DISCOVER YOUR ALPHABETICAL BRAIN

Learn How the the New Brain Science Explains Consciousness, Free Will, Happiness, and Success based upon Evolutionary Humanism

Dennis Martin

Infinite Interactive Ideas

LIST OF 15 MAJOR INTERACTIVE BRAIN IDEAS

1 - WORKING MEMORY
2 - NEURONS
3 - DENDRITES
4 - AXONS
5 - NUCLEUS OF A NEURON
6 - GLIAL CELLS
7 - SYNAPSES
8 - POTENTIATION
9 - CONNECTOME
10 - PLASTICITY
11 - CEREBRAL CORTEX
12 - PREFRONTAL CORTEX
13 - LIMBIC SYSTEM
14 - PLEASURE CIRCUIT
15 - LONG-TERM MEMORY

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Happy New Year 2018

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All references to other books and journals in support of the facts and assumptions that scientifically validate the relevance of the 15 brain ideas are provided at the website:

www.alphabeticalbrain.com

INTRODUCTION: DISCOVER YOUR ALPHABETICAL BRAIN™

The purpose of this handbook is to explain how your creative imagination and your ability to reason taken together make possible your ability to understand how your brain works. Since your brain makes possible your ***conscious self-awareness,*** it is worth your focused time and attention. By learning 15 specific brain ideas and their interactions, you will gain new knowledge that can help you thrive in the future.

It is assumed at the beginning that you can control your ***conscious self-awareness*** by learning the 15 brain ideas, which are called the **Alphabetical Brain™ Vocabulary.** The 15 brain ideas can provide you with the best way to study your brain. All 15 basic brain ideas are necessary since scientists have discovered that the human brain is the ***most complex*** three pounds of matter in the universe, even compared to the vast cosmic scale of the universe. There are ***more billions*** of parts and mental functions inside your brain than there are parts and physical properties in the universe.

However, learning about the 15 brain ideas can be quicker and more fun than you might expect.

The ***new brain facts and ideas*** can help you establish ***what is real*** and ***what is fake*** about the abundant choices you must make in our advanced digitized global high-tech civilization. By knowing what your brain can do for you, you will be able to ***save time*** and ***focus your attention*** on creating your own

organized personal planning projects to achieve your most fulfilling goals.

SUMMARY OF CLASSIC BRAIN SRUCTURES

The following diagrams show major brain structures that have been know for more than a century. However, their interactive relationships --- how each section impacts every other section --- has not been fully understood until the past few years. Brain scientists know that each major section of a human brain provides specific kinds of influences on your conscious self-awareness or perception of yourself.

There is perpetual competition among the many major parts of your brain that puts persistent consciousness and self-awareness. However, you can control the amount of influence of each part by learning how to manage the mental forces by your choices and habits.

The major parts or sections of your brain are illustrated in the following diagrams in a way that can help you remember them best in the context of their direct interconnections. First, you will see six brain images of the left side of your brain known as your Left Hemisphere. Then, you will see six brain images of the right side of your brain known as your Right Hemisphere.

These areas or sections of your brain are all separated by membranes and are all connected by ***neuronal pathways*** that form a huge network or wiring system that that flows in two ways: sensory information that flows into your brain and motor information that flows out of your brain and throughout your body.

Many scientific studies have demonstrated that you can optimize the ***functions of your mind*** by taking care of the physical parts of your brain. By knowing the way your brain works, you will be able to control your brain functions. The way you will save time is by avoiding useless social behaviors and stopping dangerous addictive habits before they do irreparable damage to your brain's physical structures.

In addition, you can use the new brain knowledge to learn more about how to use ***critical thinking skills*** and ***strategic reading strategies,*** which are built into the structure of this handbook and the accompanying free website, alphabeticalbrain.com/, for your convenience. Furthermore, by managing your memories and broadening your imagination by learning new mindful ***brain-awareness skills*** that can strengthen your ***self-identity.***

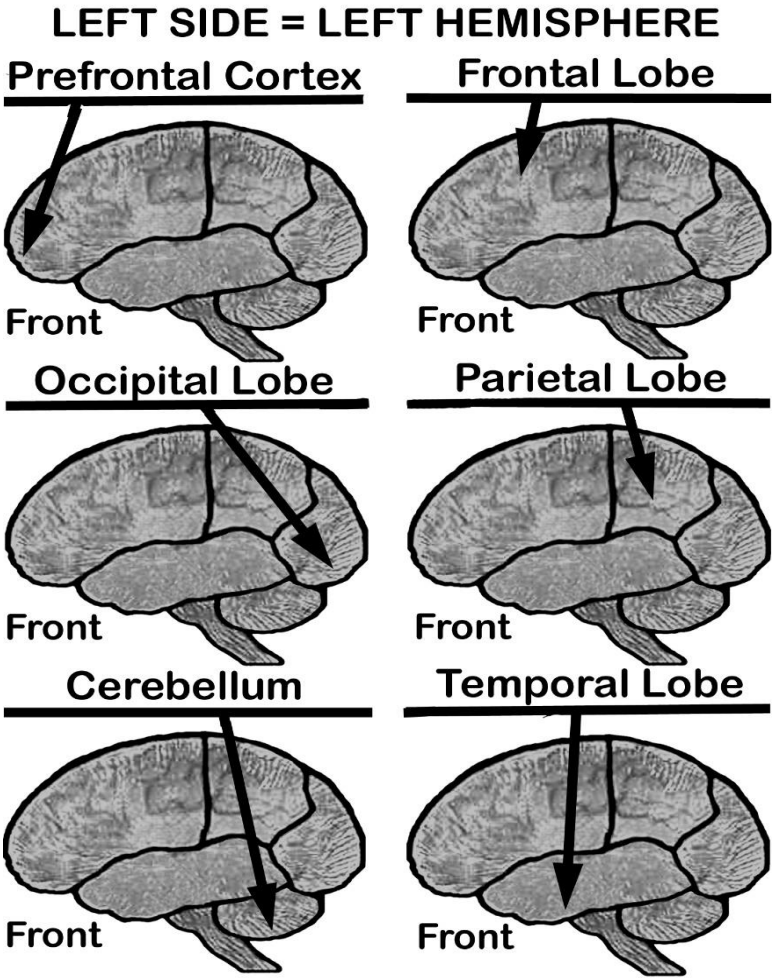
CLASSIC BRAIN STRUCTURES AND FUNCTIONS

What are the major structures of your brain that everybody learns in primary and secondary school?

You can quickly review the six functional parts of both sides your brain and your brainstem that are depicted in the following six diagrams as a foundation for understanding the 15 new brain ideas that only a few people understand. This core brain knowledge will provide the rational foundation for your future growth as an enlightened altruistic humanistic thinking person who can control your own emotions and influence others to think well and do good in the 21st century.

The scientific linguistic context of this website starts here. The first set of six brain pictures with names in Diagram #1 represent the left side of your brain, which is called your Left Hemisphere. Each of these sections of your brain has a different major function dependent upon its structural place in your brain.

DIAGRAM #1


LEFT SIDE = LEFT HEMISPHERE
Prefrontal Cortex
Front
Frontal Lobe
Front
Occipital Lobe
Front
Parietal Lobe
Front
Cerebellum
Front
Temporal Lobe
Front

Now think about the names of the six major structures of your brain that are depicted and named in Diagram #1. Now write the names (or think of the names for each section) on the blank lines above the six brains in Diagram #2.

DIAGRAM #2

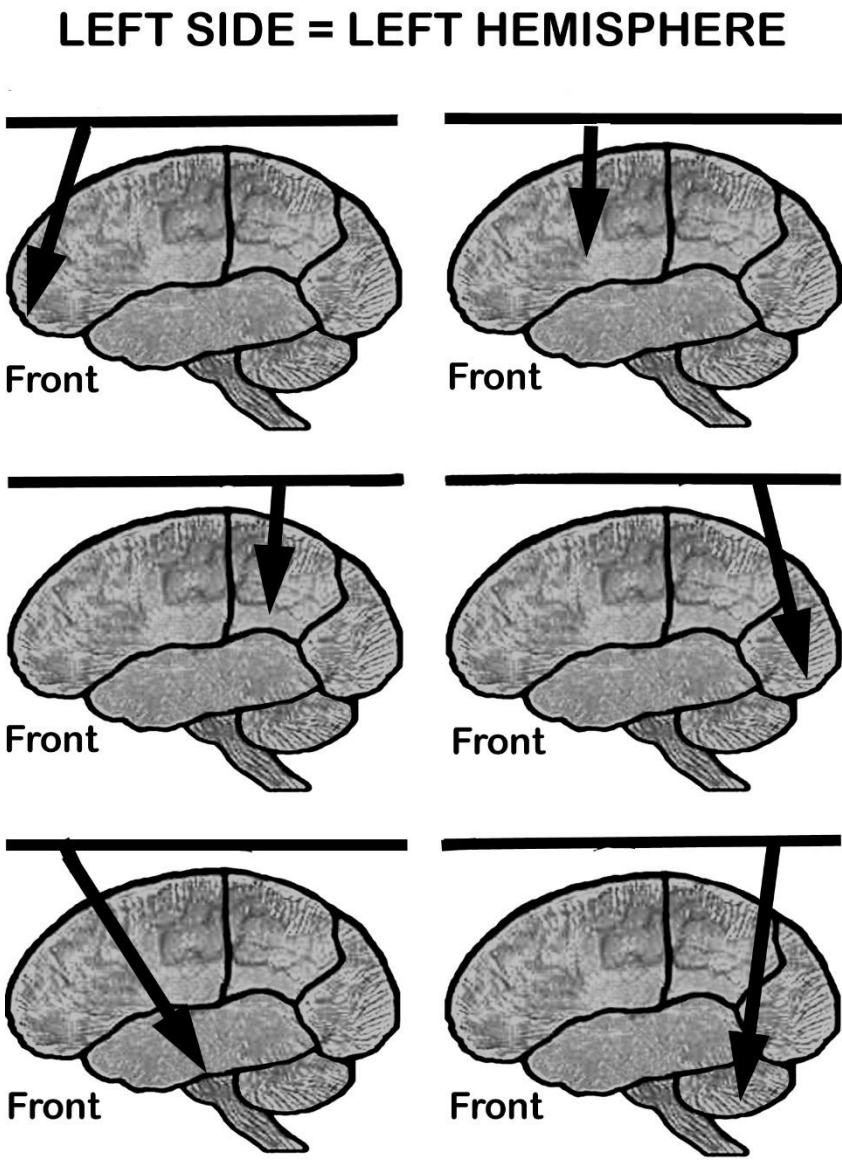

LEFT SIDE = LEFT HEMISPHERE
Front
Front
Front
Front
Front
Front

DIAGRAM #3

The next chart of six mini-brain images with names in Diagram #3 represent the right side of your brain, which is called your Right Hemisphere.

Each of the six structures on the right side of your brain are separated by membranes and have different functions.

Think about the names of the six major structures of your Right Hemisphere (right side of your brain) that are depicted and named in the six mini-brain diagrams of your Right Hemisphere in Diagram #3.

Now write the names (or think of the name of each mini-brain diagram) on the blank lines above the six images in Diagram #4.

RAM #3

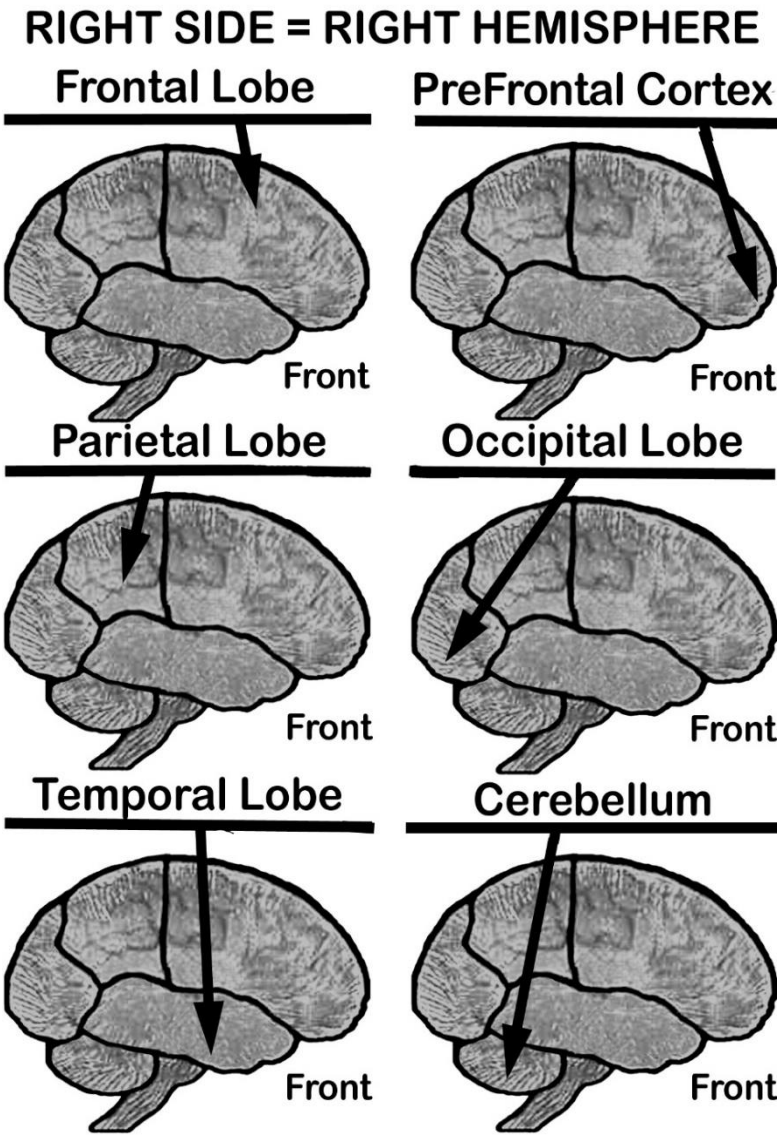

RIGHT SIDE = RIGHT HEMISPHERE
Frontal Lobe
Front
PreFrontal Cortex
Front
Parietal Lobe
Front
Occipital Lobe
Front
Temporal Lobe
Front
Cerebellum
Front

DIAGRAM #4

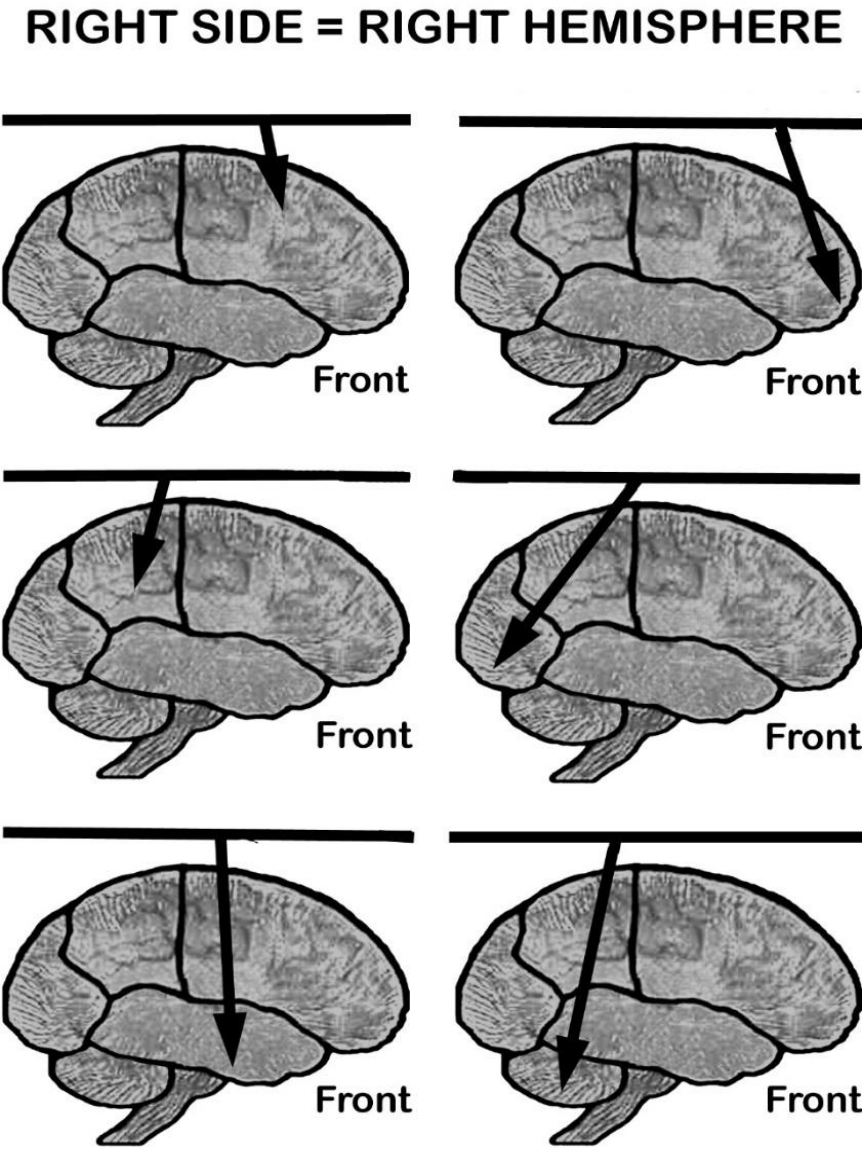

RIGHT SIDE = RIGHT HEMISPHERE
Front
Front
Front
Front
Front
Front

DIAGRAM #5

The next set of six mini-diagrams with names in **Diagram #5** represent the left side of your brainstem. The three structures of your brainstem and the three communication processes (where both blood flows and biochemical signals flow) have no side-to-side differences but do have front-to-back differences in function.

You can see the names of the ***four structures*** of your brainstem and the ***two communication processes*** on the lines above the brainstem images.

