

Kentucky PLTW Biomedical Science

Principles of Biomedical Science

Foundation Standard 1:
Academic Foundation:
Understand human anatomy, physiology, common diseases and disorders, and medical math principles. [PBS1](#)

1.1.2 Identify basic structures and describe functions of human body systems [PBS112](#)

1.1.2 a Skeletal [PBS112A](#)

- A** Structures of the skeletal system [PBS112AA](#)
 - i** Distinguish between axial and appendicular skeletons [PBS112AAI](#)
 - ii** Describe long bone anatomy [PBS112AAII](#)
 - iii** Identify joint types and movement [PBS112AAIII](#)
 - iv** Name and classify all bones (206) [PBS112AAIV](#)
- B** Functions of the skeletal system [PBS112AB](#)
 - i** Structure and support [PBS112ABI](#)
 - ii** Muscle attachment and movement [PBS112ABII](#)
 - iii** Mineral storage [PBS112ABIII](#)
 - iv** Hematopoiesis [PBS112ABIV](#)

1.1.2 b Muscular [PBS112B](#)

- A** Structures of the muscular system [PBS112BA](#)
 - i** Identify types of muscle tissue [PBS112BAI](#)
 - ii** Identify major muscle groups of neck, shoulder, chest, abdomen, back, arms, and legs [PBS112BAII](#)
- B** Functions of the muscular system [PBS112BB](#)
 - i** Body movement [PBS112BBI](#)
 - ii** Posture [PBS112BBII](#)
 - iii** Protection [PBS112BBIII](#)

1.1.2 c Integumentary [PBS112C](#)

- A** Structures of the integumentary system [PBS112CA](#)
 - i** Identify integumentary components [PBS112CAI](#)
 - ii** Label the layers of skin [PBS112CAII](#)
- B** Functions of the integumentary system [PBS112CB](#)
 - i** Vitamin D production [PBS112CBI](#)
 - ii** Sensory organ [PBS112CBII](#)
 - iii** Infection protection [PBS112CBIII](#)
 - iv** Temperature regulation [PBS112CBIV](#)
 - v** UV light protection [PBS112CBV](#)

1.1.2 d Cardiovascular [PBS112D](#)

- A** Structures of the cardiovascular system [PBS112DA](#)
 - i** Identify cardiovascular organs [PBS112DAI](#)

- ii Label the parts of the heart [PBS112DAII](#)
 - iii Distinguish blood components [PBS112DAIII](#)
 - B Functions of the cardiovascular system [PBS112DB](#)
 - i Blood flow through the heart and body [PBS112DBI](#)
 - ii Transports nutrients, waste, antibodies, hormones, and gases [PBS112DBII](#)
 - iii Cardiac conduction system [PBS112DBIII](#)
 - 1.1.2 e Lymphatic/Immune [PBS112E](#)
 - A Structures of the lymphatic system [PBS112EA](#)
 - i Identify lymphatic organs [PBS112EAI](#)
 - B Functions of the lymphatic system [PBS112EB](#)
 - i Provide protection against disease [PBS112EBI](#)
 - ii Movement of lymph fluid [PBS112EBII](#)
 - 1.1.2 f Respiratory [PBS112F](#)
 - A Structures of the respiratory system [PBS112FA](#)
 - i Identify respiratory organs [PBS112FAI](#)
 - B Functions of the respiratory system [PBS112FB](#)
 - i Gas exchange [PBS112FBI](#)
 - 1.1.2 g Nervous System [PBS112G](#)
 - A Structures of the nervous system [PBS112GA](#)
 - i Identify organs of the nervous system [PBS112GAI](#)
 - ii Identify structures of the special sense organs [PBS112GAI](#)
 - B Functions of the nervous system [PBS112GB](#)
 - i Sensation [PBS112GBI](#)
 - ii Movement [PBS112GBII](#)
 - iii Processing [PBS112GBIII](#)
 - 1.1.2 h Endocrine [PBS112H](#)
 - A Structures of the endocrine system [PBS112HA](#)
 - i Identify endocrine glands [PBS112HAI](#)
 - B Functions of the endocrine system [PBS112HB](#)
 - i Production of hormones [PBS112HBI](#)
 - ii Regulation of body processes [PBS112HBII](#)
 - iii Controls metabolism [PBS112HBIII](#)
 - iv Regulates growth, development, and maturation [PBS112HBIV](#)
 - 1.1.2 i Digestive [PBS112I](#)

