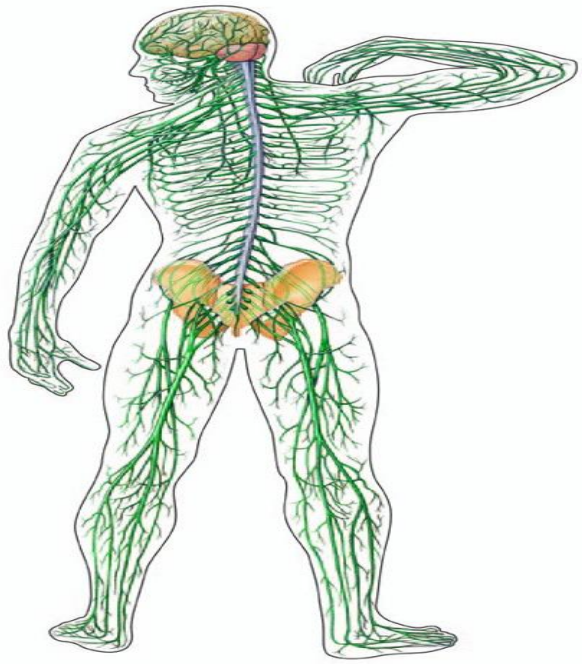
Sensory neuron: Conducts impulses inwards to the brain or spinal cord.
Touch, odor, taste, sound, vision

.Motor Neurons: Pathway along which impulses pass from the brain or spinal cord to a muscle or gland.

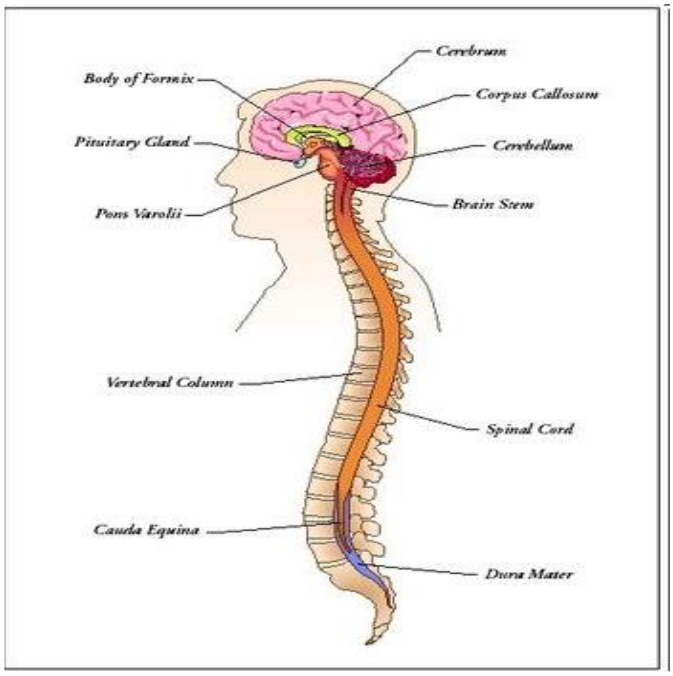
Receptors: Cells that receive messages from your surroundings.
Receptor Cell → Interneurons → Brain → Interneurons → Effector Cell.

The Central Nervous System: Brain and Spinal Cord → Control center of the body.
Peripheral Nervous System: Network of nerves throughout body.

◊ The nervous system can be divided into the central nervous system, and peripheral nervous system? Which one is which?



Answer= Peripheral Nervous System



Answer= Central Nervous System

The Brain: An organ of soft nervous tissue contained in the skull of vertebrates, functioning as the coordinating center of sensation and intellectual and nervous activity.

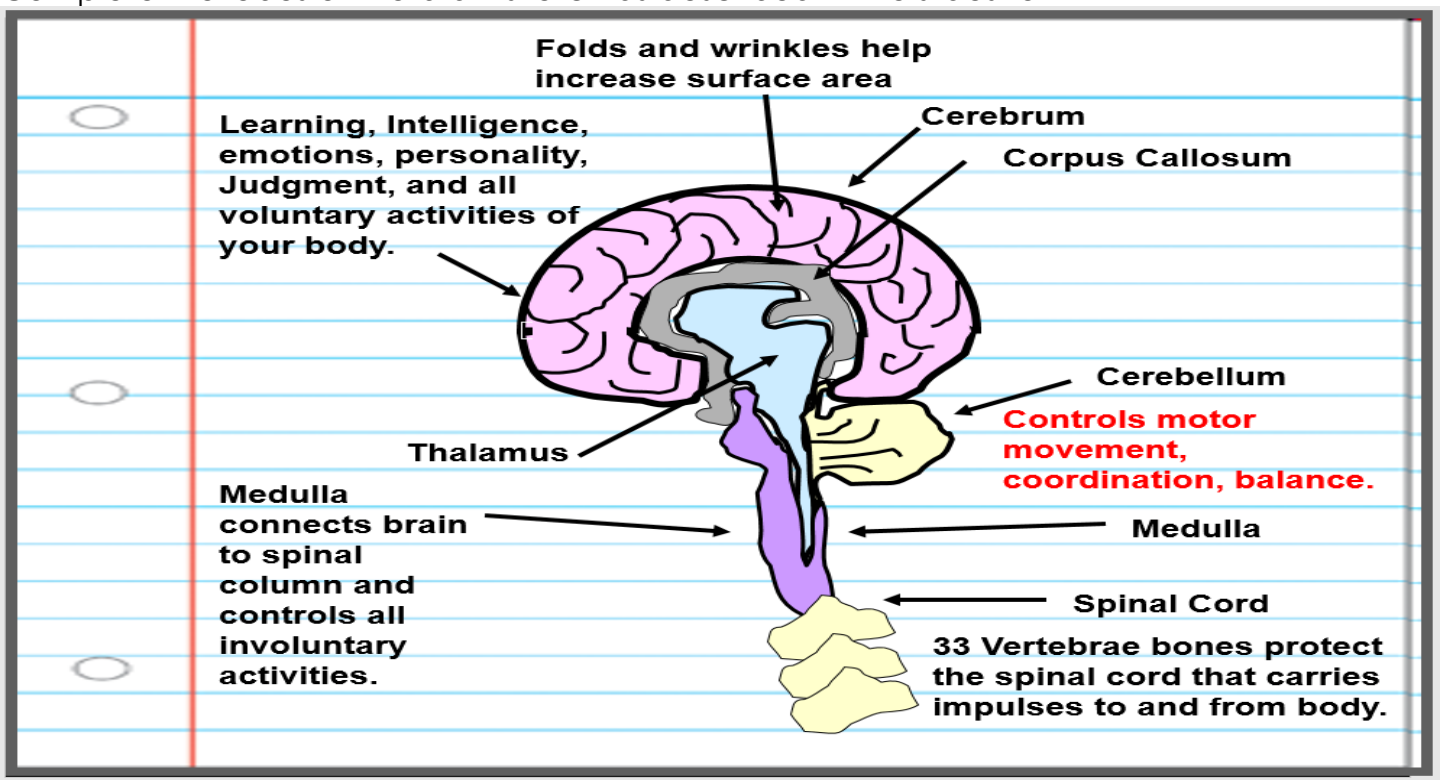
Thick outer layer that comes in contact with the skull.
Watery layer cushions brain
Inner layer clings to the surface of the brain

Cerebrospinal fluid (CSF) is a clear fluid that surrounds the brain and spinal cord.
It cushions the brain and spinal cord from injury and also serves as a nutrient delivery and waste removal system for the brain.

