The content and assessments of each medical science block within the Foundation Phase is informed by categories and subcategories derived from the USMLE 2012 Content Guide for STEP 1. Below is a listing of each medical science block and its corresponding categories and subcategories. Please note that two categories, Population Health and Social Sciences, apply to all blocks. These categories are listed at the end of the document.

Principles of Medicine Block

Biochemistry and molecular biology
- Gene expression: DNA structure, replication, exchange, and epigenetics
- Gene expression: transcription
- Gene expression: translation, post-translational processing, modifications, and disposition of proteins
- Structure and function of proteins and enzymes
- Energy metabolism

Cell biology, physiology, and histology
- Adaptive cell responses and cellular homeostasis
- Mechanisms of injury and necrosis, including pathologic processes
- Apoptosis
- Cell cycle and cell cycle regulation
- Mechanisms of dysregulation
- Cell/tissue structure, regulation, and function
- Basic physiological processes
- Epithelial tissue
- Connective tissue
- Muscle tissue
- Nerve tissue

Human development and genetics
- General embryology
- Principles of pedigree analysis
- Population genetics: Hardy-Weinberg law, founder effects, mutation-selection equilibrium
- Principles of gene therapy
- Genetic testing and counseling
- Genetic mechanisms

General pathology: biology of tissue response to disease
- Acute inflammatory responses
- Chronic inflammatory responses
- Reparative processes
Pharmacodynamic and pharmacokinetic processes
- Pharmacokinetics: absorption, distribution, metabolism, excretion, dosage intervals
- Mechanisms of drug action, structure-activity relationships
- Concentration and dose-effect relationships, types of agonists and antagonists and their actions
- Individual factors altering pharmacokinetics and pharmacodynamics
- Mechanisms of drug adverse effects, overdosage, toxicology
- Mechanisms of drug interactions
- Signal transduction

Microbial biology
- Microbial identification and classification
- Bacteria
- Viruses
- Fungi
- Parasites
- Prion

Immunologic Block
Normal processes
- Development of cells of the adaptive immune response
- Structure, production, and function of the immune system
- Cellular basis of the immune response and immunologic mediators
- Basis of immunologic diagnostics
- Principles of immunologic protection
- Effect of age on the function of components of the immune system

Abnormal Processes
- Disorders associated with immunodeficiency
- HIV/AIDS
- Immunologically mediated disorders
- Adverse effects of drugs on the immune system

Hematologic Block
Normal Processes
- Embryonic development, fetal maturation, and perinatal changes
- Organ structure and function
- Cell/tissue structure and function
- Repair, regeneration, and changes associated with stage of life

Abnormal Processes
- Infectious and immunologic
- Neoplasms
- Anemia, cytopenias, and polycythemia
- Coagulation disorders
- Traumatic, mechanical, and vascular disorders
- Congenital disorders
- Adverse effects of drugs on the hematologic and lymphoreticular sys
Cardiovascular Block

Normal Processes
- Cell/tissue structure and function
- Embryonic development, fetal maturation, and perinatal transitional changes
- Organ structure and function
- Repair, regeneration, and changes associated with stage of life

Abnormal Processes
- Adverse effects of drugs on the cardiovascular system
- Congenital disorders, including disease in adults
- Diseases of the myocardium
- Diseases of the pericardium
- Dyslipidemia
- Dysrhythmias
- Heart failure
- Hypertension
- Hypotension
- Infectious, immunologic, and inflammatory disorders
- Ischemic heart disease
- Neoplasms
- Valvular heart disease
- Vascular disorders
- Traumatic and mechanical disorders

Respiratory Block

Normal Processes
- Cell/tissue structure and function, including surfactant formation and alveolar structure
- Embryonic development, fetal maturation, and perinatal changes
- Organ structure and function
- Pulmonary defense mechanisms and normal flora
- Repair, regeneration, and changes associated with stage of life

Abnormal Processes
- Adverse effects of drugs on the respiratory system
- Congenital disorders
- Disorders of the pleura, mediastinum, and chest wall
- Infectious, immunologic, and inflammatory disorders
- Metabolic, regulatory, and structural disorders
- Neoplasms
- Obstructive airway disease
- Pneumoconiosis/fibrosing/restrictive pulmonary disorders/interstitial lung disease
- Respiratory failure/respiratory arrest and pulmonary vascular disorders
- Traumatic and mechanical disorders
Urinary Block

**Normal Processes**
- Cell/tissue structure and function
- Embryonic development, fetal maturation, and perinatal changes
- Organ structure and function
- Repair, regeneration, and changes associated with stage of life

