

# UNIT OUTLINE 1: Biological Bases of Behavior

AP EXAM WEIGHTING: **15-25%**

Unit 1 focuses on how the functions of our biological systems influence our physical and mental actions and responses. Knowledge of biological functions and mechanisms, especially how neurons communicate, how the brain functions, and how sleep and sensation impact behavior and mental processes, will help students gain a more comprehensive understanding of psychology throughout the course as well as awareness of how all behaviors and mental processes are based in biological operations. For instance, in Unit 2, students will learn that biological mechanisms are vital to memory, and in Unit 5, they will discover that damage to certain biological structures can be the cause of psychological disorders.

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## Learning Objectives & Essential Knowledge

**BOLD Vocabulary:** College Board AP Exam Terms  
*Italicized Vocabulary:* Additional Myers 4E Textbook Terms

### TOPIC 1.1 Interaction of Heredity and Environment

**1.1.A** Explain the relationship between heredity and environment in shaping behavior and mental processes.

**1.1.A.1** Heredity and the Environment

**1.1.A.2** Evolutionary Perspective

**1.1.A.3** Research: Twin studies, family studies, adoption studies

☐ *Psychology*

☐ **Nature**

☐ **Evolutionary Perspective**

☐ **Natural Selection**

☐ *Behavior Genetics*

☐ *Mutations*

☐ **Environment**

☐ **Heredity**

☐ *Genes*

☐ *Genome*

☐ **Nurture**

☐ **Eugenics**

☐ *Identical (Monozygotic) Twins*

☐ *Fraternal (Dizygotic) Twins*

☐ *Interaction*

☐ *Epigenetics*

### TOPIC 1.2 Overview of the Nervous System

**1.2.A** Differentiate among the subsystems of the human nervous system and their functions.

**1.2.A.1** The Central Nervous System

**1.2.A.2** The Peripheral Nervous System

**1.2.A.I** Autonomic Nervous System

**1.2.A.II** The Somatic Nervous System

☐ **Nervous System**

☐ **Central Nervous System**

☐ *Nerves*

☐ *Reflex*

☐ **Autonomic Nervous System**

☐ **Sympathetic Nervous System**

☐ **Peripheral Nervous System**

☐ **Somatic Nervous System**

☐ **Parasympathetic Nervous System**

### TOPIC 1.3 The Neuron and Neural Firing

**1.3.A** Explain how the structures and functions of typical neurons in the central nervous system affect behavior and mental processes.

**1.3.A.1** Types of Neural Cells in the Brain

**1.3.A.2** Neurons in the Central and Peripheral Nervous System

☐ **Neurons**

☐ *Cell Body*

☐ *Dendrites*

☐ *Axon*

☐ *Myelin*

☐ *Synapse*

☐ **Glial Cells**

☐ **Reflex Arc**

☐ **Sensory Neurons**

☐ **Motor Neurons**

☐ **Interneurons**

**1.3.B** Explain how the basic process of neural transmission is related to behavior and mental processes.

**1.3.B.1** Process of Neural Transmission

**1.3.B.2** Functions of Neurotransmitters

**1.3.B.3** Outside of the Nervous System (*Endocrine System*)

☐ *Action Potential*

☐ **All-or-Nothing Principle**

☐ **Depolarization**

☐ **Reuptake**

☐ **Multiple Sclerosis**

☐ *Neurotransmitters*

☐ **Excitatory Neurotransmitters**

☐ **Dopamine**

☐ **Norepinephrine**

☐ **GABA**

☐ **Substance P**

☐ **Hormones**

☐ **Refractory Period**

☐ **Resting Potential**

☐ **Threshold**

☐ **Myasthenia Gravis**

☐ **Inhibitory Neurotransmitters**

☐ **Serotonin**

☐ **Glutamate**

☐ **Endorphins**

☐ **Acetylcholine**

☐ *Endocrine System*

☐ **Adrenaline**

☐ **Ghrelin**

- ☐ Leptin
- ☐ Melatonin

- ☐ Oxytocin

**1.3.C** Explain how psychoactive drugs affect behavior and mental processes.

- 1.3.C.1** Effects on Neurotransmitter Function
- 1.3.C.2** Psychological and Physiological Effects
- 1.3.C.3** Tolerance, Addiction, and Withdrawals

