This document provides a list of MCAT2015 content from the course-mapping tool that has been added, removed, moved or changed since the Preview Guide to the MCAT2015 Exam was released in September 2012. It includes changes to the foundational concepts, topics, and subtopics in the *Biological and Biochemical Foundations of Living Systems* section (Foundational Concepts 1-3), the *Chemical and Physical Foundations of Biological Systems* section (Foundational Concepts 4-5), and the *Psychological, Social, and Biological Foundations of Behavior* section (Foundational Concepts 6-10). To view the final, MCAT2015 content, see the tool *What's on the MCAT2015 Exam*? at www.aamc.org/mcat2015exam.

Foundational Concept 1

Biomolecules have unique properties that determine how they contribute to the structure and function of cells, and how they participate in the processes necessary to maintain life.

Added:	Removed:	Moved/Changed:
N/A	**N/A**	**Analytic Methods (BIO)** ▪ Testcross (Backcross; concepts of parental, F1, and F2 generations) **Non-Enzymatic Protein Function (BIO, BC)** ▪ Binding (BC) **Nucleic Acid Structure and Function (BIO, ~~OC,~~BC)** **Transcription (BIO)** ▪ Ribozymes, spliceosomes, small nuclear ribonucleoproteins (snRNPs), small nuclear RNAs (snRNAs)

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Update Summary for Course-Mapping Tool Version 2 (**April 2014**)

Foundational Concept 3

Complex systems of tissues and organs sense the internal and external environments of multicellular organisms, and through integrated functioning, maintain a stable internal environment within an ever-changing external environment.

Added:	Removed:	Moved/Changed:

Immune System (BIO)
▪ Tissues
  o Bone marrow
  o Spleen
  o Thymus
  o Lymph nodes
	Circulatory System (BIO)
	▪ Oxygen transport by blood
	  o ~~Oxygen transport by blood; modification of oxygen affinity~~
		Endocrine System: Mechanisms of Hormone Action (BIO)
		▪ Integration with nervous system: feedback control ~~regulation by second messengers~~
		▪ Regulation by second messengers

Foundational Concept 4

Complex living organisms transport materials, sense their environment, process signals, and respond to changes using processes that can be understood in terms of physical principles.

Added:	Removed:	Moved/Changed:
Force (PHY) ▪ Newton's First Law, inertia ▪ Newton's Second Law ($F = ma$) ▪ Newton's Third Law, forces equal and opposite ▪ Friction, static and kinetic ▪ Center of mass **Work (PHY)** ▪ Work done by a constant force: $W = Fd\cos\theta$ ▪ Conservative forces **Periodic Motion (PHY)** ▪ Amplitude, frequency, phase ▪ Transverse and longitudinal waves: wavelength and propagation speed **Electrostatics (PHY)** ▪ Coulomb's Law	**Work (PHY)** ▪ ~~Derived units, sign conventions~~ ▪ ~~PV diagram: work done = area under or enclosed by curve~~ **Energy of Point Object Systems (PHY)** ▪ ~~Conservative forces~~ **Equilibrium (PHY)** ▪ ~~Concept of force, units~~ ▪ ~~Newton's First Law of Motion, inertia~~ **Light, Electromagnetic Radiation (PHY)** ▪ ~~Circular polarization~~	**Equilibrium (PHY)** ▪ Vector analysis of forces acting on a point object **Energy of Point Object Systems (PHY)** **Electrostatics (PHY)** ▪ Electrostatic energy, ~~Potential difference, absolute,~~ electric potential at a point in space **Light, Electromagnetic Radiation (PHY)** ▪ Polarization of light: linear and circular

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Foundational Concept 4 Complex living organisms transport materials, sense their environment, process signals, and respond to changes using processes that can be understood in terms of physical principles.		
Added:	**Removed:**	**Moved/Changed:**
Magnetism (PHY) ▪ Definition of magnetic field **B** ▪ Motion of charged particles in magnetic fields; Lorentz force		

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Update Summary for Course-Mapping Tool Version 2 (**April 2014**)

Foundational Concept 5

The principles that govern chemical interactions and reactions form the basis for a broader understanding of the molecular dynamics of living systems.

