

#### Brain-Healthy Jeopardy

**Objective:** Discover how the brain works as we think, learn, and play.

#### Materials

BrainHealthy Jeopardy Discovery Packet BrainHealthy Jeopardy Board Jeopardy Answer Key for "Host" Markers, Highlighters, and/or Writing Tools Stopwatch Tape (optional)

BrainHealthy jeopardy provides information about brain structures, functions, and the facts - you'll learn the truth about the brain as you clear up some myths. There's so much to learn!

#### Instructions

- 1. Learn about the brain by playing a game of Jeopardy.
- 2. We have a Jeopardy board split into 5 different categories. Dark blue is The Upstairs Brain, light blue is The Downstairs Brain, gold is Neurons, red is Brain Facts, and green is Brain Myths.
- 3. Use the Discovery Packet to learn facts about the brain and to reference as you play Jeopardy.
- 4. Start the game. Each column has leveled questions with the value of 100, 200, 300, 400, or 500. Each number is connected to a brain-based question we can answer. Point level-100 is the easiest and point level-500 is the most challenging.
- 5. Split into teams and take turns selecting a level from one of the categories to try to answer.
- 6. Use teamwork to decide which category and difficulty level your team wants to select. Let me know by saying something like "Brain Facts for 300 points". Then, the "host" will read the question and your team will work together to come up with the best answer.
- 7. The team that chooses the category and level gets to try to discover the correct answer first. If that team gets the answer correct, then they get that number of points.
- 8. If a team gets the answer incorrect, then the other team gets a chance to try to give the right answer. If this team gets it right, then they get the points.
- 9. If neither team can get the correct answer, then I will tell you what the answer is, but no team gets the points.
- 10. Once a category and difficulty level has been chosen, it gets crossed off the Jeopardy board and cannot be chosen again. We will play the game until all the numbers have been crossed off the board.

### Reflection

- What is something new you learned about the brain?
- What was something surprising about the brain?
- If you shared one thing you learned from BrainHealthy Jeopardy, who would you share it with and what would you share?

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# BrainHealthy Bobardy

500	500	500	500	500
400	400	400	400	400
300	300	300	300	300
200	200	200	200	200
100	100	100	100	100
stairs brain	vnstairs 3rain	eurons	3rain Ayths	Brain Facts

#### Categories:

The Upstairs Brain.

- 100
  - Question: The cerebrum is the part of the brain that deals with \_\_\_\_\_\_
  - Answer: thinking
- 200
  - Question: The cerebrum is the main part of the brain that develops thinking. Name 3 things it helps you do.
  - Answer: Any of the following or similar responses would be considered correct: read, learn, speak, walk, run, move your body, play chess, solve a crossword puzzle, figure out the next move in a complex video game.
- 300
  - Question: The upstairs brain has a dent that separates it into two halves, like an apple. These are known as the left and right \_\_\_\_\_\_.
  - Answer: hemisphere
- 400
  - o Question: The upstairs brain, also known as the cerebrum, is made up of how many sections or lobes?
  - o Answer: four
  - Extra 100 Points: Name the four lobes of the upstairs brain OR list which colors represent the four lobes.
  - Extra 100 Point Answer: The frontal lobe (red), parietal lobe (blue), temporal lobe (yellow), and occipital lobe (green)
- 500
  - Question: The lobe of the cerebrum MOST responsible for thinking and problem solving is right behind your forehead. What is this area is called?
  - Answer: the frontal lobe

### The Downstairs Brain.

- 100
  - Question: The downstairs brain, also known as the feeling brain, contains which 3 structures?
  - o Answer: brain stem, limbic system, and the amygdala
- 200
  - o Question: Name one thing the downstairs brain helps humans do every single day.
  - ο Answer: sleep, breathe, emotional reactions, keeps the heart beating, & regulates our temperature
- 300
  - Question: Another name for the downstairs brain is the \_\_\_\_\_\_.
  - Answer: feeling brain
- 400
  - o Question: Name two strong emotions that are produced by the downstairs brain.
  - Answer: anger, fear, disgust, excitement, or shock
- 500
  - Question: Why do our brains allow us to feel fear? Why would feeling scared be helpful?
  - Answer: Fear/Feeling Scared helps protect us from dangerous situations.