- A Structures of the digestive system [PBS112IA](#)
 - i Identify digestive organs in sequence [PBS112IAI](#)
 - ii Differentiate between alimentary and accessory organs [PBS112IAII](#)
- B Functions of the digestive system [PBS112IB](#)
 - i Chemical and mechanical digestion [PBS112IBI](#)
 - ii Absorption of nutrients [PBS112IBII](#)
 - iii Excretion of waste [PBS112IBIII](#)

1.1.2 j Urinary [PBS112J](#)

- A Structures of the urinary system [PBS112JA](#)
 - i Identify urinary organs [PBS112JAI](#)
 - ii Identify gross and microscopic anatomy of the kidney [PBS112JAI](#)
- B Functions of the urinary system [PBS112JB](#)
 - i Process of urine formation [PBS112JBI](#)
 - ii Urine composition [PBS112JBII](#)
 - iii Homeostatic balance [PBS112JBIII](#)

1.1.2 k Reproductive [PBS112K](#)

- A Structures of the reproductive system [PBS112KA](#)
 - i Identify female reproductive organs [PBS112KAI](#)
 - ii Identify male reproductive organs [PBS112KAII](#)
- B Functions of the reproductive system [PBS112KB](#)
 - i Formation of gametes [PBS112KBI](#)
 - ii Production of hormones [PBS112KBII](#)

1.2.1 Describe etiology, pathology, diagnosis, treatment, and prevention of common diseases and disorders, including, but not limited to the following: PBS121

- A Arthritis PBS121A
- B Asthma PBS121B
- C Cancer PBS121C
- D Cataracts PBS121D
- E Concussion/Traumatic Brain Injury (TBI) PBS121E
- F Cystic fibrosis PBS121F
- G Diabetes mellitus PBS121G
- H Dementia PBS121H
- I Gastric ulcer PBS121I
- J Hepatitis PBS121J
- K Hypertension PBS121K
- L Melanoma PBS121L
- M Muscular Dystrophy PBS121M
- N Myocardial Infarction PBS121N
- O Sexually Transmitted Infection (STI) PBS121O
- P Stroke/Cardiovascular Accident (CVA) PBS121P
- Q Tuberculosis PBS121Q
- R Urinary Tract Infection (UTI) PBS121R

1.2.2 Describe biomedical therapies as they relate to the prevention, pathology, and treatment of disease PBS122

- A Gene testing PBS122A
- B Gene therapy PBS122B
- C Cloning PBS122C
- D Stem cell research PBS122D

1.3.1 Demonstrate competency using basic math skills and mathematical conversions as they relate to healthcare. PBS131

1.3.1 b Mathematical PBS131B

- A Average PBS131BA
- B Ratios PBS131BB
- C Fractions PBS131BC
- D Percentages PBS131BD
- E Addition/Subtraction PBS131BE
- F Multiplication/Division PBS131BF

1.3.1 c Conversions PBS131C

- A Height (inches/meters) PBS131CA
- B Weight/mass (pounds/grams) PBS131CB
- C Length (inches/meters) PBS131CC
- D Volume (ml/cc) PBS131CD
- E Temperature (F/C) PBS131CE
- F Household measurements (Tbsp/tsp/cup/oz) PBS131CF

1.3.2 Demonstrate the ability to analyze diagrams, charts, graphs, and tables to interpret healthcare results. PBS132

1.3.3 Demonstrate use of the 24-hour clock/military time. PBS133

Identify basic levels of organization of the human body PBS111A

- A Chemical PBS111AA
- B Cellular PBS111AB
- C Tissue PBS111AC
- D Organs PBS111AD
- E Systems PBS111AE
- F Organism PBS111AF

Describe the organization of the human body using directional terms PBS111D

- A Anterior/Posterior PBS111DA
- B Medial/Lateral PBS111DB
- C Proximal/Distal PBS111DC
- D Superficial/Deep PBS111DD
- E Superior/Inferior PBS111DE

F Ventral/Dorsal [PBS111DF](#)

Identify body cavities [PBS111E](#)

A Abdominal [PBS111EA](#)

B Cranial [PBS111EB](#)

C Dorsal [PBS111EC](#)

D Pelvic [PBS111ED](#)

E Spinal [PBS111EE](#)

F Thoracic [PBS111EF](#)

Foundational Standard 2: Communications - Demonstrate methods of delivering and obtaining information, while communicating effectively [PBS2](#)

2.1.1 Model verbal and nonverbal therapeutic communication [PBS211](#)

A Active listening [PBS211A](#)

B Silence [PBS211B](#)

C Summarizing [PBS211C](#)

D Reflecting [PBS211D](#)