Added:	Removed:	Moved/Changed:
Alcohols (OC) ▪ Important reactions o Substitution reactions: S_N1 or S_N2 **Energy Changes in Chemical Reactions – Thermochemistry, Thermodynamics (GC, PHY)** ▪ *PV* diagram: work done = area under or enclosed by curve (PHY)	~~**Phosphorus Compounds (OC)**~~ ▪ ~~Description, structure of phosphoric acids~~	**Nucleotides and Nucleic Acids (~~OC,~~ BC, BIO)** ▪ Chemistry (~~OC~~, BC) ▪ Other functions (~~OC~~, BC) **Amino Acids, Peptides, Proteins (OC, BC)** ▪ General Principles o ~~1°~~ Primary structure of proteins o ~~2°~~ Secondary structure of proteins o ~~3°~~ Tertiary structure of proteins ▪ Peptides and proteins: reactions o Hydrolysis (BC) **The Three-Dimensional Protein Structure (BC)** ▪ ~~4°~~ Quaternary structure **Lipids (BC, OC)** ▪ Description, Types o Structural • Sphingolipids (BC) o Signals/cofactors • Prostaglandins (BC) **Carboxylic Acids (OC)** ▪ Important reactions o Carboxyl group reactions • ~~Reactions at 2-position, substitutions~~ o Reactions at 2-position, substitution **Phenols (OC, BC)** ▪ Oxidation and reduction (e.g., hydroquinones, ubiquinones~~, ubiquinones~~: biological $2e^-$ redox centers **Energy Changes in Chemical Reactions – Thermochemistry, Thermodynamics (GC, PHY)** ▪ First Law: ~~$\Delta E = Q - W$~~ – conservation of energy~~)~~ in thermodynamic processes **Rate Processes in Chemical Reactions - Kinetics and Equilibrium (GC)** ▪ Dependence of reaction rate ~~upon~~ on concentration of reactants

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Update Summary for Course-Mapping Tool Version 2 (**April 2014**)

Foundational Concept 6

Biological, psychological, and sociocultural factors influence the ways that individuals perceive, think about, and react to the world.

Added:

Sensory Processing (PSY, BIO)
- Sensation
  - Psychophysics

Hearing (PSY, BIO)
- Structure and function of the ear

Memory (PSY)
- Retrieval
  - Processes that aid retrieval

Removed:

Perception (PSY)
- ~~Perception~~

Emotion (PSY)
- The role of biological processes in perceiving emotion (PSY, BIO)
  - ~~Emotional experiences can be stored as memories that can be recalled by similar circumstances~~
  - ~~Prefrontal cortex is critical for emotional experience, and is also important in temperament and decision making~~

Moved/Changed:

Hearing (PSY, BIO)
- Auditory processing (e.g., auditory pathways in the brain)
  - ~~Auditory pathways in the brain~~
- Sensory reception by hair cells ~~(PSY)~~

Other Senses (PSY, BIO)
- Somatosensation (e.g., pain perception)
  - ~~Pain perception (PSY)~~
- Taste (e.g., taste buds/chemoreceptors that detect specific chemicals)
  - ~~Taste buds/chemoreceptors that detect specific chemicals~~

Cognition (PSY)
- Problem solving and decision making ~~(PSY, BIO)~~
  - Heuristics-and biases~~, intuition, and emotion~~ (e.g., overconfidence, belief perseverance)
  - ~~Overconfidence and belief perseverance~~
- Intellectual functioning
  - ~~Multiple definitions~~ Theories of intelligence

Consciousness (PSY)
- States of consciousness
  - Sleep
    - Sleep-wake disorders