### Neurons.

- 100
  - Question: What is a neuron?
  - Answer: Neurons are cells inside the brain.
- 200
  - o Question: Neurons have a special cover that helps them send messages faster. What is this called?
  - o Answer: myelin sheath
- 300
  - o Question: What are the main three jobs of a neuron?
  - Answer: 1- receive sensory information, 2-integrate information across the brain, 3- send motor output to the body
- 400
  - Question: How fast do neurons send messages?
  - Answer: Between 150-200 miles per hour!
- 500
  - Question: How would neurons help you be successful at a dance recital?

• Answer: They collect sensory information that the dance is about to begin, then they send information to the brain regions responsible for remembering and coordinating the dance movements, then the brain sends messages to your body and muscles so that the dance can go successfully.

Brain Facts.

- 100
  - o Question: Choose the right option: You are NEVER vs SOMETIMES too old to learn something new.
  - Answer: Never. The brain can learn how to do new things at any age!
- 200
  - o Question: How many neurons does the human brain have?
  - Answer: 100 BILLION!
- 300
  - Question: How heavy is the brain once you reach adulthood?
  - Answer: The brain weighs 3 pounds (which is about as much as a half-gallon of milk)
- 400
  - Question: Most of the human brain is made up of \_\_\_\_\_
  - Answer: Fat. It is the fattiest organ in the human body, and the fat is super important for your brain to be able to work well.
- 500
  - Question: We require this every day to complete activities in school, to watch a show or movie, or to ride in certain types of cars. Neurons in the brain generate a small amount of \_\_\_\_\_ when sending messages back and forth.
  - Answer: Power/electricity. The human brain can generate about 23 watts of power (enough to power a lightbulb).

Brain Myths.

- 100
  - Question: True or False? You only use about 10% of your brain.
  - Answer: False! It is a myth that you only use 10% of your brain. You actually use all of it, even when you are sleeping. Science has helped us to confirm that the brain is ALWAYS active.
- 200
  - Question: True or False? When you drink or eat something very cold and get what we call a "Brain Freeze" It is because part of your brain becomes frozen.
  - Answer: False! The sensory receptors in your mouth become very cold and it makes your head hurt. This is why it is known as brain freeze!
- 300
  - o Question: Which can hold more information? A laptop/iPad or your brain?
  - Answer: The brain! Your brain's storage capacity is considered virtually unlimited.
- 400
  - o Question: Are there more internet links or neuron connections inside your brain?
  - o Answer: There are more neuronal connection within the brain than there are internet links.
- 500
  - o Question: You can practice something a million times, but your brain will stay the exact same. True or false?
  - Answer: False! The structure of your brain changes every time you learn, as well as whenever you have a new thought or memory. The more you practice or do a certain action, the easier it becomes to do it over time.

# **BrainHealthy Jeopardy Discovery Packet**

## Become a Guru by Learning about your Brain!

The brain is a major organ of your body. It is in your head and protected by your skull. Your brain is ALWAYS active, even you are asleep. The brain is mushy, like a bowl of spaghetti. By the time you become an adult, your brain will weigh 3-pounds which is about the same weight as half a gallon of milk. Your brain has many functions and different parts. Learn more about your brain below.

## **Brain Structures: Upstairs & Downstairs Areas**

From top to bottom, the brain has two main areas: the upstairs (thinking) and the downstairs (feeling).

- 1. The <u>upstairs brain</u> consists of the upper and largest brain structure called the **cerebrum.** Like two halves of an apple, the cerebrum can be divided into <u>two</u> <u>hemispheres</u>: left and right.
- 2. The <u>downstairs brain</u> consists of the lower and outer part located in the back of your head known as the **cerebellum**. Beneath the cerebrum and in front of the cerebellum is the **brain stem**.



The **cerebrum** fills up most of your skull. It is involved in remembering, problem solving, thinking, and feeling. It also controls movement.

The **cerebellum** sits at the back of your head, under the cerebrum. It controls coordination, balance, and well learned movements.

It is pronounced: sara-bell-um



The **brain stem** sits beneath your cerebrum in front of your cerebellum. It connects the brain to the spinal cord and controls automatic functions such as breathing, digestion, heart rate and blood pressure.



It is pronounced:

sir-ree-brum

The cerebrum makes up more than 85% of the brain's weight. The cerebrum is the part of the brain that deals with thinking and controls daily activities such as reading, learning, and speech. It also assists planned muscle movements such as walking, running, and body movement.

