

Kentucky PLTW Biomedical Science

# **Biomedical Innovation**

**Foundation Standard 1:  
Academic Foundation:  
Understand human  
anatomy, physiology,  
common diseases and  
disorders, and medical  
math principles. BI1**

**1.1.2 Identify basic structures and describe functions of human body systems. BI112**

**1.1.2 a Skeletal BI112A**

- A Structures of the skeletal system BI112AA**
  - i Distinguish between axial and appendicular skeletons BI112AAI
  - ii Describe long bone anatomy BI112AAII
  - iii Identify joint types and movement BI112AAIII
  - iv Name and classify all bones (206) BI112AAIV
- B Functions of the skeletal system BI112AB**
  - i Structure and support BI112ABI
  - ii Muscle attachment and movement BI112ABII
  - iii Mineral storage BI112ABIII
  - iv Hematopoiesis BI112ABIV

**1.1.2 b Muscular BI112B**

- A Structures of the muscular system BI112BA**
  - i Identify types of muscle tissue BI112BAI
  - ii Identify major muscle groups of neck, shoulder, chest, abdomen, back, arms, and legs BI112BAII
- B Functions of the muscular system BI112BB**
  - i Body movement BI112BBI
  - ii Posture BI112BBII
  - iii Protection BI112BBIII

**1.1.2 c Integumentary BI112C**

- A Structures of the integumentary system BI112CA**
  - i Identify integumentary components BI112CAI
  - ii Label the layers of skin BI112CAII
- B Functions of the integumentary system BI112CB**
  - i Vitamin D production BI112CBI
  - ii Sensory organ BI112CBII
  - iii Infection protection BI112CBIII
  - iv Temperature regulation BI112CBIV
  - v UV light protection BI112CBV

**1.1,2 d Cardiovascular BI112D**

- A Structures of the cardiovascular system BI112DA**
  - i Identify cardiovascular organs BI112DAI

- ii Label the parts of the heart [BI112DAII](#)
      - iii Distinguish blood components [BI112DAIII](#)
    - B Functions of the cardiovascular system [BI112DB](#)
      - i Blood flow through the heart and body [BI112DBI](#)
      - ii Transports nutrients, waste, antibodies, hormones, and gases [BI112DBII](#)
      - iii Cardiac conduction system [BI112DBIII](#)
  - 1.1.2 e Lymphatic / Immune [BI112E](#)
    - A Structures of the lymphatic system [BI112EA](#)
      - i Identify lymphatic organs [BI112EAI](#)
    - B Functions of the lymphatic system [BI112EB](#)
      - i Provide protection against disease [BI112EBI](#)
      - ii Movement of lymph fluid [BI112EBII](#)
  - 1.1.2 f Respiratory [BI112F](#)
    - A Structures of the respiratory system [BI112FA](#)
      - i Identify respiratory organs [BI112FAI](#)
    - B Functions of the respiratory system [BI112FB](#)
      - i Gas exchange [BI112FBI](#)
  - 1.1.2 g Nervous System [BI112G](#)
    - A Structures of the nervous system [BI112GA](#)
      - i Identify organs of the nervous system [BI112GAI](#)
      - ii Identify structures of the special sense organs [BI112GAI](#)
    - B Functions of the nervous system [BI112GB](#)
      - i Sensation [BI112GBI](#)
      - ii Movement [BI112GBII](#)
      - iii Processing [BI112GBIII](#)
  - 1.1.2 h Endocrine [BI112H](#)
    - A Structures of the endocrine system [BI112HA](#)
      - i Identify endocrine glands [BI112HAI](#)
    - B Functions of the endocrine system [BI112HB](#)
      - i Production of hormones [BI112HBI](#)
      - ii Regulation of body processes [BI112BBII](#)
      - iii Controls metabolism [BI112BBIII](#)
      - iv Regulates growth, development, and maturation [BI112BBIV](#)
  - 1.1.2 i Digestive [BI112I](#)

- A Structures of the digestive system BI112IA
  - i Identify digestive organs in sequence BI112IAI
  - ii Differentiate between alimentary and accessory organs BI112IAII
- B Functions of the digestive system BI112IB
  - i Chemical and mechanical digestion BI112IBI
  - ii Absorption of nutrients BI112IBII
  - iii Excretion of waste BI112IBIII