Memory (PSY)
- Retrieval
  - The role of emotion in retrieving memories (PSY, BIO)

Language (PSY)
- ~~Different~~ Brain areas that control language and speech (PSY, BIO)

Emotion (PSY)
- Universal emotions (i.e., fear, anger, happiness, surprise, joy, disgust, and sadness)
- The role of biological processes in perceiving emotion (PSY, BIO)
  - ~~Generation and experience of emotions involve many brain regions~~ Brain regions involved in the generation and experience of emotions ~~involve many brain regions~~

Stress (PSY)
- The nature of stress
  - Different types of stressors (e.g., cataclysmic events, personal, ~~etc.~~)
- Managing stress (e.g., exercise, relaxation, spirituality, ~~etc.~~)

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Update Summary for Course-Mapping Tool Version 2 (**April 2014**)

Foundational Concept 7

Biological, psychological, and sociocultural factors influence behavior and behavior change.

Added:

How the Presence of Others Affects Individual Behavior (PSY)

- Social control (SOC)
- Conformity (PSY, SOC)
- Obedience (PSY, SOC)

Normative and Non-normative Behavior (SOC)

- Social norms (PSY, SOC)
  - Sanctions (SOC)
  - Folkways, mores, and taboos (SOC)
  - Anomie (SOC)
- Deviance
  - Perspectives on deviance (e.g., differential association, labeling theory, strain theory)
- Aspects of collective behavior (e.g., fads, mass hysteria, riots)

Psychological Disorders (PSY)

- Types of psychological disorders
  - Obsessive–compulsive disorder
  - Trauma- and stressor-related disorders
  - Bipolar and related disorders
  - Depressive disorders

Biological Bases of Behavior (PSY, BIO)

- The nervous system

Removed:

~~**Culture (PSY, SOC)**~~

- ~~Assimilation~~
- ~~Multiculturalism (SOC)~~
- ~~Subcultures (SOC)~~

Socialization (PSY, SOC)

- ~~Definition of socialization (SOC)~~
- ~~Norms~~
- ~~Stigma and deviance (SOC)~~
- ~~Conformity and obedience~~

Theories of Attitude and Behavior Change (PSY)

- Elaboration likelihood model
  - ~~Information processing routes to persuasion (i.e., central and peripheral route processing)~~

Biological Bases of Behavior (PSY, BIO)

- The nervous system
  - Structure and function of the central nervous system
    - The brain
      - ~~The diencephalon (BIO)~~
      - ~~Control of voluntary movement in the cerebral cortex~~
      - ~~Information processing in the cerebral cortex~~

Associative Learning (PSY)

- Biological processes that affect associative learning (e.g., biological predispositions, instinctive drift), (PSY, BIO)
  - ~~Innate behaviors are developmentally fixed~~
  - ~~Learned behaviors are modified based on experiences~~
  - ~~Development of learned behaviors (PSY, BIO)~~

Psychological Disorders (PSY)

Moved/Changed:

Biological Bases of Behavior (PSY, BIO)

- The nervous system
  - Neurons (e.g., the reflex arc)
    - ~~The reflex arc~~
  - Structure and function of the peripheral nervous system
  - Structure and function of the central nervous system
    - The brain
      - ~~The brainstem~~ Forebrain
      - ~~The cerebellum~~ Midbrain
      - ~~The cerebrum~~ Hindbrain
- Neuronal communication and its influence on behavior (PSY)
- Influence of genetic ~~Genetic~~ and environmental factors ~~contribute to~~ on the development of behaviors

Socialization (PSY, SOC)

- Agents of socialization (e.g., the family, mass media, peers, workplace) (~~SOC~~)

Psychological Disorders (PSY)

- Types of psychological disorders
  - ~~Somatoform~~ Somatic symptom and related disorders
  - Dissociative disorders
- Biological bases of nervous system disorders (PSY, BIO)
  - Stem cell-based therapy to regenerate neurons in the central nervous system ~~CNS~~ (BIO)