# **Exploring the Upstairs Brain**

The upstairs brain and its primary structure, the cerebrum, has <u>four sections</u> called lobes:



## (1) frontal lobe (2) parietal lobe (3) temporal lobe (3) occipital lobe

Each of the lobes of the cerebrum controls specific abilities as seen above.

The cerebrum is the main part of the brain that controls our thinking. It helps you play chess, solve a crossword puzzle, or figure out your next move in a complex video game.



MOST thinking happens in the frontal lobe. If

you place your four fingers on your forehead, the area behind your hand is where your thoughts are formed!

The frontal lobe is a very important area of the brain because it helps with decision-making, problem-solving, and planning. The frontal lobe also helps the development of cognition, language processing, and intelligence.



# What is the Downstairs Brain?



## The Downstairs or Feeling Brain

The downstairs brain is often referred to as the feeling brain. It contains the brain stem, limbic region, and the amygdala.

The downstairs brain is well developed from birth and is responsible for:

- Basic bodily functioning such as breathing, blinking, heart beating, flinching, digestion, waking up, etc.
- Flight, flight, and freeze response in stressful situations.
- Producing strong emotions such as anger, fear, disgust, or excitement.



## Comparing the "Upstairs" to the "Downstairs" Brain

**The upstairs brain** is the THINKING part of the brain. It is responsible for planning, imagination and creativity, reasoning, problem solving and sound decision making. The cerebrum makes up the upstairs brain and has 4 lobes or sections that all have different jobs. The frontal lobe of the cerebrum is still developing into your late 20's!

**The downstairs brain** is often referred to as the FEELING brain, as it is the earliest developing brain region and is responsible for our most basic functions related to survival, such as breathing. The downstairs brain contains the brain stem, the limbic region, and the amygdala. These structures are responsible for strong emotions, like fear, that keep us alert so we can respond to stressful or scary situations.

# While the upstairs and downstairs brain areas perform different roles, they connect due to special cells called neurons.



# What is a Neuron?

Your brain contains about 100 billion microscopic cells called neurons—so many it would take you over 3,000 years to count them all.



Whenever you dream, laugh, think, see, or move, it's because tiny chemical and electrical signals are racing between these neurons along billions of tiny neuron highways. A single neuron generates a tiny amount of electricity, but all your neurons working together can generate enough electricity to power a low-wattage light bulb.

Believe it or not, the activity in your brain never stops. Countless messages zip around inside it every second like a supercharged pinball machine.

Your neurons create and send more messages in a single day than all the phones in the entire world. Neurons send messages at a speed of 150-200 miles per hour. A special insulating layer of the neuron called the myelin sheath boosts the speed of how quickly messages are transmitted.

## Neurons have 3 jobs:

1<sup>st</sup> They listen for sensory messages about what is going on in your environment.

2<sup>nd</sup> When they receive a message, they then send that message to the correct area of the brain where it can be processed correctly (like a computer).

3<sup>rd</sup> They help you respond to your environment so that you can move your body as needed.

## Imagine you are at a dance recital.

**1**<sup>st</sup> Your eyes, ears, and sense of touch send **SENSORY INPUT** telling your neurons that the curtain just rose, and the music is beginning. You now need to start dancing the routine you spent weeks learning.

 $2^{nd}$  Neurons send the SENSORY INPUT → to the areas of the brain needed to dance your routine. In this case it would go to areas responsible for memory, coordination, muscle movements, and probably emotions! Those areas INTEGRATE all the sensory input super-fast because you want to start dancing at the right moment.

**3**<sup>rd</sup> The areas of the brain that **INTEGRATED the information**  $\rightarrow$  send **MOTOR OUTPUT** or muscle messages to the rest of your body. You dance your routine and get a standing ovation at the end. Way to go!



## When you learn, you change the structure of your brain.



Riding a bike seems impossible at first. But soon you master it. How? As you practice, your brain builds its neural pathways for bike riding just like if you walked the same dirt path each day to school. Over time, the path becomes smooth from your footprints, making it easier to walk. It also becomes familiar, and you can take the route without really thinking about it. Learning to ride a bike happens the same way!

In fact, the structure of your brain changes every time you learn, as well as whenever you have a new thought or memory. The more you practice or do a certain habit, the easier it becomes to do it over time because you grow neurons dedicated to making that set of actions more likely to be successful. This is called neuroplasticity.