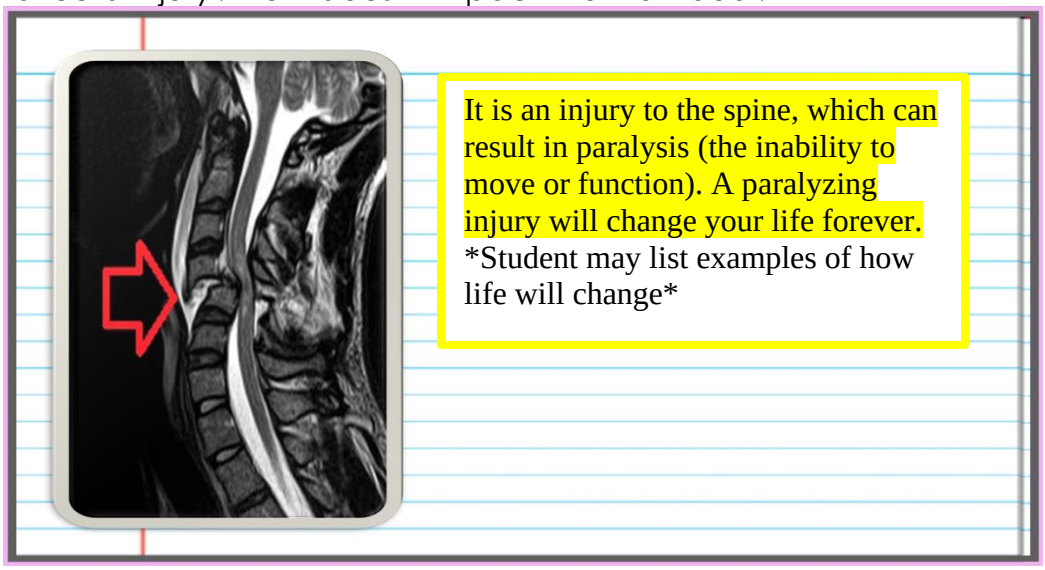
The brain is well protected by the skull.
- The brain is also covered in three layers of connective tissue which nourish and protect.

Part 9 Lesson 3 Lobes of the Brain

Complete the lobes of the brain sketch as described in the slideshow



What is a spinal cord Injury? How does it impact the individual.



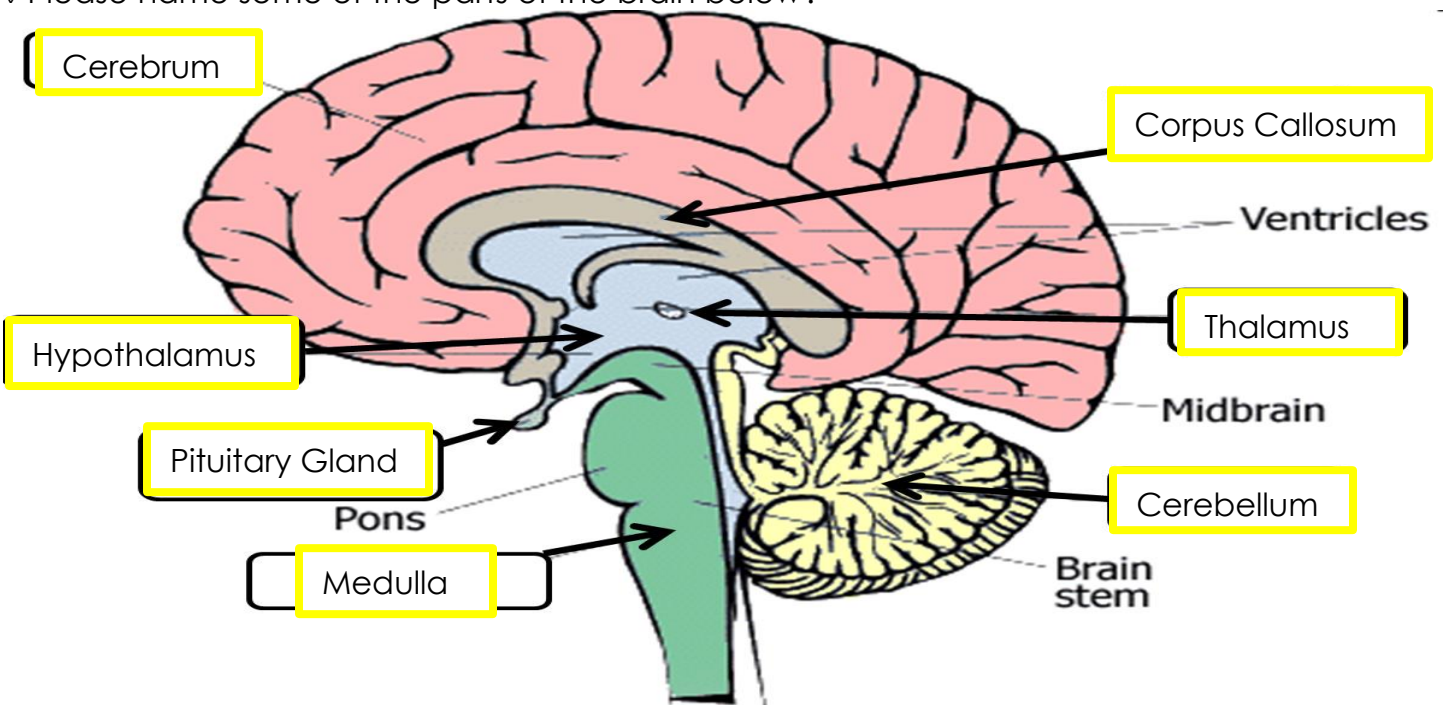
Thalmus: Lobed mass of grey matter buried under the cerebral cortex. It is involved in sensory perception and regulation of motor functions.

Also controls sleep and awake consciousness.

