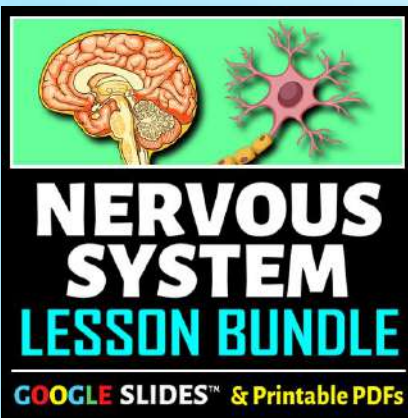


# OTHER NERVOUS SYSTEM RESOURCES YOU MIGHT LIKE by Tangstar Science



These products can be purchased individually or in the

## NERVOUS SYSTEM LESSON BUNDLE

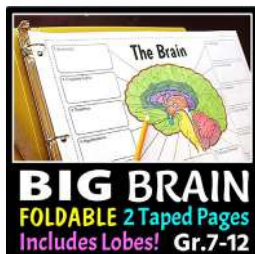
of **13** Resources for **40% OFF**.

**9** OF THESE RESOURCES HAVE OPTIONS FOR GOOGLE DRIVE / CLASSROOM.

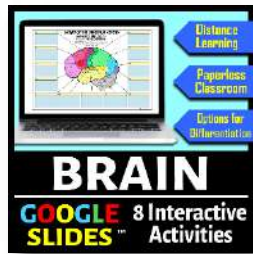
Teaching the Topic



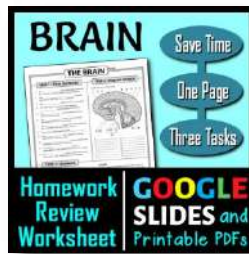
Teaching the Topic



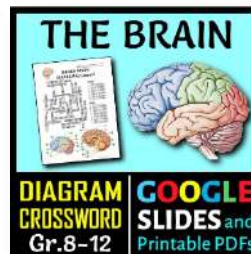
Interactive Distance Learning



Homework, Review, Test Prep



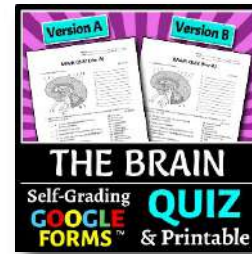
Review, Bonus, Sub Plan



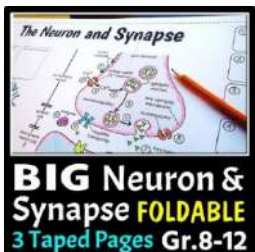
Fun Pair/Group Review Game



Quick Assessment



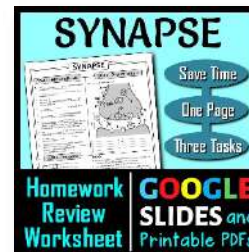
Teaching the Topic



Interactive Distance Learning



Homework, Review, Test Prep



Review, Bonus, Sub Plan



Article, Science Literacy Sub Plan



Article, Science Literacy Sub Plan



## LIST OF ALL THE RESOURCES

1. **Brain – Big Foldable** (Printable with Options for Differentiation)
2. **Brain – Interactive Google Slides Activities** (Options for Differentiation)
3. **Brain – Homework Review Worksheet** (Editable, Printable & Google Slides Options)
4. **Brain – Diagram Crossword** (Editable, Printable & Google Slides Options)
5. **Brain – Taboo Review Card Game** (Printable & Editable Template Cards)
6. **Brain – Quiz with Two Versions** (Editable, Printable & Self-Grading Google Forms Options)
7. **Neuron & Synapse – Big Foldable** (Printable with Options for Differentiation)
8. **Neuron & Synapse – Interactive Google Slides Activities** (Options for Differentiation)
9. **Synapse – Homework Review Worksheet** (Editable, Printable & Google Slides Options)
10. **Neuron & Spinal Cord – Diagram Crossword** (Editable, Printable & Google Slides Options)
11. **Spinal Cord & Vertebral Column – Big Foldable** (Printable with Options for Differentiation)
12. **Article #27: “Lobotomies, Who Needs All That Brain?”** (Printable & Google Slides Options)
13. **Article #52: “Concussions in Sports”** (Printable & Google Slides Options)

# OTHER NERVOUS SYSTEM RESOURCES YOU MIGHT LIKE by Tangstar Science

## RESOURCE 1: TEACHING THE TOPIC - Big Brain Foldable (2 Pages)

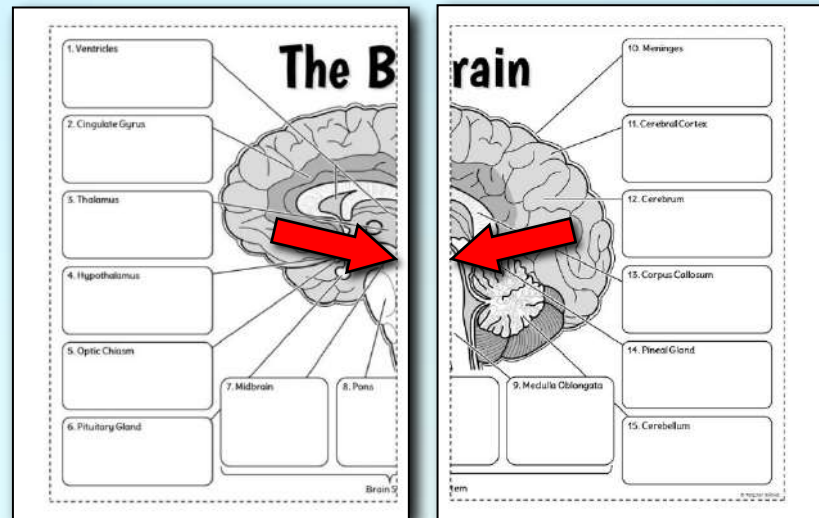
2 pages **cut out** and **taped** together.

then...

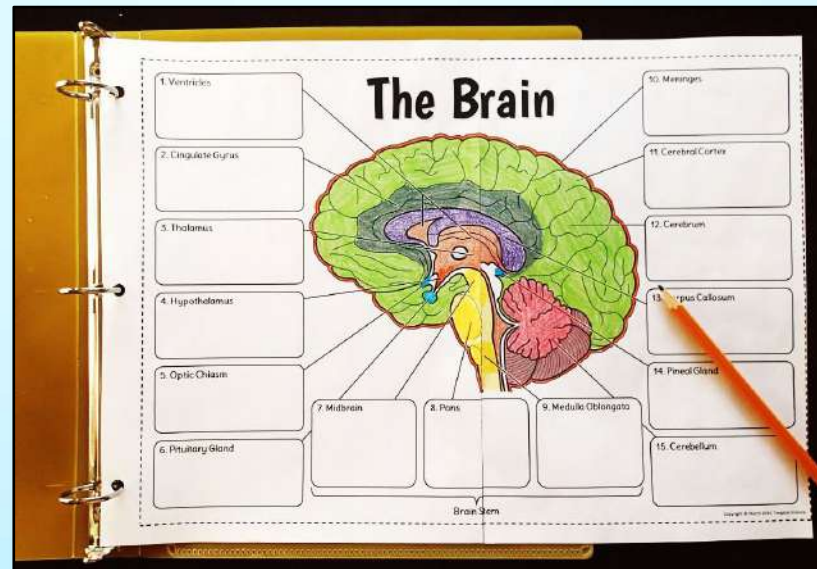
Put in a **Binder**.

OR

Put in an **INB**.



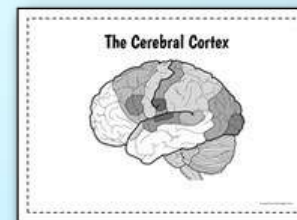
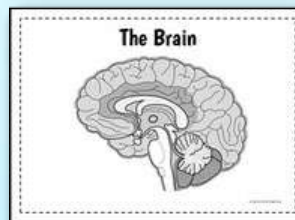
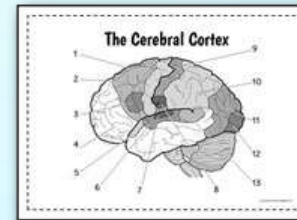
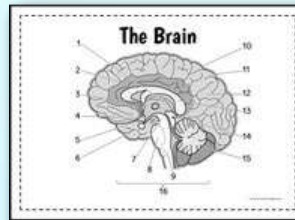
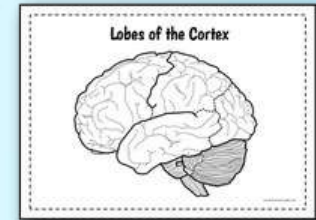
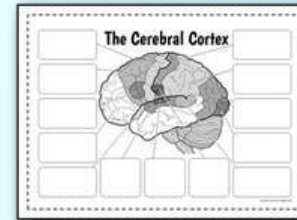
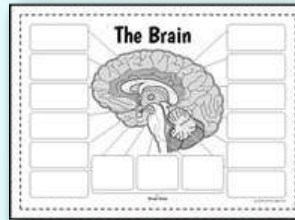
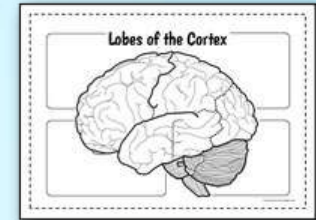
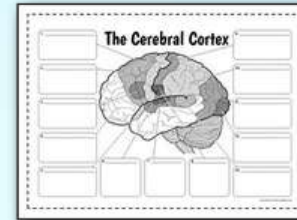
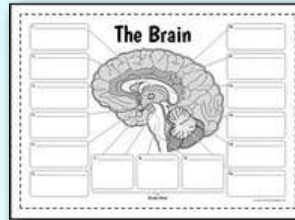
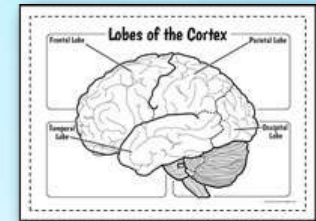
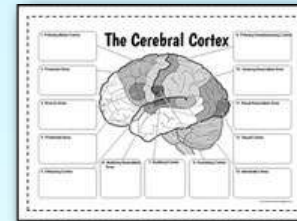
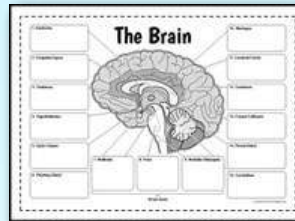
**Printable  
PDFs**





## RESOURCE 1: TEACHING THE TOPIC - Big Brain Foldable (2 Pages)

There are many  
**foldable options**  
for differentiation and  
**full answer keys** are  
provided for all options.



## RESOURCE 2: INTERACTIVE DISTANCE LEARNING – Brain Google Slides Activities

### EXAMPLE OF ONE OF THE ACTIVITIES

**THE BRAIN**  
DRAG & DROP THE LABELS & FILL IN THE DESCRIPTIONS

INSTRUCTIONS: Drag and drop the labels into the correct boxes on the diagram and write a description of the functions of the structures under the labels.

1.   
2.   
3.   
4.   
12.   
13.   
14.   
15.   
16.   
17.   
18.   
19.   
20.

Optic Chiasm  
Ventricles  
Medulla Oblongata  
Brain Stem  
Thalamus  
Pons  
Amygdala  
Hypothalamus  
Corpus Callosum  
Cerebrum  
Limbic System  
Pituitary Gland  
Meninges  
Cerebral Cortex  
Cerebellum  
Hippocampus  
Cingulate Gyrus  
Pineal Gland  
Midbrain

#### **TASK 1:**

Drag & drop the labels of the structures onto the yellow numbered boxes on the diagram.

#### **TASK 2:**

Fill in the descriptions of the functions of the structures by typing them into the blue boxes on the diagram.