DIAGRAM #5

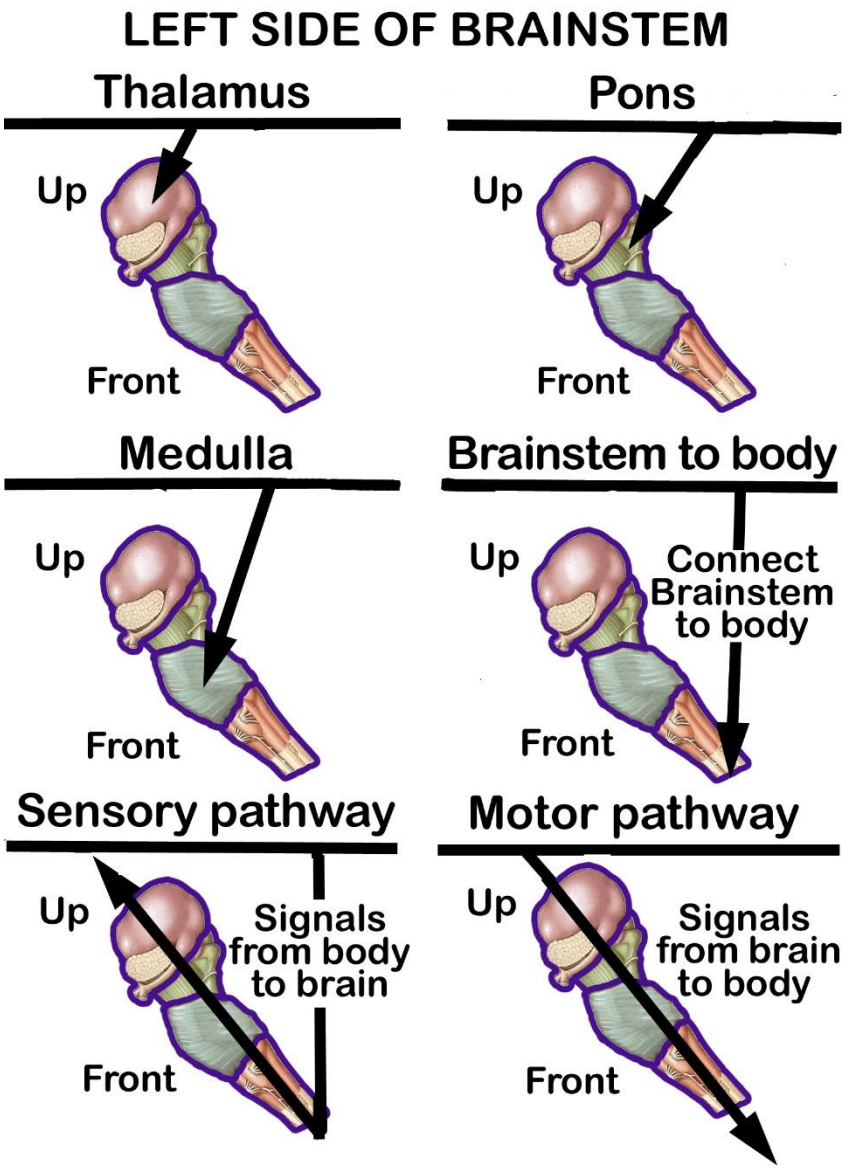
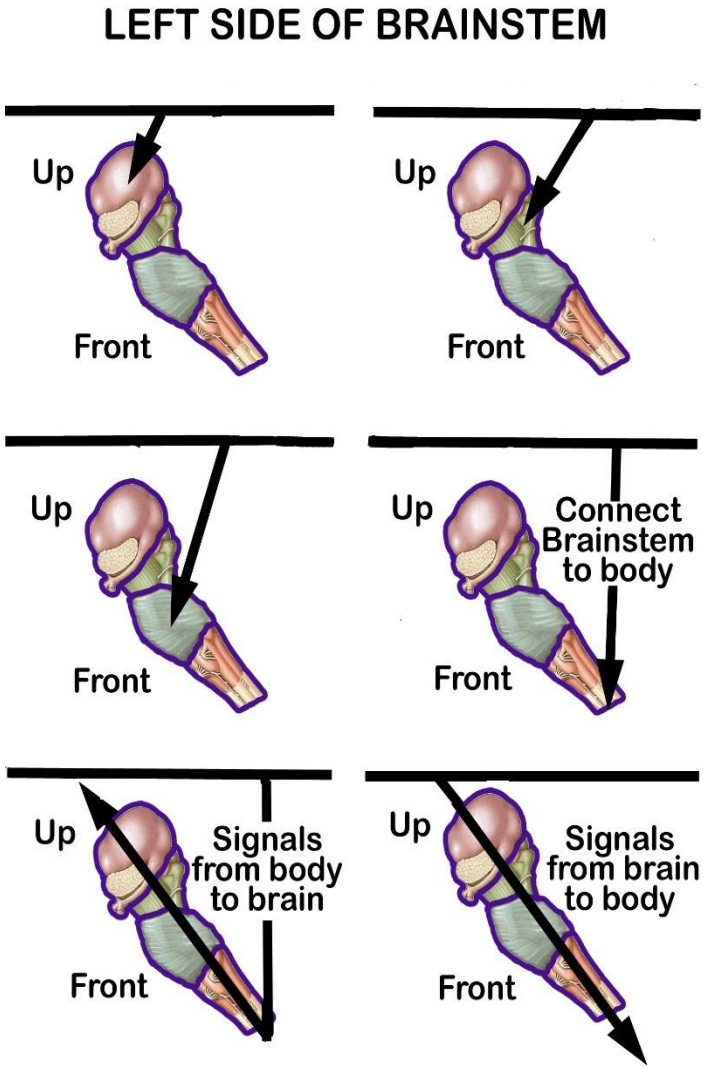

LEFT SIDE OF BRAINSTEM
Thalamus
Up
Front
Pons
Up
Front
Medulla
Up
Front
Brainstem to body
Up
Connect Brainstem to body
Front
Sensory pathway
Up
Signals from body to brain
Front
Motor pathway
Up
Signals from brain to body
Front

DIAGRAM #6

The next set of six mini-diagrams with names in Diagram #6 represent the same left side of your brainstem. The four structures of your brainstem and the two communication processes (where both blood flows and biochemical signals flow) have no side-to-side differences but do have front-to-back differences in function.

Write down the names of the four structures of your brainstem and the two communication processes on the lines above the six brainstem images (or think about the names repeatedly) until you can easily identify them.

DIAGRAM #6


LEFT SIDE OF BRAINSTEM
Up
Front
Up
Front
Up
Front
Up
Connect
Brainstem
to body
Front
Up
Signals
from body
to brain
Front
Up
Signals
from brain
to body
Front

These distinctions provide a new constructive way of thinking about the significance of your brain. It can give you more reasons to believe in the power of your own thoughts to control your own feelings. This self-empowering process of learning new knowledge about the way your brain and body are connected can give you the ability to make more effective decisions within the social constraints of your social group.

All the definitions for these conventional 18 brain ideas were known during the 20th century by scientists and doctors. They are identified so far in this handbook only by their names. You can see them listed alphabetically in the **GLOSSARY** at the end of this handbook. In addition, you will soon be able to **TAP** or **CLICK** on each of the 18 mini-diagrams to instantly see their functional definitions for easy memorization. They will be listed alphabetically at the **WEBSITE GLOSSARY** link at the free alphabeticalbrain.com website, which is under construction.

The 15 new brain ideas about the 15 major brain functions will always be true and will add to the classic brain sections. This new perspective depends upon analyzing your language skills and identifying the importance of augmenting your general vocabulary with the new brain vocabulary. That is why the next **Four Brain Quizzes** deal directly with learning accurate meanings for the 15 major brain ideas.

The 15 brain ideas and their supporting facts are presented in the scientific context of proven memory enhancement techniques for quick retention. Being

scientific means that they are based upon the gigantic contribution that secular science has produced using the scientific method as its basis for truth. Scientists have created our modern technological civilization with amazing discoveries and inventions largely during the past five hundred years.

By understanding how your brain's physical structures and your mind's mental functions interact, you will be able to use the new brain information to motivate yourself to learn the complete **Alphabetical Brain Vocabulary™.** That includes ***adopting cognitive skills*** necessary for expressing your mental force.

Your new behavior and attitudes can strengthen your self-esteem and self-reliance. This can help you improve your resilience in all kinds of challenging personal situations. You may need to adopt more healthy habits that will contribute to your brainpower and overall attitudes about sleeping, eating, exercising, and, ability to challenge your ***mindful self-awareness*** every day.

WHAT DO SCIENTISTS KNOW ABOUT YOUR BRAIN'S FULL POTENTIAL?

Scientific research has proven that you have an ***embodied brain*** and an ***embodied mind*** and a complicated ***memory system.*** This handbook is designed to help you to pay attention to the nature of the ***interactive relationships*** between your brain's ***working memory system,*** located in the ***prefrontal cortex*** part of your ***cerebrum,*** and your brain's ***long-term memory***

system, located in the ***hippocampus*** part of your ***limbic system.***

Your long-term memory system is made up of several separate kinds of memory resources, including ***semantic, episodic, muscle memory,*** and ***autobiographical*** parts. In addition, they each have several features, such as ***declarative memory*** aspects and ***explicit*** and ***implicit*** aspects and as ***fluid*** and ***crystal*** characteristics.

The ***autobiographical*** aspect of your ***long-term memory*** system gives you the capacity to weave together your thousands of life experiences into a comprehensive story.

By memorizing the specific ***brain vocabulary*** of the essential ***names of the 15 brain ideas,*** as well as their ***definitions or meanings,*** you will be storing the new brain knowledge of ***semantic memory data*** throughout your cerebral cortex and the ***declarative memory triggers*** for that data in your ***long-term memory*** system. These triggers are maintained in the ***hippocampus*** part of your ***limbic system*** and they connect to all parts of your ***cerebrum's four lobes.***

Likewise, you have ***muscle memory,*** which is also known as ***procedural memory.*** It deals with physical skills and habits of movement at both the conscious and unconscious level. It is made possible by the ***repeated signaling*** of hundreds of thousands of ***action-potential spikes*** of ionic current being forwarded from your ***working memory*** located in

your ***prefrontal cortex*** to your ***long-term memory*** systems located in your ***hippocampus,*** where the triggers to your active vocabulary are stored.

This cellular communication process is known as ***long-term potentiation,*** which is often called ***potentiation,*** and the reason it works is due to ***neuroplasticity,*** which is often called ***plasticity,*** to indicate the infinite adaptability of your brain and nervous system. Together, they are now known as your ***connectome*** to indicate that the two microscopic communication processes --- plasticity and potentiation --- connect your brain and nervous system to make ***consciousness*** and ***self-awareness*** possible**.**

The important distinctions among your several memory functions and the microscopic processes of ***potentiation*** and ***plasticity*** will be explained in detail later in this handbook in the **Flash Card Section**, which provides ***simple declarative descriptions*** for the 15 brain ideas and their interactions. You must remember that to be fully self-aware, all your brain's physical structures must be working well for your mind's mental functions to be optimized.

Since you have the intellectual capacity to ***learn real facts*** about your brain's physical parts and your mind's mental interactions, you can start anytime. The real facts about your brain and mental functions can expand your ***self-identity,*** since they expand the ***vocabulary you use*** to describe how you think and make decisions. The proof of this statement can be

found by thinking about what happens to dementia victims whose brain functions deteriorate in a devastating way, by losing their self-awareness or sense of self.

Especially, think about what happens to the brains and the mental functions of people who suffer from the most predictable fatal form of the dementias, which is ***Alzheimer's disease.*** The victims usually have difficulty recognizing familiar faces and they often forget what they did just a few minutes before. It is important to know that the victims of Alzheimer's disease, and other dementias, are often unable to adequately care for themselves, even long before they die.

Think about the ordeals of **Ronald Reagan** and **Glen Campbell** whose celebrated lives were cut short by Alzheimer's disease. Their families publicized their progressively more disabling symptoms to increase public awareness and to gain support for more medical research about Alzheimer's disease.

The main point is that the ***self-identity of Alzheimer's victims,*** and other dementia patients, ***deteriorates*** when the connections in the neuronal circuits of the nerve tracts of the brain become obstructed and eventually become irreparably blocked.

Also, the ***self-identity of caregivers*** is adversely impacted as the victims of Alzheimer's become more disabled and more in need of intensive care. This is due to damaged brain functions that are predictable and usually unstoppable after the early symptoms are

observed. Thus, caregivers are forced to watch the ***identities*** of their loved ones ***disintegrate*** day after day to the point that they are not able to maintain their own bodily needs or recognize their caregivers.

In addition, Alzheimer's victims often ***confabulate,*** which is unintentionally remembering false memories of the past. It is defined further as the production of fabricated, distorted, or misinterpreted memories about oneself or the world, without the conscious intention to deceive anyone.

Even with the current massive medical efforts to find a cure for Alzheimer's, there has been an alarming increase in the number of deaths from age-related dementia patients in the U. S. and an increasing number of deaths from Alzheimer's disease, which are projected to reach epidemic proportions soon.

The death rate is estimated to increase from about 80,000-100,000 deaths each year to one million per year by mid-century. At this high rate it will become the biggest medical catastrophe in the history of the United States by 2050. In addition to the tens of thousands of deaths every year, there are many more long-suffering relatives and institutional caregivers who are troubled and often demoralized by providing the kinds of support and services that Alzheimer's victims require.

Medical science now clearly understands how the functions of brain structures are disrupted when neuronal pathways are obstructed. Blockage of neuronal signals is mainly caused by the ***accumulation of amyloid plaque***

and protein tangles in the neuronal pathways (nerves) in the brain.

Amyloid is a general term for ***protein fragments*** that the body produces normally. The most dangerous is Beta amyloid, which is a protein fragment snipped from an amyloid precursor.

In addition, ***telomeres,*** which are **repeating *DNA* sequences** at the end of chromosomes, are suspected of being additional causes of Alzheimer's. They prevent chromosomes from fusing with other chromosomes and can stop chromosomes from deterioration by the loss of base pair sequences.

You can think of a telomere as being a **"protective guardrail"** on a chromosome. For example, unhealthy lifestyles, such as ***not*** getting enough sleep, can ***shorten*** telomeres, which can ***shorten*** the lifespans of those people.

Also, knowing that the biochemical circuits are broken primarily from the ***prefrontal cortex*** to the ***hippocampus*** along the ***anterior cingulate cortex neuronal pathway,*** which is on the insides of both ***cerebral hemispheres*** (both the left and the right sides of the brain), you may become more motivated to choose to add healthier habits to your lifestyle.

Healthy habits may help you avoid or delay getting Alzheimer's disease, including the early onset kind, which starts around 45 years of age instead of the usual 60 years of age. The famous **Nun's Study** indicated that active

leadership functions of supervisory Nuns gave them longer years of effective lives even though the physical structures of their brains were damaged in similar ways as the more passive Nuns, but they lived longer.

The evidence showed that the more cognitive record-keeping and scheduling activities of the supervising Nuns had provided more **"cognitive reserve",** which had preserved the mental functions of the cognitively active Nuns compared to the less actively involved Nuns who had spent most of their time in more passive roles, such as praying.

In this handbook, you can learn the essential brainpower skills, which involve your true adaptable ***mental force.*** The power of your mental force, namely, ***brainpower,*** depends upon your ***critical thinking and reading skills,*** which are directly related to the ***size*** of your general vocabulary and especially the ***accuracy*** of your brain vocabulary. You can activate your major mental functions by using appropriate technical words, which can provide you with an expanded self-awareness.

Moreover, the quality of your own ***conscious self-awareness*** is dependent upon your specific vocabulary of essential brain-activating words. They are stored in your ***long-term memory*** system, known as your ***active vocabulary,*** since the words can be consciously retrieved from your ***long-term memory*** system.

After you have **increased *your brain vocabulary*** you will be able to optimize the benefits of

the new brain knowledge. In addition, you can then profoundly impact your own behavior. You will be able to express your ***free will*** and ***creative imagination*** with full confidence in yourself.

In addition, you will be learning the ***real facts of life,*** because the ***emotions related to love and sex*** are coordinated in your brain and involve all aspects of the brain vocabulary, which is based upon evolution biology and modern American humanism. This psycho-socio and biological context can provide you with the best and most objective evidence for explaining the nature of your own personal reality.

Finally, you can share this new brain vocabulary with your family and friends as you increase your self-awareness of the brain facts and ideas. The latest discoveries have provided amazing new insights about how human brains function when they are healthy.

You can also learn how abnormal brain functions are caused by physical structural disorders, such as brain concussions or mental dysfunctions that cause depressions. Everything has changed in the way ***brain functions*** are understood by scientists and educated adults. The new brain science, known as ***neuroscience,*** now allows research scientists and surgeons and doctors see inside living human brains.

The powerful new microscopes called ***Block Fluorescent 3-D Microscopes*** and the older ***functional Magnetic Resonance Imaging (fMRI)*** and ***Positron Emission Tomography (PET)*** brain

scanners have made it possible for researchers and doctors to look inside living brains. The new computerized microscopes have verified the brain research of the past century and the research done during the 1990s (the **"decade of the brain"**) and especially during the past few years. Because of the incredible technical advances in knowledge, we now have access to pictures of organic functions ***inside living human brains*** under different cognitive conditions.

The results have allowed scientists to discover exactly how the key parts of human brains operate when they are thinking and feeling and making decisions, both when calm or under stress. In addition, the new brain knowledge is helping doctors diagnose brain disorders and determine appropriate medical treatments at brain research centers and general hospitals around the world. The new brain knowledge is now available in books and articles and video documentaries for everyone to see and understand.

Therefore, since ***evidence exists in plain English*** about how brain functions work, which is ***universally accessible,*** it should become ***common sense knowledge*** for educated humans, including you, your family, and everybody else.

Finally, you can share this new brain vocabulary with your family and friends as you increase your self-awareness of the brain facts and ideas. The latest discoveries have provided amazing new insights about

how human brains function when they are healthy and when they are unhealthy. Some abnormal brain functions can be caused by physical structural disorders, such as brain concussions, or mental dysfunctions that can be caused by intellectual or emotional disorders.

BRAIN STUDY QUIZ #1

The following **list of the names** of the **15 brain *ideas*** is a survey inventory that gives you the opportunity to skim over the ***15*** **names of the brain ideas** to test the extent of your current brain knowledge. Simply put a ***check*** in the column marked **"Check List"** to identify what brain ideas you already know and understand. Also, you can write down the ***first words*** you associate with the **names** on the list in the column labelled **"Definitions"**. [You may want to write on a piece of paper instead of the handbook even though it was created for you to write in.]

The act of writing down your thoughts on paper can strengthen your ***long-term memory*** system. This is because your hand, foot, and arm movements, known as ***muscle memory,*** can reinforce your other two kinds of declarative memory called ***semantic memory*** and ***episodic memory.***

This self-administered inventory gives you the opportunity to skim over the ***15 brain names*** to test your ***permanent memory*** concerning the ***15 brain***

ideas. **Quiz #1** can help you focus on the brain ideas that you do **not** know yet.

Brain Study Quiz #1
CHECK THE BRAIN IDEAS YOU ALREADY KNOW AND DEFINE THEM

	BRAIN IDEA NAMES	CHECK LIST	DEFINITIONS
1	Working Memory		
2	Neurons		
3	Dendrites		
4	Axons		
5	Nucleus		
6	Glial Cells		
7	Potentiation		
8	Synapses		
9	Connectome		
10	Plasticity		
11	Cerebral Cortex		
12	Prefrontal Cortex		
13	Limbic System		
14	Pleasure Circuit		
15	Long-Term Memory		

BRAIN STUDY QUIZ #2

The **15** ***memory codes*** listed on **Quiz #2** can help you ***remember*** the brain ideas easier than any other memory retention system or memory tricks. The secret of creating permanent memories is to **repeatedly match** the ***memory codes*** to the ***names of the brain ideas*** over time. **names of the major brain ideas** that you need to

The ***memory codes*** are effective ***cues*** since the ***combination of*** **letters** is directly related to the learn. They act like glue that sticks the brain ideas tightly into your long-term memory system. This sticky metaphor will be explained later in the ***flash card section,*** which contains the ***15 brain functions.*** To make complex decisions about your use of time or money, you need to determine risks and benefits as you seek to achieve success.

With the new brain vocabulary, you will be able to visualize what is going on inside your brain as you think about possible outcomes. This is when your new brain knowledge can leap into your **conscious self-awareness** and help you make wiser decisions. The ***"spaced-repetition"*** method of memorization is the best way to learn the 15 brain ideas because it involves the most efficient way to use your time and energy.

It is important for you to fully focus your attention in frequent intervals of **visual sighting** or **mental imagination** for a few minutes and then exposing yourself to them again after a few hours and then again after a few days. The length of the intervals between your

Brain Study Quiz #2
MATCH THE 15 MEMORY CODES
TO THE NAMES OF THE 15 BRAIN IDEAS

15 MEMORY CODES		15 NAMES OF BRAIN IDEAS
1	WRK MEM	
2	N	
3	DEN	
4	AX	
5	NUC	
6	GLI CEL	
7	POT	
8	SYN	
9	CONN	
10	PLAS	
11	CER COR	
12	PFC	
13	LIM SYS	
14	PLEA CIR	
15	L-T MEM	

Exposures to the list of the ***15*** **brain ideas** is important since it is a way of counteracting the ***Forgetting Curve***. That evidence-based curve indicates **memory loss over time.** It shows that learners usually forget an **average of 90%** of whatever they have tried to learn within one month.