Motivation (PSY)

- Factors that influence motivation
  - Drives (e.g., negative feedback systems) (PSY, BIO)
    - ~~Negative feedback systems (PSY, BIO)~~
- Theories that explain how motivation affects human behavior
  - Other theories (e.g., cognitive, need-based)
  - ~~Other: cognitive and need based theories~~

~~Application of theories of motivation to understand behaviors (e.g., eating, sexual, drug and alcohol use, etc.)~~ Biological and sociocultural motivators that regulate behavior (e.g., hunger, sex drive, substance addiction)

- ~~Biological factors in regulation of these motivational processes~~
- ~~Socio-cultural factors in regulation of these motivational processes~~

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Added:	Removed:	Moved/Changed:
o Structure and function of the central nervous system ▪ The spinal cord	▪ Types of psychological disorders o ~~Mood disorders~~	**Group Decision-making Processes (PSY, SOC)** **Associative Learning (PSY)** ▪ The role of cognitive processes ~~that affect~~ in associative learning ▪ Biological ~~factors~~ processes that affect associative learning (e.g., biological predispositions, instinctive drift), (PSY, BIO)

Foundational Concept 8:

Psychological, sociocultural, and biological factors influence the way we think about ourselves and others, as well as how we interact with others.

Added:	Removed:	Moved/Changed:
Prejudice and Bias (PSY, SOC) ▪ Stigma (SOC) **Elements of Social Interaction (PSY, SOC)** ▪ Status (SOC) o Types of status (e.g., achieved, ascribed) ▪ Role o Role conflict and role strain (SOC) o Role exit (SOC) ▪ Groups o Primary and secondary groups (SOC) o In-group vs. out-group o Group size (e.g., dyads, triads) (SOC) ▪ Organizations (SOC) o Formal organization o Bureaucracy o Characteristics of an ideal bureaucracy o Perspectives on bureaucracy (e.g., iron law of oligarchy, McDonaldization) **Social Behavior (PSY)** ▪ Altruism	**Prejudice and Bias (PSY, SOC)** ▪ ~~Definition of prejudice~~ ▪ Ethnocentrism (SOC) ▪ ~~In group and out group~~	**Elements of Social Interaction (PSY, SOC)** ▪ ~~Statuses~~ Status (SOC) **Self-Concept, Self-identity, and Social Identity (PSY, SOC)** ▪ ~~Definitions of self-concept, identity, and social identity~~ **Formation of Identity (PSY, SOC)** ▪ Theories of identity development (e.g., gender, moral, psychosexual, social) ~~Stages of identity development~~ ▪ ~~Theories of developmental stages (e.g., Erikson, Vygotsky, Kohlberg, Freud) (PSY)~~ ▪ Influence of social factors on identity formation o Influence of individuals (e.g., imitation, looking-glass self, role-taking) **Attributing Behavior to Persons or Situations (PSY)** ▪ Attributional processes (e.g., fundamental attribution error, role of culture in attributions) ~~Attribution theory~~ o ~~Fundamental attribution error~~ o ~~How culture affects attributions~~ **Self-presentation and Interacting with Others (PSY, SOC)** ▪ Expressing and detecting emotion o The role of gender in the ~~Gender shapes~~ expression and detection of emotion o The role of culture in the ~~Culture shapes~~ expression and detection of emotion ▪ Presentation of self ~~Impression management~~ o Impression management **Social Behavior (PSY)** ▪ Social support (PSY, SOC)

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Foundational Concept 9

Social stratification and access to resources influence well-being.

