

Grade 8

Reading Science

The Wonders of the Human Brain

Passage: The human brain, a remarkable and intricate organ, stands as the command center of our entire body, responsible for everything we think, feel, and do. Averaging about three pounds in weight and comprising nearly 86 billion neurons, this astounding organ has fascinated scientists and researchers for centuries.

Despite its relatively small size compared to the rest of the body, the brain consumes about 20% of the body's energy. This is because neurons, the brain's building blocks, are constantly at work, transmitting signals across intricate networks. Neurons communicate through tiny gaps called synapses, sending electrical impulses and chemical signals to share information.

The brain is divided into several major parts, each playing unique and crucial roles. The cerebrum, the largest part, controls voluntary activities, intelligence, learning, and judgment. The cerebellum, located at the back of the skull, regulates balance, posture, and coordination. The brainstem, connecting the brain to the spinal cord, controls involuntary functions such as breathing, heartbeat, and blood pressure.

One of the most fascinating aspects of the brain is its plasticity, which is its ability to change and adapt. This is especially evident in childhood and adolescence, but the brain maintains some degree of plasticity throughout life. Learning new skills, overcoming challenges, and experiencing new things can all contribute to the brain's adaptability.

Recent advances in technology have allowed scientists to study the brain in unprecedented detail. Neuroimaging techniques like MRI and PET scans provide non-invasive ways to observe brain activity, enabling breakthroughs in our understanding of conditions like Alzheimer's, Parkinson's, and mental illnesses.

Despite these advances, much about the brain remains a mystery. Its complexity and capacity for change continue to captivate and puzzle scientists. As research continues, the potential for new discoveries and innovations in medicine, psychology, and neuroscience is limitless.

Multiple Choice Questions:

1. How much does the human brain weigh on average?

- a) 1 pound
- b) 3 pounds
- c) 5 pounds
- d) 7 pounds

2. What percentage of the body's energy does the brain consume?

- a) 5%
- b) 10%
- c) 15%
- d) 20%

3. What is the primary building block of the brain?

- a) Cells
- b) Neurons
- c) Synapses
- d) Tissues

4. What are synapses?

- a) A part of the brain
- b) Tiny gaps for neuron communication
- c) A type of neuron
- d) A form of brain energy

5. Which part of the brain controls voluntary activities and intelligence?

- a) Cerebrum
- b) Cerebellum
- c) Brainstem
- d) Neuron

6. What does the cerebellum regulate?

- a) Balance and coordination
- b) Intelligence
- c) Involuntary functions
- d) Neuron communication

7. What is the role of the brainstem?

- a) Learning and judgment
- b) Balance and coordination
- c) Controlling involuntary functions
- d) Intelligence

8. What is brain plasticity?

- a) The brain's weight
- b) The brain's ability to change and adapt
- c) A type of brain cell
- d) A brain disease

9. Which technology allows scientists to observe brain activity non-invasively?

- a) X-ray
- b) Ultrasound
- c) MRI and PET scans
- d) Blood tests

10. What remains a mystery despite advances in brain research?

- a) The brain's weight
- b) The number of neurons in the brain
- c) The complexity and capacity for change of the brain
- d) The brain's energy consumption

1. Answer: B) 3 pounds *Explanation: The passage mentions that the human brain averages about three pounds in weight.*
2. Answer: D) 20% *Explanation: The passage states that the brain consumes about 20% of the body's energy.*
3. Answer: B) Neurons *Explanation: The passage mentions that neurons are the building blocks of the brain.*
4. Answer: B) Tiny gaps for neuron communication *Explanation: The passage describes synapses as tiny gaps that allow neurons to communicate.*
5. Answer: A) Cerebrum *Explanation: The passage specifies that the cerebrum controls voluntary activities, intelligence, learning, and judgment.*
6. Answer: A) Balance and coordination *Explanation: According to the passage, the cerebellum regulates balance, posture, and coordination.*
7. Answer: C) Controlling involuntary functions *Explanation: The brainstem is described in the passage as controlling involuntary functions such as breathing, heartbeat, and blood pressure.*
8. Answer: B) The brain's ability to change and adapt *Explanation: Brain plasticity is defined in the passage as the brain's ability to change and adapt.*
9. Answer: C) MRI and PET scans *Explanation: The passage mentions that neuroimaging techniques like MRI and PET scans provide non-invasive ways to observe brain activity.*
10. Answer: C) The complexity and capacity for change of the brain *Explanation: The passage concludes by stating that the brain's complexity and capacity for change continue to captivate and puzzle scientists.*