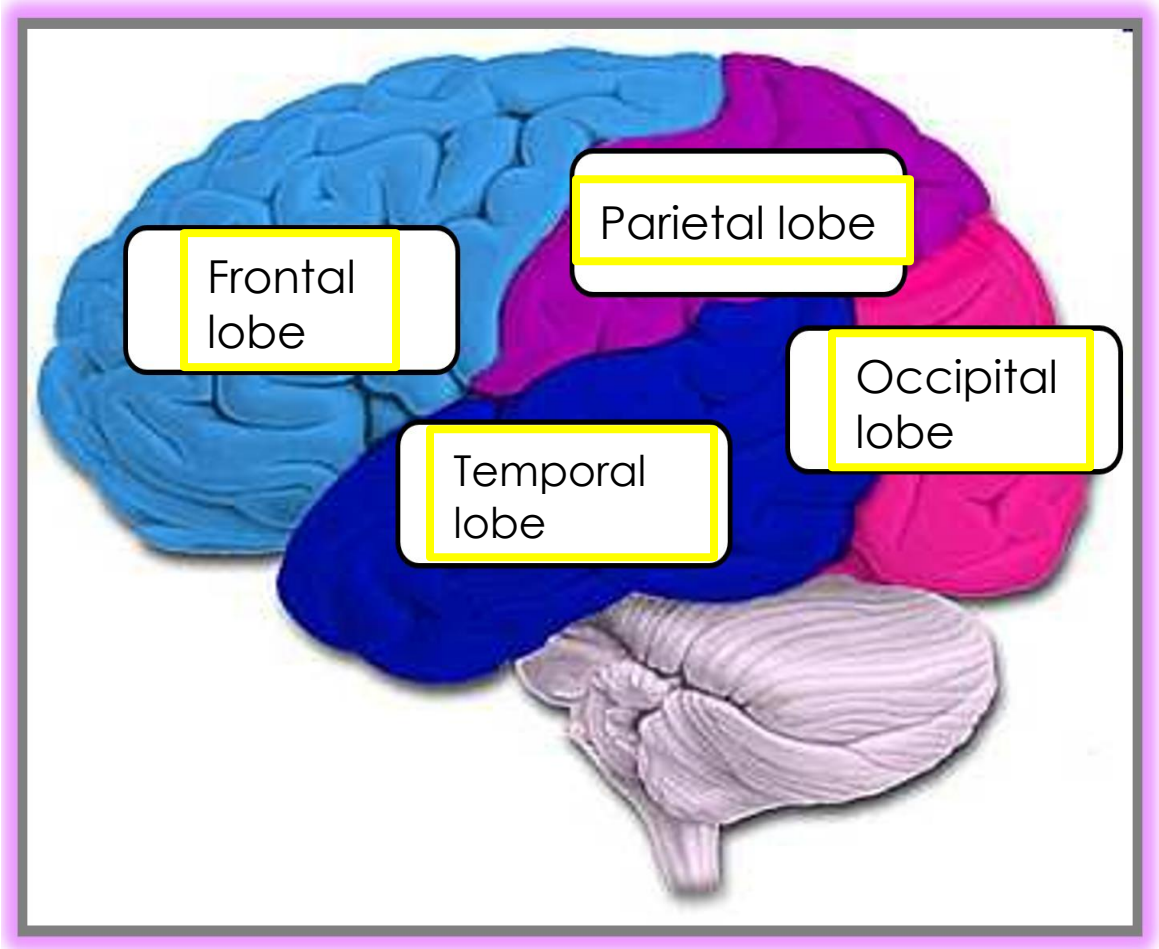
Corpus Callosum: Thick band of nerve fibers that divides the cerebrum into left and right hemispheres.

Allows communication between both hemispheres.

◊ Please name some of the parts of the brain below?



The brain is divided into four sections, known as lobes. Name them below



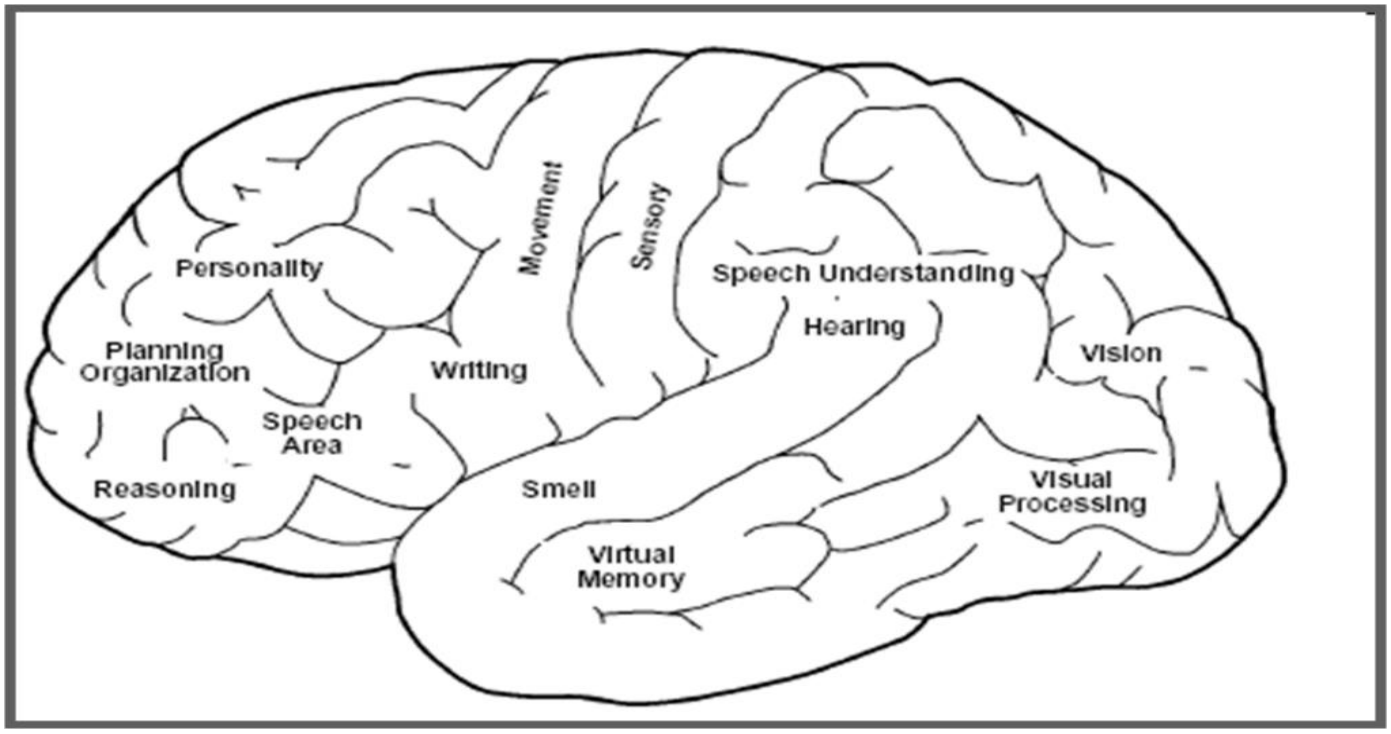
Frontal Lobe- associated with reasoning, planning, parts of speech, movement, emotions, and problem solving