That measurement of forgetfulness was discovered more than **100** ***years ago*** by Ebbinghause. Simply stated, the rate of forgetting is logarithmic and exponential, being greatest just after learning something. The memory simply disappears into oblivion unless it is intentionally reinforced by repetitive exposures to the information or accompanied by strong emotions.

In addition, it is important to remember that memories are "**reconstructions"** and ***not*** **"reproductions"** of the actual events or stories being remembered. In this regard, it is essential to remember that when you become aware of a memory, it can be changed by you either consciously or unconsciously.

Thus, your memories usually change over time to reflect new beliefs or values. This is because your memories are inherently adaptable to your current assumptions, attitudes, beliefs, and values.

BRAIN STUDY QUIZ #3

For speedy verification of your **15** ***answers*** to the following **15** ***questions*** about the names and meanings of the **15** ***brain ideas,*** you can shift your attention back and forth from **Quiz #3** to check the correct answers from

either of the ***identical two lists*** of the **15** ***brain names*** on **Quiz #1 or Quiz #4.**

You will soon discover that the following **15** ***questions*** are listed in ***reverse order*** compared to the correct order of the definitions that are listed on both identical lists of brain ideas on **Quiz #1** and **Quiz #4.**

By thinking through the technical words in the following questions, which define the **15** ***key brain ideas,*** you will be able to memorize them faster by ***matching*** them to their ***memory codes*** than any other way of attempting to remember them.

Brain Study Quiz #3 (Part 1)
NAME THE 15 BRAIN IDEAS

1 – What memory system in the hippocampus is a cause of your self-awareness and stores triggers to declarative memories, such as semantic, episodic, and muscle memories?

Answer =

2 - What biological circuit in your limbic system causes your feelings of happiness when the neurotransmitters dopamine and acetylcholine and others are stimulated?

Answer =

3 – What part of your brain has eight organs and releases neurotransmitters and hormones to control all of your emotions?

Answer =

4 - What part of your brain evolved to control your limbic system's emotions and is the source of your conscious self-awareness and your decision-making function?

Answer =

5 - What is the thin, wrinkled and folded top layer that covers your cerebrum and contains 80-100 billion neuron cell bodies, which are often called your gray matter or neocortex?

Answer =

CONTINUE →

Brain Study Quiz #3 (Part 2)
NAME THE 15 BRAIN IDEAS

6 - What is the adaptive process of your body and brain's connectome that is one cause of your ability to think, feel, create, and learn new ideas and habits?

Answer =

7 – What is the three-dimensional cellular communication network of neuronal pathways that connects your brain and spinal cord and is one cause of your free will?

Answer =

8 – What are the hundreds of trillions of tiny microscopic biochemical junctions that connect neurons and switch them on or off?

Answer =

9 – What is the way neurons connect so you can think of ideas, feel emotions, control your muscles, and memorize anything you choose?

Answer =

10 - What are the brain cells known as white matter, that surround the axon filaments in your 100 billion neurons and protect, nourish, and speed the flow of biochemical signals?

Answer =

CONTINUE →

Brain Study Quiz #3 (Part 3)
NAME THE 15 BRAIN IDEAS

11 – What is the source of the action potential spikes that flow through neurons to activate your organs, muscles, glands, and senses?
Answer =

12 – What are the thin filaments inside your 100 billion neurons that conduct biochemical currents of ions that activate your organs, muscles, glands, and senses.
Answer =

13 – What are the thousands of extensions that branch out from the cell bodies of most of your neurons to attach to other neurons through the process of synaptic plasticity?
Answer =

14 – What are the cells in your brain and nervous system that send biochemical currents down filaments from their cell bodies to their end terminals to connect your billions of brain cells to organs, muscles, glands, and senses?

Answer =

15 - What memory system gives you the power to recall an old memory and also to forward your thoughts and perceptions to the long-term memory in your hippocampus?
Answer =

BRAIN STUDY QUIZ #4

The following brain study exercise is helpful in explaining that ***short declarative statements*** are the easiest ways to remember important ideas. Also, the way they are associated in this table with the other brain ideas provides an efficient way to create a ***frame of reference*** or more specifically a ***linguistic context*** that can convey greater meanings, such as the dynamic interactive nature of all 15 of the brain ideas in a holistic pattern of interconnectivity and interactivity.

Thus, the ***progressive logical sequence*** of these **15** ***major brain ideas*** can become a permanent intellectual scaffolding or structure for your future thinking about all your brain functions. You will have this dependable language data base (linguistic context) with which to develop any other brain ideas about your philosophy of human nature in the future.

This exercise is another example of the power of ***repeating*** the association among the key words and their concise specific meanings. It is a way of deepening the penetration of the meanings into your ***long-term memory system*** located in the ***hippocampus*** part of your brain's ***limbic system.***

Brain Study Quiz #4

MAKE 15 MEMORABLE DECLARATIVE STATEMENTS

NAMES OF BRAIN IDEAS		DEFINITIONS AS STATEMENTS
1	Working Memory	
2	Neurons	
3	Dendrites	
4	Axons	
5	Nucleus	
6	Glial Cells	
7	Potentiation	
8	Synapses	
9	Connectome	
10	Plasticity	
11	Cerebral Cortex	
12	Prefrontal Cortex	
13	Limbic System	
14	Pleasure Circuit	
15	Long-Term Memory	

CIRCLE OF CONSCIOUSNESS SYMBOL©

Now is a good time to see the impact of the 15 brain ideas within the **Circle of Consciousness Symbol©**. The close connection between Brain Idea **#1**, ***working memory,*** and Brain Idea **#15**, ***long-term memory*** (next to each other on the circle) can remind you of their close connection inside your brain.

The **Circle of Consciousness Symbol©** is a visual learning device that allows you to focus attention on the big picture of the ***logical progressive sequence*** of all 15 brain ideas simultaneously.

It was created to convey a powerful visual image of the previously unimaginable coalescence of the many diverse and interactive physical structures of your awesome self-manifesting holistic evolutionary brain.

The symbol depicts how the connected relationships of all 15 brain ideas, and especially the closeness of ***working memory*** and ***long-term memory*** inside all healthy functioning human brains, produces both ***consciousness*** and ***self-awareness***. This entire spectrum of named brain functions describes in plain English what your ***trainable self-identity or self*** reasonably consists of in its phenomenal reality.

The **13** ***brain ideas*** between the two basic memory functions are essential functional elements of the human brain that together explain how the two memory systems, ***brain ideas*** **#1** and **#15**, work. The **Circle of Consciousness Symbol©** provides a ***big picture***

perspective for you to think about, since it portrays a progressive logical connection among the 15 basic brain ideas by using ***four diagrams***. It gives you another way of perceiving the interactions of the 15 brain idea***s*** in addition to the **15** ***brain flash cards.***

You can use these perspectives to save time as you train your amazing brain to do what you want it to do by using the ***spaced-repetition*** method of memorization.

The 15 major brain ideas provide a practical new scientific way you can use the new brain knowledge to activate your mind's cognitive memory circuits. They depend upon your ***brain's structures*** and your ***mind's functions,*** and your ***language,*** which is the primary cultural influence in your life.

DIAGRAM #1
OUTSIDE YOUR CONSCIOUSNESS

Diagram #1: The first diagram shows **15** ***arrows outside*** the circle, ***all arrows pointing outward*** toward the names of each of the 15 brain ideas. It depicts the assumption that you do ***not*** know the complete meanings of all or most of the brain ideas. Therefore, the symbol depicts the fact that all or some of the 15 brain ideas are ***outside*** your conscious self-awareness.

CIRCLE OF CONSCIOUSNESS SYMBOL™

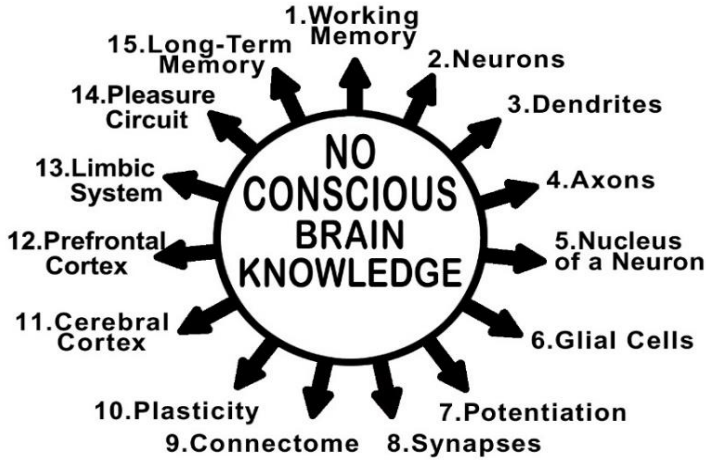


Diagram #1

ALL ARROWS OUTSIDE THE CIRCLE OF CONSCIOUSNESS INDICATE LITTLE OR NO CONSCIOUS KNOWLEDGE ABOUT YOUR BRAIN FUNCTIONS

DIAGRAM #2
INSIDE YOUR CONSCIOUSNESS

Diagram #2 shows ***all the arrows pointing inward*** toward the smaller center circle called **MENTAL FORCE**. The two words ***"mental force"*** describe both your ability to reason and your ability to imagine. When you know ***how these two major cognitive functions operate,*** you can make adaptive choices with your ***working memory*** system, since it controls your creative imagination and your decision-making abilities.

The second diagram depicts the assumption that the ***names*** of the **15** ***brain ideas*** and their ***unique sequence of interactive relationships*** will all be ***inside*** your permanent long-term memory system after you have studied your brain's physical structures seriously and your mind's mental functions sufficiently.

Once you learn which of the 15 brain ideas you need to concentrate on, you will be able to add many new useful words about your brain and nervous system to your active general vocabulary of powerful words. They can help you manage your strongest feelings.

CIRCLE OF CONSCIOUSNESS SYMBOL™

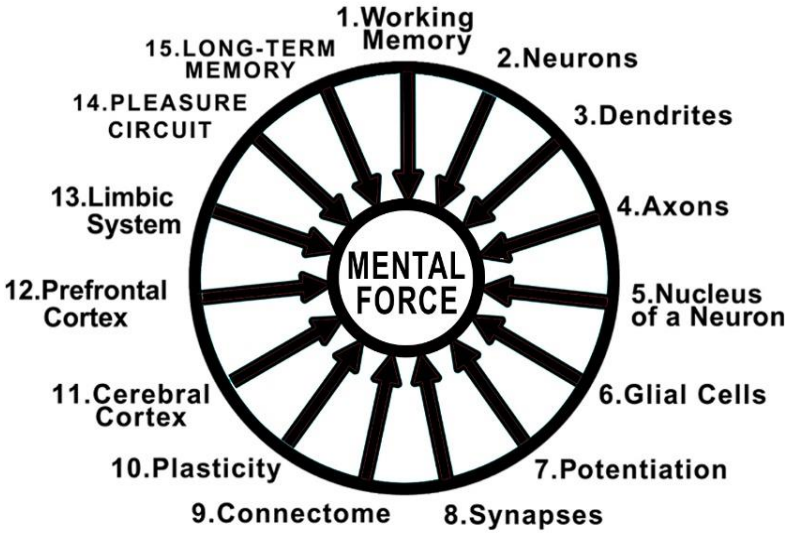


Diagram #2

ALL 15 NAMES OF THE BRAIN IDEAS INSIDE THE CIRCLE OF CONSCIOUSNESS INDICATE COMPLETE KNOWLEDGE ABOUT YOUR BRAIN FUNCTIONS AND POWERFUL MENTAL FORCE

DIAGRAM #3
MEMORY CODES

Diagram #3: The third diagram can stimulate your ***prefrontal cortex*** when you make ***instant repeated viewings*** of the two diagrams by simply moving your eyes back and forth from **Diagram #3** to **Diagram #2**.

This exercise provides the opportunity for you to focus your attention on both the ***15 memory codes*** and the ***names of the* 15 *brain ideas*** by using your ***prefrontal cortex*** (**PFC**). It provides the opportunity to focus your attention to ***match the names*** of the **15** ***brain ideas*** with the **15** ***memory code cues*** (acronyms) ***associated with the names*** of the brain ideas.

They appeared as a list in Brain Quiz #2 on page 21. You can freely flip back and forth from **Diagram #3** to **Diagram #2** to match the memory codes to the brain names. This action by itself can stimulate your ***declarative semantic memory cells.***

It is essential for you to know that your ***self-awareness*** is caused by ***the interactive connections*** of your ***conscious working memory*** system (**think:** random-access memory) and your permanent ***long-term memory*** system (**think:** hard drive). These analogies only hint at the complexity of the dynamic interconnectedness of the two major memory systems in everybody's brain.

CIRCLE OF CONSCIOUSNESS SYMBOL™

ALL15 DOUBLE-HEADED ARROWS INSIDE THE CIRCLE INDICATE COMPLETE KNOWLEDGE ABOUT YOUR MAJOR BRAIN FUNCTIONS

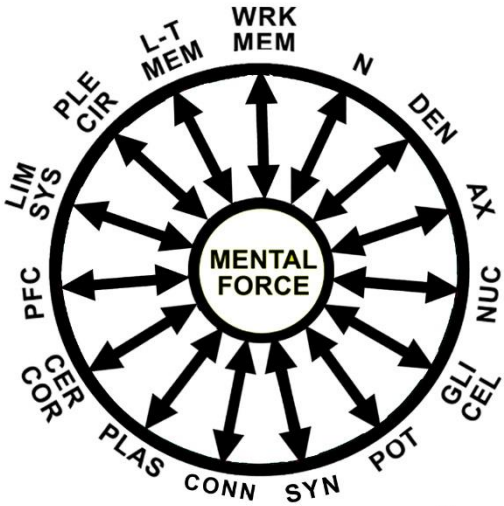


Diagram #3

MATCH THE 15 MEMORY CODES TO THE 15 BRAIN IDEAS TO BOOST MEMORY RETENTION

You will be able to understand how easy it is to learn anything, when you become aware of how to use the ***numerical lists*** and the ***consciousness symbol diagrams*** to boost your memory retention. Also, if you decide to use the power of the ***spaced-repetition method*** of memorization to strengthen the ***signals in your neuronal pathways,*** you can be an effective learner and benefit immediately from the new brain knowledge.

This means that the ***names*** of the 15 brain ideas will be ***easy to recall*** when required by new situations and all the essential details associated with them will be easier to be forwarded from your ***long-term memory*** located in your ***hippocampus*** to your ***working memory*** located in your ***prefrontal cortex.***

Healthy mental functions require that you keep your 15 major physical brain structures healthy. Then, you can experience yourself as a unique person with the free will to reason and to make good decisions during your whole lifetime.

This process of remembering and applying the new brain information can be facilitated easily once you learn about your brain's structures and their mental functions. By knowing which ***brain functions*** are related to which parts of your brain and nervous system, you will become aware of their specific relationships to each other, and why they matter.

Then you will be able to generate more accurate new meanings about the reality of your ***mental force*** and how you can use it to improve the quality of your life.

You will be able to choose to avoid self-imposed emotional obstacles and you will be able to open your mind to new ideas about yourself and the world around you. This learning experience can give you the power to train the rest of your brain to learn the ***acronym letters*** of the 15 memory code ***cues*** and their connections to the **names** of the 15 brain ideas in the logical sequence presented in the circle. By spacing the times that you devote to studying the 15 brain ideas, you will be able to remember the ideas easily in your ***long-term memory*** system.

The names of your most important ***brain structures*** and their ***mental functions*** can all be remembered easily by understanding how your two basic memory systems, your ***working memory*** and your ***long-term memory,*** are connected. You will not be able to think of your brain as being separate from your body anymore, except as an amusing ritual when toy spend time cogitating.

However, when you can understand the biology of your emotions and begin to define your feelings and thoughts with words that define the combined biological and psychological sources of your ***consciousness*** and ***self-awareness,*** then you will be making real progress developing your emotional intelligence and historical perspective about the meaning of life. These 15 brain ideas will always be useful to you. If your brain ever gets damaged, these brain ideas could prove vital for your recovery and rehabilitation.

Once you decide which of the 15 brain ideas you need to concentrate on, you will be able to add many new useful brain-related words to your active vocabulary. Then the names and meanings of the 15 brain ideas will be easy to recall when required by new situations.

By being mindful of the memory boosting methods of memorization that are available to use with the ***numerical lists*** and the ***Circle of Consciousness Symbol*** and the **15** ***brain flashcards,*** you will realize just how easy it is to learn anything, if you use the pattern of remembering in this handbook.

If you plan your study activities as recommended, you will be strengthening the ***signals in your neuronal pathways*** and storing ***memories*** that will be easy to recall. You will be able to think of yourself as an efficient learner because of your ***newly organized mental force*** or brainpower.

You will be learning what the physical parts of your brain do to make possible the mental force of your mind's functions. After using the study methods recommended in this handbook, you will be able to remember the 15 brain ideas for as long as you remember to use them.

THE 15 BASIC BRAIN IDEAS
IN FLASH CARD FORMAT

How many of the 15 brain ideas do you already know? What is the fastest way to learn about all of them?

The ***two clumps of neurons*** the size of two pennies are located about one inch above both of your eyes and about one inch inside your forehead. They are called your ***prefrontal cortex*** and they contain your ***working memory*** resources.

They are connected to your ***long-term memory*** system at the bottom of your ***limbic system*** in your ***hippocampus*** by the neuronal pathways of your ***anterior cingulate cortex***. The health of these pathways is vital for your conscious self-awareness.

You have **100** ***billion neurons*** in your brain and nervous system and even ***more than*** **100** ***billion neurons*** surrounding your stomach. They send ionic signals throughout your body since they energize your body's communication system, including your ability to experience sensations from your senses and ability to control your muscles to move your body, can be done both consciously and unconsciously. The signals flow from your sensory cortex to your brain and from your brain's motor cortex throughout the rest of your body.

Your whole body has evolved to protect you from diseases and accidental mistakes that you could make when you experiment with the unknown contents of various foods or chemical drug substances. They are there because of natural evolutionary forces that developed in conjunction with cultural forces to help you survive.

The flash card arrangement of the 15 brain ideas are described by a **QUESTION** on the ***front side*** of a

flash card and an **ANSWER** on the ***back side.*** They can help you learn the meaning of the brain ideas quicker and easier than other memory techniques since they use memory code cues to boost your memory retention.

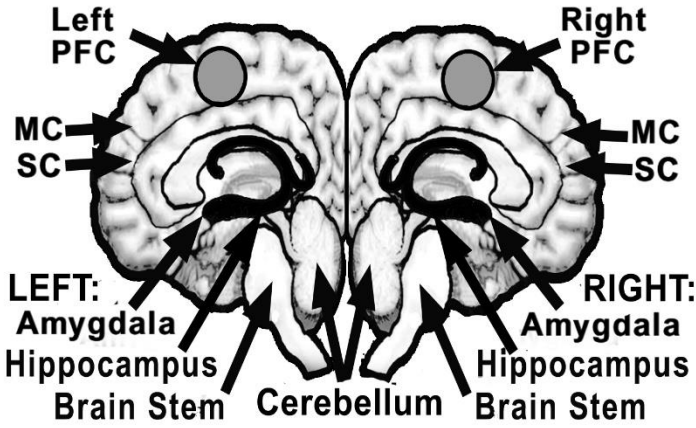
You can learn fast after a few repeated exposures to the memory codes. Just look at the ***question*** on the front side of the page and the ***answer*** on the back side of the page. Then shift back and forth to ***match*** the memory code with the name and the meaning of the brain idea.