Added:

Theoretical Approaches (SOC)

- Microsociology vs. macrosociology
- Exchange-rational choice
- Feminist theory

Social Institutions (SOC)

- Education
  - Hidden curriculum
  - Teacher expectancy
  - Educational segregation and stratification
- Family (PSY, SOC)
  - Forms of kinship (SOC)
  - Diversity in family forms
  - Marriage and divorce
  - Violence in the family (e.g., child abuse, elder abuse, spousal abuse) (SOC)
- Religion
  - Religiosity
  - Types of religious organizations (e.g., churches, sects, cults)
  - Religion and social change (e.g., modernization, secularization, fundamentalism)
- Government and economy
  - Power and authority
  - Comparative economic and political systems
  - Division of labor
- Health and medicine
  - Medicalization
  - The sick role
  - Delivery of health care
  - Illness experience
  - Social epidemiology

Culture (PSY, SOC)

- Elements of culture (e.g., beliefs, language, rituals, symbols, values)
- Culture lag (SOC)
- Culture shock (SOC)
- Assimilation (SOC)
- Multiculturalism (SOC)
- Subcultures and countercultures (SOC)
- Mass media and popular culture (SOC)

Removed:

Culture (PSY, SOC)

- ~~Symbolic culture~~
  - ~~Language and symbols~~
  - ~~Values and beliefs (PSY, SOC)~~
  - ~~Norms and rituals (PSY, SOC)~~
- ~~Culture and social groups (PSY, SOC)~~

Demographic Shifts and Social Change (SOC)

- ~~Demographic transition~~

Moved/Changed:

Culture (PSY, SOC)

- Material vs. symbolic culture (SOC)

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Added:	Removed:	Moved/Changed:
▪ Transmission and diffusion (SOC) **Demographic Structure of Society (PSY, SOC)** ▪ Age o Aging and the life course o Age cohorts (SOC) o Social significance of aging ▪ Gender o Sex versus gender o The social construction of gender (SOC) o Gender segregation (SOC) ▪ Race and ethnicity (SOC) o The social construction of race o Racialization o Racial formation ▪ Immigration status (SOC) o Patterns of immigration o Intersections with race and ethnicity **Demographic Shifts and Social Change (SOC)** ▪ Theories of demographic change (i.e., Malthusian theory and demographic transition) ▪ Population growth and decline (e.g., population projections, population pyramids) ▪ Fertility, migration, and mortality o Fertility and mortality rates (e.g., total, crude, age-specific) o Patterns in fertility and mortality o Push and pull factors in migration ▪ Social movements o Relative deprivation o Organization of social movements o Movement strategies and tactics ▪ Globalization o Factors contributing to globalization (e.g., communication technology, economic interdependence) o Perspectives on globalization o Social changes in globalization (e.g., civil unrest, terrorism) ▪ Urbanization o Industrialization and urban growth o Suburbanization and urban decline o Gentrification and urban renewal		

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Update Summary for Course-Mapping Tool Version 2 (**April 2014**)

Foundational Concept 10 Social stratification and access to resources influence well-being.		
Added:	**Removed:**	**Moved/Changed:**
Social Class (SOC) ▪ Aspects of social stratification o Class consciousness and false consciousness o Socioeconomic gradient in health o Global inequalities **Spatial Inequality (SOC)** ▪ Neighborhood safety and violence ▪ Environmental justice (location and exposure to health risks)	**Spatial Inequality (SOC)** ▪ ~~Global inequalities~~	**Spatial Inequality (SOC)** ▪ Residential segregation (~~neighborhoods~~) **Social Class (SOC)** ▪ Aspects of social stratification o Social class ~~Class~~, and socioeconomic status~~, and power~~ o Power, privilege, and prestige o ~~Intersections~~ Intersectionality (e.g., ~~with~~ race, gender, ~~and~~ age) ▪ Patterns of social mobility o ~~Downward~~ Vertical and ~~upward~~ horizontal mobility ▪ Poverty o Relative and absolute poverty **Health Disparities (SOC)** (e.g., class, gender and race inequalities in health) ▪ ~~Race, gender, and class inequalities in health~~ **Healthcare Disparities (SOC)** (e.g., class, gender, and race inequalities in healthcare) ▪ ~~Race, gender, and class inequalities in healthcare~~

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