1.1.2 j Urinary BI112J

- A Structures of the urinary system BI112JA
  - i Identify urinary organs BI112JAI
  - ii Identify gross and microscopic anatomy of the kidney BI112JAI
- B Functions of the urinary system BI112JB
  - i Process of urine formation BI112JBI
  - ii Urine composition BI112JBII
  - iii Homeostatic balance BI112JBIII

1.1.2 k Reproductive BI112K

- A Structures of the reproductive system BI112KA
  - i Identify female reproductive organs BI112KAI
  - ii Identify male reproductive organs BI112KAII
- B Functions of the reproductive system BI112KB
  - i Formation of gametes BI112KBI
  - ii Production of hormones BI112KBII

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**1.2.2 Describe biomedical therapies as they relate to the prevention, pathology, and treatment of disease. BI122**

- A Gene testing BI122A
- B Gene therapy BI122B
- C Cloning BI122C
- D Stem cell research BI122D

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**1.3.1 Demonstrate competency using basic math skills and mathematical conversions as they relate to healthcare. BI131**

**1.3.1 a Metric system BI131A**

- A Kilo- BI131AA
- B Centi- BI131AB
- C Deci- BI131AC
- D Milli- BI131AD
- E Micro- BI131AE

**1.3.1 b Mathematical BI131B**

- A Average BI131BA
- B Ratios BI131BB
- C Fractions BI131BC
- D Percentages BI131BD
- E Addition/Subtraction BI131BE
- F Multiplication/Division BI131BF

**1.3.1 c Conversions BI131C**

- A Height (inches/meters) BI131CA
- B Weight (pounds/grams) BI131CB
- C Length (inches/meters) BI131CC
- D Volume (ml/cc) BI131CD
- E Temperature (F/C) BI131CE
- F Household measurements (Tbsp/tsp/cup/oz) BI131CF

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**1.3.2 Demonstrate the ability to analyze diagrams, charts, graphs, and tables to interpret healthcare results. BI132**

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**Identify basic levels of organization of the human body BI111A**

**A Chemical BI111AA**

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**B Cellular BI111AB**

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**C Tissue BI111AC**

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**D Organs BI111AD**

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**E Systems BI111AE**

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**F Organism BI111AF**

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**Foundation Standard 2: Communications**  
**Demonstrate methods of delivering and obtaining information, while communicating effectively.** BI2

**2.1.1 Model verbal and nonverbal therapeutic communication.** BI211

- A Active listening BI211A
  - B Silence BI211B
  - C Summarizing BI211C
  - D Reflecting BI211D
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**2.1.3 Distinguish between subjective and objective information.** BI213

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**2.1.5 Modify communication to meet the needs of the patient/client and be appropriate to the situation.** BI215

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**2.3.1 Use proper elements of written and electronic communication (spelling, grammar, and formatting).** BI231

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**2.3.2 Prepare examples of technical and informative writing.** BI232

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**Foundation Standard 4: Employability Skills**  
**Use employability skills to enhance employment opportunities and job satisfaction.** BI4

**4.2.1 Apply employability skills in healthcare.** BI421

- A Chain of command BI421A
  - B Communication Skills BI421B
  - C Decision making BI421C
  - D Flexible BI421D
  - E Organization BI421E
  - F Problem Solving BI421F
  - G Scope of practice BI421G
  - H Time Management BI421H
  - I Work Ethic BI421I
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**4.4.1 Develop components of a personal portfolio.** BI442

- A Letter of introduction BI441A
  - B Resume BI441B
  - C Sample Projects BI441C
  - D Writing Sample BI441D
  - E Work-based Learning Documentation BI441E
  - F Oral Report BI441F
  - G Community Service/Service Learning BI441G
  - H Credentials BI441H
  - I Technology Skills BI441I
  - J Leadership Examples BI441J
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**Foundation Standard 7: Safety Practices Identify existing and potential hazards to clients, coworkers, and self. Employ safe work practices and follow health and safety policies and procedures to prevent injury and illness. BI7**

**7.1.1 Explain principles of infection transmission. BI711**

**7.1.1 a Identify classifications of pathogens BI711A**

- A Bacteria BI711AA
- B Fungi BI711AB
- C Parasites BI711AC
- D Protozoa BI711AD
- E Viruses BI711AE

**7.1.1 b Describe characteristics of microorganisms BII711B**

- A Aerobic BI711BA
- B Anaerobic BI711BB
- C Non-pathogenic BI711BC
- D Pathogenic BI711BD