WORKING MEMORY #1

The purpose of your ***working memory*** is to determine which information from your ***six senses*** are most important. Which senses, sight, hearing, taste, touch, smell, and proprioception, and which ***habits*** are most important to you? Proprioception is your brain's ability to sense stimuli arising within your body regarding its position, motion, and equilibrium because of ***neuron clusters*** in our joints, which respond to the force of gravity. All the ***sensory information*** going to your brain from your body gives you the opportunity to produce the most comfort and pleasure or provide the most protection from danger or pain.

BRAIN IDEA #1

WRK MEM = ? #1

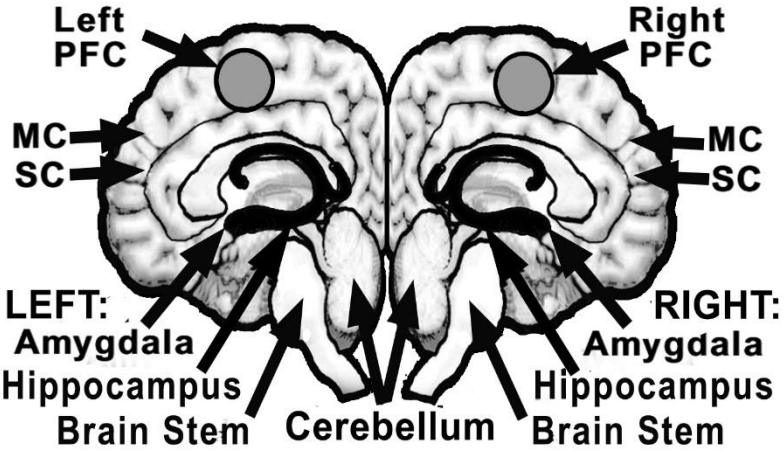


Left PFC = Left PreFrontal Cortex
Right PFC = Right PreFrontal Cortex
MC = Motor Cortex (signals to body)
SC = Sensory Cortex (signals to brain)

MIRROR IMAGE MODEL OF YOUR CONSCIOUS MEMORY

What memory circuit provides you with your "sense of self" and gives you the power to become aware of old memories and to forward new memories to your long-term memory?

WORKING MEMORY #1



Left PFC = Left PreFrontal Cortex
Right PFC = Right PreFrontal Cortex
MC = Motor Cortex (signals to body)
SC = Sensory Cortex (signals to brain)

MIRROR IMAGE MODEL OF YOUR WORKING MEMORY

Your working memory is located in your prefrontal cortex and provides you with your "sense-of-self" and has the power to perceive old memories and forward new memories to your long-term memory system.

In addition, your ***working memory*** can be thought of as your ***creative imagination*** since it allows you to be creative at any moment that you are aware of the need to be creative.

METAPHORICAL EXPLANATION

"The relationship between working memory and long-term memory is like that of a librarian and a library. Like a librarian, working memory allows you to search through the books, or information, stored in the library to accomplish a specific task." (page 160)

"With Alzheimer's disease, both elements are under attack: the librarian struggles to search through the stacks, and the worms are eating through the books. A shrinking working memory has a detrimental effect on your ability to access the books, to search through the library and find and apply what you need. And when the books deteriorate, it is much harder to read what remains." (page 160)

SCIENTIFIC EXPLANATION

"However, working memory is such a dynamic and adaptive tool that if it remains strong, even if Alzheimer's begins to 'eat away at your neurons', it may in fact help to prevent you from experiencing the cognitive symptoms associated with the disease" for a long time. (page 160) You can make your ***long-term memory*** system more efficient by adapting the following three powerful learning techniques to improve the functioning of your

working memory system in its relationship to your ***long-term memory*** system. The techniques are: ***Code Breakers; Bootstrapping;*** and ***Chunking:***

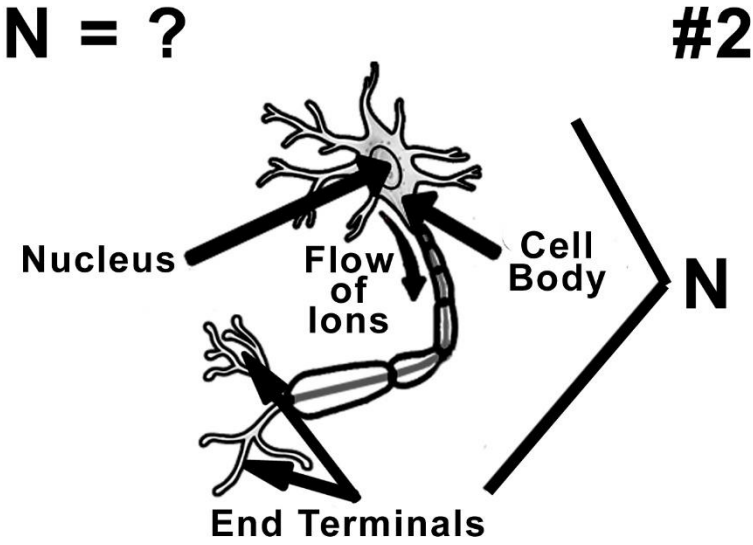
(1) The **Code Breakers Technique** can be used to quicken recall of the 15 major brain ideas, if you develop a step by step plan to remember them in your ***long-term memory*** system. For example, the 15 memory codes featured on this website can be used to remember the 15 brain ideas because of the effective spaced-repetition method of learning by association and repetition. (page 182)

(2) The **Bootsrapping Technique** of learning involves the process of combining (binding) verbal information (text) with visual information (brain diagrams or graphic images) by using both your working memory system and your long-term memory system.

This technique can help you process information such as the brain names and their definitions as well as the details about each brain idea, so all the information can be consolidated, retained, and retrieved at will. **(page 183)**

(3) The **Chunking Technique** for boosting memorization involves a method of breaking down complex information, such as the description of your brain's many amazing functions, into smaller subjects or **"chunks"**.

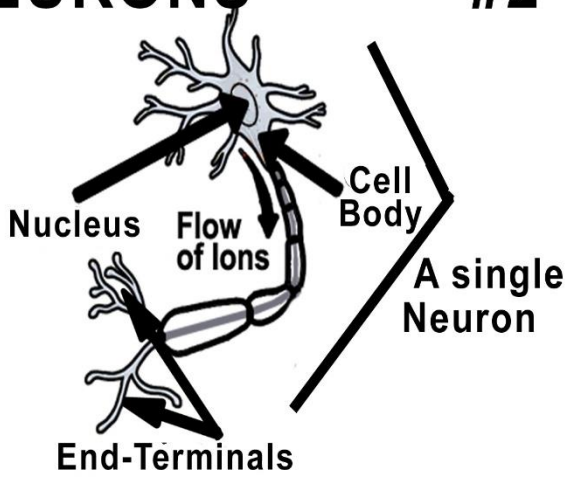
BRAIN IDEA #2



MODEL OF A BRAIN CELL THAT CAN SEND AN ELECTROCHEMICAL CHARGE TO OTHER CELLS

What are the 100 billion cells in your brain and nervous system that can send action potential spikes of biochemical signals (ions) to other cells?

NEURONS #2



MODEL OF A SINGLE ACTIVATED NEURON SENDING SIGNALS TO ORGANS, GLANDS, MUSCLES AND OTHER NEURONS

Your neurons are different from all the other cells in your body since they can send and receive electricalchemical signals from your brain to all other parts of your body.

Then they can be committed to your ***long-term memory system.*** "With long chunks of information stored in [integrated into] your long-term memory, your working memory [which operates as the **'conductor'**] can prioritize and manage data more efficiently." (page 183)

BOOK SOURCE:

See the book, **Working Memory Advantage**, 2013 and especially see the appendix section containing the **Working Memory Quick Hits Manual** on pages 280-291.

Your neurons are specialized brain cells that make it possible for the many physical structures of your body to communicate with each other. Also, they make it possible for you to communicate with yourself and others.

Your neurons are the basic building blocks of your brain and nervous system. They make up about **20%** of the cells in your brain. All aspects of your memory resources depend upon the smooth functioning of all your neurons and all their synaptic connections.

Typically, as many as **10,000-15,000** dendrites are attached to the cell body of each of your ***100 billion neurons*** but there can be as few as one dendrite attached to a single cell body. All these ***neurons*** send and receive signals all around your brain and up and down your body but only in one direction within each neuronal pathway.

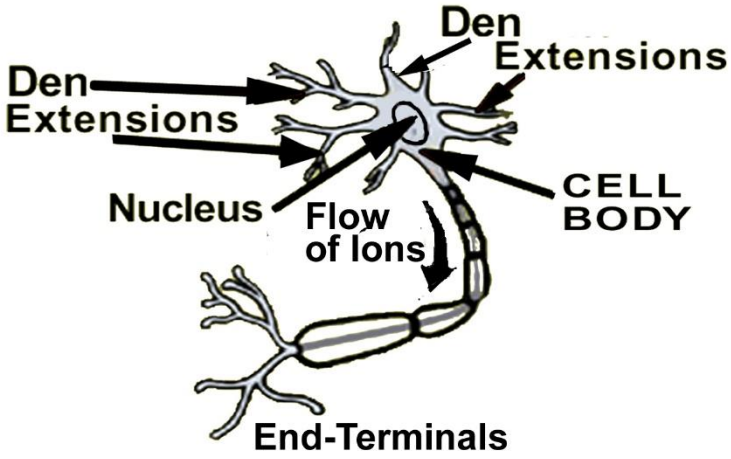
All your **100** ***million neurons*** are connected to each other by your **900** ***billion synapses.*** Your ***synapses*** relay biochemical signals through an electro-chemical transduction process that is known as ***potentiation,*** which is short for ***long-term potentiation.***

DENDRITES #2

Your dendrites are terminals (or neurites) that receive biochemical currents (electro-chemical impulses or signals) from either other neurons, senses, internal organs, glands, or muscles. Typically, as many as 10,000-15,000 dendrites are attached to the cell body of each of your 100 billion neurons. However, there can be as few as one dendrite attached to a single cell body.

BRAIN IDEA #3

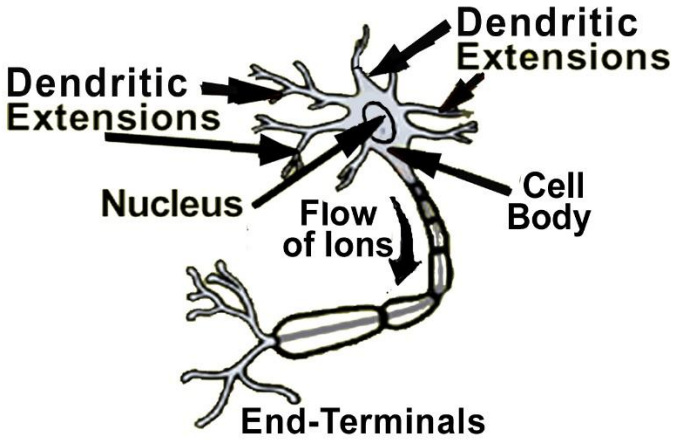
DEN = ? #3



MODEL OF A SINGLE NEURON WITH CELL BODY EXTENSIONS

What are the thousands of extensions that branch out from the cell body of most of your neurons to attach to the end terminals of other neurons, muscles, and glands?

DENDRITES #3



MODEL OF THE DENDRITIC EXTENSIONS THAT ATTACH TO THE CELL BODIES OF YOUR 100 BILLION NEURONS

Typically your dendrites are the thousands of terminal extensions that branch out from each neuron cell body to connect your 100 billion neurons to each other or to muscles, organs, or glands.

AXONS #4

Your axons are the thin threadlike fibers called axon filaments, which extend from each cell body of your 100 billion neurons to either other neurons, senses, internal organs, glands, or to your muscles through special end terminals known as axon terminal buttons.

An axon's filament attaches to a neuron's cell body and its function is to carry biochemical currents (ionic impulses or signals) from the cell body to the end terminals (extensions) at the other end of each neuron.

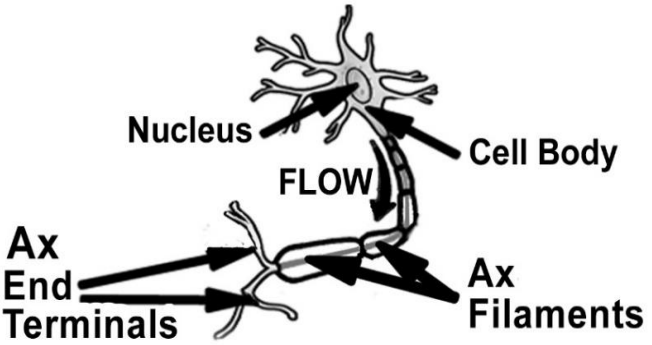
The terminals attach through biochemical junctions (electro-chemical switches) known as synapses, which relay ionic signals from neuron to neuron, and from your neurons to all the other organs, glands, senses, and muscles in your body. The biochemical signals can flow through very short or very long filaments.

For example, your sciatica nerve, which is the longest nerve in your body, sends biochemical currents from the cell bodies in the neuron fibers of your lower back down your two legs to the end terminal buttons at the other end of the two neuron filaments, which both terminate at the back of the heals of your feet.

Typically, at least 10,000-15,000 synapses are attached to the end terminals of one neuron's filament. However, there can be as few as a ***single neuron*** for each memory of a popular super celebrity or a revered relative such as a parent or grandparent.

BRAIN IDEA #4

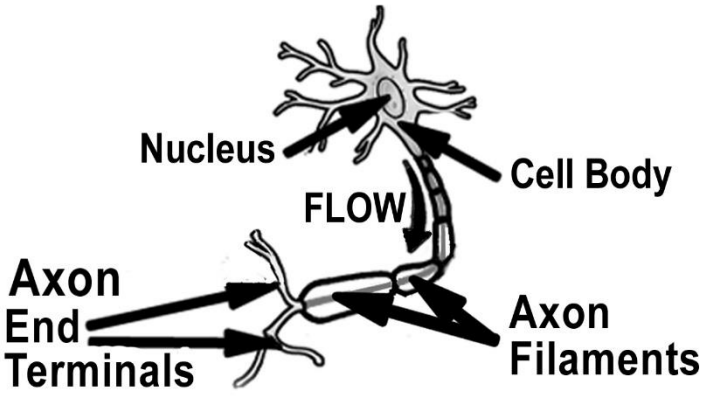
AX = ? **#4**



MODEL OF A SINGLE NEURON CELL BODY SENDING A BIOCHEMICAL CURRENT TO ITS END TERMINALS

What are the thin filaments inside your 100 billion neurons that conduct biochemical currents of ions from the nucleus of a neuron to the end terminals of neurons that activate your body and brain's mental functions?

AXONS #4



MODEL OF AN AXON FILAMENT CONDUCTING BIOCHEMICAL CURRENT (IONIC SIGNALS) TO ITS END TERMINALS

Axons are the long thin threadlike filaments that transmit biochemical signals from the nucleus to the axon end terminals of a neuron to stimulate your muscles,organs, glands,senses, and neurons.

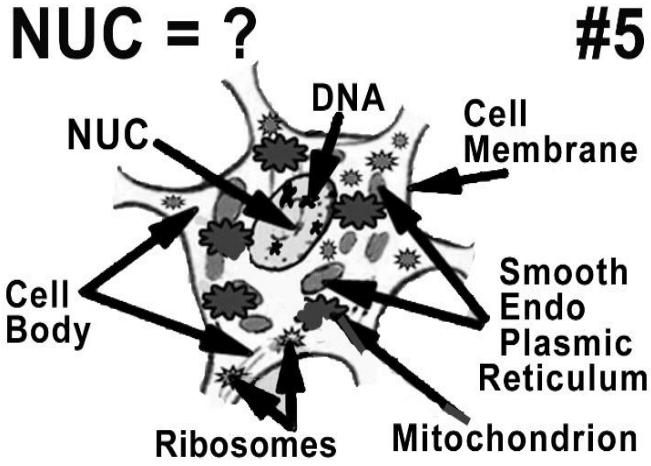
NUCLEUS OF A NEURON #5

The nucleus of a neuron is the source of ***action potential spikes*** (biochemical signals) that are sent down a neuron's filament to cross a synaptic gap when it is activated by your, actions whether new experiences or habits. The elementary and fundamental function of the ***nucleus of a neuron*** is that it is the smallest functioning unit and ultimate building block of human consciousness and free will.

All your 100 billion neurons have ***nucleuses*** capable of sending ***action potential signals*** to other neurons, senses, internal organs, glands, and your muscles. These action potential spikes are the ***cause*** of the fact your ***neurons can connect*** to each other and with your muscles, organs, and glands.

They connect through ***synapses*** which can turn the action potential signals **ON** or **OFF**.

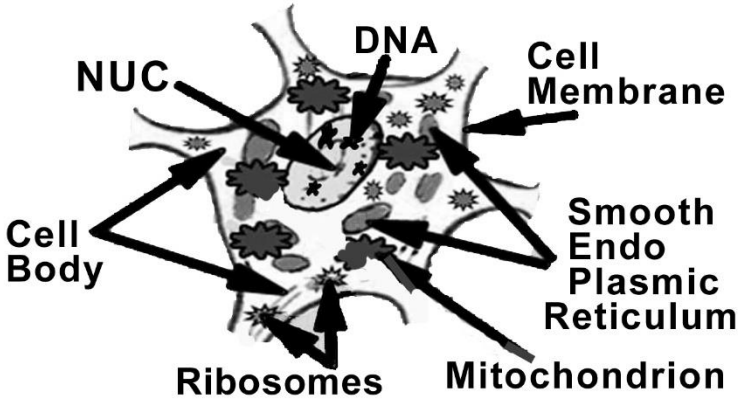
BRAIN IDEA #5



MODEL OF THE CENTER OF A NEURON CELL BODY, INCLUDING ITS DNA, SURROUNDED BY MANY ORGANELLES SUCH AS RIBOSOMES AND MITOCHONDRION

What is the source of the action potential spikes flowing through neurons that connect the signals through synapses that attach to the dendrites of other neurons to activate your muscles, organs, glands, and senses?

NUCLEUS #5



MODEL OF THE NUCLEUS OF A NEURON INSIDE THE CELL BODY WITH ITS MANY ORGANELLES, INCLUDING DNA IN THE NUCLEUS

The nucleus of a neuron is like a complex chemical factory that is the source of the action potential spikes that flow through the axon filaments of neurons to the end-terminals of neurons where they attach through synapses to the dendrites of other neurons.

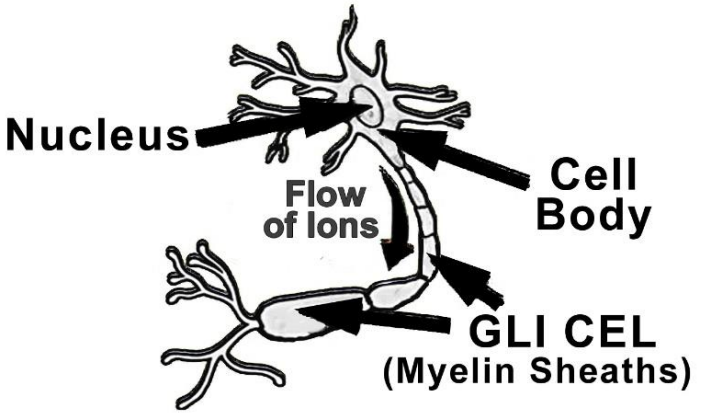
GLIAL CELLS #6

Your glial cells are the approximately 900 billion brain cells in your brain and nervous system that protect and facilitate the functioning of your 100 billion neurons. They are the specialized brain cells known as "white matter" which cover the axon filaments of your neurons with myelin sheaths. They nourish, lubricate, and protect the axon filaments of your neurons from toxins.