**Abnormal Processes**
- Adverse effects of drugs on the renal and urinary system
- Congenital disorders
- Infectious, immunologic, and inflammatory disorders
- Metabolic and regulatory disorders
- Neoplasms
- Signs, symptoms, and ill-defined disorders
- Traumatic and mechanical disorders
- Vascular disorders

Gastrointestinal Block

**Normal Processes**
- Embryonic development, fetal maturation, and perinatal changes
- Organ structure and function
- Cell/tissue structure and function
- Repair, regeneration, and changes associated with stage of life
- Gastrointestinal defense mechanisms and normal flora

**Abnormal Processes**
- Infectious, immunologic, and inflammatory disorders
- Neoplasms
- Signs, symptoms, and ill-defined disorders
- Disorders of the oral cavity, salivary glands, and esophagus
- Disorders of the stomach, small intestine, colon, rectum, anus
- Disorders of the liver and biliary system, noninfectious
- Disorders of the pancreas
- Disorders of the peritoneal cavity
- Traumatic and mechanical disorders
- Congenital disorders
- Adverse effects of drugs on the gastrointestinal system
Neurologic Block

Normal Processes
- Embryonic development, fetal maturation, and perinatal changes
- Organ structure and function
- Cell/tissue structure and function
- Repair, regeneration, and changes associated with stage of life

Abnormal Processes
- Infectious, immunologic, and inflammatory disorders
- Neoplasms
- Cerebrovascular disease
- Disorders relating to the spine, spinal cord, and spinal nerve roots
- Cranial and peripheral nerve disorders
- Neurologic pain syndromes
- Degenerative disorders/amnestic syndromes
- Global cerebral dysfunction
- Neuromuscular disorders
- Movement disorders
- Metabolic disorders
- Paroxysmal disorders
- Sleep disorders
- Traumatic and mechanical disorders and disorders of increased intracranial pressure
- Congenital disorders
- Adverse effects of drugs on the nervous system
- Disorders of the eye, eyelid, and ear

Behavioral Health in Health and Disease Block

Normal Processes
- Psychodynamic and behavioral factors, related past experience (e.g., transference, personality traits)
- Adaptive behavioral responses to stress and illness (e.g., coping mechanisms)
- Maladaptive behavioral responses to stress and illness (e.g., drug-seeking behavior, sleep deprivation)
- Patient adherence

Abnormal Processes
- Psychotic disorders
- Anxiety disorders
- Mood disorders
- Somatoform disorders
- Factitious disorders
- Eating disorders and impulse control disorders
- Disorders originating in infancy/childhood
- Personality disorders
- Psychosocial disorders/behaviors
- Sexual and gender identity disorders
- Substance abuse disorders
- Adverse effects of drugs
Endocrine Block

Normal Processes
- Embryonic development, fetal maturation, and perinatal changes
- Organ structure and function
- Cell/tissue/structure and function, including hormone synthesis, secretion, action, metabolism
- Repair, regeneration, and changes associated with stage of life

Abnormal Processes
- Diabetes mellitus and other disorders of the endocrine pancreas
- Thyroid disorders
- Parathyroid disorders
- Adrenal disorders
- Pituitary disorders
- Hypothalamic endocrine disorders
- Multiple endocrine neoplasia
- Congenital disorders
- Adverse effects of drugs on the endocrine system

Reproductive Block

Normal Processes
- MALE: Embryonic development, fetal maturation, and neonatal changes
- MALE: Organ structure and function
- MALE: Cell/tissue structure and function
- MALE: Reproductive system defense mechanisms and normal flora
- FEMALE: Embryonic development, fetal maturation, and perinatal changes
- FEMALE: Organ structure and function
- FEMALE: Cell/tissue structure and function
- FEMALE: Reproductive system defense mechanisms and normal flora
- FEMALE: Pregnancy, including fertilization and implantation
- FEMALE: Labor and delivery
- FEMALE: The puerperium, lactation, gestational uterus, and placenta

Abnormal Processes
- MALE: Infectious, immunologic, and inflammatory disorders
- MALE: Neoplasms
- MALE: Metabolic and regulatory disorders, including sexual dysfunction
- MALE: Traumatic and mechanical disorders
- MALE: Congenital disorders of the male reproductive system
- MALE: Adverse effects of drugs on the male reproductive system
- FEMALE: Breast
- FEMALE: Female reproductive system
- FEMALE: Prenatal care
- FEMALE: Obstetric complications
- FEMALE: Labor and delivery
- FEMALE: Puerperium, including complications
- FEMALE: Newborn (birth to 4 weeks of age)
- FEMALE: Congenital disorders, neonatal
- FEMALE: Adverse effects of drugs on pregnancy, childbirth, and the puerperium
- FEMALE: Systemic disorders affecting pregnancy, labor and delivery, and puerperium
Musculoskeletal Block