2.1.4 Interpret elements of communication using sender-message-receiver-feedback model [PBS214](#)

2.1.5 Modify communication to meet the needs of the patient/client and be appropriate to the situation [PBS215](#)

2.1.6 Describe appropriate interactions with patients throughout various stages of psychosocial development [PBS216](#)

2.2.1 Use common roots, prefixes, and suffixes to communicate information [PBS221](#)

2.2.2 Interpret common medical abbreviations to communicate information [PBS222](#)

2.3.1 Use proper elements of written and electronic communication (spelling, grammar, and formatting) [PBS231](#)

2.3.2 Prepare examples of technical and informative writing [PBS232](#)

**Foundation Standard 3:
Systems - Identify how
key systems affect
services performed and
quality of care** PBS3

3.1.1 Differentiate healthcare delivery systems and healthcare related agencies PBS311

3.1.1 a Types of practice settings PBS311A

- A Acute care PBS311AA
- B Ambulatory care PBS311AB
- C Behavioral and mental health services PBS311AC
- D Home care PBS311AD
- E Long-term care PBS311AE
- F Medical and dental practices PBS311AF

3.1.2 Examine the healthcare consumer's rights and responsibilities within the healthcare system PBS312

- A Self-advocacy PBS312A
- B Compliance PBS312B
- C Patient's Bill of Rights PBS312C

**Foundation Standard 4:
Employability Skills -
Use employability skills
to enhance employment
opportunities and job
satisfaction** PBS4

4.1.1 Identify personal traits and attitudes desirable in a career ready member of a health team PBS411

- A Acceptance of criticism PBS411A
- B Competence PBS411B
- C Dependability PBS411C
- D Discretion PBS411D
- E Empathy PBS411E
- F Enthusiasm PBS411F
- G Honesty PBS411G
- H Initiative PBS411H
- I Integrity PBS411I
- J Patience PBS411J
- K Positive Attitude PBS411K
- L Responsibility PBS411L
- M Self-motivation PBS411M
- N Tact PBS411N
- O Team player PBS411O
- P Willingness to learn PBS411P

4.1.2 Summarize professional standards as they apply to hygiene, dress, language, confidentiality and behavior PBS412

4.3.1 Research levels of education, credentialing requirements, and employment trends in health professions [PBS431](#)

4.3.2 Distinguish differences among career within a health science pathway [PBS432](#)

- A Biotechnology research and development [PBS432A](#)
 - B Diagnostic services [PBS432B](#)
 - C Health informatics [PBS432C](#)
 - D Support services [PBS432D](#)
 - E Therapeutic services [PBS432E](#)
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Foundation Standard 5: Legal Responsibilities - Describe legal responsibilities, limitations, and implications on healthcare worker actions [PBS5](#)

5.2.1 Apply standards for the safety, privacy and confidentiality of health information [PBS521](#)

- A HIPAA [PBS521A](#)
 - B Privileged communication [PBS521B](#)
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5.2.3 Summarize the essential characteristics of a patient's basic rights within a healthcare setting [PBS523](#)

Foundation Standard 6: Ethics - Understand accepted ethical practices with respect to cultural, social, and ethnic differences within the healthcare environment [PBS6](#)

6.1.1 Differentiate between ethical and legal issues impacting healthcare [PBS611](#)

6.1.2 Identify ethical issues and their complications related to healthcare [PBS612](#)

- A Ethics committee [PBS612A](#)
 - B Euthanasia [PBS612B](#)
 - C In vitro fertilization [PBS612C](#)
 - D Organ donation [PBS612D](#)
 - E Scope of practice [PBS612E](#)
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6.2.2 Demonstrate respectful and empathetic treatment of ALL patients/clients [PBS622](#)

- A Civility [PBS622A](#)
 - B Customer service [PBS622B](#)
 - C Patient satisfaction [PBS622C](#)
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**Foundation Standard 7:
Safety Practices -
Identify existing and
potential hazards to
clients, co-workers, and
self. Employ safe work
practices and follow
health and safety
policies and procedures
to prevent injury and
illness.** PBS7

7.1.1 Explain principles of infection transmission PBS711

7.1.1 a Identify classifications of pathogens PBS711A

- A Bacteria PBS711AA
- B Fungi PBS711AB
- C Parasites PBS711AC
- D Protozoa PBS711AD
- E Viruses PBS711AE

7.1.1 b Describe characteristics of microorganisms PBS711B

- A Aerobic PBS711BA
- B Anaerobic PBS711BB
- C Non-pathogenic PBS711BC
- D Pathogenic PBS711BD