Your glial cells permit action potential spikes of biochemical electrical current (signals) to flow through the axon filaments faster and they insulate them from the signals of other neurons.

BRAIN IDEA #6

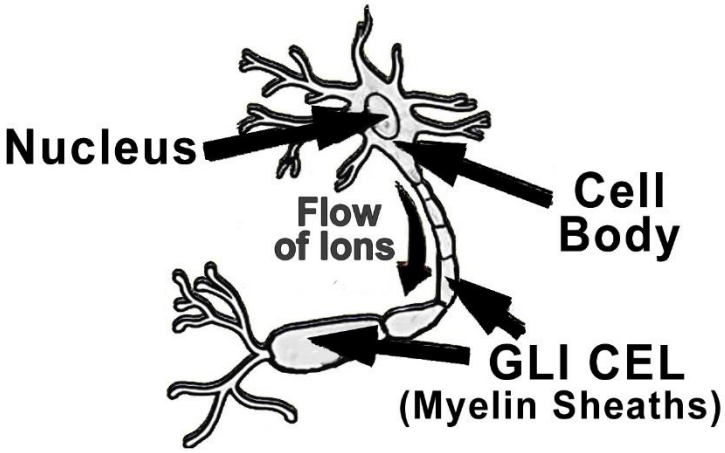
GLI CEL = ? #6



MODEL OF A SINGLE AXON FILAMENT COVERED BY WHITE MATTER KNOWN AS MYELIN SHEATHS

What are the brain cells known as "white matter" that surround the axon filaments of your 100 billion neurons to protect and nourish them so the ionic signals moving from cell bodies can flow faster?

GLIAL CELLS #6



MODEL OF THE WAY GLIAL CELLS COVER THE AXON FILAMENTS OF NEURONS SO THEIR BIOCHEMICAL SIGNALS ARE NOURISHED AND PROTECTED FROM TOXINS

Glial cells are the brain cells known as "white matter" that form myelin sheaths around axon filaments to protect and nourish them so ions can flow faster down the filaments.

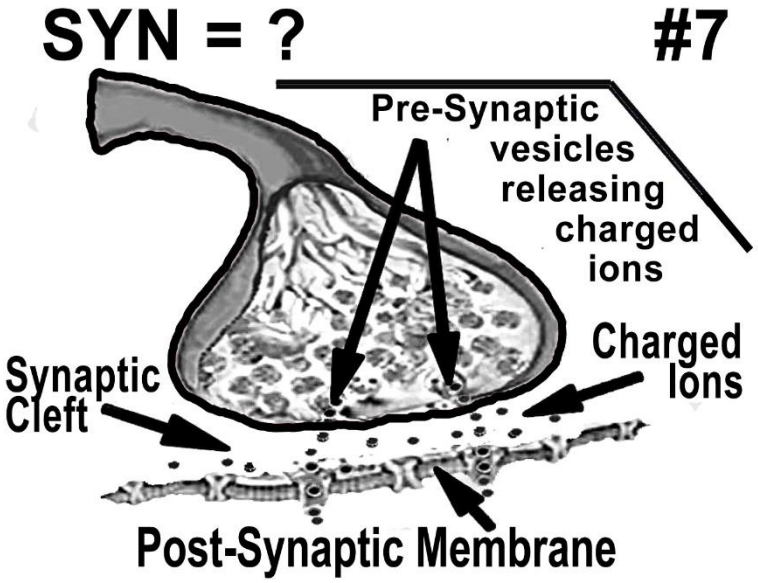
SYNAPSES #7

The purpose of your synapses is to make possible the transmission of biochemical currents (ionic impulses or signals) from neuron to neuron all around your brain and up and down your body.

Your synapses are the 900 trillion electro-chemical junctions or biochemical switches, that allow the 100 billion neurons in your brain and nervous system to send signals to and from your senses and to and from your many bodily organs. this signaling process is what ultimately makes possible your human consciousness.

Your brain's ***transduction signaling process*** is caused by the way your neurons and your synapses are connected at the microscopic quantum level of human existence.

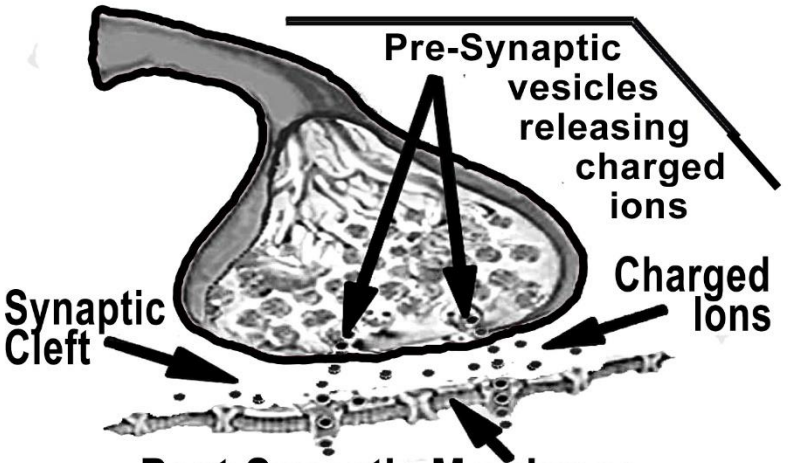
BRAIN IDEA #7



MODEL OF THE WAY NEURONS CONNECT TO EACH OTHER BY SENDING BIOCHEMICAL SIGNALS FROM PRE-SYNAPTIC MEMBRANES TO POST-SYNAPTIC MEMBRANES

What are the trillions of tiny biochemical junctions that connect neurons and switch the ionic flow of neurons ON or OFF?

SYNAPSES #7



MODEL OF A SINGLE SYNAPSE WITH ITS SYNAPTIC CLEFT (GAP) AND POST-SYNAPTIC MEMBRANE

Your 900 trillion synapses are the tiny electrochemical junctions that switch on or off your 100 billion neurons that flow from your neuron cell bodies to power the processes of neuroplasticity and potentiation.

POTENTIATION #8

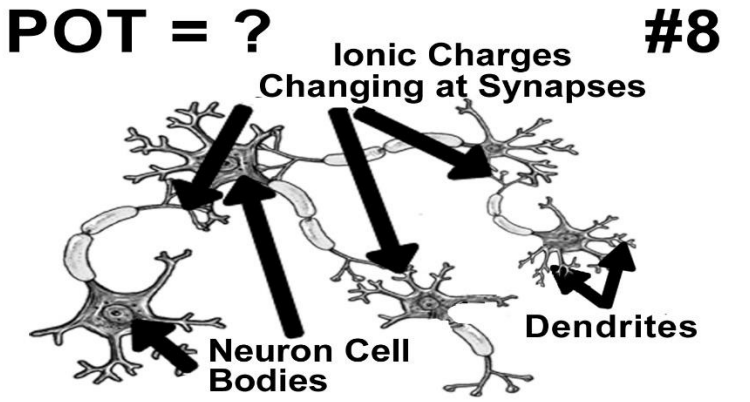
The purpose of potentiation, which is short for long-term potentiation, is to make cellular communication possible among all of the neuronal brain cells throughout your brain (cranium) and nervous system (body). The transduction action of potentiation activates the neurons in your neuronal pathways and makes possible your mind's mental force.

The function of long-term potentiation is to strengthen the action potential spikes in neuronal pathways by adding connections to more neurons through the repeated signaling of ionic currents along the particular neuronal pathways being stimulated (excited) or blocked (inhibited).

It is this biochemical communication process that causes a habit to form through repeating a certain physical behavior or mental idea until it is consciously or sub-consciously registered in your working memory and then transferred to your long-term memory system where it is unconsciously remembered. This happens inside neural pathways when the ionic currents (biochemical signals) are associated with strong emotions or repeated enough due to training or incidental routine behavior to create "memory triggers" that are "wired" into your long-term memory system in your hippocampus.

This fundamental biological process can produce new memories of all the sensations that your mind's mental force is aware of from both inside and outside your body. For example, procedural memory, which is also called muscle memory, deals with physical skills and habits of movement that are made possible by the potentiation process. The process is the repeated signaling of thousands or hundreds of thousands of action potential spikes of ionic current that are forwarded from your working memory system to your long-term memory system.

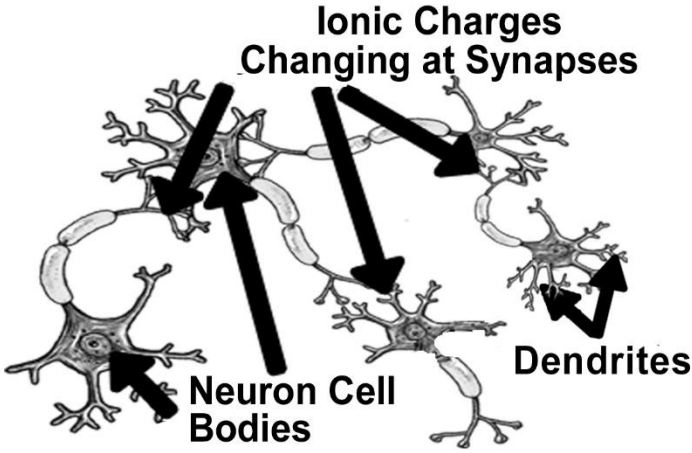
BRAIN IDEA #8



MODEL SHOWING YOUR NEURONS CONNECTING TO EACH OTHER BY SENDING PRE-SYNAPTIC IONIC CHARGES THROUGH SYNAPTIC CLEFS (GAPS) TO BECOME POST-SYNAPTIC IONIC CHARGES

What is the cellular microscopic communication process that makes consciousness and bodily movements possible due to the way "action potential spikes" of current flow through synapses to connect all of your neurons?

POTENTIATION #8



MODEL OF POTENTIATION AS NEURONS ATTACH TO EACH OTHER AT SYNAPSES AND USE IONIC CURRENT TO SEND SIGNALS IN YOUR BRAIN AND AROUND YOUR BODY

Potentiation is the cellular communication process that sends "action potential spikes" flowing from neuron to neuron to make possible your infinate adaptability and consciousness.

CONNECTOME #9

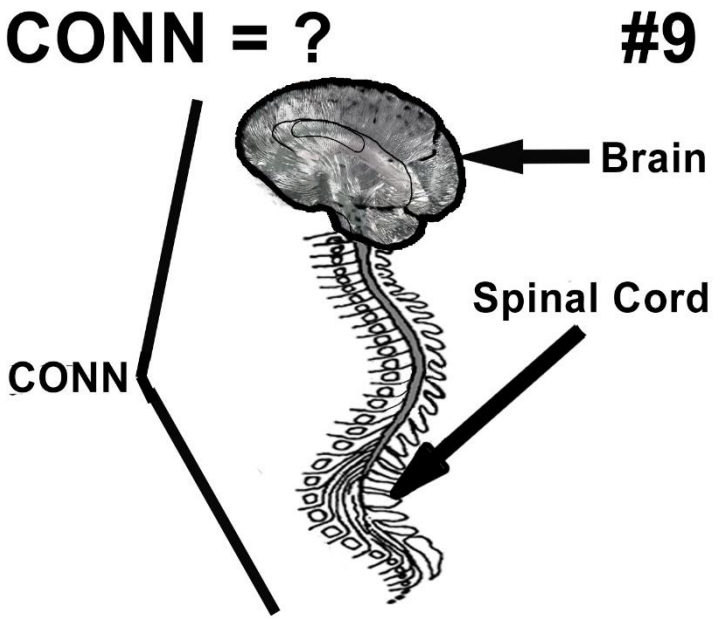
The purpose of your connectome is to make possible the transmission of biochemical current (ionic signals) all around your brain and up and down your body. The word connectome describes the biological structure of the 3-D communication network, which connects your brain to your nervous system (the rest of your body).

In addition, the massive complexity of your connectome network structures makes possible your brain's plasticity process and, therefore, your mind's ability to reason and, therefore, to adapt to virtually any challenge.

Thus, this intrinsic biological process of your brain's plasticity function (using the physical structure of your connectome) gives you the unique ability of your mind's adaptable mental functions, that includes ***"Your brain's ability to change itself by itself."***

Therefore, the functional interactions between the biological structure of your body's connectome and the psychological process of your mind's ability to reason gives you the power to be a creative person with willpower and the freedom to choose among many options to create a potentially infinite number of solutions to problems. Since we live in the most technically sophisticated civilization that has ever existed, your choices are limited only by your own personal knowledge and motivation to create your own goals and make plans to achieve them.

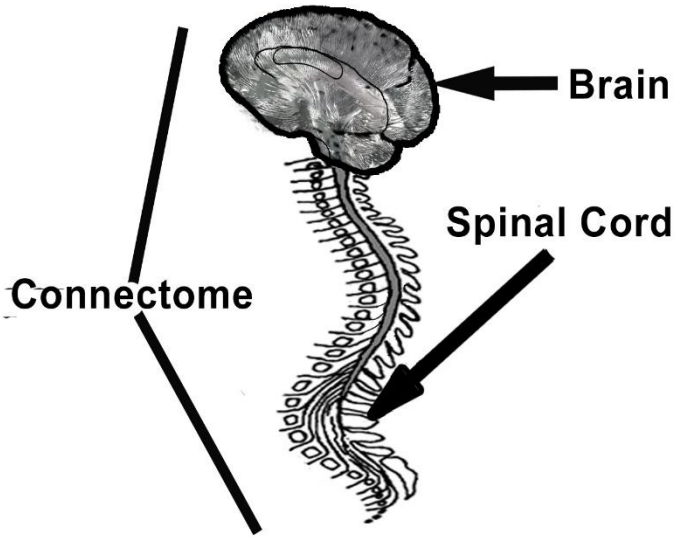
BRAIN IDEA #9



MODEL OF YOUR 3-DIMENSIONAL CONNECTOME CONSISTING OF YOUR BRAIN AND SPINAL CORD

What is the three dimensional cellular communication network that connects your brain and spinal cord and is a major cause of your conscious self-awareness and free will?

CONNECTOME #9



MODEL OF YOUR 3-DIMENSIONAL CONNECTOME CONSISTING OF YOUR BRAIN AND SPINAL CORD

Your connectome consists of all the interactive nerve fibers and neuronal pathways in your brain and spinal cord that make your consciousness and movements possible.

By increasing your vocabulary, you will be expanding your conscious self-awareness. You will be building your intellect (brainpower) so you can make your own decisions and choose your own unique mindful responsive behavior to any condition. This is better than merely reacting by habit.

Historically, your biochemical connectome network was simply called your brain and brainstem and spinal cord without any detailed explanation of how your brain and body were connected to communicate at the extremely tiny molecular level of quantum effects.

Now, however, the microscopic functions of your biochemical current (electrochemical ions), whether polarized, depolarized, or re-polarized in the zillions of molecules of your 100 billion neurons and 900 trillion synapses are understood well enough by brain scientists and science journalists to give you clear descriptions so you can learn about them and use the practical knowledge to better cope with the daily challenges of existence and lifelong quest for increased intimacy and wisdom.

In addition, the smaller connectome circuits within the larger connectome network have a variety of specialized functions that make possible an infinite number of possible connections among your 100 billion neurons. The smaller cortical and neuronal connectome circuits can activate a vast number of diverse movements that you do either consciously or unconsciously.

PLASTICITY #10
(NEUROPLASTICITY)

The evolutionary purpose of your brain's ***plasticity process*** (neuroplasticity) is that it makes you adaptable by making it possible for you to learn from changes in the environment and your own experiences how to survive and thrive.

Now that you are aware of the massive complexity of your connectome's neuronal pathway structures, you will be able to understand how it produces your brain's plasticity. The plasticity process includes your brain's ability to modify itself through learning more complex language skills and increasing your vocabulary as you learn to make more useful choices and manage your habits better.

The ***neuroplasticity process*** makes possible your mind's mental force and, therefore, your ability to reason and imagine. Now modern scientific knowledge can explain in plain English the way in which your billions of neurons and trillions of synapses are attached to each other and how they function together to create your coherent self-awareness or sense-identity through the learning process as your mind interacts with culture and nature to activate your conscious self-awareness, and memory systems.

BRAIN IDEA #10

PLAS = ? **#10**

NEURONS ARE THE SPARKS OF LIFE
K+ = Potassium ions (positive)
NA- = Sodium ions (negative)

MODEL OF THE ADAPTABILTY OF YOUR BRAIN THAT MAKES FREE WILL POSSIBLE

What is the adaptive process of your brain's connectome that is one of the essential causes of your ability to think, feel, learn, and create new things?

PLASTICITY #10

NEURONS ARE THE SPARKS OF LIFE

K+ = Potassium ions (positive)
NA- = Sodium ions (negative)

MODEL OF THE PLASTICITY PROCESS THAT MAKES YOUR ADAPTABLE BRAIN POSSIBLE

Plasticity is the adaptive process of your brain that causes your ability to think, feel, learn, and create new things due to the flow of ions through synapses.

This phenomenal adaptive cellular communication process has a dimension known as **"synaptic plasticity".** Since your ***neurons*** and ***synapses*** are jointly involved in the ***exchange of ionic isotopes*** of potassium (**NA-**) and sodium (**K+**) at the location of each of your 900 billion synapses, which make possible your and infinite adaptability.

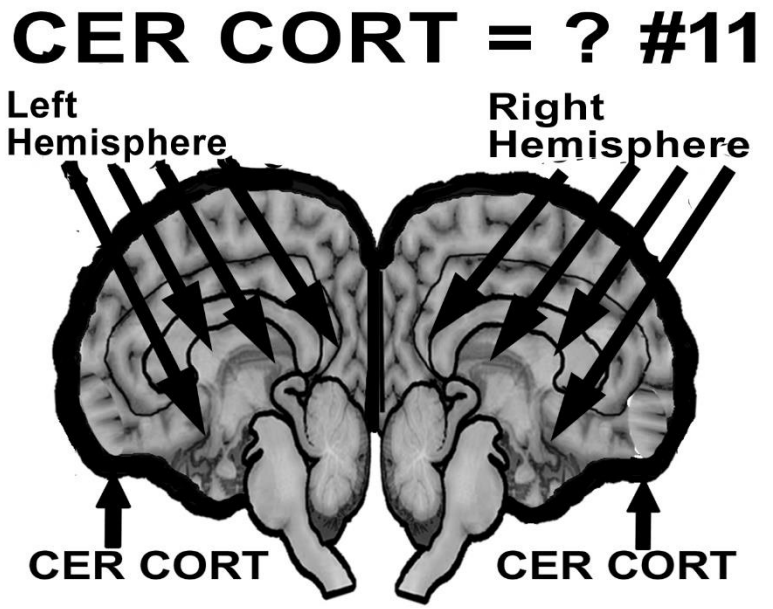
It is important to realize that the process of ***synaptic plasticity*** depends upon how well all the other interactive and interdependent parts of the network that consists of your brain and nervous system, known as your connectome are coordinated. It is called your ***connectome*** because it ***connects*** your brain and nervous system at both macro and micro circuit levels.

CEREBRAL CORTEX #11

The primary purpose of your cerebral cortex is to control your conscious bodily movements. It is the outermost layer of your brain that is responsible for higher thought processes including speech and decision making. It gives you conscious control over your behavior by generating biochemical currents or signals that control your thoughts, feeling, and memories so you will be able to make smart decisions regarding survival.