Normal processes
• Embryonic development, fetal maturation, and perinatal changes
• Organ structure and function
• Cell/tissue structure and function
• Repair, regeneration, and changes associated with stage of life

Abnormal Processes
• Infectious, inflammatory, and immunologic disorders
• Neoplasms
• Degenerative and metabolic disorders
• Traumatic and mechanical disorders
• Congenital disorders
• Adverse effects of drugs on the musculoskeletal system

Integumentary Block

Normal Processes
• Embryonic development, fetal maturation, and neonatal changes
• Organ structure and function, including barrier function, thermal regulation
• Cell/tissue structure and function, eccrine function
• Repair, regeneration, and changes associated with stage of life
• Skin defense mechanisms and normal flora

Abnormal Processes
• Infectious, immunologic, and inflammatory disorders
• Neoplasms
• Adnexal disorders
• Oral disease
• Disorders of pigmentation
• Traumatic and mechanical disorders
• Congenital disorders
• Adverse effects of drugs on skin and subcutaneous tissue

Multi-Organ Synthesis Block

Normal Processes
• Embryonic development, fetal maturation, and perinatal transitional changes
• Organ structure and function
• Cell/tissue structure and function
• Repair, regeneration, and changes associated with stage of life

Abnormal Processes
• Vascular disorders
• Inflammatory disorders
• Neoplasms
• Degenerative disorders
• Infectious disease
• Congenital disorders
• Autoimmune/allergic disorders
• Trauma
• Endocrine disorders
Social Sciences (Communications, Ethics, and Systems-based Practice)*
*Aplies to all medical science blocks

- Communication: patient interviewing, consultation, and interactions with the family
- Communication: health literacy
- Communication: health numeracy
- Communication: cultural competence
- Communication: use of an interpreter
- Ethics: consent/informed consent to treatment, permission to treat
- Ethics: determination of medical decision-making capacity/informed refusal
- Ethics: involuntary admission
- Ethics: legal issues related to abuse (child, elder, and intimate partner)
- Ethics: birth-related issues (e.g., prenatal diagnosis, abortion, maternal-fetal conflict)
- Ethics: death and dying and palliative care
- Ethics: physician-patient relationship (boundaries, confidentiality including HIPAA, privacy, truth-telling)
- Ethics: impaired physician, including duty to report impaired physician
- Ethics: negligence/malpractice, including duty to report negligence and malpractice
- Ethics: physician misconduct, including duty to report physician misconduct
- Ethics: referrals
- Ethics: cultural issues not otherwise coded
- Systems-based practice and patient safety

Population Health*
*Applies to all blocks.

- Epidemiology: measures of disease frequency and incidence/prevalence
- Epidemiology: composite health status indicators, measures of population impact
- Epidemiology: population pyramids and impact of demographic changes
- Epidemiology: disease surveillance and outbreak investigation
- Epidemiology: communicable disease transmission
- Epidemiology: measures of health status
- Epidemiology: survival analysis interpretation
- Epidemiology: points of intervention
- Study design: descriptive studies (case report/case series)
- Study design: analytical studies (observational)
- Study design: analytical studies (interventional)
- Study design: systematic reviews and meta-analysis
- Study design: obtaining and describing samples, matching, inclusion/exclusion criteria, controls, concealed allocation, randomization, stratification
- Study design: methods to handle noncompliance
- Study design: qualitative analysis
- Measures of association: relative risk
• Measures of association: odds ratio, hazard ratio
• Measures of association: other measures of association
• Distributions of data
• Correlation and regression, uses, and interpretation
• Principles of testing and screening: properties of a screening test
• Principles of testing and screening: sensitivity and specificity; predictive value, positive and negative
• Principles of testing and screening: ROC curves
• Study interpretation: causation
• Study interpretation: chance
• Study interpretation: interpretation of graphs/tables and text
• Study interpretation: bias, confounding, and threats to validity (includes methods to address)
• Study interpretation: internal vs. external validity
• Study interpretation: statistical vs. clinical significance; clinical and surrogate outcome/end-point
• Clinical decision making, interpretation, and use of evidence
• Research ethics: informed consent for research
• Research ethics: privacy of patient data (HIPAA)
• Research ethics: roles of institutional review boards (IRBs)
• Research ethics: intervention analysis
• Research ethics: regulatory issues
• Research ethics: other issues related to research ethics