### **CONCEPTS**

- Optic Chiasm
- Ventricles
- Medulla Oblongata
- Pons
- Thalamus
- Amygdala
- Brain Stem
- Pituitary Gland
- Hypothalamus
- Corpus Callosum
- Cerebrum
- Limbic System
- Cerebellum
- Cerebral Cortex
- Meninges
- Midbrain
- Hippocampus
- Cingulate Gyrus
- Pineal Gland

### **ANSWER KEY**



## RESOURCE 2: INTERACTIVE DISTANCE LEARNING – Brain Google Slides Activities

### WHAT IS THIS RESOURCE?

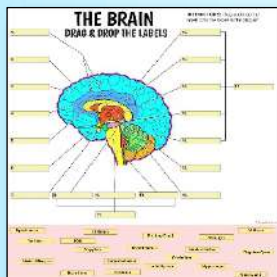
This resource asks students to identify the structures of the brain on a diagram as well determine the functions of these structures. This is done using **EIGHT** different interactive activities in Google Slides.

Having these options is great for differentiation in your classroom. As well, multiple activities can be used by each student to help them develop, review and deepen their understanding.

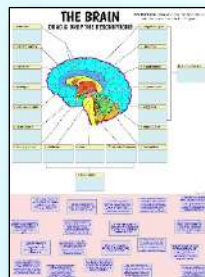
*Great for distance learning and paperless classrooms.*

### THE EIGHT ACTIVITY OPTIONS AVAILABLE

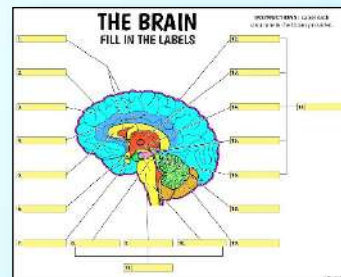
#### 1 Drag & Drop Labels



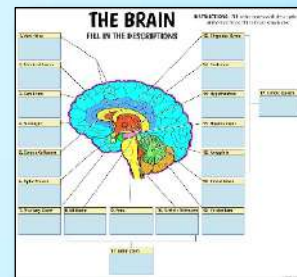
#### 2 Drag & Drop Descriptions



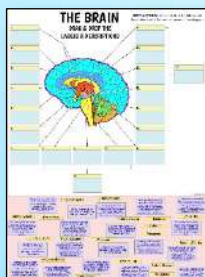
#### 3 Type in Labels



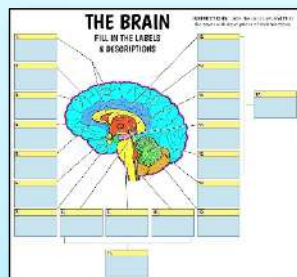
#### 4 Type in Descriptions



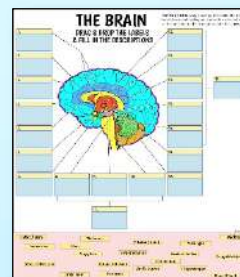
#### 5 Drag & Drop Both Labels & Descriptions



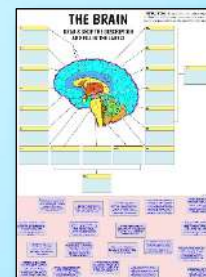
#### 6 Type in Both Labels & Descriptions



#### 7 Drag & Drop Labels & Type in Descriptions



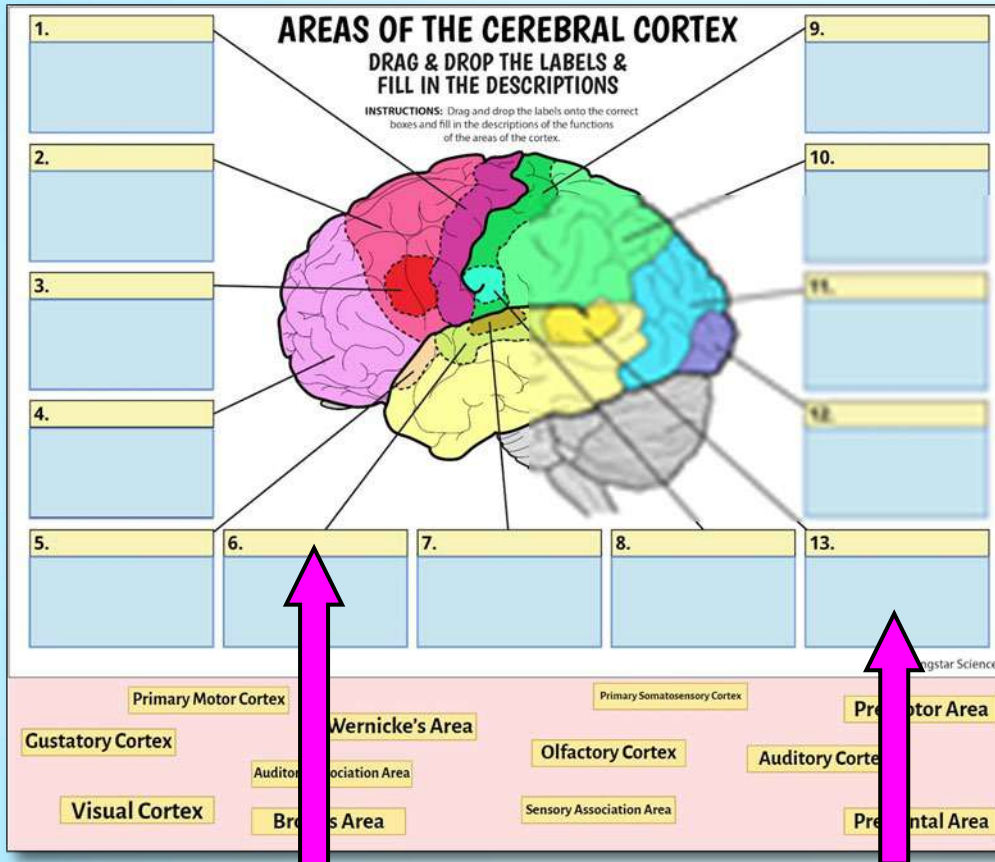
#### 8 Type in Labels & Drag & Drop Descriptions





## RESOURCE 2: INTERACTIVE DISTANCE LEARNING – Brain Google Slides Activities

### EXAMPLE OF ONE OF THE ACTIVITIES



#### **TASK 1:**

Drag & drop the labels of the structures onto the yellow numbered boxes on the diagram.

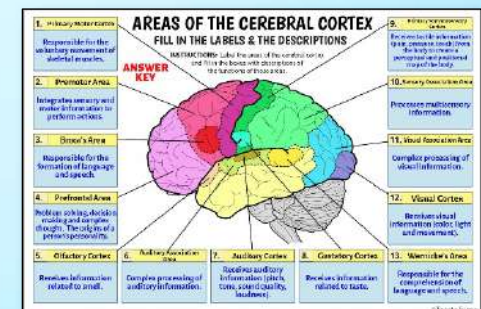
#### **TASK 2:**

Fill in the descriptions of the functions of the structures by typing them into the blue boxes on the diagram.

### CONCEPTS

- Gustatory Cortex
- Primary Motor Cortex
- Visual Cortex
- Wernicke's Area
- Broca's Area
- Auditory Association Area
- Olfactory Cortex
- Sensory Association Area
- Primary Somatosensory Cortex
- Premotor Area
- Auditory Cortex
- Prefrontal Area

### ANSWER KEY



## RESOURCE 2: INTERACTIVE DISTANCE LEARNING – Brain Google Slides Activities

### WHAT IS THIS RESOURCE?

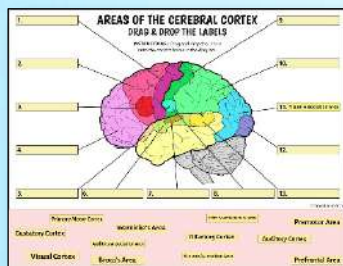
This resource asks students to identify the structures of the cerebral cortex on a diagram as well determine the functions of these structures. This is done using **EIGHT** different interactive activities in Google Slides.

Having these options is great for differentiation in your classroom. As well, multiple activities can be used by each student to help them develop, review and deepen their understanding.

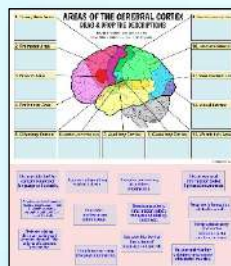
### THE EIGHT ACTIVITY OPTIONS AVAILABLE

*Great for distance learning and paperless classrooms.*

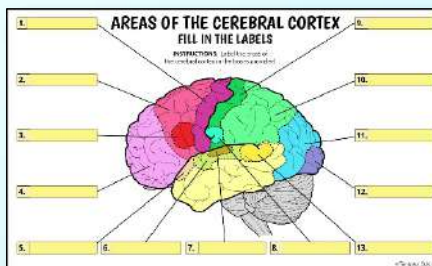
#### **1** Drag & Drop Labels



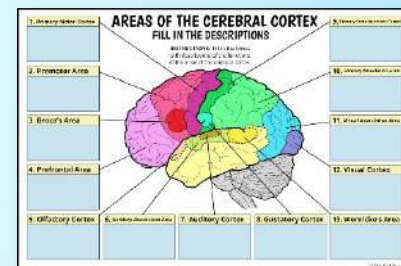
#### **2** Drag & Drop Descriptions



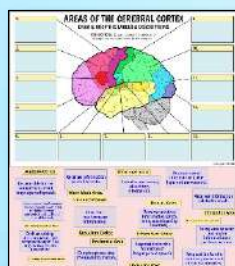
#### **3** Type in Labels



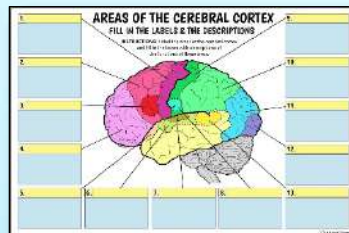
#### **4** Type in Descriptions



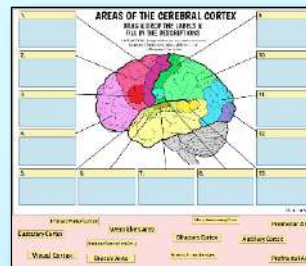
#### **5** Drag & Drop Both Labels & Descriptions



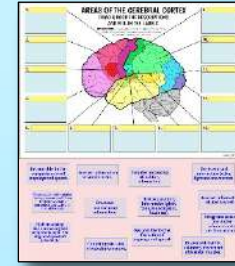
#### **6** Type in Both Labels & Descriptions



#### **7** Drag & Drop Labels & Type in Descriptions

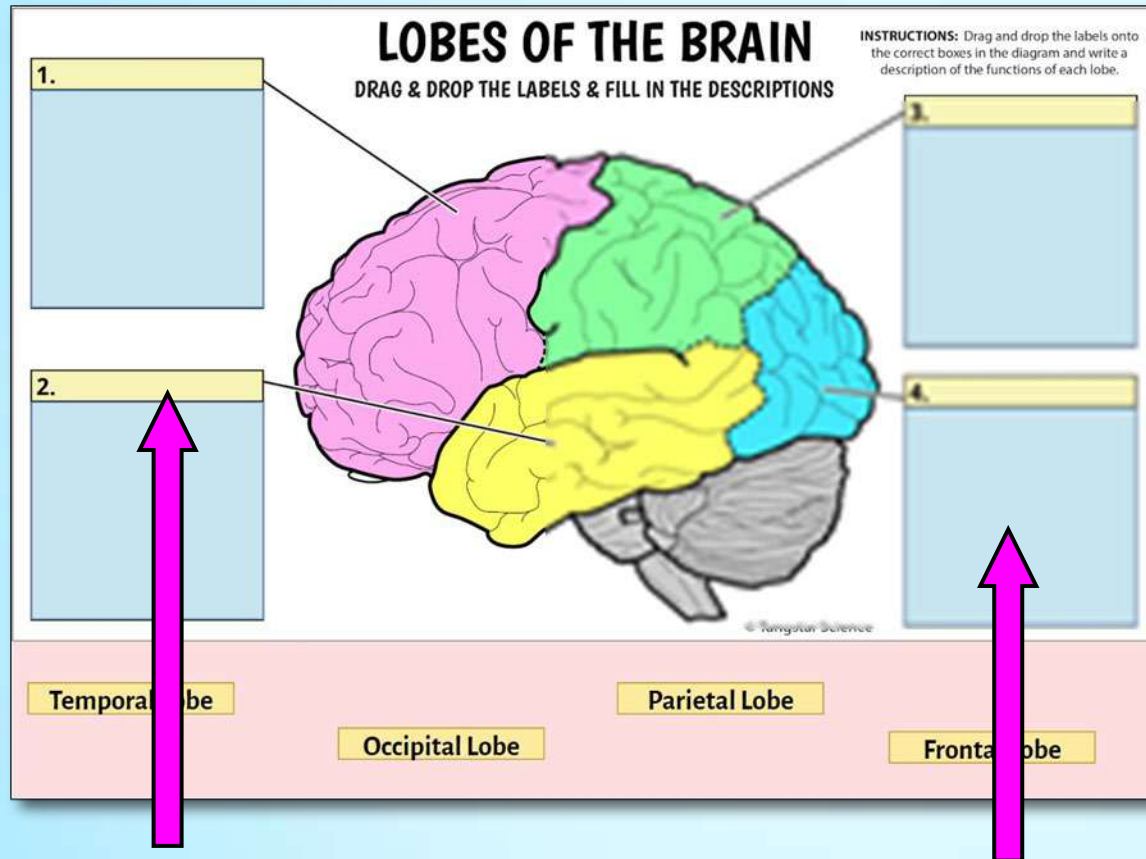


#### **8** Type in Labels & Drag & Drop Descriptions





## EXAMPLE OF ONE OF THE ACTIVITIES



### TASK 1:

Drag & drop the labels of the structures onto the yellow numbered boxes on the diagram.