**7.1.1 c Recognize chain of infection BI711C**

**7.1.1 d Describe mode of transmission BI711D**

- A Common vehicle (air, food, water) BI711DA
- B Direct BI711DB
- C Healthcare-associated infections (nosocomial) BI711DC
- D Indirect BI711DD
- E Opportunistic BI711DE
- F Vectors BI711DF

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**7.1.2 Differentiate methods of controlling the spread and growth of pathogens.** BI712

7.1.2 a Asepsis BI712A

- A Sanitization BI712AA
- B Antisepsis BI712AB
- C Disinfection BI712AC
- D Sterile technique BI712AD
- E Sterilization BI712AE

7.1.2 b Standard precautions BI712B

- A Handwashing BI712BA
- B Gloving BI712BB
- C Personal Protective Equipment (PPE) BI712BC
- D Environmental cleaning BI712BD

7.1.2 c Isolation precautions BI712C

- A Transmission-based contact BI712CA

7.1.2 d Bloodborne pathogen precautions BI712D

7.1.2 e Vaccinations BI712E

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**7.2.1 Apply personal safety procedures based on Occupational Safety and Health Administration (OSHA) and Centers for Disease Control (CDC) regulations.** BI721

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**7.2.2 Demonstrate principles of body mechanics during patient care.** BI722

- A Ambulating BI722A
- B Lifting BI722B
- C Positioning BI722C

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**7.2.3 Demonstrate and apply the use of personal protective equipment (PPE).** BI723

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**7.3.1 Apply safety techniques in the work environment.** BI731

- A Ergonomics BI731A
- B Safe operation of equipment BI731B
- C Patient/client/employee safety measures BI731C

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**7.4.1 Observe all safety standards related to the occupational exposure to hazardous chemicals standard (safety data sheets [SDS]).** BI741

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**7.4.2 Comply with safety signs, symbols, and labels.** BI742

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**Foundation Standard 8:  
Teamwork Identify roles  
and responsibilities of  
individual members as  
part of the healthcare  
team. BI8**

**8.1.2 Identify characteristics of effective teams. BI812**

- A Defined roles BI812A
  - B Common purpose BI812B
  - C Effective communication BI812C
  - D Effective leadership BI812D
  - E Measurable processes and outcomes BI812E
  - F Mutual respect BI812F
  - G Shared goals BI812G
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**8.2.1 Recognize methods for building positive team relationships. BI821**

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**8.2.2 Analyze attributes and attitudes of an effective leader. BI822**

**8.2.2 a Characteristics BI822A**

- A Focused and driven BI822AA
- B Interpersonal skills BI822AB
- C Motivates and inspires BI822AC
- D Organized and balance BI822AD

**8.2.2 b Types BI822B**

- A Autocratic BI822BA
- B Democratic BI822BB
- C Laissez faire BI822BC

**8.2.2 c Roles BI822C**

- A Communicates vision BI822CA
  - B Leads change BI822CB
  - C Manages accountability BI822CC
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**8.2.3 Apply effective techniques for managing team conflict. BI823**

- A Communicate assertively BI823A
  - B Set clear expectations BI823B
  - C Gather the facts BI823C
  - D Mediate disputes BI823D
  - E Negotiate resolutions BI823E
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**Foundation Standard 9: Health Maintenance Practices Differentiate between wellness and disease. Promote disease prevention and model healthy behaviors.** BI9

**9.1.1 Promote behaviors of health and wellness.** BI911

- A Exercise BI911A
  - B Nutrition BI911B
  - C Relationships BI911C
  - D Sleep habits BI911D
  - E Stress management BI911E
  - F Weight control BI911F
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**9.1.3 Describe strategies for prevention of disease.** BI913

- A Community health education outreach programs BI913A
  - B Immunizations BI913B
  - C Medical, dental, and mental health screenings BI913C
  - D Routine physical exams BI913D
  - E Stress management BI913E
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**Foundation Standard 10: Technical Skills Apply and demonstrate technical skills and knowledge common to health career specialties.** BI10

**10.1.1 Demonstrate procedures for measuring and recording vital signs including the normal ranges.** BI1011

- A Blood pressure BI1011A
- B Temperature BI1011B
- C Oxygen saturation BI1011C
- D Pain BI1011D
- E Pulse BI1011E
- F Respirations BI1011F