Parietal Lobe- associated with movement, orientation, recognition, perception of stimuli

Occipital Lobe- associated with visual processing
Temporal Lobe- associated with perception and recognition of auditory stimuli, memory, and speech

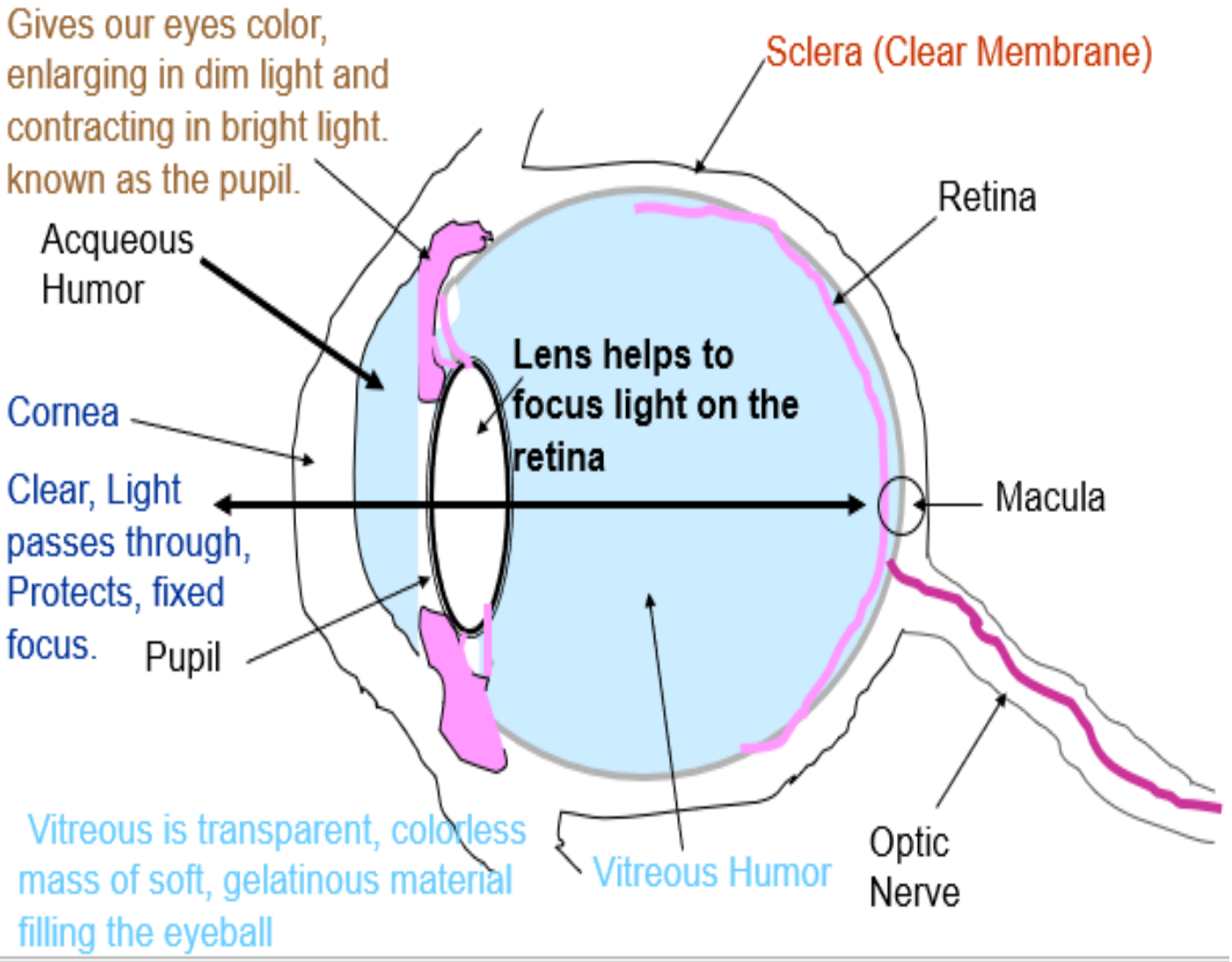
Cerebrum: Learning, Intelligence, emotions, personality, Judgment, and all voluntary activities of your body.
Medulla: Connects brain to spinal column and controls all involuntary activities.
Corpus Callosum: Thick band of nerve fibers that divides the cerebrum into left and right hemispheres.
Cerebellum: Controls motor movement, coordination, balance.
Thalamus: Lobed mass of grey matter buried under the cerebral cortex. It is involved in sensory perception and regulation of motor functions.

Part 9 Lesson 4 Sensory Organs "Eyes"



Please complete and label a sketch of the human eye as described in the slideshow.

Complete and label the sketch of the eye as described in the slideshow.



Rod and Cones: The two types of photoreceptors in the eye.

Rods are more numerous (120 million) and work well in dim light.

Cones see color (6-7 million – macula) and don't work well in dim light.

Part 9 Lesson 6 Observation Basics

Observation: Anything you can see, hear, smell, touch, taste, (Using your senses).

Our perceptions are not photographs, they are constructions-- something that our minds manufacture.

-What we perceive is partially determined by what we know or believe.
-Constructive perception has survival value - it helps us make sense of the world.
-So, seeing is not necessarily believing. USE YOUR JOURNAL!

Part 9 Lesson 7 Observation Continued

Please make some notes in the boxes below about each of the pictures in the short 30 seconds you have to observe.

Street Scene with Van…	The Shed Scene / Crime Scene…
Messy Bedroom Scene…	Roadway Scene
Kids in the line…	Ocean view scene…
Big Scissors Scene…	Man with rubble…
Waterpark Scene…	Skittles…

Part 9 Lesson 8 Smell and Taste

Big questions associated with memory.

- How are memories formed? (Encoding)
- How are memories retained? (Storage)
- How are memories recalled? (Retrieval)

Encoding is an active process and there are many types.

There may be different levels of processing which occur, and some are deeper than others. Distractions can alter processing.

Smell: To perceive the scent of (something) by means of the olfactory nerves.

To smell…

Inside your nose is a patch of neurons that come in contact with the air.
They have hair like projections called cilia that maximize surface area with air.
Odor molecules binds to cilia and the message is sent via the neurons.

To Taste…

We must smell.
75% of what we perceive as taste comes from our sense of smell.
Volatile (evaporates) molecules from the food travel up the nasal cavity to nose.

Smelly Belly Activity

Which trial group are you_____?

Class divides into trial one and trial 2 by counting off.
A.) Ones will sample first, two's will run the trial and then switch.
B.) Samplers approach a station 1-12 and sit down. Servers are welcoming and kind.
C.) If it is a smell bag they close their eyes and smell the contents of the paper bag and then make a guess by marking the appropriate box for that station. (crush jelly beans to release volatile molecules.)
D.) If it is a taste station they close their eyes and pinch their nose as they chew and swallow one bean. Only remove pinched nose until after the jelly bean is consumed. Mark appropriate box with your guess.