Since humans have evolved to become the greatest survivalists on earth, it is important to know how your cerebral cortex caused humans to become the most dominant species on earth.

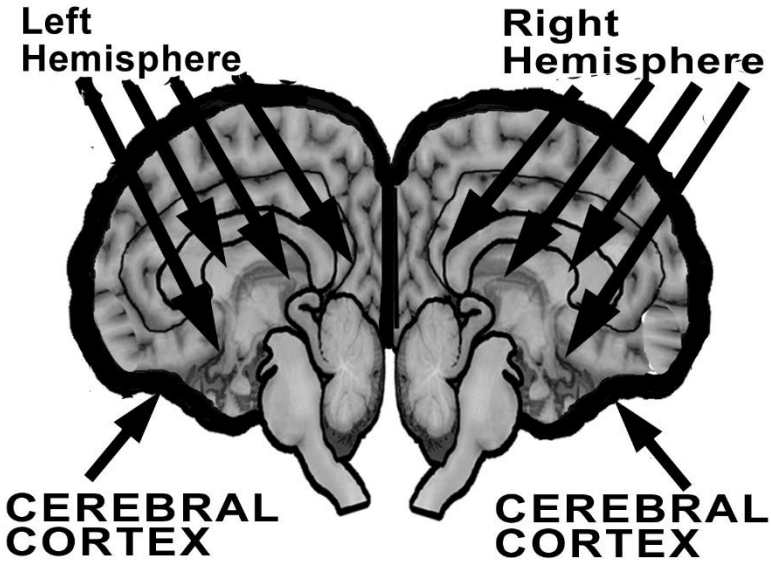
BRAIN IDEA #11



MIRROR IMAGE MODEL OF THE COVER OF YOUR BRAIN'S TWO CEREBRAL HEMISPHERES

What is the thin wrinkled outer layer of "gray matter" that covers both of your cerebral hemispheres and is the newest part of your evolutionary brain?

CEREBRAL CORTEX #11



MIRROR IMAGE MODEL OF YOUR EVOLUTIONARY BRAIN'S CEREBRAL CORTEX

Your cerebral cortex is the thin outer cover of your brain's two hemispheres, which consists of neurons known as "gray matter."

Our cerebral cortex provides us with more brainpower than any other animal has, including animals which are larger in physical size who have larger brains. That is because their brains have proportionally less cerebral cortex tissue than our human brains.

Since your cerebrum is split into two parts, a left hemisphere and a right hemisphere, your cerebral cortex is often referred to in its divided sense as having two "cortices" (the word is plural for cortex). But whatever names are used, the unmistakable fact is that the primary function of a human brain is to help the body that it is attached to survive.

The cerebral cortex is the newest part of the human brain to have evolved after hundreds of thousands of years of the evolution. In addition, humans developed fully as Homo sapiens only about 40-000-50,000 years ago precisely because of our incredible cerebral cortex, which is hugely larger than the cortex of apes.

PREFRONTAL CORTEX #12

The basic purpose of your prefrontal cortex is to help you survive! It can make you the master of your emotions, which means that it can provide you with "executive control" over your feelings, if you know how to make logical scientific decisions.

Each of the 15 primary brain ideas in the image, which are emphasized on this website, can converge and merge in your mind to produce the mental force

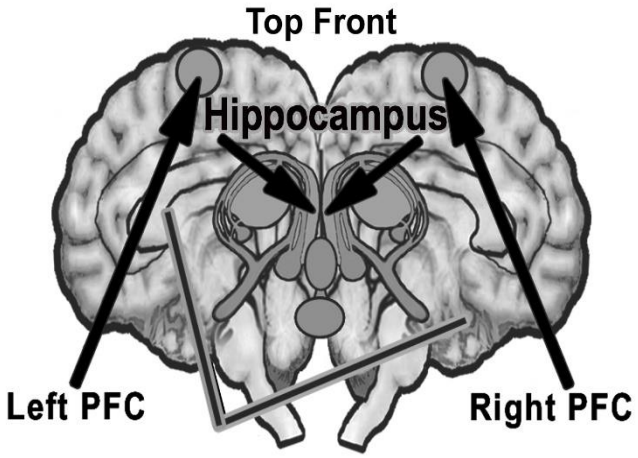
(brainpower) that can empower you to stand up for your self-beliefs. But you must do some critical thinking and critical reading, meaning deliberately "slow" thinking or reasoning in contrast to "fast" thinking, which means instinctual or intuitive thinking based upon learned behaviors and memories of your past experiences and attitudes.

The best way to cope with the new scientific brain knowledge as part of your consciousness is to apply critical thinking skills and critical reading skills to stimulate your creative imagination to empower you to create your own goals and plans for success in the future based upon your humanistic altruistic values.

Critical thinking skills and critical reading skills both involve improving your vocabulary and intelligence and resilience as you seek new knowledge and ask yourself essential questions to satisfy your basic curiosity.

BRAIN IDEA #12

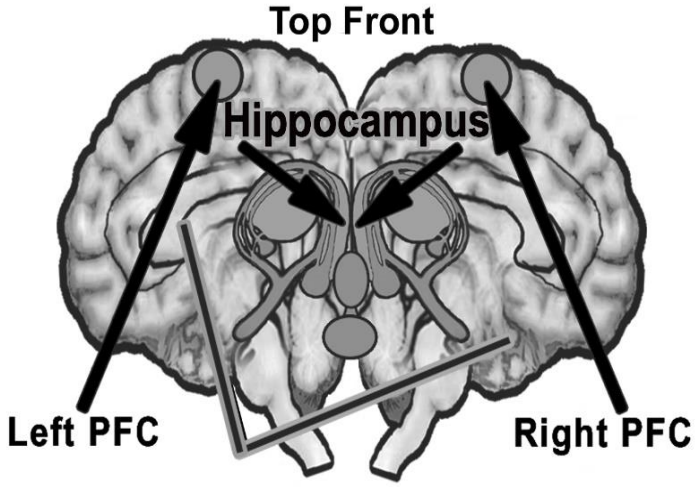
PFC = ? **#12**



MIRROR IMAGE MODEL OF THE SOURCE OF YOUR EXECUTIVE CONTROL FUNCTION COMPARED TO YOUR HIPPOCAMPUS

What are the sources of your self-awareness and conscious executive control functions, including your creative imagination, your ability to reason, and your memory?

PREFRONTAL CORTEX #12



MIRROR IMAGE OF YOUR PREFRONTAL CORTEX (PFC) IN RELATION TO YOUR HIPPOCAMPUS

Your PFC consists of two small clusters of neurons (each the size of a penny) in the front of your cerebrum that are the executive control center for your conscious self-awareness and the source of your working memory and your ability to reason and imagine.

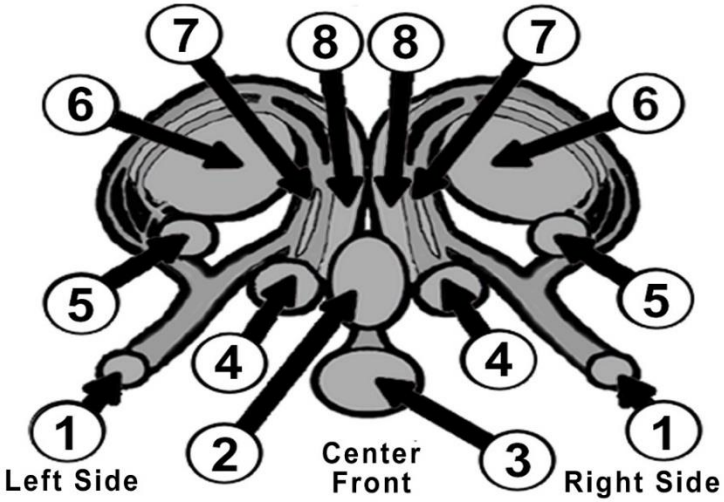
LIMBIC SYSTEM #13

The purpose of your ***limbic system*** is to produce all the motivational energy and emotions that your brain and mind need to help you survive and thrive in a complicated and potentially dangerous environment. To do so, it assists in the preservation of your memories of the most salient experiences and most consequential decisions that saved your life or that worked well for you during the past.

Your limbic system consists of eight major structures, which provide more than eight major functions that are directly involved in your survival activities, particularly, and all of your other thoughts and feelings no matter what their associations are.

BRAIN IDEA #13

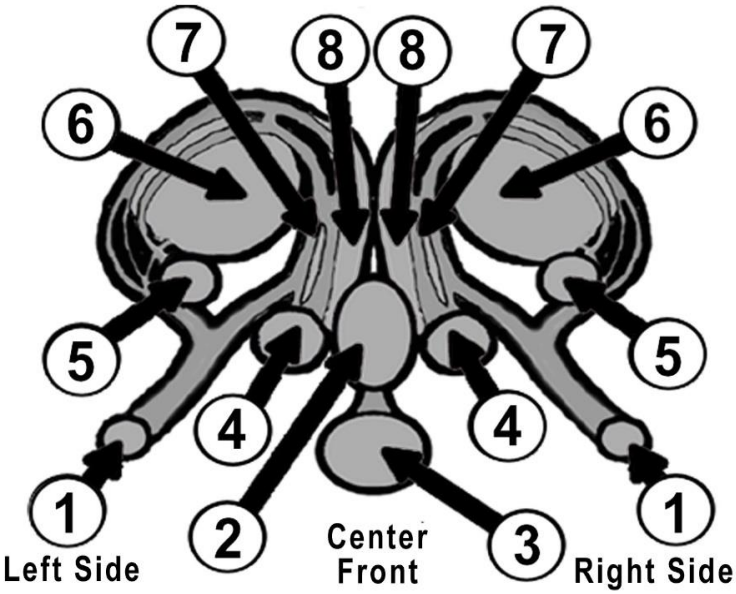
LIM SYS = ? **13**



MIRROR IMAGE DEEP INSIDE UNDER CEREBRAL CORTEX

What part of your brain is known as your "emotional brain"since its eight organs release neurotransmitters and hormones, which create and modulate your emotions based on signals from your senses and prefrontal cortex?

LIMBIC SYSTEM # 13



MIRROR IMAGE DEEP INSIDE UNDER CEREBRAL CORTEX

1. Olfactory bulbs (two sides)
2. Hypothalams (two parts)
3. Pituitary glans ("Master")
4. Amygdala glands (two sides)
5. Pineal glands (two sides)
6. Thalamus (Gateway to Bstem)
7. Hippocampus (two sides)
8. Basal Gangia (two sides)

In addition, since your ***hippocampus*** has several types of long-term memory resources, its healthy functioning is essential for your perception of having a unique persistent authentic self. You have semantic, episodic, and procedural memory modules with triggers inside your hippocampus.

The latest brain research has demonstrated that your brain's prefrontal cortex, which is your executive decision maker, does not develop fully until the mid-20s and early 30s of a person's life. Therefore, a person's ability to reason cannot control strong emotions as easily and as fully until the third decade of life. For example, the strong bonding feelings that are evoked by the social peer groups in the second decade of life are hard for an individual to overcome until his or her prefrontal cortex is fully developed in the 30s.

When you understand yourself from this new perspective of humanistic and scientific reasoning, the self-image that you construct from your life experiences is the genuine real deal, not some fanciful illusion or twisted delusion. Unfortunately, your limbic system can also preserve a lot of useless, dysfunctional memories of social habits and mindsets, including a variety of addictions, that were learned in your childhood and youth before you were prepared through proper education to establish complete control over your feelings.

Nevertheless, the eight vital brain structures of your limbic system produce many kinds of neurotransmitters that stimulate each other and your

many hormones that flow through your blood (circulation system) or your neuronal pathways (biochemical signals) to activate a range of feelings all over your body.

YOUR LIMBIC SYSTEM
HAS EIGHT MAJOR PARTS
(See the numbered list below)

[1] OLFACTORY BULBS (These two bulbs, which are located on each side of your ***limbic system complex*** at the front, are attached inside your two nostrils to give you the sense of smell).

[2] HYPOTHALAMUS (Though it consists of only one organ structure, it is divided into two separate parts with many essential functions for regulating consciousness).

[3] PITUITARY GLAND (This single organ structure is known as the **"master gland"** since it controls the release of many neurotransmitters and hormones).

[4] AMYGDALA GLANDS (These two glands, one in each hemisphere, consist of two parts linked together in the limbic system complex to activate feelings of anxiety, fear, and pleasure as well as memory functions).

[5] PINEAL GLANDS (These glands are on both sides of your limbic system complex and regulate sleep behavior since they control your circadian clock).

[6] THALAMUS (This single brain structure in your limbic system complex connects your brainstem to the rest of your brain and is known as the **"gateway"** to

your brainstem).

[7] HIPPOCAMPUS = (A part of your limbic system that lies on the inside of each temporal lobe and which is crucial for spatial movement (navigation) and encoding and retrieving long term memories).

[8] BASAL GANGLIA (This bundle of nuclei at the bottom of both sides of your limbic system complex is divided into several sections including the striatum and globus pallidus. It primarily deals with selecting and mediating movement.).

PLEASURE CIRCUIT #14

The evolutionary purpose of your pleasure circuit is to produce emotional pleasure and rewards of all kinds as motivation for your resilience and endurance in the face of uncertainty and the difficult challenges of surviving in hostile conditions and thriving in safe and secure situations.

You are a survivor of nearly unimaginable odds over hundreds of thousands of years, because human beings could have evolved in other ways as is shown by the fossil record of earlier pre-humans and protohumans before homo sapiens became dominant between 30,000-40,000 years ago.

Think of the small animals roaming around and escaping the claws and teeth and feet of gigantic dinosaurs 60 million years ago. Some of those animals evolved into us after one of the five major extinctions

during the geologic shifts in the continents and ice ages, which wiped out a huge number of species who had previously lived on planet Earth.

Now that we are living with sophisticated technology created by science and engineering, which can control many of the destructive conditions of nature, the use of the logic of the scientific method has proven to be the best measure of what humans can achieve.

As the victor in the great battle to survive and thrive, we humans have won out over all other animals. This was due to our large brains and partly to the human pleasure circuit, which has provided us with the pleasure instinct and other reasons for willing to stay alive (will to live). You have pleasure circuits, that can be activated both consciously or unconsciously for many reasons and anytime you think it is appropriate for you to feel good.

The problem is that we live in a culturally contextualized world due to the influence of our birth language and the socio-economic structure of the families and communities we were born into.

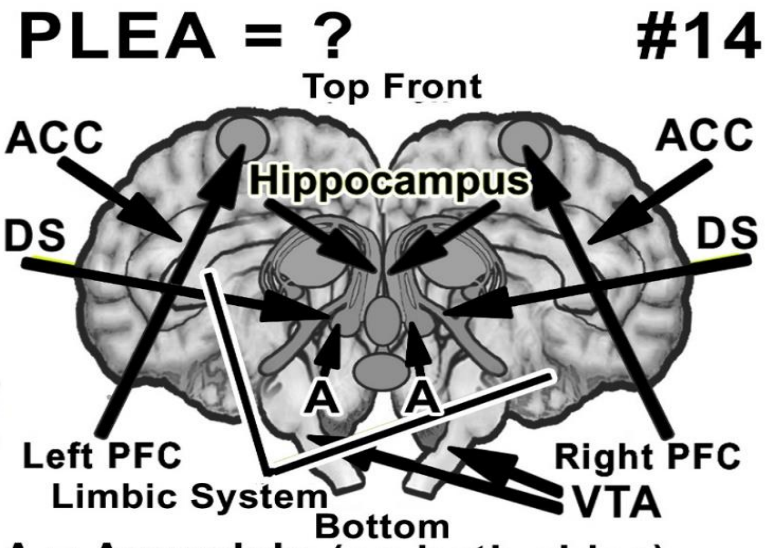
If your early education perpetuated the basic language of your parents and childhood caregivers, then you were stuck in a peculiar version of reality influenced by the words and grammar that you learned. Until high school or college, you did not have much choice unless you had influential humanistic teachers and mentors in your life who taught you how to be an independent critical thinker with an open mind. The significant challenge after formal education was for you to develop

an appreciation for lifelong self-education to keep your mind ready to solve more complex problems in a fast-changing global business culture.

It is assumed that brain science along with evolutionary biology and cognitive psychology can provide the best intellectual foundation for all future thinking and problem-solving activities. New scientific ideas about managing your pleasure circuit are more easily accessible now than at any other time in human history through technical education and skill training programs.

Your instinctual need for pleasure can be modified by understanding at the basic biological level how your thoughts can control your feelings. You can create a healthy sustainable emotional balance in your life by yourself --- with a little help from your friends and brain scientists. You can get off the hedonic treadmill of addictive cravings and meaningless social trivialities by asserting your basic humanistic rational quest for meaning in satisfying your curiosity by seeking knowledge and helping others for altruistic purposes.

BRAIN IDEA #14

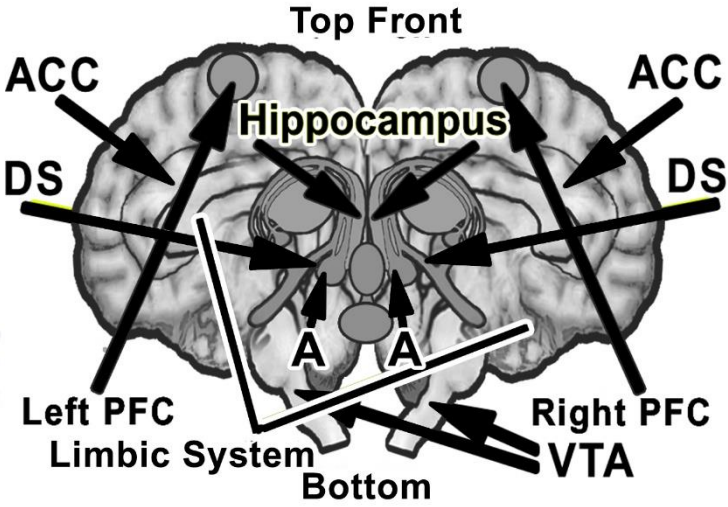


A = Amygdala (on both sides)
ACCE = Anterior Cingulate Cortex
DS = Dorsal Striatum Basal Cortex
VTA = Ventral Tegmental Area

MIRROR IMAGE MODEL OF YOUR REWARD SYSTEM CIRCUIT

What circuit in your brain is the source of all the happy feelings that you associate with fun and meaning in your life as well as sad feelings?

PLEASURE CIRCUIT #14



A = Amygdala (on both sides)
ACCE = Anterior Cingulate Cortex
DS = Dorsal Striatum Basal Cortex
VTA = Ventral Tegmental Area

MODEL OF YOUR PLEASURE CIRCUIT (REWARD SYSTEM)

Your pleasure circuit is the source of all the happy feelings that you feel about fun and meaning in your life and includes sadness and depression.

BRAIN IDEA #15

The evolutionary purpose of ***your long-term memory*** system is to consolidate memories that are useful for survival purposes in the future.

This awesome purpose can be understood by learning the distinctions among three kinds of long-term memory.

They are: [1] episodic memory for recalling events; [2] semantic memory for recalling facts; and [3] implicit memory for doing routine activities like eating or remembering how to brush your teeth or knowing where to find your clothes in the morning or recognizing the faces of your family members and friends. (See below for more book information: Working Memory, 2013, page 160).