### TASK 2:

Fill in the descriptions of the functions of the structures by typing them into the blue boxes on the diagram.

## CONCEPTS

- Temporal Lobe
- Occipital Lobe
- Parietal Lobe
- Frontal Lobe

## ANSWER KEY



## RESOURCE 2: INTERACTIVE DISTANCE LEARNING – Brain Google Slides Activities

### WHAT IS THIS RESOURCE?

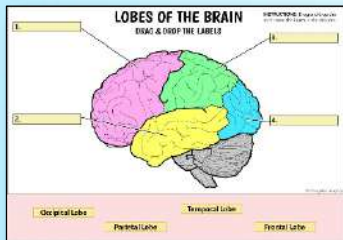
This resource asks students to identify the lobes of the brain on a diagram as well determine the functions of these lobes. This is done using **EIGHT** different interactive activities in Google Slides.

Having these options is great for differentiation in your classroom. As well, multiple activities can be used by each student to help them develop, review and deepen their understanding.

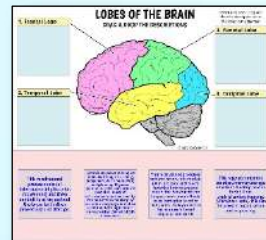
### THE EIGHT ACTIVITY OPTIONS AVAILABLE

Great for distance learning  
and paperless classrooms.

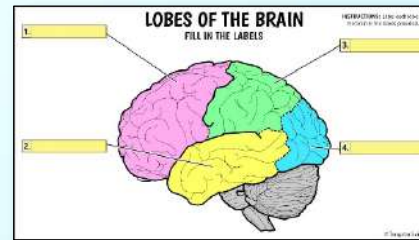
#### 1 Drag & Drop Labels



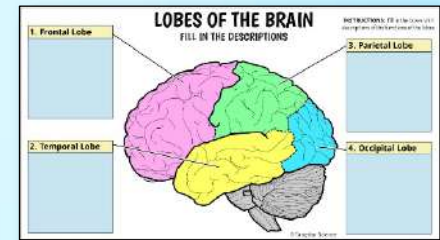
#### 2 Drag & Drop Descriptions



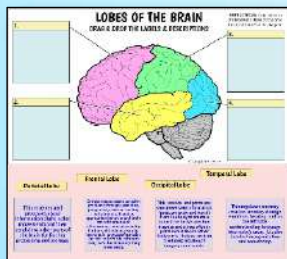
#### 3 Type in Labels



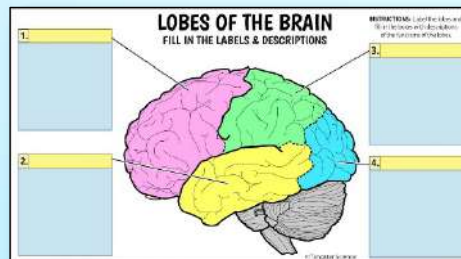
#### 4 Type in Descriptions



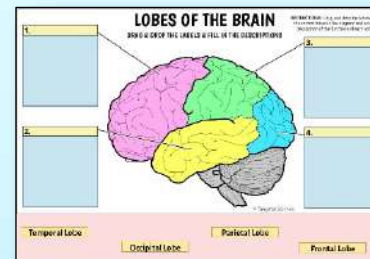
#### 5 Drag & Drop Both Labels & Descriptions



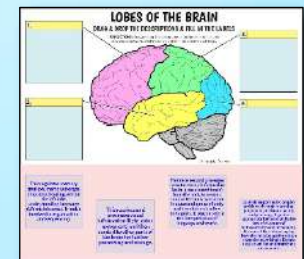
#### 6 Type in Both Labels & Descriptions



#### 7 Drag & Drop Labels & Type in Descriptions



#### 8 Type in Labels & Drag & Drop Descriptions



## RESOURCE 3: INDIVIDUAL REVIEW - Brain Review Worksheet / Test Prep (1 Page)

Zoom  
in to Read

### THE BRAIN

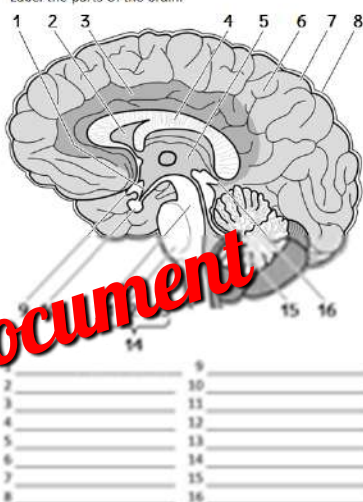
Name: \_\_\_\_\_

#### TASK 1: Fill in the Blanks

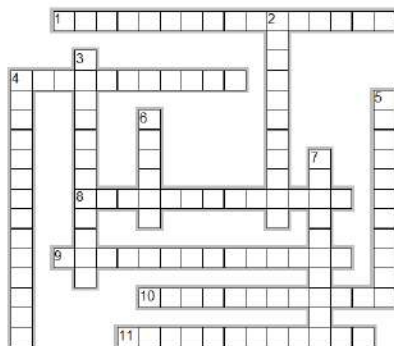
- The \_\_\_\_\_ relays information between the cerebrum and the spinal cord and midbrain.
- The \_\_\_\_\_ connects the left and right sides of the cerebrum.
- The \_\_\_\_\_ lobe processes visual data.
- This triple layer around the brain called the \_\_\_\_\_ protects against infection.
- The \_\_\_\_\_ are four interconnected chambers in the brain.
- The \_\_\_\_\_ controls reflex patterns associated with vision and hearing.
- The \_\_\_\_\_ is the relay station between the cerebellum and the cerebral cortex.
- Two halves of the brain form the \_\_\_\_\_.
- The \_\_\_\_\_ lobe regulates memory organization and sequencing.
- \_\_\_\_\_ formation of language and \_\_\_\_\_
- The \_\_\_\_\_ responsible for movement of muscles.
- The \_\_\_\_\_ cortex receives information about color, tone, sound quality and loudness

#### TASK 2: Diagram Analysis

Label the parts of the brain.



#### TASK 3: Crossword



##### ACROSS

- This controls vital bodily functions like breathing.
- This secretes melatonin to control the sleep/wake cycle.
- The primary \_\_\_\_\_ cortex receives tactile information to create a positional map of the body.
- The outer \_\_\_\_\_ of the cerebrum.
- This receives and processes somatosensory information.
- Plays a vital role in maintaining homeostasis.

##### DOWN

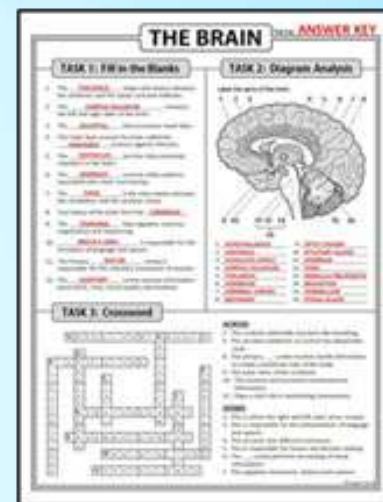
- This is where the right and left optic nerve crosses.
- This is responsible for the interpretation of language and speech.
- This secretes nine different hormones.
- This is responsible for reason and decision making.
- The \_\_\_\_\_ cortex performs processing of visual information.
- This regulates movement, balance and posture.

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## CONCEPTS

- Hypothalamus
- Optic chiasm
- Pituitary gland
- Cerebellum
- Medulla oblongata
- Brain stem
- Pineal gland
- Cerebral cortex
- Thalamus
- Corpus callosum
- Meninges
- Ventricles
- Midbrain
- Pons
- Cerebrum
- Cingulate Gyrus
- Temporal lobe
- Occipital lobe
- Frontal lobe
- Parietal lobe
- Broca's Area
- Wernicke's Area
- Primary motor cortex
- Visual cortex
- Auditory cortex
- Primary somatosensory cortex

## ANSWER KEY



## 3 TASKS

- Assign the whole page, or break it up into in class tasks, exit tickets and homework tasks.
- The variety of different tasks helps students review in different ways and holds their interest.

Comes with  
Editable PPT,  
Printable PDFs &  
**GOOGLE SLIDES™**  
Options



## RESOURCE 3: INDIVIDUAL REVIEW - Brain Review Worksheet / Test Prep (1 Page)

### DIGITAL VERSION IN GOOGLE SLIDES

#### Great for Distance Learning and a Paperless Classroom.

- Students type their answers in the **light blue text boxes** on the Google Slide. This can either be printed out at home (on 8.5"x11" letter-sized paper) for their own notes or digitally submitted to the teacher for proof of completion or for marks.

## THE BRAIN

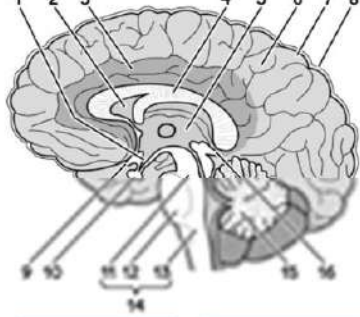
Name: \_\_\_\_\_

TASK 1: Fill in the Blanks

1. The \_\_\_\_\_ relays information between the cerebrum and the spinal cord and midbrain.
2. The \_\_\_\_\_ connects the left and right sides of the cerebrum.
3. The \_\_\_\_\_ like processes visual data.
4. This single layer around the brain called the \_\_\_\_\_ protects against infection.
5. The \_\_\_\_\_ are four interconnected chambers in the brain.
6. The \_\_\_\_\_ controls reflex patterns associated with vision and hearing.
7. The \_\_\_\_\_ is the relay station between the cerebellum and the cerebral cortex.
8. Two halves of the brain form the \_\_\_\_\_.
9. The \_\_\_\_\_ like regulates memory, organization and sequencing.
10. \_\_\_\_\_ is responsible for the formation of language and speech.
11. The Primary \_\_\_\_\_ cortex is responsible for the voluntary movement of muscles.
12. The \_\_\_\_\_ cortex receives information about pitch, tone, sound quality and loudness.

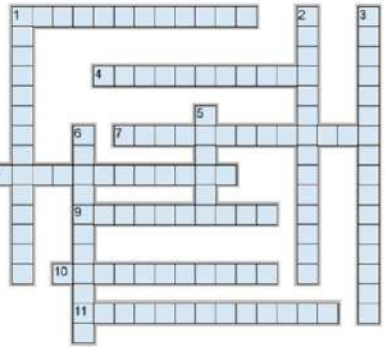
TASK 2: Diagram Analysis

Label the parts of the brain.