	Apple	Buttered Popcorn	Licorice	Bubble-gum	Juicy Pear	Very Cherry
#1 Smell						
#2 Taste						
#3 Smell						
#4 Taste						
#5 Smell						
#6 Taste						
#7 Smell						
#8 Taste						
#9 Smell						
#10 Taste						
#11 Smell						
#12 Taste						

Put your guess above and below each box.

Where you more successful on your smell guesses or your taste?

Answers will vary

Was the trial accurately conducted. Where did it succeed, and where did fall short?

Answers will vary

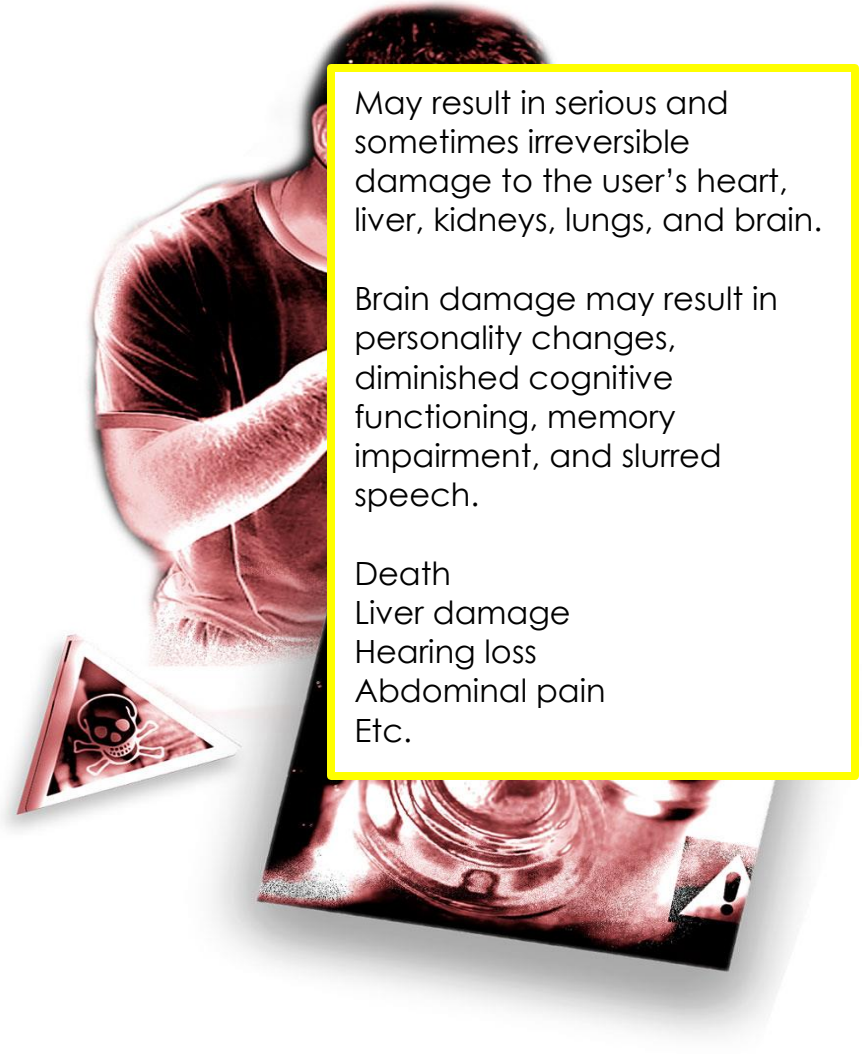
How are smell and taste connected?

To taste, we must smell. 75% of what we perceive as taste comes from our sense of smell. Molecules evaporate from the food and travel up the nasal cavity to nose.

Inhalant abuse may result in serious and sometimes irreversible damage to the user's heart, liver, kidneys, lungs, and brain.

Brain damage may result in personality changes, diminished cognitive functioning, memory impairment, and slurred speech.

What are some dangers of inhalants? Are they just funny air?



May result in serious and sometimes irreversible damage to the user's heart, liver, kidneys, lungs, and brain.

Brain damage may result in personality changes, diminished cognitive functioning, memory impairment, and slurred speech.

Death
Liver damage
Hearing loss
Abdominal pain
Etc.

Part 9 Lesson 12 Hearing

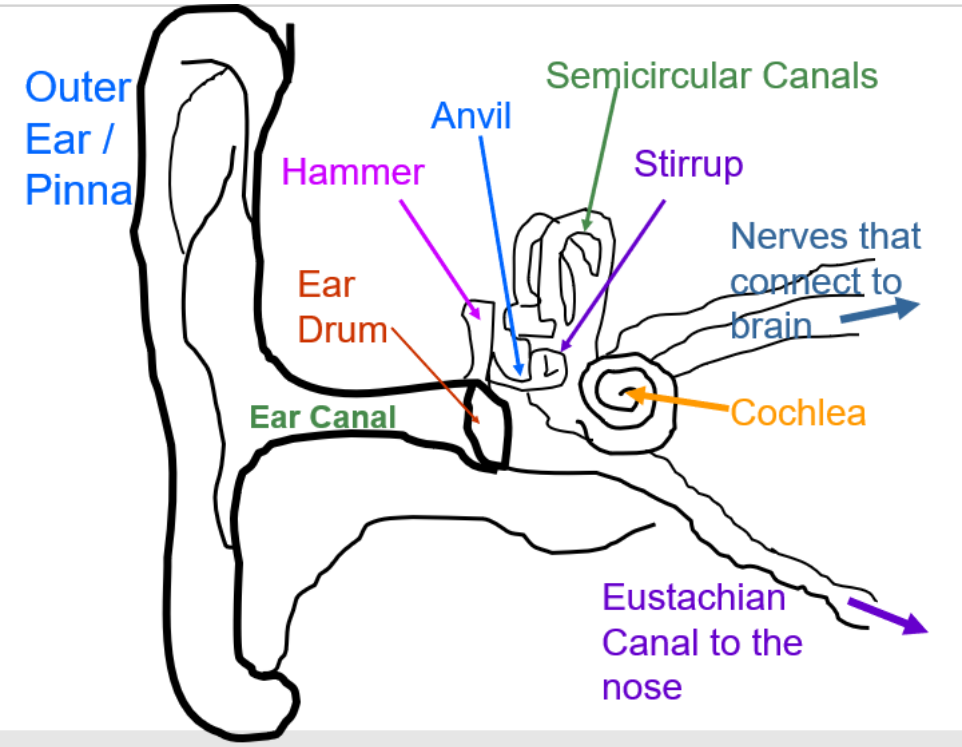
Hearing…

-The hearing system is based solely on physical movement. (Not chemical such as smell and taste).
-Sound occurs when it vibrates in matter. (Solid, Liquid, Gas).