REMINDER FROM BRAIN IDEA #1 WORKING MEMORY

"The relationship between working memory and long-term memory system is like that of a librarian and a library. Like a librarian, working memory allows you to search through the books, or information, stored in the library to accomplish a specific task." (page 160)

"With Alzheimer's disease, both elements are under attack: the librarian struggles to search through the stacks, and the worms are eating through the books. A shrinking working memory has a detrimental effect on

your ability to access the books, to search through the library and find and apply what you need." (page 160)

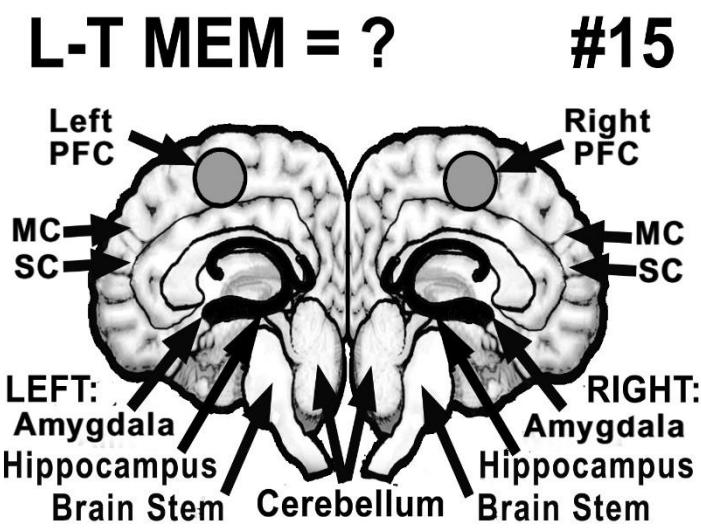
"And when the books deteriorate, it is much harder to read what remains." (page 160)

“Working memory is such a dynamic and adaptive tool that if it remains strong, even if Alzheimer's begins to eat away at your neurons, it may in fact help to prevent you from experiencing the cognitive symptoms associated with the disease" for a long time. (page 160).

What are the secrets of making your long-term memory system more efficient? There are ***three powerful learning techniques*** that can improve the functioning of your working memory in its relationship to your long-term memory. They are: (1) Code Breakers; (2) Bootstrapping; and (3) Chunking.

Technique can be used to quicken recall of the 15 major brain ideas, if you develop a step by step plan to remember them in your long-term memory system. For example, the 15 memory codes featured on this website can be used to remember the 15 brain ideas through the spaced-repetition method of learning by association. (page 182).

BRAIN IDEA #15

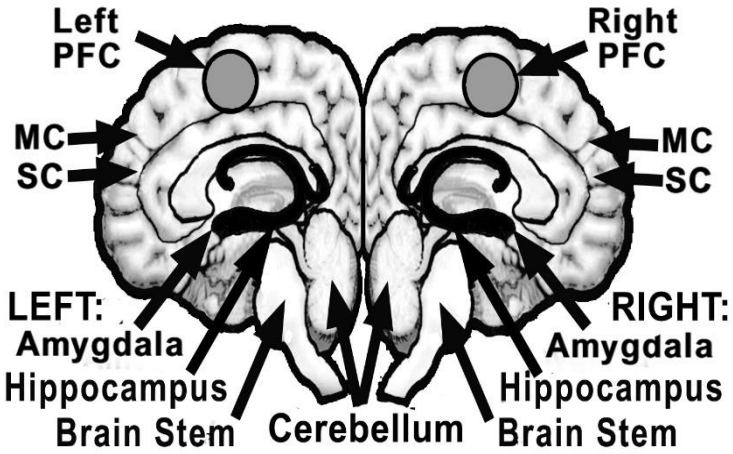


Left PFC = Left Prefrontal Cortex
Right PFC = Right Prefrontal Cortex
MC = Motor Cortex (signals to body)
SC = Sensory Cortex (signals to brain)

MIRROR IMAGE MODEL OF YOUR PERMENENT MEMORY

What complex mental process is necessary for you to remember past experiences, be self-aware, perceive reality, and reconstruct memories with feelings?

LONG-TERM MEMORY #15



Left PFC = Left PreFrontal Cortex
Right PFC = Right PreFrontal Cortex
MC = Motor Cortex (signals to body)
SC = Sensory Cortex (signals to brain)

MIRROR IMAGE MODEL OF YOUR LONG-TERM MEMORY

Your long-term memory is a primary cause of the complex mental process necessary for you to remember past experiences, be self-aware, perceive reality, and reconstruct memories with feelings.

(2) The Bootrapping Technique of learning involves the process of combining (binding) verbal information (text) with visual information (brain diagrams or graphic images) by using both your working memory system and your long-term memory system. This technique can help you process (consolidate) information such as the brain names and their definitions and the details about each brain idea so all the information can be integrated, retained, and retrieved at will. (page 183).

(3) The Chunking Technique of memorization involves a method of breaking down complex information, such as the description of your brain's many amazing functions, into smaller subparts or "chunks". Then they can be committed to your long-term memory system. "With long chunks of information stored in your long-term memory, your working memory "conductor" can prioritize and manage data more efficiently." (page 183).

BOOK SOURCE = Working Memory Advantage, 2013; especially see the appendix section containing the **Working Memory Quick Hits Manual** on pages 280-291.

HOW DOES KNOWING ABOUT YOUR BRAIN HELP YOU THRIVE?

The new brain facts and vocabulary can help you reinvent yourself and transform your attitudes and habits into successful skills for fearlessly expressing your humanistic values. You can learn to become prepared to meet the challenges of the future successfully.

The structure of this website is designed to help you use ***critical thinking skills*** and ***critical reading strategies*** to cope with the enormous complexity of your brain's interactive organic structures. Thinking about your brain's physical structures in a systematic way can help you understand what your mind's functions are able to achieve.

Now is the perfect time to learn about the new evidence-based brain knowledge. It involves learning and understanding what truly causes an enlightened consciousness and an enlarged self-awareness.

Your mindsets (attitudes) and habits (routine unconscious daily behaviors) are all learned cultural behaviors. They are the genuine psycho-social causes and shapers of your behavior including your moment by moment conscious self-awareness.

Moreover, these same mental and cultural causes and shapers (especially language) make your free will possible due to the evolutionary nano-microscopic molecular quantum processes inside your brain that also make your consciousness possible.

You can discover which brain circuits cause normal positive behaviors, such as creative decision making, and which brain circuits cause abnormal negative behaviors, such as chemical addictions, chronic anxiety, and learned helplessness.

As you learn how the feedback and feedforward loops of your evolutionary brain's ***neuronal circuits***

work, you will be able to understand how to choose the ideas and ideals that will help you thrive in the future, no matter what challenges you face or what problems you need to solve.

Since you live in the most technically sophisticated civilization in history, your choices are limited only by your motivation to create your own reasonable goals and sensible plans for achieving them.

You have the freedom to choose from many attitudes and behaviors displayed in the mass media 24 hours a day and seven days a week. However, the mass media opportunities for viewing various lifestyles and innumerable events globally can be overpowering. The pressures of living in the rapidly changing digitized global world of the 21st century can cause extreme psychological instability or mental disorders, especially if you are not confident about your own abilities and skills to cope with the social pressures.

Thus, your freedom is constantly being threatened by destructive cultural pressures to conform to the goals and plans of others, such as business corporations and social institutions. This is due to the powerful influence of business advertising, which all children are born into and all adults have been exposed to throughout their lives. We have all been exposed to the **"shop until you drop"** description of a common response to the **"buy now or you will regret it"** slogan of businesses.

Every day your brain is vulnerable to hidden cultural pressures, which can shape your behavior, if you

are not aware of what they are doing to your brain 24 hours each day if you let them. Prominent among the many negative cultural influences, which can upset your brain's fragile balance, are the steady stream of marketing distractions from the mass media and social media and entertainment companies.

The large number of disruptive images and sounds from the mass media and social media and other cultural institutions can diminish your self-identity and decrease your happiness level, if you passively let them influence you through learned helplessness. However, by learning how to control your own emotions, you can combat many kinds of manipulation, such as gaslighting.

Nevertheless, you can learn to protect your ***mind's mental force*** from the pervasive negative cultural influences with their menacing metaphorical memes. The definition of meme is now in the Oxford English Dictionary as "An element of a culture that can be passed on by non-genetic means, especially imitation." This phrase was cited in the book**, The Meme Machine**, in the foreword by Richard Dawkins on page viii. The book was written by Susan Blackmore with a Foreword by Richard Dawkins, Oxford University Press, 1999 (i-xx, 264 pages).

A ***meme*** is the fundamental unit of information, analogous to the gene in the emerging evolutionary theory of culture and epigenetics. Memes have the characteristic of being pervasive thoughts or thought patterns that replicate themselves through cultural means

(socialization), such as cliches or analogies or parasitic codes or viruses of the mind that are contagious to vulnerable children and naïve impressionable adults.

For example, many ***commercial memes*** are dangerous for your brain since they can distort or exaggerate the importance of products for the maximum profit of enterprising corporations instead of providing transparent evidence-based healthy options for consumers.

Some of the most dangerous cultural metaphors are ***memes.*** They are ideas, beliefs or belief systems, or patterns of behavior, which can spread throughout a culture (any social group) either vertically by cultural inheritance (as by parents to children) or horizontally by cultural acquisition (as by peers, the news media, or the entertainment media).

Also, such memes can manipulate both individuals and groups through distorting political and economic policies to meet the special interests of corporations rather than the social needs of individuals and groups. In addition, religious memes can vivify ancient religious beliefs to confuse and frighten people and make them anxious about themselves and their futures. This can be a waste of their money and a waste of their precious time.

However, by learning the new brain vocabulary and by making healthy educated decisions regarding your own personal and family welfare, you can reduce the damage of negative cultural influences on your mind's ability to reason. You can use the brain vocabulary to

focus on the positive brain ideas and supporting facts using the scientific method to investigate your brain as well as nature and the cosmos.

You would be using your critical thinking skills and critical reading strategies to search for reasonable answers to solve tough problems and choose the best options for difficult social and political issues.

When you learn the new brain vocabulary, and the new propositional logic that explains the meaning of your ***mind's mental force,*** you will be able to improve your ability to use your ability to reason and creatively solve problems. This fact is based upon your ability to learn new scientific knowledge, which derives from the ***neurosplasticity*** (plasticity) of your brain, which gives you the ability to adapt to changes when you need to make life enhancing changes to promote your own self-identity and to protect your family and friends.

Your ***mind's mental force*** can give you the ability to learn how to make reasonable choices even if you are confused by conflicting social issues and political policies. But you must know how your brain works to overcome the strong pressures of menacing mindless cultural memes that can confuse and depress you and others to the point of becoming depersonalized and dehumanized.

Fortunately, you can become more mindful of your sense-of-self or self-identity and your true humanistic nature, since you were born to be more than a consumer of other people's products and services!

HOW Y OU CAN HELP CHILDREN LEARN ABOUT THEIR BRAINS

This website is especially designed to help parents communicate about the essential 15 brain ideas with their children. Parents need to develop a balanced approach to making sure that their children learn healthy brain habits. The bonus is that what is good for children's brains is also good for children's hearts.

Children need to exercise regularly; eat nutritious foods; get enough sleep; and challenge their brains daily to solve difficult problems by using modern critical thinking skills an strategic reading skills.

The website teaches thinking skills that can provide you with a modern humanistic philosophy of life. You can use this website to provide reliable brain knowledge for dealing with family life relationship issues. It includes brain information related to good parenting practices. To be a humanist parent is to be able to use your intellectual intelligence (IQ) and your emotional intelligence (EQ) to reason effectively and create a fulfilling philosophy of life for yourself and for your children.

You need to apply the modern techniques of critical thinking and critical reading within the context of a secular view of history. As a humanist parent, or someone responsible for teaching children, you need to create balance and challenge in your own life, so you and the children who you guide can create ***more cognitive***

reserve (more resilience) and ***less cognitive dissonance*** (less confusion).

This positive mental approach based upon knowledge and not fantasies can prepare you for emergencies and provide you with the basis for fulfilling family interactions. The idea of increasing cognitive reserve means that you can increase the variety and density of the neuronal connections throughout your brain and nervous system by doing a variety of interesting and challenging new activities daily.

The idea of reducing cognitive dissonance in your own life, and in the lives of your children, refers to conscientiously coping with the mind-numbing assault on the brains of children by the massively disruptive mass media and the addictive social. The compelling commercials compete with educational programs for the ***precious time*** that children need intermingle with other children and people rather than commercials.

Children must be trained to satisfy their own age-related developmental needs of physical, intellectual, and emotional growth through the predictable developmental stages and teachable moments of their young lives.

Unfortunately, when children's brains are distracted so much of the time, childish traditional metaphorical beliefs can be reinforced. Such irrational beliefs can become simplistic even though children need to be developing an appreciation for the complexity of reality as they grow up.

Children could become more enthusiastic about gaining an understanding of science, history, politics, art, and even their own health if they were not constantly pressured to waste so much time on noisy commercials. The 15 basic brain ideas need to be discussed within the family circle and across generations with the appropriate age-related content of words for all ages.

All family members can participate and contribute within the context of mindful growth through the sequence of predictable "ages and stages" concerning childhood growth factors.

As both you and your children learn the new brain ideas in a rational humanistic context, the new scientific insights about brain structures and mind functions can become more useful in everyday decision-making and problem-solving situations.

The new brain knowledge can help children learn to control their thoughts and feelings better by using the most important brain ideas ever discovered. Parents and teachers can teach children progressive mindfulness skills so their behavior and aspirations for the future will reflect the modern humanistic liberal values of respect for diversity, including gender, racial and ethnic inclusion.

The book, **10 Mindful Minutes** by Goldie Hawn and Wendy Holden, describes a wonderful way to introduce children at home or in the classroom to a sensible brain vocabulary and many skill-sets. The book, which was published by the Perigee/Penguin Group,

2011 (218 pages), suggests that parents and teachers can teach children to think of the two parts of their prefrontal cortex as if they were **"Two Wise Owls"** since they are the primary source of their conscious self-awareness. The two prefrontal cortices are the size of a penny in the front section above each eye about an inch below the forehead at the front of the brain on both the left and right cerebral hemispheres.

The other essential part of the human brain that can be taught to children at home or in the classroom is the function of the amygdala. This vital brain function can help children regulate their emotions when they learn that their amygdala is like a **"Guard Dog."**

You can teach children not to be distracted by mass media advertisements and online shopping choices, which their young brains are exposed to every day on television or the radio or podcasts or computers or in movies, or on social media, including music and games.

The new brain vocabulary can empower children to enjoy more meaningful lives when they are taught basic language skills that emphasize the new brain vocabulary. In addition, Children can be taught to respect scientific humanism as they learn how scientists have discovered the hidden causes of human behavior and have invented new ideas and techniques for exploring nature and the universe.

Today, when children's success in life depends more than ever before on independent thinking skills and emotionally intelligent reasoning skills, it is vitally

important to teach them how to determine the rational benefits and the possible risks of their decisions. It is the function of a humanist parent to teach children how to make sane and fair choices based upon reasoning rather than blind obedience.

Unfortunately, our hyper-connected consumption-driven society can itself be a source of brain damage due to the constant disruptive influences by the ubiquitous mass media. Since corporations want to commodify your experience of being a human being by selling you anything and everything, it is important that humanist parents teach their children how to cope with the overwhelming media distractions.

This mindless triggering of unnecessary false emotions by the incessant marketing of the mass media and the social media both require that specific critical thinking skills and critical reading strategies and progressive mindfulness skills can be taught to children.

Then they will be resilient and know how to deal with the enormous distress caused by hyper-commercialism. As both you and your children learn the new brain ideas in a rational humanistic context, the new scientific insights about brain structures and mind functions can become more useful in everyday decision-making and problem-solving situations.

In addition to the brain process of neuroplasticity, brains can change by neurogenesis. It is the growth of new neurons in your limbic system's two olfactory glands, which is the part of your brain required to detect odors,

and in your limbic system's eight separate organs. The hippocampus is the part of your brain that contains the **"triggers"** for the long-term memory system.

This website can help humanist parents teach their children the new whole-brain thinking approach to the scientific understanding of brain structures and mental functions, which is the best way to integrate the new brain knowledge into humanist family living to produce responsible and resilient children. To be most successful, you must discuss the desired behaviors continuously and model them always in your daily activities with your children.

WHAT ARE THE LASTING BENEFITS OF UNDERSTANDING YOUR BRAIN?

Accurate brain knowledge can help you prosper in the real world of scientific thinking about your brain. First, your brain and mind are always connected and always active, even when you are asleep. This website can help you expand your imagination and stimulate more happiness every day.

The new brain knowledge can give you more control over your brain's pleasure circuits and your mind's memory systems, after you learn more about the basis of your ability to reason and make sensible decisions about how you use your ***time.***

Two new brainpower maxims are: **"Your Mind is What Your Brain Does!"** and **"Use it or lose it!"** meaning that your mind is inseparable from your brain

and body and if you don't develop the full resources of your brainpower or mental force, then you will lose the ability to use your brain effectively. This means that you have a powerful embodied self with no need to project a mystical spiritual soul. By using this handbook, you can access many efficient solutions for creating successful outcomes every day.

However, you must decide to manage your time wisely and choose to organize your plans for achieving your basic humanistic needs to love and be loved for rational altruistic purposes. Fortunately, you can gain more confidence in your ability to feel self-confident and to stop intrusive unwanted negative feelings by activating ***whole-brain thinking*** strategies.

Also, you will be able to share accurate up-to-date brain knowledge with others to solve problems and create a sense of well-being for yourself and your friends and relatives. To do it, you must balance your mind's mental forces. This is a gargantuan task, if it is not done correctly, since there are ***internal biological pressures*** from many brain organs competing for your attention as well as many sources of distraction from cultural causes outside your body.

For example, you have strong actionable messages coming into your prefrontal cortex (your brain's executive function) from both sides of your brain (the left hemisphere and the right hemisphere) and you have two opposing functions in the back and front of your brain (the occipital lobes and frontal lobes).

In addition, you have two opposing functions at the top and bottom of your brain (the cerebral cortex and your limbic system). Since these main physical biological brain structures evolved to protect you against environmental threats, such as wild animals and geological catastrophes, like earthquakes, volcanic eruptions, and other combative humans, the many functions of your mind are always competing for your attention during your waking hours --- and even when you are asleep.

Even though your brain and nervous system evolved to detect danger or threats in your environment during the past 3-4 million years, your personal experiences of the past, and your goals for the future, can both play major roles in how you choose to control your behavior and how you strengthen your ability to reason right now.

By learning how your thoughts can control your feelings, you will be able to reduce toxic distress and increase the healthy pleasures in your life. In addition, by learning the new brain vocabulary, you will be empowered to choose a new rational mindset based upon your own experiences and scientific experimental facts to understand your true potential as a creative happy humanistic person.

In addition, you will be able to use your hundreds of millions of ***mirror neurons*** and their hundreds of trillions of synaptic connectors to empathize with others

and to collaborate more successfully with family members and your friends and your social network.

When you choose to focus on a perception of reality based on the new brain facts according to science, you will have a solid rational philosophical basis for making your plans and achieving your goals for the rest of your life. You will be able to escalate up to a higher level of human consciousness, knowing that your goals and plans for achieving them will probably change to become more interesting after you begin to imagine new insights about yourself and imagine new relationships with others based upon your new knowledge about the 15 brain ideas

This will happen because you will be adjusting to new possibilities with the same firm dependable humanistic personal moral values and perceptions of reality. When you become mindful of the awesome ability of your brainpower to cope with the existential conditions of life, you will be able to rise to the challenges that you choose to encounter and master. The **Humanist Alternative** puts full responsibility on you for solving your problems and improving your social relationships in collaboration with your family and 4 friends.