1 _____	9 _____
2 _____	10 _____
3 _____	11 _____
4 _____	12 _____
5 _____	13 _____
6 _____	14 _____
7 _____	15 _____
8 _____	16 _____

TASK 3: Crossword



**ACROSS**

1. This receives and processes somatosensory information.
4. This is responsible for reasoning and decision making.
7. This is responsible for the interpretation of language and speech.
8. Plays a vital role in maintaining homeostasis.
9. This regulates movement, balance and posture.
10. This secretes melatonin to control the sleep/wake cycle.
11. The primary \_\_\_\_\_ cortex receives tactile information to create a positional map of the body.

**DOWN**

1. This secretes nine different hormones.
2. The outer layer of the cerebrum.
3. This controls vital bodily functions like breathing.
5. The \_\_\_\_\_ cortex performs the processing of visual information.
6. This is where the right and left optic nerve crosses.

©Tangstar Science

## RESOURCE 4: EXTRA REINFORCEMENT - Brain Diagram Crossword (1 Page)

### USEFUL FEATURES OF THIS DIAGRAM CROSSWORD

#### Fully Editable Word Document is Included

- Reword questions according to your classroom needs.

#### One Page

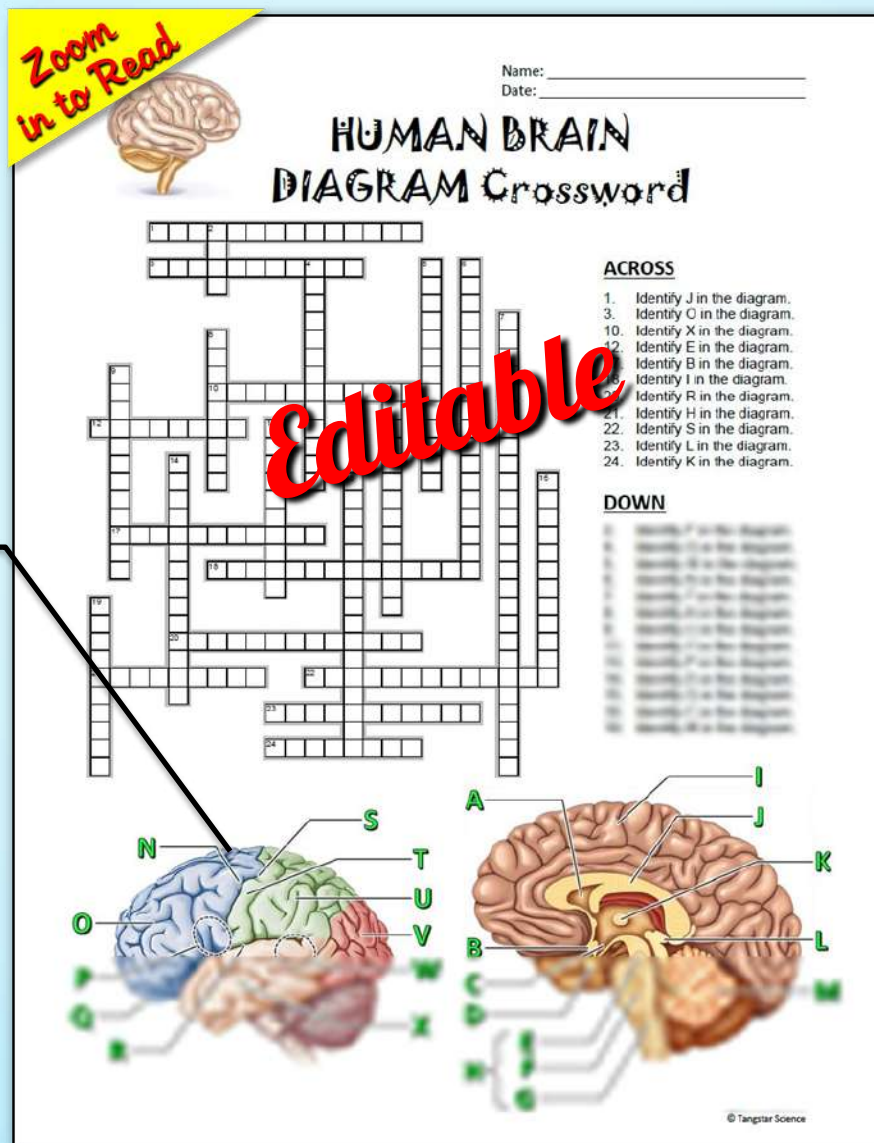
- For easy and economical printing.

#### Clear Diagrams

- Helps students practice labeling biological diagrams. Diagram crosswords are a fun twist on the usual labeling worksheet.

#### BONUS ACTIVITY:

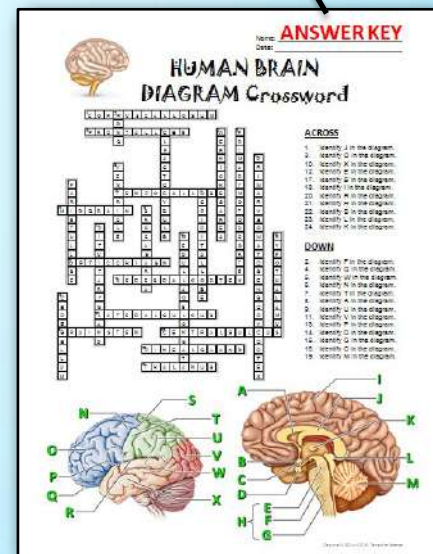
After completing the crossword, have students cut out the diagrams, paste them in their notes and then label the structures for extra reinforcement.



**No Prep!  
Just Print  
and Use.**

#### Full Answer Key

- Easy for you or your students to take up the answers.

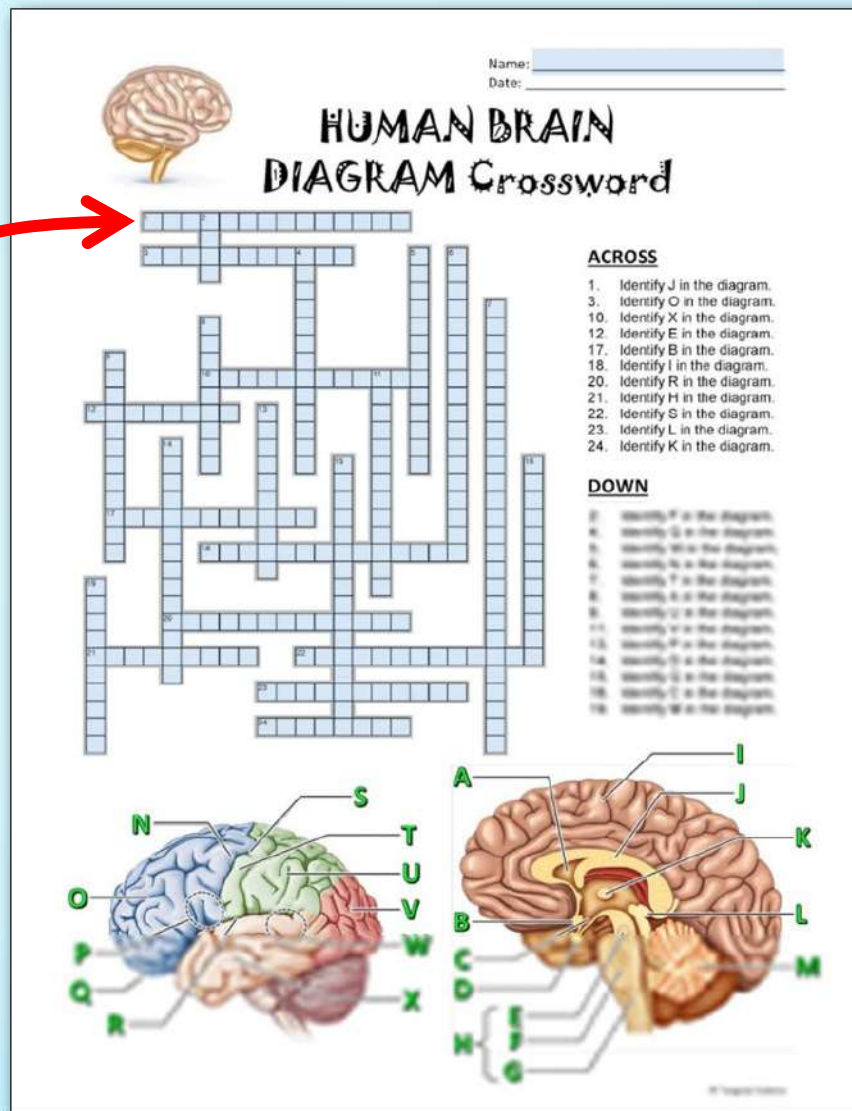


## RESOURCE 4: EXTRA REINFORCEMENT - Brain Diagram Crossword (1 Page)

### DIGITAL VERSION IN GOOGLE SLIDES

**Great for Distance Learning and a Paperless Classroom.**

- Students type their answers in the **light blue text boxes** on the crossword in the Google Slide. This can either be printed out at home (on 8.5"x11" letter-sized paper) for their own notes or digitally submitted to the teacher for proof of completion or for marks.



### TERMS

- corpus callosum
- frontal lobe
- temporal lobe
- midbrain
- optic chiasm
- cerebral cortex
- lateral sulcus
- brain stem
- central sulcus
- pineal gland
- thalamus
- pons
- olfactory bulb
- primary motor cortex
- primary somatosensory cortex
- ventricle
- parietal lobe
- occipital lobe
- Broca's area
- pituitary gland
- medulla oblongata
- hypothalamus
- cerebellum



## RESOURCE 5: GROUP REVIEW - Brain Taboo Card Game (4 Pages)

### 32 CARDS ON 4 PAGES

Just Print, Cut  
and Play.



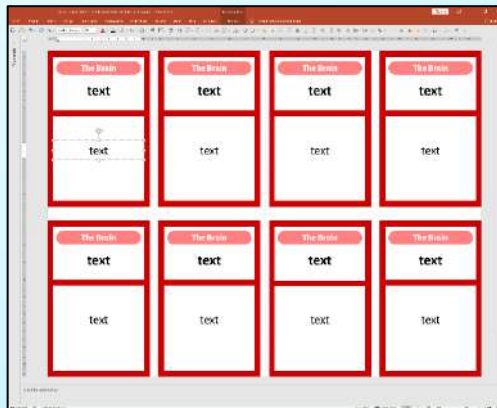
Printable  
PDFs



### 32 TERMS

- Amygdala
- Auditory cortex
- Brain stem
- Broca's area
- Central sulcus
- Cerebellum
- Cerebral cortex
- Cerebrum
- Cingulate gyrus
- Corpus callosum
- Frontal lobe
- Hippocampus
- Hypothalamus
- Limbic system
- Medulla oblongata
- Meninges
- Midbrain
- Occipital lobe
- Olfactory bulb
- Optic chiasm
- Parietal lobe
- Pineal gland
- Pituitary gland
- Pons
- Premotor Area
- Primary motor cortex
- Primary somatosensory cortex
- Temporal lobe
- Thalamus
- Ventricles
- Visual cortex
- Wernicke's area

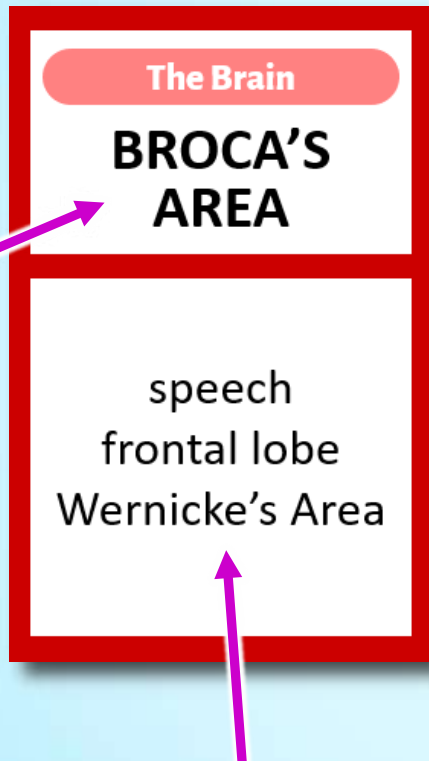
### EDITABLE TEMPLATE



Make Your  
Own Cards in  
PowerPoint.