To hear, you must…

-Direct the sound waves into the hearing part of the ear.
-Sense the fluctuations in air pressure.
-Translate these fluctuations into an electrical signal that your brain can understand.

Complete and label a sketch of the human ear as described in the slideshow.



- Anvil: A tiny bone that passes vibrations from the hammer to the stirrup.
- Cochlea: A spiral-shaped, fluid-filled inner ear structure; it is lined with cilia (tiny hairs) that move when vibrated and cause a nerve impulse to form.

Eardrum: (Also called the tympanic membrane) a thin membrane that vibrates when sound waves reach it.

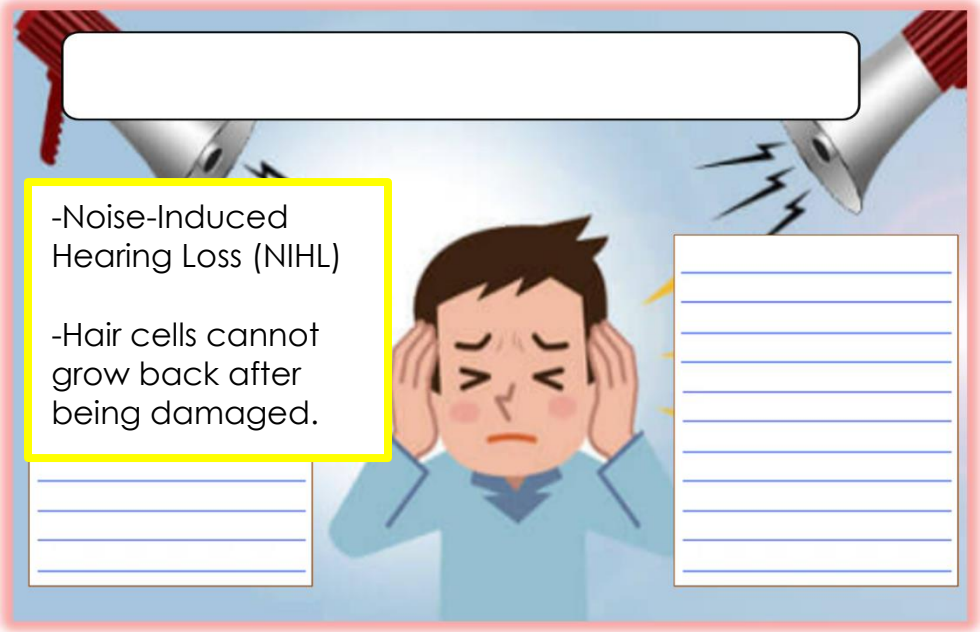
- Eustachian Canal: A tube that connects the middle ear to the back of the nose; it equalizes the pressure between the middle ear and the air outside.
  - When your ears pop as you change altitude (going up a mountain or in an airplane), you are equalizing the air pressure in your middle ear.
- Hammer: A tiny bone that passes vibrations from the eardrum to the anvil.
- Nerves: These carry electro-chemical signals from the inner ear (the cochlea) to the brain.
- Ear Canal: The tube through which sound travels to the eardrum.
- Pinna: The visible part of the outer ear. It collects sound and directs it into the outer ear canal
- Semicircular Canals: Three loops of fluid-filled tubes that are attached to the cochlea in the inner ear. They help us maintain our sense of balance.
- Stirrup: A tiny, U-shaped bone that passes vibrations from the stirrup to the cochlea. This is the smallest bone in the human body (it is 0.25 to 0.33 cm long).

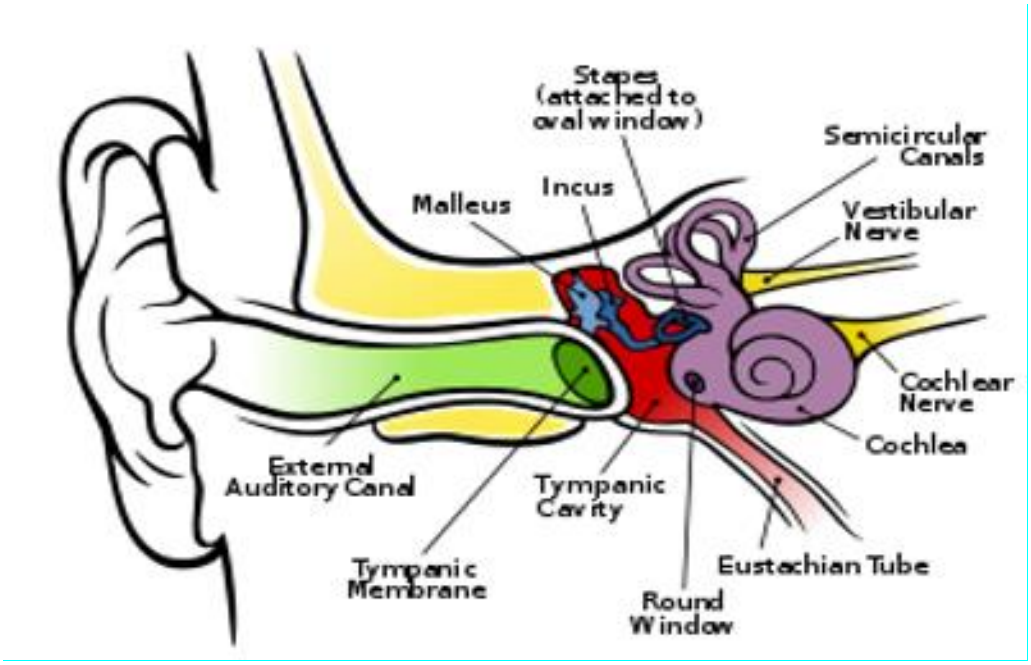
Which two terms are switched? **Nerves** - These carry electro-chemical signals from the inner ear (the cochlea) to the brain. **Stirrup** - The tube through which sound travels to the eardrum. **Pinna** - The visible part of the outer ear. It collects sound and directs it into the outer ear canal **Semicircular Canals** - Three loops of fluid-filled tubes that are attached to the cochlea in the inner ear. They help us maintain our sense of balance. **Ear Canal** -A tiny, U-shaped bone that passes vibrations from the stirrup to the cochlea. This is the smallest bone in the human body (it is 0.25 to 0.33 cm long). **Anvil** :- A tiny bone that passes vibrations from the hammer to the stirrup. **Cochlea** A spiral-shaped, fluid-filled inner ear structure; it is lined with cilia (tiny hairs) that move when vibrated and cause a nerve impulse to form. **Eardrum** (Also called the tympanic membrane) a thin membrane that vibrates when sound waves reach it. **Eustachian Canal** - A tube that connects the middle ear to the back of the nose; it equalizes the pressure between the middle ear and the air outside. **Hammer** A tiny bone that passes vibrations from the eardrum to the anvil.	