When you make your goals consistent with humanistic values, your self-acceptance and self-esteem can improve. This will empower you to manage your time better. Since no divine intervention has ever been proven to work for anybody, it makes good sense to train your

brain to achieve your highest aspirations yourself, with a little help from the brain scientists cited on this website.

Among the lasting benefits of using this website are its memory boosting structure and its emphasis on specific critical thinking skills and critical reading strategies for understanding the 15 brain ideas.

The humanistic story of your life describes your thoughts and feelings and values through time. Your behavior is an expression of your own preferences and the way you have developed your habits to achieve your goals.

However, if you do not have clear-cut goals, then your behavior may seem confusing and chaotic and cause extra anxiety. Your life may seem to be a disconnected random pattern of events, known by psychologists as **"dissociation".** These symptoms of mental illness impact nearly everyone in societies that have changed rapidly during a short period of time.

That is why modern life with its constant changes can make even normal people feel anxious and crazy at times. In the 1960s, it was called "**Future Shock"** by Toffler and later it was called **"Culture Shock"** as educated people began to realize that to survive as a human civilization we must **"think globally and act locally".** Another popular statement of social reform (political mantra) among youth was **"You are either part of the solution or part of the problem."**

To preserve the natural resources of our **"little pale dot"**, as Carl Sagan called our planet Earth, we must learn to cope with the combined pressures of ***rapidly changing global technology and information overload.***

Therefore, everybody with a conscience needs to understand how his or her brain works so, together we can become leaders of those who know little or nothing about their own brains. That huge segment of the world's 7+ billion population is pathetically ignorant of the seriousness of the social and economic issues facing all of us.

Especially, we need to be aware of the ***massive ignorance*** of the great majority of people on earth regarding the ***scientific view*** of nature, human nature, and the universe. The great majority of people are still believers in simple rule-based simplistic prescientific folk traditions learned as children from their parents or religions.

More than ever before in history, a critical mass of educated people must use their combined brainpower, which can give them control over their mental force, to creatively adapt to the many negative cultural pressures that adversely impact all of us. This means that we must collectively make ***rational choices*** about our destructive

impact on our planetary environment, including climate change, overpopulation, and predatory capitalism.

An accurate brain vocabulary can **empower you** to make good decisions that are life sustaining. Since you were likely indoctrinated (brainwashed) as a child by your parents and teachers who knew little or nothing about their own brain functions and knew nothing or little about how the brains of children and teenagers develop, you need to learn the true way your brain can work to make your life as good as possible.

Since the complete **Alphabetical Brain Vocabulary** probably was ***not available*** for your parents and teachers to use, they probably were ***not*** able to give you the correct information that was required for them and you to understand a human brain's true ***intellectual*** (**IQ**) and ***emotional*** (**EQ**) capabilities.

As you learn more about your brain, you must separate the specific words that ***name real things*** about your brain from ***metaphorical words*** that often confuse and distort what you could achieve if you had accurate scientific knowledge about your brain's full potential.

Metaphors and analogies often have slippery unscientific meanings, and often merely ***name emotional states*** that have subjective meanings rather objective meanings. You need to know the difference

between scientific reality and traditional cultural fantasies regarding the power of your mental force.

GLOSSARY OF MAJOR BRAIN IDEAS

THE 15 BRAIN IDEAS LISTED ALPHABETICALLY:

Axons (#4) =

Cerebral Cortex (#11) =

Connectome (#9) =

Dendrites (#3) =

Glial Cells (#6) =

Limbic System (#13) =

Long-Term Memory (#15) =

Plasticity (#10) =

Pleasure Circuit (#14) =

Potentiation (#7) =

Prefrontal Cortex (#12) =

Neurons (#2) =

Nucleus of a Neuron (#5) =

Synapses (#8) =

Working memory (#1) =

GLOSSARY OF 15 BIG BRAIN FUNCTIONS:

CONSCIOUSNESS

FREE WILL

HAPPINESS

SUCCESS

==========

ACTION POTENTIAL = A brief pulse of electrical current that is generated by a neuron that may be transmitted to neighboring cells.

ACETYLCHOLINE = A neurotransmitter chemical that is involved in learning and regulates memory and also sends biochemical messages from the motor nerves to control skeletal and smooth muscle action in the peripheral nervous system including the visceral muscles that control your body's internal organs.

ADRENALINE = A hormone and neurotransmitter that boots up the body to participate in the fight-or-flight response of the

sympathetic nervous system. It is also known as epinephrine. [see also EPINEPHRINE and NOREPINEPHRINE]

ALZHEIMER'S DISEASE = A progressive, neurodegenerative disease similar to dementia caused by cell death in several areas of the brain.

AMNESIA = A general term for memory deficit.

AMPHETAMINE = A psychostimulant drug that prompts wakefulness and focus and is the basis of many drugs for treating attention deficit hyperactivity disorder (ADHD). It is also known as "speed". AMYGDALA GLANDS = The survival-oriented part of the brain that regulates primitive emotions and the fight-or-flight syndrome. The glands involve two paired clumps of neurons (nuclei) located in the limbic area of the temporal lobes on both cerebral hemispheres. These two glands consist of two parts linked together in the limbic system complex to activate and regulate feelings of anxiety, fear, and pleasure as well as memory functions. It is also known as the "emotional brain".

AMYLOID PLAQUES = Deposits found in the spaces between nerve cells in the brain that are made of beta-amyloid plaques and other materials. They are involved in the destruction of neuronal connections, which is one of the caused Alzheimer's Disease.

ANDROGENS = The sex steroid hormones including testosterone, which are responsible for male sexual maturation and associated with stereotypical masculine behavioral traits.

ANGIOTENSIN-CONVERTING ENZYME (ACE) INHIBITERS = A medication prescribed for lowering blood pressure.

ANS = Autonomic Nervous System.

ANTERIOR = Toward or at the front side of the body.

ANGULAR GYRUS: A ridge of the neocortex in the parietal lobe, next to the temporal and occipital lobes that regulates the position of the body in space and links sound and meaning.

ANTAGONIST = A molecule that blocks or prevents activation of a receptor,

ARCUATE FASCICULUS = The nerve-fiber tract that connects Broca's Area and Wernick's Area.

ASCENDING RETICULAR FORMATION = A part of the reticular formation, responsible for the arousal and sleep-wake cycle

ASSOCIATION AREAS = The regions of the brain that combine different types of information to produce a "whole" experience.

ASTROCYTE = A type of support cell that provides brain cells with nutrients and insulation.

ATAXIA = A symptom of neurological disorder in which a person experiences difficulty with balance and coordinated movement.

ATTENTION DEFICIT HYPERACTIVITY DISORDER (ADHD) = A syndrome of learning and behavioral problems characterized by a short attention span and often by inappropriately energetic behavior or frenzied activity it usually occurs first in early childhood.

AUDITORY CORTEX = The region of the brain that deals with receiving and processing information relating to sound.

AUTONOMIC NERVOUS SYSTEM (ANS) = A component of the peripheral nervous system, which deals with regulating the activity of internal organs. Your ANS includes both your sympathetic and your parasympathetic nervous systems.

AXONS = The long fiberlike extensions of neurons that carry and transmits outgoing electrical signals to other cells. Most of your 100 billion neurons have only one axon.

B ==========

BASAL GANGLIA = This bundle of nuclei at the bottom of both sides of your limbic system complex is divided into several sections including the striatum and globus pallidus. It primarily deals with selecting and mediating movement.

BILATERAL = On both sides of the body: for example, both brain hemispheres.

BIPOLAR DISORDER = An illness that is characterized by dramatic mood swings.

BLOOD-BRAIN BARRIER = A network of tightly packed cells surrounding the brain

It prevents toxic molecules from entering the brain

BOTTOM-UP INFORMATION PROCESSING = Usually refers to relatively "raw" information flowing from the primary sensory areas of the brain rather than from areas involved in thinking, imagining, or creating expectations

BRAINSTEM = The lower part of your brain that becomes your spinal cord at the bottom of your neck. It has three unique

physical structures with separate essential functions: thalamus, pons, and medulla oblongata.

BRAINWAVES = The regular occillations or "firings" of neurons, with different rates of firing indicating different mental states.

BROCA'S AREA = A frontal-lobe brain region that deals with articulating speech

BRODMANN'S AREAS = The microscopically distinct cortical area that were mapped out by neurologist Korbinian Broadmann (1868-1918)

C ==========

CAUDATE NUCLEUS = A part of the striatum.

CELL BODY = The central structure of a neuron, also referred to as the soma.

CENTRAL FISSURE = A long, deep fissure that runs across the brain, dividing the parietal and frontal lobes. Also called the central sulcus.

CENTRAL NERVOUS SYSTEM = The brain and spinal cord (CNS).

CEREBELLUM = The "small brain" behind the cerebrum that assists in the regulation of posture, balance, and coordination.

CEREBRAL CORTEX = The outer, wrinkled "gray" part of the cerebral hemispheres. Also called "cortrex".

CEREBRAL HEMISPHERES = The two halves of the brain.

CEREBROSPINAL FLUID = The fluid in the brain's ventricle, which brings nutrients to, and removes waste from, the brain. (CSF).

CEREBRUM = The major part of the brain, excluding the cerebellum and brainstem.

CEREBELLAR PENDUCLES = The short stalklike extensions of the cerebellum, which connect it to the brainstem.

CHOLINERGIC SYSTEM = The nerve pathways that are activated by the neurotransmitter acetylcholine.

CINGULATE CORTEX = The area of cortex that makes up the sides of the longitudinal fissure. It is closely connected to the underlying limbit system as well as to cortical areas of the brain, and is important in combining "top-down" and "bottom-up" information to guide actions.

COGNITION = Conscious and unconscious brain processes, such as perceiving, thinking, learning, and remembering information.

CONCUSSION = A brain trauma, usually caused by a blow to the head and resulting in temporary loss of consciousness and possibly later permanent brain damage.

CONE = A color-sensitive receptor cell in the retina, used primarily for daytime vision.

CORPUS COLLOSUM = The thick band of nerve tissue that connects the left and right hemispheres of the brain and carries information between them.

CORTEX = See CEREBRAL CORTEX.

CRANIAL NERVES = The 12 pairs of nerves that arise from the brainstem. These include the olfactory nerve, which conveys information about smell to the brain, and the optic nerve, which carries data about vision.

D ==========

DECUSSATION = The crossing of nerve fibers, as in the optic chiasm.

DELUSION = A false belief that is not easily eradicated by exposure to evidence that reveals its falsity.

DEMENTIA = A loss of brain function due to degeneration through age or cumulative damage to the brain.

DENDRITE = A branch that extends from a neuron's cell body and receives signals from other neurons.

DENTATE GYRUS = The part of the hippocampus containing nerve cells that receive input from the entorhinal cortex.

DEPRESSION = A common illness characterized by intense and chronically low mood and energy levels.

DOPAMINE = A neurotransmitter that produces motivation and strong feelings of pleasurable anticipation.

DORSAL = At or toward the (upper) back.

DORSAL HORN = The back part of the spinal cord, where nerve fibers, especially pain-carrying fibers, merge with the spinal cord to travel upward toward the brain.

DORSAL ROUTE = The pathway in the visual system that connects the visual cortex to the parietal lobe, also referred to as the "where" or "how" pathway: see also VENTRAL ROUTE.

DORSOLATERAL PREFRONTAL CORTEX = The area of the frontal lobe concerned with planning, organization, and various other executive functions of cognition.

DURA MATER = The top of the three layers of tissue separating the brain from the skull: see also MENINGES.

DYSLEXIA = A condition associated with difficulty in learning to read and write in the absence of any other intellectual problems.

E ==========

EFFERENT = Leading away from: see also AFFERENT.

EXCITATORY NEUROTRANSMITTER = A type of neurotransmitter that encourages neurons to fire: see also INHIBITORY NEUROTRANSMITTER.

EXPLICIT MEMORY = The memories that can be consciously retrieved and reported.

F ==========

FISSURE = A deep cleft, or sulcus, on the surface of the brain.

FOUR LOBES = The four main regions of your brain that are delineated by function on both sides (hemispheres) of your brain, which means that there are actually eight areas that have different functions based upon their different structures.

FRONTAL LOBE = The area at the front of the brain, responsible for thinking, making judgments, planning, decision-making, and conscious emotion.

G ==========

GANGLION = A cluster of interactive nuclei. The term also refers to light-sensitive in the brain.

GLIAL CELLS = Also referred to as glia, the brain cells that support neurons by performing a variety of "housekeeping" functions in the brain. They may also mdeiate signals between neurons.

GLOBUS PALLIDUS = A part of the basal ganglia involved in movement control: see also BASAL GANGLIA.
GYRUS = The bulges of tissue on the surface of the brain (plural is GYRI).

H ==========

HALLUCINATION = A false perception that occurs in the absence of any sensory stimuli.

HEMISPHERE = One half of he brain.

HIPPOCAMPUS = A part of your limbic system that lies on the inside of each temporal lobe and which is crucial for spatial movement (navigation) and encoding and retrieving long term memories.

HORMONES = The chemical messengers secreted by endocrine glands to regulate the activity of target cells. They play a role in sexual development, metabolism, growth, and many other physiological processes.

HYPOTHALAMUS = A cluster of nuclei that controls many body functions, including feeding, drinking, and the release of many hormones. Though it consists of only one organ structure, it is divided into two separate parts with many essential functions for regulating consciousness.

I ==========

ILLUSION = A false perception or distorion of the senses often caused by unconscious brain processes.

IMPLICIT MEMORY = The memories that cannot be retrieved consciously, but are activated as part of particular skills or actions, or in the form of an emotion linked to an event that cannot be made conscious. Implicit memories underlie the learning of physical skills such as a playing a sport or tying one's shoes: see also PROCEDURAL MEMORY.

L ==========

LONG-TERM MEMORY = The final phase of memory, in which information storage may last anywhere from hours up to a lifetime

LONG-TERM POTENTIATION = A change in a neuron that increases the likelihood of it firing in unison with one that it has fired with before

MEDULLA OBLONGATA (BRAINSTEM) = A part of the brainstem situated between the pons and the spinal cord that maintains vital bodily processes, such as breathing and heart rate.

NEUROGENESIS = The generation of new neurons in the brain

NEURON = The name of nerve cells, which can signal to other neurons by generating and passing on electrical signals
NEUROTRANSMITTER = A chemical secreted by neurons that carries signals between them across synapses

M ==========

O ==========

OCCIPITAL = The back part of your cerebrum, mainly dedicated to visual processing

OLFACTORY BULBS These two bulbs, which are located on each side of your limbic system complex at the front, are attached inside your two nostrils to give you the sense of smell.

P ==========

PARASYMPATHETIC NERVOUS SYSTEM = A branch of the autonomic nervous system concerned with the conservation of the body's energy. It inhibits the sympathetic nervous system.

PARIETAL LOBE = The top-back subdivision of the cerebral cortex, mainly concerned with spatial computation, body orientation, and attention

PEPTIDES = The chains of amino acids that can function as neurotransmitters or hormones.

PERIPHERAL NERVOUS SYSTEM (PNS) = The part of the nervous system that includes all nerves and neurons outside the brain and nervous system.

PIA MATTER = The innermost layer of the meninges. It is a thin elastic tissue that covers the surface of the brain.

PINEAL GLANDS = These glands are on both sides of your limbic system complex and regulate sleep behavior since they control your circadian clock.

PITUITARY GLAND = This single organ structure is known as the "master gland" since it controls the release of many neurotransmitters and hormones.

PONS (BRAINSTEM) = A part of the brainstem lying in front of the CEREBELLUM.

PREFRONTAL CORTEX = The region of your brain in the forward-most part of your cerebrum (frontal lobe) that is involved in planning and other higher-level cognition, including working memory.

PREMOTOR CORTEX = A part of the frontal cortex involved with planning movements.

POSTSYNAPTIC NEURONS = Neurons that receive messages from another neuron: see also PRESYNAPTIC NEURONS.

PRESYNAPTIC NEURONS = Neurons that release a neurotransmitter to carry signals across a synapse to another neuron: see also POSTSYNAPTIC NEURONS.

PRIMARY CORTEX = A region of the brain that first receives sensory information from organs, such as the primary visual cortex.

PROCEDURAL MEMORY = A form of implicit memory relating to learned movements, such as riding a bicycle.

PROPRIOCEPTION = Sensory information relating to balance and the position of the body in space.

PROSOPAGNOSIA = Inability to recognize faces.

PSYCHODELIC = A drug that distorts perception, thought, and feeling.

PSYCHOACTIVE = Changing brain function, usually referring to drugs.

PSYCHOSIS = A condition in which a person loses touch with reality.

PSYCHOTHERAPY = The treatment of a mental disorder using psychological rather than medical methods.

PUTAMEN = A part of the striatum, which itself is part of the basal ganglia. It mainly regulates movement and procedural learning.

PYRAMIDAL NEURON = An excitatory neuron with a distinctive triangular body. It is located in the cortex, hippocampus, and amygdala.

Q ==========

R ==========

RAPHE NUCLEI (plural) = The brainstem nuclei that mainly release serotonin and have wide-ranging effects on mental function.

RAPID EYE MOVEMENT (REM) = A phase of sleep characterized by rapid eye movements and vivid dreams.

REFLEX = An involuntary movement controlled by neurons in the spinal cord.

RETICULAR FORMATION = A complex area in the brainstem containing various nuclei that affect arousal, sensation, motor function, and vegetative functions such as heartbeat and breathing.

RETINA = The part of the eye containing light-sensitive cells, which send electrical signals to the visual area of the brain for processing into visual imagery.

REUPTAKE = The process by which excess neurotransmitters are removed by transporter cells back into the axon terminals that first released them.

ROD = A sensory neuron in the outer edge of the retina. It is sensitive to low-intensity light and is specialized for night vision.

S ==========

SCHIZOPHRENIA = An illness characterized by intermittent psychosis.

SEIZURE = A disruption of normal neuronal activity. For example, Grand mal seizures involve widespread synchronous neuronal firing which produces unconsciousness.

SEROTONIN = A neurotransmitter that regulates many functions, including mood, appetitie, and sensory perception.

SHORT-TERM MEMORY = A phase of memory in which a limited amount of information may be held for several seconds to minutes: see also WORKING MEMORY.

SOMATOSENSORY CORTEX = An area of the brain concerned with receiving and processing information about body sensations, such as pain and touch.

SPECT = see single photon emission computed tomography.

STRIATE CORTEX = An area of the visual cortex (in cross-section) by visually distinct strips of cells.

STRIATUM= A section in the basal ganglia composed of the caudate and the putamen.

SULCUS (plural = sulci) = A valley or groove in the brain surface: the opposite of gyrus.

SUPERIOR COLLICULI = Paired structures of nuclei of the midbrain that play a part in relaying visual information.

SUPPLEMENTARY MOTOR CORTEX = An area in the front of the motor cortex involved in planning actions that are under internal control, such as actions done from memory rather than guided by current sensations (situational awareness).

SYMPATHETIC NERVOUS SYSTEM = A part of the autonomic nervous system that speeds up heart rate, among other things, in response to stimulation: see also PARASYMPATHETIC NERVOUS SYSTEM.

SYNAPSE = A gap between two neurons that is bridged by neurotransmitters.

T ==========

TEMPORAL LOBE = A division of the cerebral cortex at the side of your head concerned with hearing, language, and memory

THALAMUS = This single brain structure in your limbic system complex connects your brainstem to the rest of your brain and is known as the "gateway" to your brainstem.

W ==========

WORKING MEMORY = A mental process by which information is held in your consciousness as active neuronal signals until it is forgotten or encoded in long-term memory.