7.1.1 c Recognize chain of infection PBS711C

7.1.1 d Describe mode of transmission PBS711D

- A Common vehicle (air, food, water) PBS711DA
- B Direct PBS711DB
- C Healthcare-associated infections (nosocomial) PBS711DC
- D Indirect PBS711DD
- E Opportunistic PBS711DE
- F Vectors PBS711DF

7.1.2 Differentiate methods of controlling the spread and growth of pathogens PBS712

7.1.2 a Asepsis PBS712A

- A Sanitization PBS712AA
- B Antisepsis PBS712AB
- C Disinfection PBS712AC
- D Sterile technique PBS712AD
- E Sterilization PBS712AE

7.1.2 b Standard precautions PBS712B

- A Handwashing PBS712BA
- B Gloving PBS712BB
- C Personal Protective Equipment (PPE) PBS712BC
- D Environmental cleaning PBS712BD

7.1.2 c Isolation precautions PBS712C

- A Transmission-based contact PBS712CA

7.1.2 d Bloodborne pathogen precautions PBS712D

7.1.2 e Vaccinations PBS712E

7.2.3 Demonstrate and apply the use of personal protective equipment (PPE) PBS723

7.4.1 Observe all safety standards related to the occupational exposure to hazardous chemicals standard (safety data sheets [SDS]) PBS741

7.4.2 Comply with safety signs, symbols, and labels PBS742

**Foundation Standard 8:
Teamwork - Identify
roles and
responsibilities of
individual members as
part of the healthcare
team** PBS8

8.1.1 Evaluate roles and responsibilities of healthcare team members PBS811

8.1.2 Identify characteristics of effective teams PBS812

- A Defined roles PBS812A
- B Common purpose PBS812B
- C Effective communication PBS812C
- D Effective leadership PBS812D
- E Measurable processes and outcomes PBS812E
- F Mutual respect PBS812F
- G Shared goals PBS812G

8.2.1 Recognize methods for building positive team relationships PBS821

8.2.2 Analyze attributes and attitudes of an effective leader PBS822

8.2.2 a Characteristics PBS822A

- A Focused and driven PBS822AA
- B Interpersonal skills PBS822AB
- C Motivates and inspires PBS822AC
- D Organized and balanced PBS822AD

8.2.2 c Roles PBS822C

- A Communicates vision PBS822CA
- B Leads change PBS822CB
- C Manages accountability PBS822CC

8.2.4 Evaluate why teamwork is an important part of healthcare and how it improves patient care PBS824

Foundation Standard 9: Health Maintenance Practices - Differentiate between wellness and disease. Promote disease prevention and model healthy behaviors. PBS9

9.1.1 Promote behaviors of health and wellness PBS911

- A Exercise PBS911A
- B Nutrition PBS911B
- C Relationships PBS911C
- D Sleep habits PBS911D
- E Stress management PBS911E
- F Weight control PBS911F

9.1.2 Examine various aspects of behavioral health PBS912

- A Anxiety PBS912A
- B Depression PBS912B
- C Substance abuse PBS912C
- D Suicide PBS912D

9.1.3 Describe strategies for prevention of disease PBS913

- A Community health education outreach programs PBS913A
- B Immunizations PBS913B
- C Medical, dental, and mental health screenings PBS913C
- D Routine physical exams PBS913D
- E Stress management PBS913E

9.2.1 Discuss physical, mental, social and behavioral development and its impact on healthcare PBS921

Foundation Standard 10: Technical Skills - Apply and demonstrate technical skills and knowledge common to health career specialties. PBS10

10.1.1 Demonstrate procedures for measuring and recording vital signs including the normal ranges PBS1011

- A Blood pressure PBS1011A
 - B Temperature PBS1011B
 - C Oxygen saturation PBS1011C
 - D Pain PBS1011D
 - E Pulse PBS1011E
 - F Respirations PBS1011F
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Foundation Standard 11: Information Technology in Healthcare - Apply information technology practices common across health professions. PBS11

11.1.1 Identify components of an electronic health record (EHR) and/or electronic medical record (EMR) PBS1111

- A Diagnostic tests PBS1111A
 - B History and physical PBS1111B
 - C Medications PBS1111C
 - D Patient demographics PBS1111D
 - E Progress notes PBS1111E
 - F Treatment plan PBS1111F
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11.1.2 Explore different types of health data collection tools PBS1112

- A Medical wearable devices PBS1112A
 - B Patient monitoring equipment PBS1112B
 - C Phone application PBS1112C
 - D Telemedicine/telehealth PBS1112D
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11.1.3 Create electronic documentation that reflects timeliness, completeness, and accuracy PBS1113