Which two terms are switched?
Cochlea These carry electro-chemical signals from the inner ear (the cochlea) to the brain.
Ear Canal- The tube through which sound travels to the eardrum.
Pinna - The visible part of the outer ear. It collects sound and directs it into the outer ear canal
Semicircular Canals - Three loops of fluid-filled tubes that are attached to the cochlea in the inner ear. They help us maintain our sense of balance.
Stirrup -A tiny, U-shaped bone that passes vibrations from the stirrup to the cochlea. This is the smallest bone in the human body (it is 0.25 to 0.33 cm long).
Anvil :- A tiny bone that passes vibrations from the hammer to the stirrup.
Nerves - A spiral-shaped, fluid-filled inner ear structure; it is lined with cilia (tiny hairs) that move when vibrated and cause a nerve impulse to form.
Eardrum (Also called the tympanic membrane) a thin membrane that vibrates when sound waves reach it.
Eustachian Canal - A tube that connects the middle ear to the back of the nose; it equalizes the pressure between the middle ear and the air outside.
Hammer A tiny bone that passes vibrations from the eardrum to the anvil.

Sounds that are too loud or that last a long time can cause Noise-induced hearing loss (NIHL). Our sensitive hair cells convert sound energy into electrical signals that travel to the brain and can become damaged. Once damaged, our hair cells cannot grow back.

What are some of the dangers of listening to loud sounds or music?





Anvil: A tiny bone that passes vibrations from the hammer to the stirrup.
Nerves: A spiral-shaped, fluid-filled inner ear structure; it is lined with cilia (tiny hairs) that move when vibrated and cause a nerve impulse to form.
Eardrum: (Also called the tympanic membrane) a thin membrane that vibrates when sound waves reach it.
Eustachian Canal: A tube that connects the middle ear to the back of the nose; it equalizes the pressure between the middle ear and the air outside.
Hammer: A tiny bone that passes vibrations from the eardrum to the anvil.

Part 9 Lesson 10 Times have Changed

-Choose a partner for this project that was not next to you during random order collection.
-Keep your random test order hidden from your new partner / listener.
-Listener should keep eyes closed during each drop and until pennies have been collected.
-Old and new pennies look differently.
-Tester and listener must communicate for each drop. Tester says "dropping" and listener says "drop away." -Listener can open eyes when tester says pennies have been collected and mark their guess on the listener spreadsheet.

Listener

Trials	1	2	3	4	5	6	7	8	9	10
Old										
New										
Correct √ Wrong X										

The number correct out of 10. ____ / 10

Tester (Make random "Old" or "New" 1-10)

Trials	1	2	3	4	5	6	7	8	9	10
Old										
New										

Collect the class data. Total score of class divided by the number of students.
Total Score _____ / number of students_____ = _____ Average

Did we answer the problem? Can you determine the age of a penny by the sound that it makes when dropped? **Use data in your response.**

_____

_____

_____

_____

Finding Standard Deviation and Variance.

- Standard variation is the square root on the variance.
- Variance: The average of the squared differences from the mean.
- The mean / average was… _____
- Everyone calculate how far away <u>their</u> data was from the mean / average.
  - Ex.) The mean was 80 and I got 60 so I was 20 from the mean.
- To calculate the variance, take each difference, square it, and then average the result as a class.
  - Ex) 22 + 4.52 + 1.52 + 3.52 + (rest of class)

Divide by total # of students = variance

- The Standard Deviation is just the square root of the Variance.
  - So square the variance that we found.

Example… $\sqrt{6523}$ = 80.76%

Class data Variance

Total from above _____ / number of students_____ =_____Variance

√_____ Variance = _____ % Standard Deviation

We now have a standard to show which scores are high and low and to help answer our problem.

What was your score compared to the Standard Deviation? Were you above or below?____

What problems did you encounter? Are your results accurate or should you throw them out?

Part 9 Lesson 11 Touch and Wrap-Up

Touch Sensations begin as signals generated by touch receptors in your skin.

-They travel along sensory nerves made up of bundled fibers that connect to neurons in the spinal cord.

Then signals move to the thalamus, which relays information to the rest of the brain.

The skin has touch receptor cells that allows you to feel texture.

Deeper receptor cells allow you to feel pressure.

Other receptors respond to heat, cold, and pain.

Across

2. Corpus _____: Thick band of nerve fibers that divides the cerebrum into left and right hemispheres.
4. A spiral-shaped, fluid-filled inner ear structure; it is lined with cilia (tiny hairs) that move when vibrated and cause a nerve impulse to form.
6. _____ Canals - Three loops of fluid-filled tubes that are attached to the cochlea in the inner ear. They help us maintain our sense of balance.
10. _____ Lobe- associated with perception and recognition of auditory stimuli, memory, and speech
11. The _____ helps to focus light on the retina
13. Type of neuron that conducts impulses inwards to the brain or spinal cord.
15. _____ Lobe- associated with movement, orientation, recognition, perception of stimuli
17. A specialized cell transmitting nerve impulses.
18. Lobed mass of grey matter buried under the cerebral cortex. It is involved in sensory perception and regulation of motor functions.
21. A tiny bone that passes vibrations from the eardrum to the anvil.
22. (Also called the tympanic membrane) a thin membrane that vibrates when sound waves reach it.
23. Ear _____ -The tube through which sound travels to the eardrum.
26. This is at the back of the eye. Formed of light-sensitive nerve endings that carry the visual impulse to the optic nerve..
27. These carry electro-chemical signals from the inner ear (the cochlea) to the brain.
29. _____ Sensations begin as signals generated by touch receptors in your skin. -They travel along sensory nerves made up of bundled fibers that connect to neurons in the spinal cord.
30. The _____ of the eye is the black circle in the center of the iris. It is a portal which admits and regulates the flow of light to the retina.