## RESOURCE 5: GROUP REVIEW - Brain Taboo Card Game (4 Pages)

### HOW TO PLAY TABOO



The guesser  
needs to  
guess this  
term.

The clue givers  
cannot use these  
taboo terms in  
their clues.

**Step 1:** Form groups (or pairs) where one person is the **guesser** and the remaining students are the **clue givers**. Group members take turns being the guesser.

**Step 2:** The **guesser needs to guess the term** on the card (in this case it's "BROCA'S AREA"). Clue givers will give descriptions of the term to help the guesser guess the right term. Use a timer to limit the guessing time.

**Step 3:** The **clue givers have to describe the term without using the taboo words** on the card (in this case the taboo words are "speech", "frontal lobe" and "Wernicke's Area"). Also, clue givers cannot use root words found in the term or the taboo words. For example, if the term was "kicking", the root word "kick" cannot be used in the clue giving.

**ASSIGNING POINTS:** **3 points are given to the guesser** for every correct term guessed. **2 points are deducted from any clue giver that uses a taboo word OR root word** during clue giving. Alternatively they can choose to lose their next turn as the guesser.

## RESOURCE 6: ASSESSMENT - Brain Quiz with Two Versions (1 Page)

### TWO VERSIONS PREVENT CHEATING

- Version A and B contain the same questions but in mixed order.
- This allows you to alternate them between adjacent neighbours to deter cheating.


Version A

Version B

NAME: \_\_\_\_\_ DATE: \_\_\_\_\_ MARK: \_\_\_\_/25

### BRAIN QUIZ (Ver.A)

1. Label the parts of the brain. (12 marks)




2. Match each statement with the most correct term. Note: Each term may be used once, more than once or not at all. (12 marks)

___ a) This part of the brain is responsible for the production of speech.	A) brain stem
___ b) This produces melatonin.	B) brain's area
___ c) The nerve tract connecting the two hemispheres.	C) cerebellum
___ d) The part of the brain responsible for thinking and problem solving.	D) cerebral cortex
___ e) This controls posture and balance.	E) cerebellum
___ f) This master gland creates growth hormone.	F) pineal gland
___ g) These chambers are filled with cerebrospinal fluid.	G) corpus callosum
___ h) This is the "blood brain barrier".	H) frontal lobe
___ i) This creates many hormones that control the production of other hormones.	I) hypothalamus
___ j) This is formed by the crossing of the optic nerves.	J) medulla oblongata
___ k) The largest part of the brain.	K) meninges
___ l) This helps to regulate breathing, heart rate, swallowing and sneezing.	L) midbrain
___ m) This is responsible for the detection of touch and the position of the body in space (proprioception).	M) occipital lobe
	N) optic chiasm
	O) parietal lobe
	P) primary motor cortex
	Q) sensory cortex
	R) thalamus
	S) ventricles
	T) Wernicke's area

NAME: \_\_\_\_\_ DATE: \_\_\_\_\_ MARK: \_\_\_\_/25

### BRAIN QUIZ (Ver.B)

1. Label the parts of the brain. (12 marks)



2. Match each statement with the most correct term. Note: Each term may be used once, more than once or not at all. (12 marks)

___ a) This part of the brain is responsible for the production of speech.	A) Wernicke's area
___ b) This produces melatonin.	B) ventricles
___ c) The nerve tract connecting the two hemispheres.	C) thalamus
___ d) The part of the brain responsible for thinking and problem solving.	D) temporal lobe
___ e) This controls posture and balance.	E) primary somatosensory cortex
___ f) This master gland creates growth hormone.	F) primary motor cortex
___ g) These chambers are filled with cerebrospinal fluid.	G) pons
___ h) This is the "blood brain barrier".	H) pituitary
___ i) This creates many hormones that control the production of other hormones.	I) pineal gland
___ j) This is formed by the crossing of the optic nerves.	J) parietal lobe
___ k) The largest part of the brain.	K) optic chiasm
___ l) This helps to regulate breathing, heart rate, swallowing and sneezing.	L) occipital lobe
___ m) This is responsible for the detection of touch and the position of the body in space (proprioception).	M) midbrain
	N) meninges
	O) medulla oblongata
	P) hypothalamus
	Q) frontal lobe
	R) corpus callosum
	S) cerebellum
	T) sensory cortex
	U) central cortex
	V) cerebellum
	W) brain's area
	X) brain stem

### IT'S EDITABLE

- Allows you to customize, add or delete questions.

### EASY PRINTING

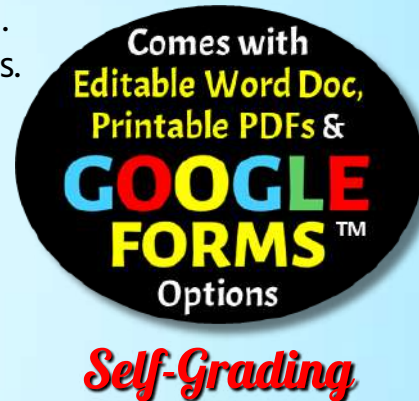
- Single page quiz saves on printing, time and money.

### 25 MARKS, STRAIGHTFORWARD QUESTIONS

- 12 marks labelling a diagram.
- 13 marks matching questions.

### DIAGRAM

- I drew the diagram myself in Adobe Illustrator so that it would be clear and accurate.




### ANSWER KEY • Makes marking quick and easy.

ANSWER KEY

### BRAIN QUIZ (Ver.A)

1. Label the parts of the brain. (12 marks)



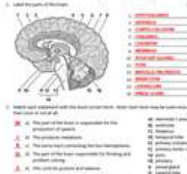
2. Match each statement with the most correct term. Note: Each term may be used once, more than once or not at all. (12 marks)

1. This part of the brain is responsible for the production of speech.	Wernicke's area
2. This produces melatonin.	hypothalamus
3. The nerve tract connecting the two hemispheres.	corpus callosum
4. The part of the brain responsible for thinking and problem solving.	cerebral cortex
5. This controls posture and balance.	cerebellum
6. This master gland creates growth hormone.	pituitary
7. These chambers are filled with cerebrospinal fluid.	ventricles
8. This is the "blood brain barrier".	endothelial cells
9. This creates many hormones that control the production of other hormones.	hypothalamus
10. This is formed by the crossing of the optic nerves.	optic chiasm
11. The largest part of the brain.	cerebrum
12. This helps to regulate breathing, heart rate, swallowing and sneezing.	brain stem
13. This is responsible for the detection of touch and the position of the body in space (proprioception).	somatosensory cortex

ANSWER KEY

### BRAIN QUIZ (Ver.B)

1. Label the parts of the brain. (12 marks)



2. Match each statement with the most correct term. Note: Each term may be used once, more than once or not at all. (12 marks)

1. This part of the brain is responsible for the production of speech.	Wernicke's area
2. This produces melatonin.	hypothalamus
3. The nerve tract connecting the two hemispheres.	corpus callosum
4. The part of the brain responsible for thinking and problem solving.	cerebral cortex
5. This controls posture and balance.	cerebellum
6. This master gland creates growth hormone.	pituitary
7. These chambers are filled with cerebrospinal fluid.	ventricles
8. This is the "blood brain barrier".	endothelial cells
9. This creates many hormones that control the production of other hormones.	hypothalamus
10. This is formed by the crossing of the optic nerves.	optic chiasm
11. The largest part of the brain.	cerebrum
12. This helps to regulate breathing, heart rate, swallowing and sneezing.	brain stem
13. This is responsible for the detection of touch and the position of the body in space (proprioception).	somatosensory cortex



## RESOURCE 7: TEACHING THE TOPIC - Big Neuron & Synapse Foldable (3 Pages)

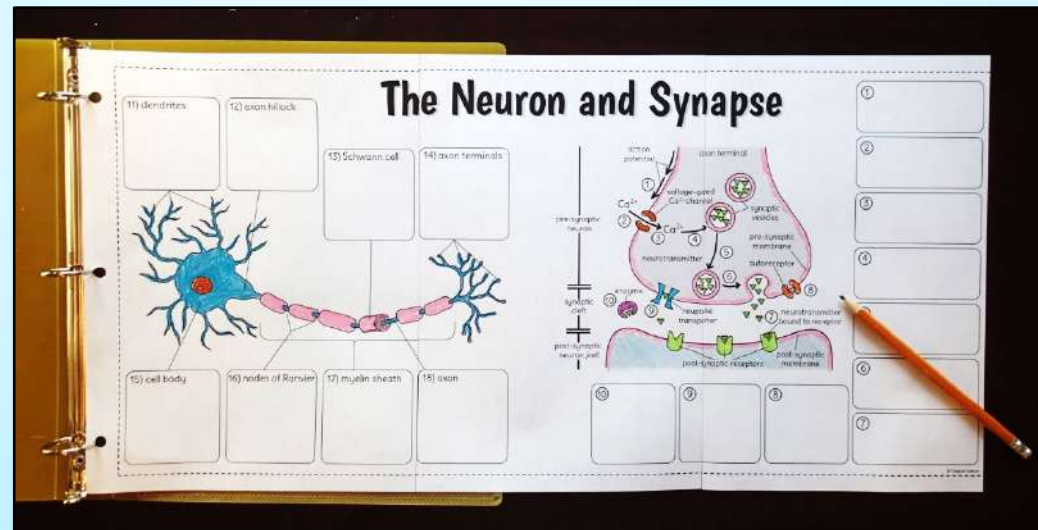
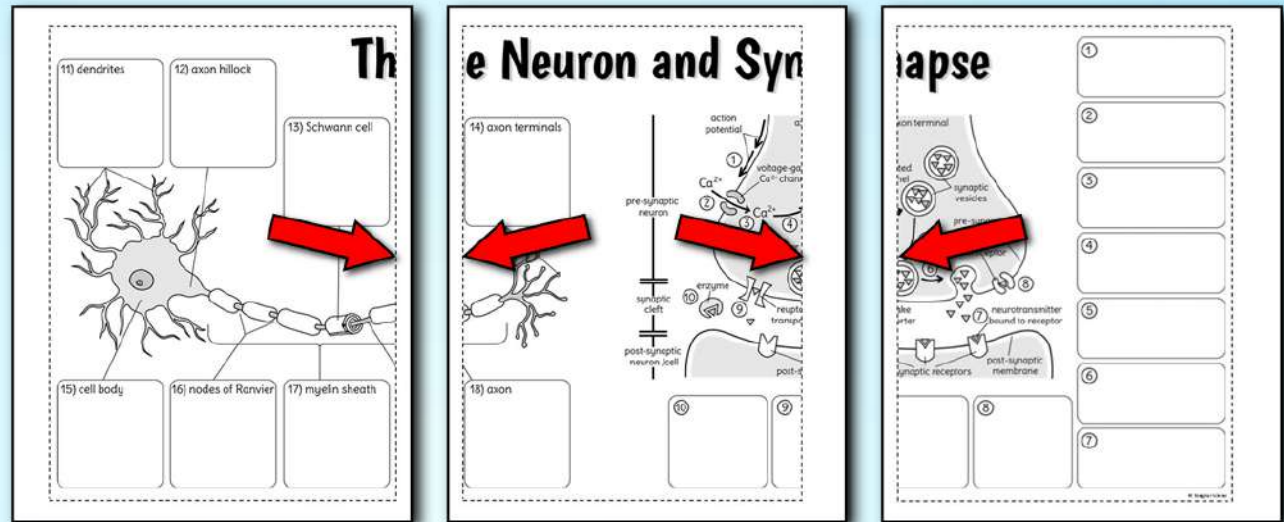
3 pages **cut out** and **taped** together.

then...

Put in a **Binder**.

OR

Put in an **INB**.