- ☐ Psychoactive Drugs
- ☐ Substance Use Disorder
- ☐ Antagonist
- ☐ Stimulants
- ☐ Caffeine
- ☐ Cocaine
- ☐ Methamphetamines
- ☐ Ecstasy
- ☐ Opioids
- ☐ Heroin
- ☐ Addiction

- ☐ Agonist
- ☐ Reuptake Inhibitor
- ☐ Depressants
- ☐ Barbiturates
- ☐ Alcohol
- ☐ Hallucinogens
- ☐ Near-Death Experience
- ☐ Marijuana
- ☐ LSD
- ☐ Tolerance
- ☐ Withdrawal

## TOPIC 1.4 The Brain

**1.4.A** Explain how the structures and functions of the brain apply to behavior and mental processes.

- 1.4.A.1** The Brain Stem
- 1.4.A.2** The Reticular Activating System
- 1.4.A.3** The Cerebellum
- 1.4.A.4** The Cerebral Cortex
- 1.4.A.5** Split Brain Research
  - 1.4.A.5.I** Areas of the Brain that Affect Language
  - 1.4.A.5.II** Research on Cortex Specialization
- 1.4.A.6** Brain Plasticity
- 1.4.A.7** Research on the Brain: Brain Scans, Case Studies, Surgical Procedures that promote understanding of the brain's functions

- ☐ Biological Psychology
- ☐ Biopsychosocial Approach
- ☐ Levels of Analysis
- ☐ Brain Plasticity (neuroplasticity)
- ☐ EEG
- ☐ MEG
- ☐ MRI
- ☐ CT
- ☐ PET
- ☐ fMRI
- ☐ Lesions
- ☐ Brain Stem
- ☐ Hindbrain
- ☐ Midbrain
- ☐ Forebrain
- ☐ Medulla Oblongata
- ☐ Reticular Activating System (Reticular Formation)
- ☐ Cerebellum
- ☐ Cerebral Cortex

- ☐ Limbic System
- ☐ Thalamus
- ☐ Hypothalamus
- ☐ Pituitary Gland
- ☐ Hippocampus
- ☐ Amygdala
- ☐ Corpus Callosum
- ☐ Split Brain
- ☐ Broca's Area
- ☐ Wernicke's Area
- ☐ Cortex Specialization
- ☐ Contralateral Hemispheric Organization
- ☐ Aphasia
- ☐ Occipital Lobe
- ☐ Temporal Lobe
- ☐ Parietal Lobe
- ☐ Association Areas
- ☐ Somatosensory Cortex
- ☐ Frontal Lobe
- ☐ Prefrontal Cortex
- ☐ Motor Cortex

## TOPIC 1.5 Sleep

**1.5.A** Explain how the sleep/wake cycle affects behavior and mental processes throughout the day and night.

- 1.5.A.1** Consciousness
- 1.5.A.2** Circadian Rhythm
- 1.5.A.3** Stages of Sleep
  - 1.5.A.3.I** NREM
  - 1.5.A.3.II** REM
- 1.5.A.4** Dream Theories
- 1.5.A.5** Memory Consolidation
- 1.5.A.6** Sleep Disorders and Disruptions

- ☐ Consciousness
- ☐ Cognitive Neuroscience
- ☐ Dual Processing
- ☐ Parallel Processing
- ☐ Sequential Processing
- ☐ Sleep
- ☐ Circadian Rhythm
- ☐ Jet Lag
- ☐ EEG Patterns
- ☐ Alpha Waves
- ☐ NREM
- ☐ Hallucinations
- ☐ Hypnagogic Sensations
- ☐ Delta Waves

- ☐ REM
- ☐ REM Rebound
- ☐ Suprachiasmatic Nucleus (SCN)
- ☐ Dream
- ☐ Activation Synthesis Theory
- ☐ Consolidation Theory
- ☐ Insomnia
- ☐ Narcolepsy
- ☐ REM Sleep Behavior Disorder
- ☐ Sleep Apnea
- ☐ Somnambulism

## TOPIC 1.6 Sensation

**1.6.A** Explain how the process of sensation is related to behavior and mental processes

**1.6.A.1** Detection of a Stimulus

**1.6.A.2** Detecting Stimulus Change or Diminished Sensitivity

**1.6.A.3** Connection and Interaction of Sensory Systems

- ☐ **Sensation**
- ☐ *Psychophysics*
- ☐ *Sensory Receptors*
- ☐ *Signal Detection Theory*
- ☐ **Absolute Threshold**
- ☐ **Just-Noticeable Difference**  
(*Difference Threshold*)