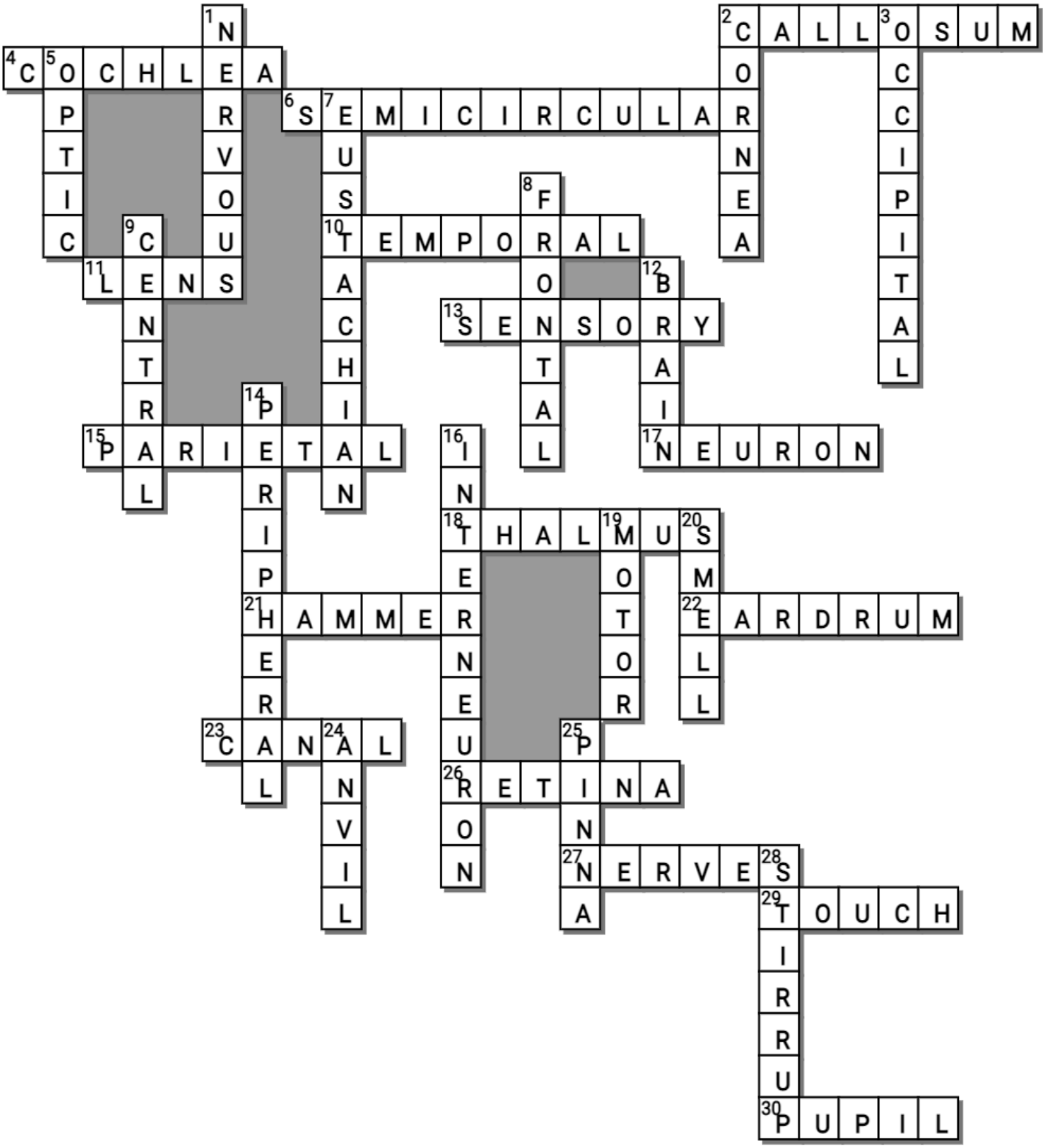
Down

1. This system receives and then sends out information about your body. It also monitors and responds to changes in your environment.
2. The _____ is the clear outer layer at the front of the eye. The cornea helps your eye to focus light so you can see clearly.
3. _____ Lobe- associated with visual processing
5. The _____ Nerve: Each of the second pair of cranial nerves, transmitting impulses to the brain from the retina at the back of the eye.
7. _____ Canal - A tube that connects the middle ear to the back of the nose; it equalizes the pressure between the middle ear and the air outside.
8. _____ Lobe- associated with reasoning, planning, parts of speech, movement, emotions, and problem solving
9. The _____ nervous system (CNS) controls most functions of the body and mind. It consists of two parts: the brain and the spinal cord. The brain is the center of our thoughts, the interpreter of our external environment, and the origin of control over body movement.
12. An organ of soft nervous tissue contained in the skull of vertebrates, functioning as the coordinating center of sensation and intellectual and nervous activity.
14. The _____ System. The nervous system outside the brain and spinal cord.
16. Transmits impulses between other neurons. (Brain and Spinal Column) Complete the diagram as described in the slideshow.
19. _____ Neuron: A Pathway along which impulses pass from the brain or spinal cord to a muscle or gland.
20. Sense of _____: To perceive the scent of (something) by means of the olfactory nerves.
24. A tiny bone that passes vibrations from the hammer to the stirrup
25. The visible part of the outer ear. It collects sound and directs it into the outer ear canal
28. A tiny, U-shaped bone that passes vibrations from the stirrup to the cochlea. This is the smallest bone in the human body (it is 0.25 to 0.33 cm long).

----------Teacher can remove this word bank to make puzzle more challenging----------

Possible Answers

ANVIL, BRAIN, CALLOSUM, CENTRAL, COCHLEA, EARDRUM, EUSTACHIAN, FRONTAL, HAMMER, LENS, MOTOR, NERVES, NERVOUS, NEURON, OCCIPITAL , OPTIC, PARIETAL , PERIPHERAL, PINNA, PUPIL, RETINA, SEMICIRCULAR, SENSORY, SMELL, STIRRUP, TEMPORAL , THALMUS, TOUCH, CANAL, CORNEA, INTERNEURON


1 N
2 CALL
3 OSUM
4 C
5 OCHLEA
6 S
7 EMICIRCULAR
8 F
9 C
10 TEMPORAL
11 LENS
12 B
13 SENSORY
14 P
15 PARIETAL
16 I
17 NEURON
18 THALMUS
19 M
20 S
21 HAMMER
22 EARDRUM
23 CANAL
24 AL
25 P
26 RETINA
27 NERVE
28 S
29 TOUCH
30 PUPIL

Part 9 Review Game

Name

1-20 = 5 pts Lesson 11 Review Game

*20-*25 * = Bonus + 1 pt,

(Secretly write owl in correct space +1 pt)

Score ____ / 100

Final Question = 5 pt wager

GRAIN BAME	TIME TO FOLD THEM	SEE ME HERE ME	I'M THINKING	MASTERMIND Bonus round 1 pt each
1) Neuron	6) C: Cerebellic Lobe	11) A: Sclera B: Iris C: Pupil	16) D: Semicircular Canal	*21) Megamind
2) Chemical, electrical	7) Cushioning	12) A: Optic nerve B: Retina C: Cornea D: Iris	17) E: a tiny, U-shaped bone that passes vibrations to the cochlea	*22) Baby Geniuses
3) A: Interneuron B: Sensory C: Motor neuron	8) C: 33 bones	13) D: Bird	18) F: all of the above	*23) Dr. Evil
4) A: Central Nervous System B: Peripheral Nervous System	9) C: It's better to have a small real advantage than the possibility of a greater one	14) F: all of the above	19) Vision or visual processing	*24) Spock
5) Cerebrum and cerebellum	10) Crossroads	15) Hammer and cochlea	20) Sensory, short-term, long-term	*25) Sherlock Holmes and Watson

Final Question Wager _____/5 Answer: Thalamus