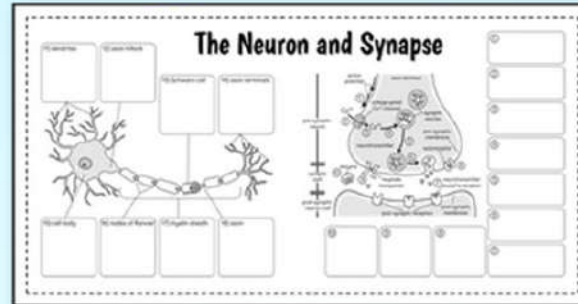


**Printable  
PDFs**

## RESOURCE 7: TEACHING THE TOPIC - Big Neuron & Synapse Foldable (3 Pages)

There are many **foldable options** for differentiation and **full answer keys** are provided for all options.

Image, Boxes and Labels



Image, Boxes and Underlines

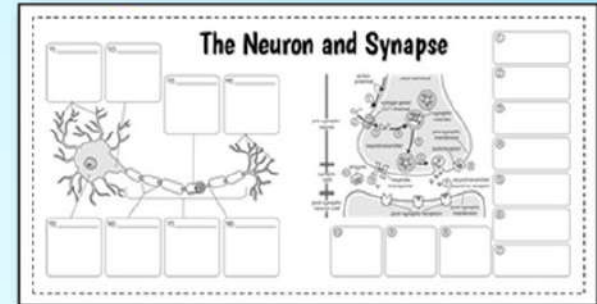


Image and Boxes

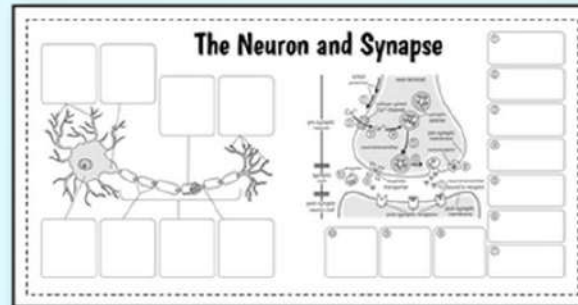


Image and Numbers

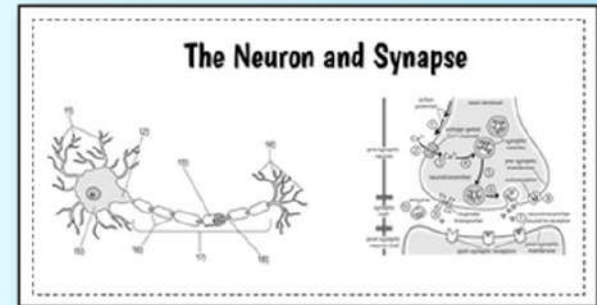
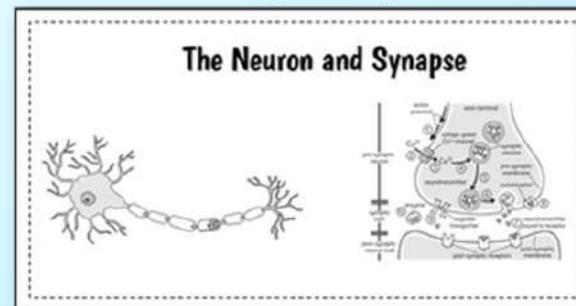


Image Only



### EXAMPLE OF ONE OF THE ACTIVITIES

### THE NEURON

**DRAW & DROP THE LABELS AND FILL IN THE DESCRIPTIONS**

**INSTRUCTIONS:** Drag and drop the labels into the yellow boxes and under these fill in the descriptions of the functions of the structures.

1. [ ] 2. [ ] 3. [ ] 4. [ ] 5. [ ] 6. [ ] 7. [ ] 8. [ ]

Axon  
Axon Terminals  
Dendrites  
Nodes of Ranvier  
Schwann Cell  
Cell Body  
Axon Hillock  
Myelin Sheath

#### TASK 1:

Drag & drop the labels of the structures onto the yellow numbered boxes on the diagram.

#### TASK 2:

Fill in the descriptions of the functions of the structures by typing them into the blue boxes on the diagram.

### CONCEPTS

- Cell Body
- Dendrites
- Axon Hillock
- Axon
- Schwann Cell
- Myelin Sheath
- Nodes of Ranvier
- Axon Terminals

### ANSWER KEY

### THE NEURON ANSWER KEY

**FILL IN THE LABELS AND DESCRIPTIONS**

**INSTRUCTIONS:** Fill in the labels and the descriptions of the functions of the structures into the correct boxes of the diagram.

1. Dendrites 2. Axon Hillock 3. Schwann Cell 4. Axon Terminals  
5. Cell Body 6. Nodes of Ranvier 7. Myelin Sheath 8. Axon



## RESOURCE 8: INTERACTIVE DISTANCE LEARNING – Neuron & Synapse Google Slides Activities

### What is this Resource?

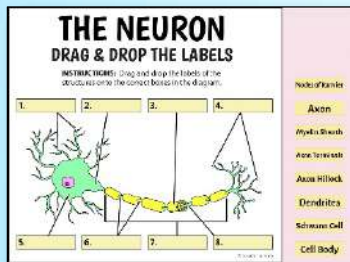
This resource asks students to identify the structures of the neuron on a diagram as well determine the functions of these structures. This is done using **EIGHT** different interactive activities in Google Slides.

Having these options is great for differentiation in your classroom. As well, multiple activities can be used by each student to help them develop, review and deepen their understanding.

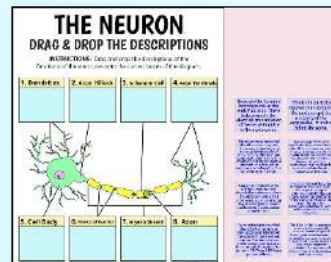
### The Eight Activity Options Available

Great for distance learning and paperless classrooms.

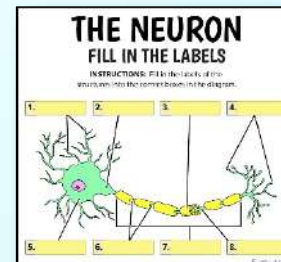
#### 1 Drag & Drop Labels



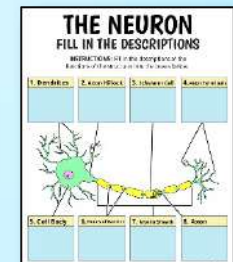
#### 2 Drag & Drop Descriptions



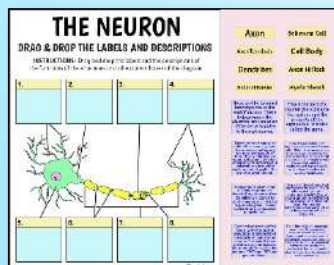
#### 3 Type in Labels



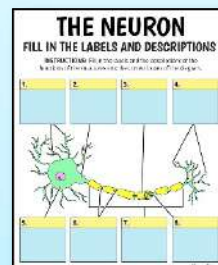
#### 4 Type in Descriptions



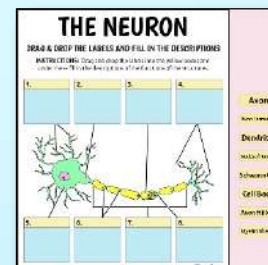
#### 5 Drag & Drop Both Labels & Descriptions



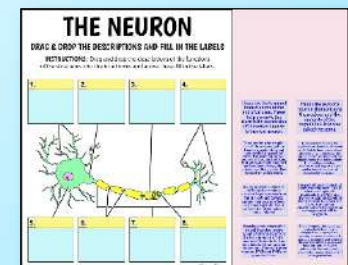
#### 6 Type in Both Labels & Descriptions



#### 7 Drag & Drop Labels & Type in Descriptions



#### 8 Type in Labels & Drag & Drop Descriptions



## RESOURCE 8: INTERACTIVE DISTANCE LEARNING – Neuron & Synapse Google Slides Activities

### EXAMPLE OF ONE OF THE ACTIVITIES

## THE SYNAPSE

### DRAG & DROP THE DESCRIPTIONS

**INSTRUCTIONS:** Drag and drop the descriptions the stages of synaptic transmission onto the correct boxes on the diagram.

©Tangstar Science

**1**

In some pre-synaptic neurons, autoreceptors are present. Autoreceptors bind to the neurotransmitters to provide a feedback loop that regulates the amount of neurotransmitter that is released. The more the autoreceptors bind, the less neurotransmitters are released.

**2**

The action potential arrives at the axon terminal and depolarizes the pre-synaptic membrane.

**3**

Neurotransmitters are released into the synaptic cleft through exocytosis.

**4**

The action potential triggers voltage-gated  $Ca^{2+}$  channels to open on the pre-synaptic membrane.

**5**

Neurotransmitters diffuse across the cleft and bind to receptors (e.g. acetylcholine receptors) on the post-synaptic membrane. This can excite (acetylcholine excites) or inhibit the post-synaptic membrane by generating excitatory post-synaptic potentials (EPSPs) or inhibitory post-synaptic potentials (IPSPs) respectively.

**6**

Synaptic vesicles containing neurotransmitters (e.g. acetylcholine) migrate to and fuse with the pre-synaptic membrane.

**7**

Transporter proteins on the pre-synaptic membrane help with the reuptake of neurotransmitters from the cleft back into the pre-synaptic neuron. This helps to reverse the effects of the neurotransmitter.

**8**

The presence of  $Ca^{2+}$  within the pre-synaptic neuron activates synaptic vesicles.

**9**

Enzymes (e.g. acetylcholinesterase) in the synaptic cleft break down the neurotransmitters to reverse their effects. The products of this breakdown (e.g. acetate and choline) are reabsorbed back into the pre-synaptic neuron to get reformed.

**10**

$Ca^{2+}$  enters the pre-synaptic neuron.

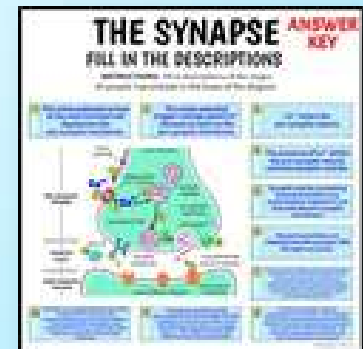
### TASK:

Drag & Drop the descriptions of the steps of synaptic transmission into the correct boxes of the diagram.

### CONCEPTS

- Synapse
- Synaptic cleft
- Presynaptic neuron
- Postsynaptic neuron
- Neurotransmitter (e.g. acetylcholine)
- Voltage-gated  $Ca^{2+}$  channel
- Calcium
- Synaptic vesicles
- Reuptake transporter
- Enzyme (e.g. acetylcholinesterase)
- Autoreceptor (for feedback control)

### ANSWER KEY



## RESOURCE 8: INTERACTIVE DISTANCE LEARNING – Neuron & Synapse Google Slides Activities

### What is this Resource?

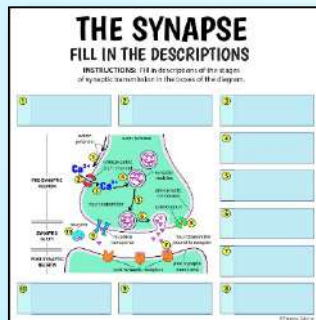
This resource asks students to understand and identify the sequence of events that occur during synaptic transmission. There are two options that contain numbered steps. The first is a fillable text option that is best suited toward

teacher instruction. The second option is a drag and drop activity that students can use to reinforce what they've just learned.

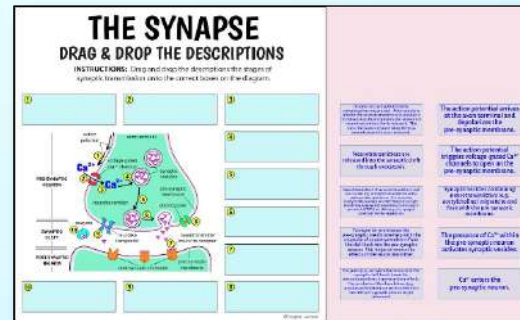
Great for distance learning  
and paperless classrooms.