- ☐ **Weber's Law**
- ☐ **Sensory Adaptation**
- ☐ **Sensory Interaction**
- ☐ **Synesthesia**
- ☐ *Embodied Cognition*
- ☐ *Subliminal*
- ☐ *Priming*

**1.6.B** Explain how the structures and functions of the visual sensory system relate to behavior and mental processes.

**1.6.B.1** Transduction in the Retina

**1.6.B.2** Lens Accommodation

**1.6.B.3** Rods

**1.6.B.4** Color Vision Theories

**1.6.B.4.I** Cones

**1.6.B.4.II** Afterimages and Ganglion Cells

**1.6.B.4.III** Color Vision Deficiencies

**1.6.B.5** Brain Damage Resulting in Visual Disorders

- ☐ *Wavelengths*
- ☐ *Hue*
- ☐ *Intensity*
- ☐ *Cornea*
- ☐ *Pupil*
- ☐ *Iris*
- ☐ **Retina**
- ☐ **Blind Spot**
- ☐ **Visual Nerve** (*optic nerve*)
- ☐ **Lens**
- ☐ **Accommodation**
- ☐ **Nearsightedness**
- ☐ **Farsightedness**
- ☐ **Fovea**
- ☐ **Photoreceptors**

- ☐ **Transduction**
- ☐ **Rods**
- ☐ **Cones**
- ☐ (*Young-Helmholtz*)  
**Trichromatic Theory**
- ☐ **Opponent-Process Theory**
- ☐ *Feature Detectors*
- ☐ **Afterimages**
- ☐ **Ganglion cells**
- ☐ **Dichromatism**
- ☐ **Monochromatism**
- ☐ **Prosopagnosia**
- ☐ **Blindsight**
- ☐ *Parallel Processing*

**1.6.C** Explain how the structures and functions of the auditory system relate to behavior and mental processes.

**1.6.C.1** Detecting Movement of Air

**1.6.C.2** Theories of Pitch Detection

**1.6.C.3** Determining Location of Sound

**1.6.C.4** Hearing Difficulties

- ☐ **Wavelengths**
- ☐ *Frequency*
- ☐ *Pitch*
- ☐ **Amplitude**
- ☐ *Middle Ear*
- ☐ *Cochlea*
- ☐ *Inner Ear*

- ☐ **Place Theory**
- ☐ **Volley Theory**
- ☐ **Frequency Theory**
- ☐ **Conduction Deafness**
- ☐ **Sensorineural Deafness**
- ☐ *Cochlear Implant*
- ☐ **Sound Localization**

**1.6.D** Explain how the structures and functions of the chemical sensory systems relate to behavior and mental processes.

**1.6.D.1** Detection and Transduction in the Nose

**1.6.D.2** Types of Taste

**1.6.D.3** Structures That Transduce Taste & Types of Tasters

**1.6.D.3** Interaction and Coordination of Chemical Senses

- ☐ **Olfactory System** (*Olfaction*)
- ☐ **Thalamus**
- ☐ **Pheromones**
- ☐ **Gustation**
- ☐ **Taste receptors**

- ☐ **Umami**
- ☐ **Oleogustus**
- ☐ **Supertasters**
- ☐ **Medium tasters**
- ☐ **Nontasters**

**1.6.E** Explain how the structures and functions of the touch sensory system relate to behavior and mental processes.

**1.6.E.1** Structures That Process Touch in the Skin & Brain

**1.6.F** Explain how the structures and functions of the pain sensory system relate to behavior and mental processes.

**1.6.F.1** Explain the Processes and Complexities of Pain

- ☐ **Gate Control Theory**

- ☐ **Phantom Limb Sensation**

**1.6.G** Explain how the structures and functions that maintain balance (vestibular) and body movement (kinesthetic) relate to behavior and mental processes.

**1.6.G.1** Vestibular Sense

**1.6.G.2** Kinesthesia

- ☐ **Vestibular Sense**
- ☐ **Semicircular Canals**

- ☐ **Kinesthesia**

