

Module B Objectives – How does my brain work?

Lesson 1 –Biology of the brain.

Chapter 2 – Neuroscience and Behavior

- (Remembering) 1. Describe the roles of motor neurons, sensory neurons, glial cells, interneurons, excitatory messages, and inhibitory messages in neural transmission.
- (Remembering) 2. Describe the process of neural transmission from the pre-synaptic neuron to the post synaptic neuron using the following terms:
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|----------------------|--------------------|---------------------|
| ▪ Cell body | ▪ Dendrites | ▪ Axon |
| ▪ Stimulus threshold | ▪ Polarization | ▪ Action potential |
| ▪ Myelin sheath | ▪ Synapse | ▪ Neurotransmitters |
| ▪ Receptor sites | ▪ Terminal buttons | |
- (Understanding) 3. Explain how breakdowns in the process of neural transmission can stop communication between neurons.
- (Understanding) 4. Explain how these breakdowns play a role in each of the following diseases/disorders:
- | | | |
|----------------------|-----------------------|-----------------|
| ▪ Multiple Sclerosis | ▪ Depression | ▪ Schizophrenia |
| ▪ Anxiety | ▪ Parkinson's Disease | |
- (Understanding) 5. Describe how prescription medications can mimic, mimic and block, and block reuptake to treat the symptoms of the diseases/ disorders listed above..
- (Remembering) 6. Explain the role of Acetylcholine, GABA, Norepinephrine, Serotonin, Dopamine, and Endorphins in neural transmission.
- (Analyzing) 7. Illustrate the impact of split brain studies, the story of Phineas Gage, neurogenesis, and enriched environments have contributed to current understanding of how the brain works.
- (Analyzing) 8. Discuss the brain is an integrated system, using the terms lateralized for function, cortical localization, structural plasticity, and functional plasticity.
- (Remembering) 9. Describe the functions that occur in all of the structures of the forebrain, including the cerebral cortex, limbic system, and corpus callosum.
- (Remembering) 10. Describe the functions that occur in the midbrain.
- (Remembering) 11. Describe the functions that occur in all of the structures of the hindbrain.

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Lesson 2 –Functions of the brain.

Chapter 3 – Sensation and Perception

- (Understanding) **12.** Explain how the structures of the eye work together to produce vision.
- (Understanding) **13.** Discuss the characteristics of color as it relates to vision.
- (Understanding) **14.** Discuss the characteristics of sound as it relates to hearing.
- (Understanding) **15.** Explain how the “chemical senses” result in smell and taste.
- (Understanding) **16.** Explain how the “body senses” result in sensations of touch and pain.
- (Understanding) **17.** Explain how the kinesthetic and vestibular senses result in movement, position, and balance.
- (Understanding) **18.** Explain the Gestalt principles as they relate to the process of perception.
- (Understanding) **19.** Explain the roles of convergence, binocular disparity, relative size, overlap, aerial perspective, texture gradient, linear perspective, and motion parallax in depth perception:
- (Understanding) **20.** Discuss the moon illusion, the Muller-Lyer illusion, and the carpentered-world hypothesis.
- (Understanding) **21.** Discuss the role of perceptual constancies in perception.

Lesson 3 – Memory and Intelligence.

Chapter 6 – Memory

- (Remembering) **22.** Explain the Stage Model of Memory, including the capacity, duration, and function of information, and the strategies used to retain information at each stage.
- (Understanding) **23.** Describe how the process of memory can break down during encoding, storage, and retrieval of information.
- (Understanding) **24.** Explain the serial position effect and encoding specificity principle and their effects on memory retrieval.
- (Analyzing) **25.** Discuss the research on source confusion, imagination inflation, and the misinformation effect and explain their role in the creation of false memories.
- (Understanding) **26.** Explain Ebbinghaus’ theory of learning and its application to enhancing student study routines.

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- (Analyzing) **27.** Identify the factors that impact forgetting.
- (Remembering) **28.** Identify the brain structures involved in the storage and retrieval of memory.

Chapter 7 – Thinking, Language, and Intelligence

- (Understanding) **29.** Explain the use of trial and error, algorithms, heuristics, and insight in problem solving.
- (Understanding) **30.** Explain how functional fixedness and mental set influence our ability to solve problems.
- (Analyzing) **31.** Explore the definitions of intelligence and discuss the issue of intelligence testing, including the debate around the reliability and validity of such tests, according to Binet, Terman, Weschler, Spearman, Thurstone, Gardner, and Sternberg.
- (Analyzing) **32.** Evaluating the influence of heredity, environment, and relevant cultural factors on the development of intelligence and their implications on the controversy of intelligence testing.