### The Two Activity Options Available

#### 1 Type in Descriptions



#### 2 Drag & Drop Descriptions





## RESOURCE 9: INDIVIDUAL REVIEW - Synapse Review Worksheet / Test Prep (1 Page)

Zoom  
in to Read

### SYNAPSE

Name: \_\_\_\_\_

#### TASK 1: Fill in the Blanks

- The \_\_\_\_\_ neuron contains receptors for neurotransmitters.
- \_\_\_\_\_ are released from synaptic vesicles.
- The firing of \_\_\_\_\_ along the pre-synaptic membrane triggers the influx of calcium.
- \_\_\_\_\_ are found at the end of an axon.

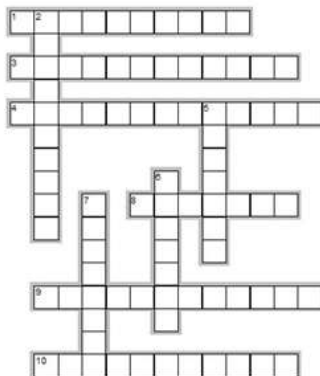
#### TASK 2: Diagram Analysis

Label the parts of the diagram.



- |         |         |
|---------|---------|
| A _____ | F _____ |
| B _____ | G _____ |
| C _____ | H _____ |
| D _____ | I _____ |
| E _____ |         |

#### TASK 3: Crossword



##### ACROSS

- Action potentials \_\_\_\_\_ the presynaptic membrane causing the activation of the voltage-gated calcium channels.
- \_\_\_\_\_ calcium channels allow for the influx of calcium.
- The gap between the presynaptic and postsynaptic neurons.
- Excessive neurotransmitters in the synaptic cleft \_\_\_\_\_ the release of any more neurotransmitters.
- Located on the presynaptic neuron, this binds to the neurotransmitters to provide information about how many neurotransmitters are present in the cleft.
- This neuron is the one that releases the neurotransmitters.

##### DOWN

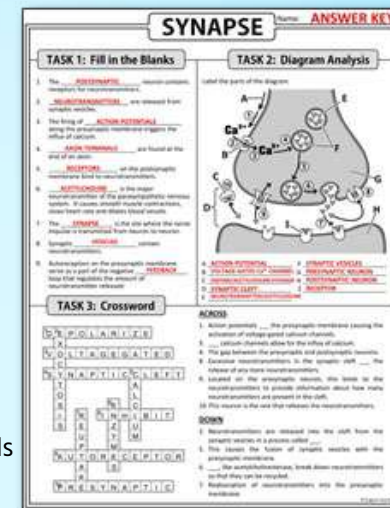
- Neurotransmitters are released into the cleft from the synaptic vesicles present in the \_\_\_\_\_.
- The \_\_\_\_\_ is the factor of synaptic vesicles with the neurotransmitters.
- \_\_\_\_\_ the neurotransmitters, bind them neurotransmitters in the synaptic cleft.
- Reuptake of neurotransmitters into the presynaptic neuron.

©Tangstar Science

## CONCEPTS

- Synapse
- Presynaptic Neuron
- Postsynaptic Neuron
- Receptors
- Synaptic Cleft
- Axon Terminals
- Neurotransmitters
- Synaptic Vesicles
- Exocytosis
- Action potentials
- Depolarize
- Voltage-Gated Calcium Channels
- Calcium Ions
- Acetylcholine
- Enzymes
- Acetylcholine Esterase
- Autoreceptors
- Negative Feedback
- Inhibition
- Reuptake

## ANSWER KEY



## 3 TASKS

- Assign the whole page, or break it up into in class tasks, exit tickets and homework tasks.
- The variety of different tasks helps students review in different ways and holds their interest.

Comes with  
Editable PPT,  
Printable PDFs &  
**GOOGLE  
SLIDES™**  
Options

## RESOURCE 9: INDIVIDUAL REVIEW - Synapse Review Worksheet / Test Prep (1 Page)

### DIGITAL VERSION IN GOOGLE SLIDES

**Great for Distance Learning and a Paperless Classroom.**

- Students type their answers in the **light blue text boxes** on the Google Slide. This can either be printed out at home (on 8.5"x11" letter-sized paper) for their own notes or digitally submitted to the teacher for proof of completion or for marks.

## SYNAPSE

Name: \_\_\_\_\_

### TASK 1: Fill in the Blanks

- The \_\_\_\_\_ neuron contains receptors for neurotransmitters.
- \_\_\_\_\_ are released from synaptic vesicles.
- The firing of \_\_\_\_\_ along the presynaptic membrane triggers the influx of calcium.
- \_\_\_\_\_ are found at the end of an axon.
- \_\_\_\_\_ is the postsynaptic membrane that receives neurotransmitters.
- \_\_\_\_\_ is the gap between the presynaptic and postsynaptic neurons. It contains small fluid-filled sacs called synaptic vesicles and voltage-gated channels.
- The \_\_\_\_\_ is the site where the nerve impulse is transmitted from neuron to neuron.
- Synapses \_\_\_\_\_ certain neurotransmitters.
- Reuptake on the presynaptic membrane serves as a part of the negative \_\_\_\_\_ loop that regulates the amount of neurotransmitter released.

### TASK 2: Diagram Analysis

Label the parts of the diagram.

A \_\_\_\_\_

B \_\_\_\_\_

C \_\_\_\_\_

D \_\_\_\_\_

E \_\_\_\_\_

F \_\_\_\_\_

G \_\_\_\_\_

H \_\_\_\_\_

I \_\_\_\_\_

### TASK 3: Crossword

#### ACROSS

- Action potentials \_\_\_\_\_ the presynaptic membrane causing the activation of voltage-gated calcium channels.
- \_\_\_\_\_ calcium channels allow for the influx of calcium.
- The gap between the presynaptic and postsynaptic neurons.
- Excessive neurotransmitters in the synaptic cleft \_\_\_\_\_ the release of any more neurotransmitters.
- Located on the presynaptic neuron, this binds to the neurotransmitters to provide information about how many neurotransmitters are present in the cleft.
- This neuron is the one that releases the neurotransmitters.

#### DOWN

- Neurotransmitters are released into the cleft from the synaptic vesicles in a process called \_\_\_\_\_.
- This causes the fusion of synaptic vesicles with the presynaptic membrane.
- \_\_\_\_\_ the postsynaptic neuron, bind that neurotransmitters so that they can be recycled.
- Reuptake of neurotransmitters into the presynaptic membrane.

## RESOURCE 10: EXTRA REINFORCEMENT – Neuron & Spinal Cord Diagram Crossword (1 Page)

### FULLY EDITABLE WORD DOC INCLUDED

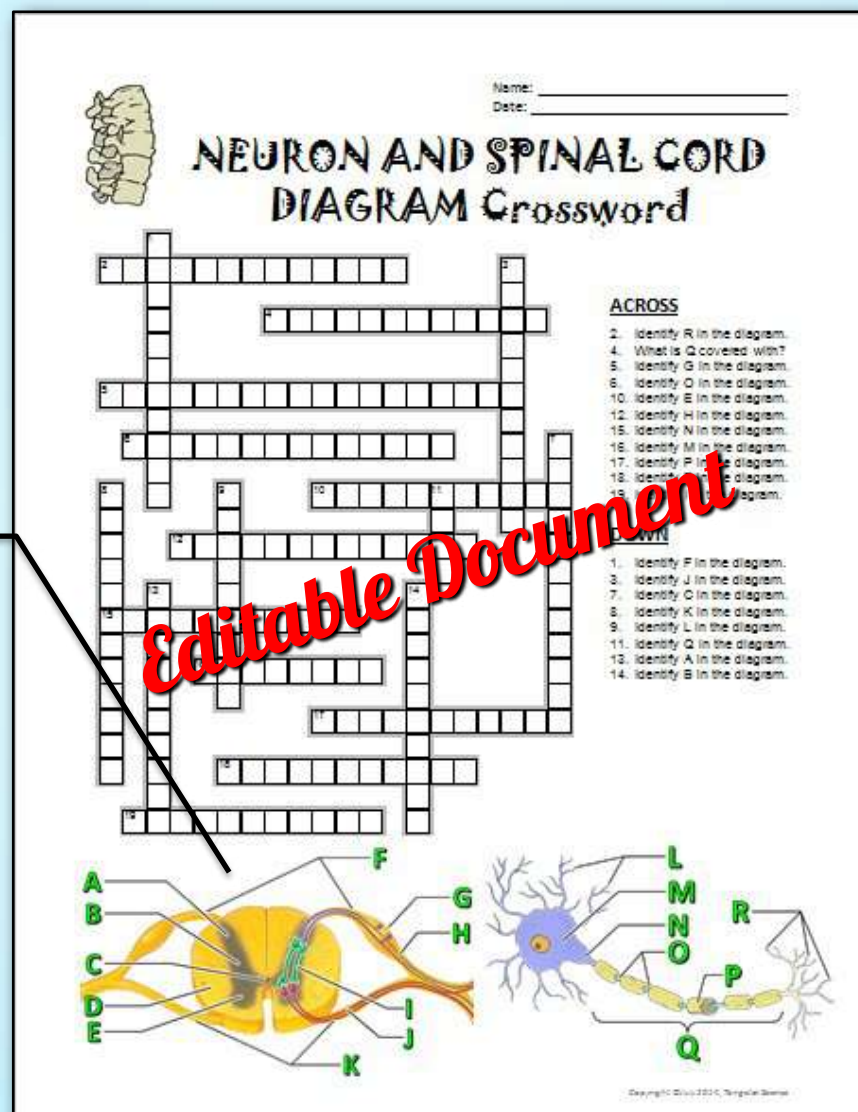
- Reword questions according to your classroom needs.

### ONE PAGE

- For easy and economical printing.

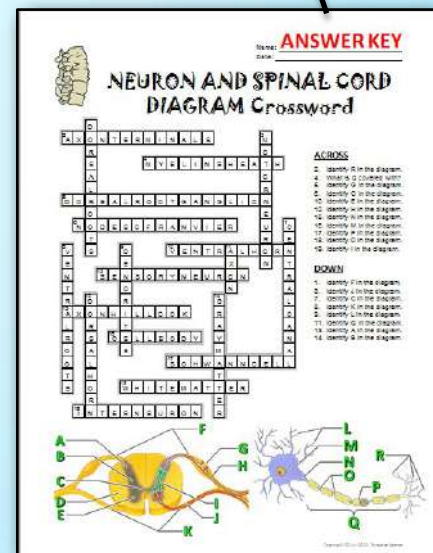
### CLEAR DIAGRAMS

- Helps students practice labeling biological diagrams. Diagram crosswords are a fun twist on the usual labeling worksheet.
- **BONUS ACTIVITY:** After completing the crossword, have students cut out the diagrams, paste them in their notes and then label the structures for extra reinforcement.



### FULL ANSWER KEY

- Easy for you or your students to take up the answers.

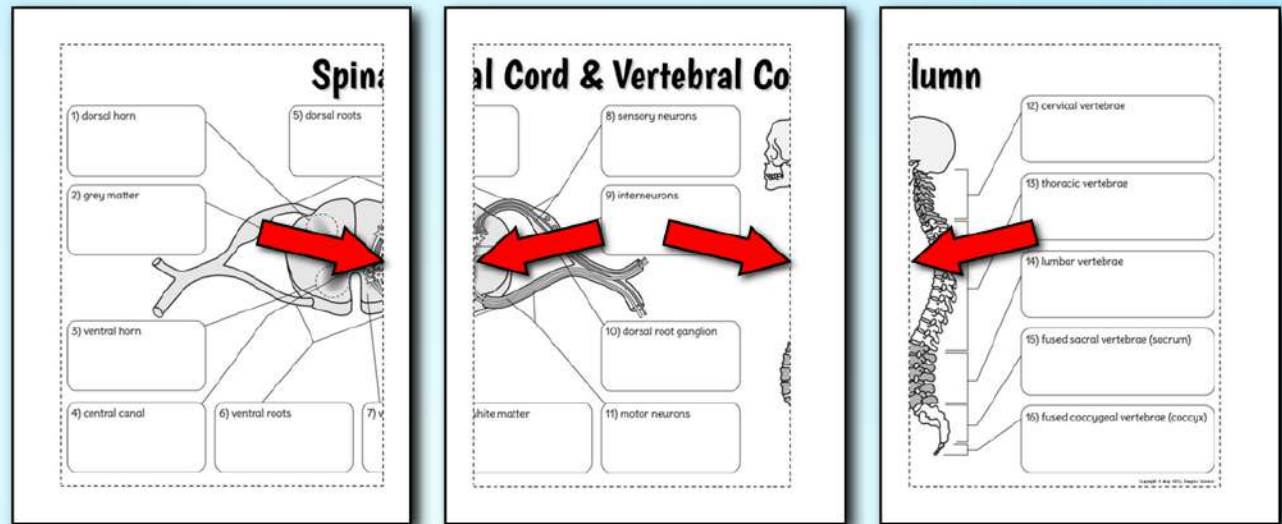




# OTHER NERVOUS SYSTEM RESOURCES YOU MIGHT LIKE by Tangstar Science

## RESOURCE 11: TEACHING THE TOPIC - Big Spinal Cord & Vertebral Column Foldable (3 Pages)

3 pages **cut out** and **taped** together.

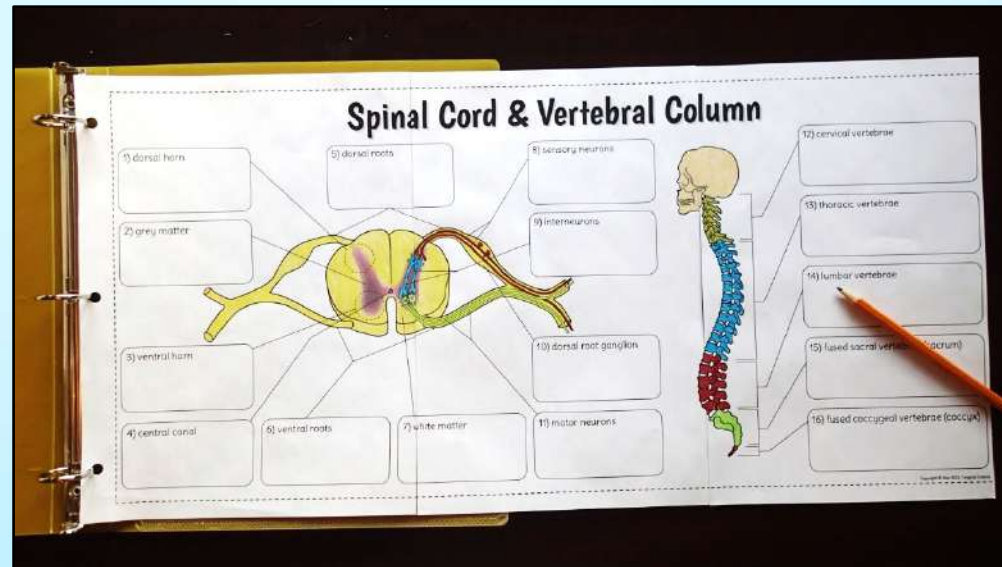


then...

Put in a **Binder**.

OR

Put in an **INB**.

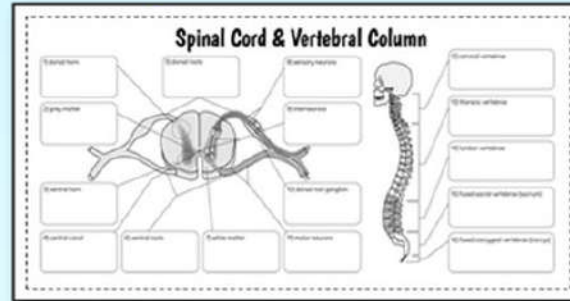


**Printable  
PDFs**

## RESOURCE 11: TEACHING THE TOPIC - Big Spinal Cord & Vertebral Column Foldable (3 Pages)

There are many **foldable options** for differentiation and **full answer keys** are provided for all options.

Image, Boxes and Labels



Image, Boxes and Underlines

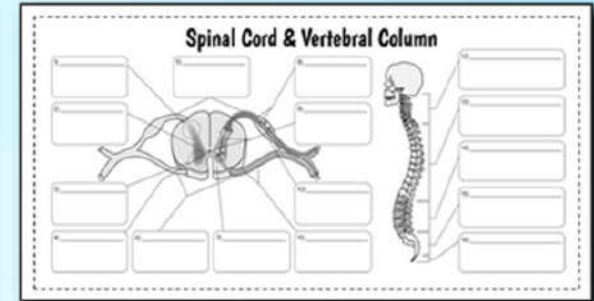


Image and Boxes

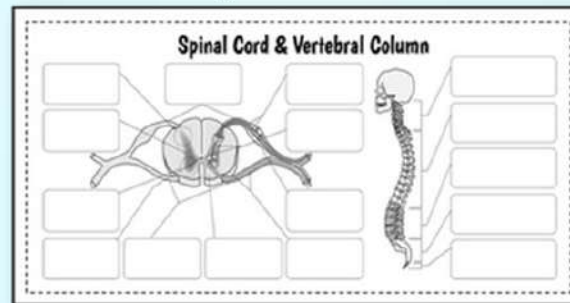


Image and Numbers

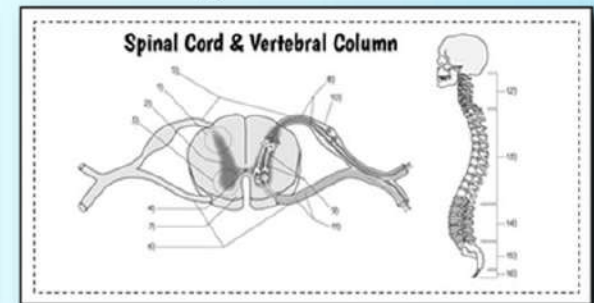
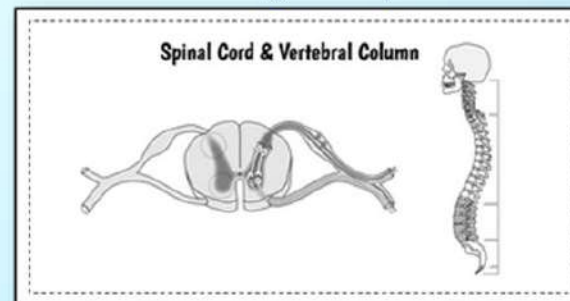


Image Only



## RESOURCE 12: ARTICLE/SCIENCE LITERACY - "Lobotomies, Who Needs That Brain?" (2 Pages)

Zoom  
in to Read

### LOBOTOMIES: WHO NEEDS ALL THAT BRAIN?

27

neuroscience ♦ anatomy and physiology

(1) These days people with mental illnesses like schizophrenia, depression, mania and anxiety are treated with medication and psychotherapies focusing on retraining the mind. Though these types of treatments seem common, it wasn't until the mid-1950s that psychoactive drugs (drugs that act on the brain) became commonly used to treat mental illnesses. Before this, many treatments for mental illnesses were often brutal and ineffective.

(2) One such treatment was the lobotomy. A lobotomy is a surgery which cuts the connection between one area of the brain and another so that they cannot communicate with each other. Lobotomies are performed on the front of the brain called the prefrontal cortex. This procedure was thought to remove disruptive and violent actions and thoughts in patients, and often it did, but at a severe cost.

(3) The prefrontal cortex is the area of the brain that performs higher level thinking. It is responsible for decision making, planning, problem solving, inhibiting inappropriate behaviors and it is also the source of our personality. Prefrontal lobotomies often left patients calmer and less aggressive, but for many, it also cost them their intelligence and personality. Many lost the ability to make decisions, communicate and control their motor functions. Some patients even died.

(4) In 1888, Gottlieb Burckhardt performed the first modern psychosurgery, which is a surgery intended to alter mental functioning. He



brain. The brain is made up of gray and white matter. The gray matter is composed of brain cells while the white matter is composed of the axons that connect brain cells to one another to allow for communication between brain cells. Moniz thought that destroying the white matter in the prefrontal area would prevent many of the symptoms of mental illnesses.

(6) Initially, Moniz's leucotomy involved drilling holes into the skull and injecting the brain with ethanol to destroy the white matter in the prefrontal area, but it ended up damaging other parts of the brain. Moniz then designed an instrument he called a leucotome which had a metal loop which could be inserted into the white matter and moved around to physically destroy the tissue. Moniz was awarded a Nobel Prize in Physiology and Medicine in 1949 for developing this technique. Decades later, patients of lobotomy and their families began campaigning to remove the award from Moniz.

(7) In 1936, an American psychiatrist named Walter Freeman, with the help of a

Science Literacy Warm Up

#### LOBOTOMIES: WHO NEEDS ALL THAT BRAIN?



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## RESOURCE 13: ARTICLE/SCIENCE LITERACY - “Concussions in Sports” (2 Pages)

**Zoom  
in to Read**

## 52

♦ nervous system ♦ sports medicine

(1) These days sports concussions are getting more attention as there are up to 4 million cases of concussions reported due to recreational, amateur and professional sports in North America each year. A concussion isn't just a simple bump to the head. It can be a very serious injury, especially when experienced repeatedly as in the case of professional sports like football and boxing.

(2) A concussion is an injury to the brain which can result in bruising of the brain tissue, damage to the brain's blood vessels and injury to its nerves. The term concussion comes from the Latin term *concussus*, meaning the "action of striking together". Concussions occur when a player takes a blow to the head by contacting another player, by being hit by equipment or when hitting the ground. A concussion can also occur due to a blow to the body that causes the head to rapidly snap forward. When a concussion happens, it means that the force to the head was great enough to bypass the two main protective features of the brain.

(3) The brain is a 3 lb organ made up of soft and vulnerable tissues. The brain has two forms of protection against physical damage. One is the cranium, which is the curved top part of the skull (not including the jaw bone), which encases the brain. The other protection involves the thin layer of fluid, called cerebral spinal fluid (CSF), that surrounds the brain and is found between the surface of the brain and the cranium. Essentially, the brain is gently "floating" in a liquid within your skull. When you turn, nod or shake your head, your brain would hit the inside of your cranium if you



accelerates very rapidly and slams into the brain. The thin layer of CSF can't provide enough shock absorption in this case. Contrecoup injuries occur at the side opposite the point of impact. These typically occur when a moving head slams into a stationary object, like the ground. In this scenario, the brain slams into the inside of the skull when the skull decelerates upon impact. A combination of both a coup and contrecoup injury can also occur simultaneously if the brain is first injured at the site of impact, causing a coup injury, and then whiplashes to the opposite side of the skull, causing a contrecoup injury. A concussion with a contrecoup injury component is often more dangerous because they are difficult to diagnose since it isn't obvious that the head has been hurt opposite to the site of impact.

(5) The immediate and short-term symptoms of a concussion can include any combination of the following: headache, nausea, vomiting, confusion, slurred speech and trouble walking. About a quarter of people with concussions also report delayed and chronic symptoms that

## CONCUSSIONS IN SPORTS

[illegible]

## CONCUSSIONS IN SPORTS

It is the very essence of *da'wah* that the Imam can only be guided from the Ummah's consensus.

**BS:** The tangential comparisons of multiple comparisons are most easily seen in facing the fact that the Imam is not a person with a disorder (barring it will get worse with time) called chronic idiopathic neurodegeneration (CIN) (as called from a cancer field with thousands of cases) it can lead to irreparable brain damage and alcohol abuse, depression and in some cases, suicide as in early days. The only way to be sure with certainty is someone suffers from CIN is to be the president of the American Psychiatric Association (APA) and it is difficult to diagnose in just a person's life, who, if

### Article Questions

- 2) What are the most main things that protect our brain from physical damage?
- 3) When a boxer is hit by a hard hit a boxing hat, what types of concussion happen due to this case? Explain how the brain is injured in this situation.
- 4) When an athlete has a hard fall to the head in a game, but shows no signs of a concussion, why might this be a dangerous situation?
- 5) What are some of the long term symptoms of a concussion?
- 6) What is CTG and how do athletes get this type of injury?
- 7) Why do you think Jason Belcher's family spent his time mentioned after his death?
- 8) If a football player has a career that results in CTE, who do you think is responsible and why?

Science Literacy Warm

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