

Biomedical Science Program: Scope & Sequence

Year 1- Semester 1

BIO101 Principles of Biomedical Science
(17 weeks)

District Pre-Assessment

Pre-Unit: Lab Orientation (1 week)

- Lab Overview
 - Lab Safety
 - Occupational Safety and Health Administration (OSHA)-10 General
 - Resume & Cover Letter
- Professional Skills: 4(A-F), 7(B)
Academic Standards: ELA.11-12.W.4, ELA.11-12.W.5, G-GMDD.A.3, 6.EE.A.2
Work-based Learning: Resume & Cover Letter
Technical Standards: 1(1-10), 2(1-3)

OSHA 10 Certification

Unit Name: (1) Medical Investigation (4 weeks)

- Investigating the Scene (1.1), Master the Morgue (1.2), Open Investigation (1.3).
 - Experimental Design | Scientific Method
- Base Standards: 1(2, 6), 3(2, 5, 9, 15, 16), 4(3, 15), 5 (1-5), 6(6, 8[3-4]), 7(2, 3), 9(1-9)
CTSO Integration (Leadership Skills): CTSO Meeting (Every other week).
Professional Skills: 2(A-C)
Academic Standards: ELA.11-12.W.9, ELA.11-12.RI.7, 6.EE.A.2
Work-based Learning: Industry lab simulation (forensic analysis [fingerprinting, hair, and blood splatter], blood typing, DNA extraction, gel electrophoresis, time-of-death, histology, heart dissection, toxicology)
Technical Standard: 1(1-3, 6-10), 2(2), 3(1-6), 4(1), 5(1-6), 8(1-4), 9(1)

Unit Name: (2) Clinical Care (4 weeks)

- Talk to Your Doc (2.1), Decoding a Diagnosis (2.2), New to the Practice (2.3).
 - The Periodic Table of Elements
- Base Standards: 1(6-9), 2(7), 3(2, 4-5, 15-16), 4(5, 7-9, 11, 12), 5(1-5)
CTSO Integration (Leadership Skills): CTSO Meeting (Every other week).
Professional Skills: 6(A-C), 7(A-C), 8(A-I), 9(A-C))
Academic Standards: ELA.11-12.W.8, 9, ELA.11-12.RI.7, 6.EE.A.2, 7.RP.A.3, HS.P1U1.1, HS.L3U1.25, HS+B.L3U1.11
Work-based Learning: Industry lab simulation (vital sign collection and analysis [temperature, heart rate, respiratory rate, oxygen saturation, and blood pressure], physical exam, phlebotomy, histology, tissue analysis [microscope],

pedigree/punnett square lab, wet loading, karyotyping),
Guest speaker (Clinical health care)
Technical Standard: 1(6-10), 2(2), 3(1-6), 4(1), 5(1-3, 5, 6), 6(3), 7(1-4), 10(1), 12(1, 5), 13(1-6, 10), 11(3)

Unit Name: (3) Outbreaks & Emergencies (4 weeks)

- Nosocomial Nightmare (3.1), Emergency Response (3.2), Information Sharing (3.3).
 - Biomedical Math Concepts
- BACE Standards: 2(2-3, 5-6), 3(2-8, 14-16), 4(1-3, 9), 5(1-5), 7(1-5, 10-11), 8(1-2[1-4, 6-7, 9-14]), 9(1-6, 8-9)
CTSO Integration (Leadership Skills): CTSO Meeting (Every other week).
Professional Skills: 1(A-D)
Academic Standards: ELA.11-12.SL.3, ELA.11-12.W.9, ELA.11-12.RI.7, 6.RP.A.3, 6.EE.A.2
Work-based Learning: Industry lab simulation (epidemiological investigation, bacterial isolation and quantification, bacterial identification, gram staining, risk analysis and assessment, stop the bleed, triage simulation, disaster response plan), Guest speaker (public health)
Technical Standards: 1(1-3, 6-10), 2(1-3), 3(1-6), 4(1-4), 5(1, 3, 4-6), 6(1-2), 7(1-4), 8(1-4, 6-13), 9(1-5, 7), 11(1, 4), 13(9)

Unit Name: (4) Innovation, Inc. (4 weeks)

- Designing the Future (4.1), New Frontier (4.2), Invitation to Innovation (4.3).
 - Chemical Structures and Their Properties
- BACE Standards: 3(1-3, 5-16), 5(1-5), 9(1-9)
CTSO Integration (Leadership Skills): HOSA Fall Leadership Conference / CTSO Meeting (Every other week).
Professional Skills: 3(A-E) & 5(A-E).
Academic Standards: ELA.11-12.RI.7, ELA.11-12.W.4 & 7-9, ELA.11-12.W.2
Work-based Learning: Industry lab simulation (CAD training, preventative medicine program design, ArcGIS training)
Technical Standards: 3(1-6), 4(1-4), 5(1-6), 12(1-9)

PBS End-of-course (EOC) Assessment

Year 1- Semester 2

BIO102 Human Body Systems

(17 weeks)

Unit Name: (1) Identity (4 weeks)

- Identity-Human (1.1), Identity-Tissue (1.2), Identity-Molecules and Cells(1.3)
- The Cell Cycle | Meiosis & Mitosis

BACE Standards: 4(7,9) 6(3)
CTSO Integration (Leadership Skills): HOSA Online Testing (State/Regionals), CTSO Meeting (Every other week).
Professional Skills: Not explicitly listed
Academic Standards: ELA.11-12.W.8 & 9, ELA.11-12.RI.7, HS.L1U1.29, HS+B.L1U1.4-7, HS.L1U1.22, HS+B.L1U1.9
Work-Based Learning: Industry lab simulation (tissue analysis [microscope], forensic anthropology, DNA fragmentation, gel electrophoresis)
Technical Standard: 5(6), 13(10)

Unit Name: (2) Communication (3 weeks)

- The Brain (2.1) Electrical Communication (2.2) Chemical Communication (2.3) Communication with the Outside World (2.4)
- Glycolysis

BACE Standards: 1(2,5) 3 (2,3,4)
CTSO Integration (Leadership Skills): CTSO Meeting (Every other week)
Professional Skills: 1(A-D), 2(A-C)
Academic Standards: ELA.11-12.W.8 & 9, ELA.11-12.RI.7
Work-Based Learning: Industry lab simulation (brain dissection, reflexology and reaction time, visual perception), University tour (GCU).
Technical Standard: 3(1-3), 8(1-7)

Unit Name: (3) Power (3 weeks)

- Introduction to Power (3.1), Food, (3.2), Oxygen (3.3), Water (3.4)
- The Krebs Cycle

BACE Standards: 4(2,15), 5(1-5)
CTSO Integration (Leadership Skills): CTSO Meeting (Every other week)
Professional Skills: Not explicitly listed
Academic Standards: ELA.11-12.W.8 & 9, ELA.11-12.RI.7, HS.P1U1.3, HS+B.L2U1.8
Work-Based Learning: Industry lab simulation (enzymatic, calorimetry, spirometry, urinalysis, kidney dissection)
Technical Standard: 9(1-7)

Unit Name: (4) Movement (3 weeks)

- Joints and Motion, (4.1), Muscles (4.2), Blood Flow (4.3) Energy and Motion-Exercise and Physiology (4.4)
- Aerobic & Cellular Respiration

BACE Standards: 6(8(2,3,4), 7(3)
CTSO Integration (Leadership Skills): HOSA State Conference, CTSO Meeting (Every other week).
Professional Skills: Not explicitly listed
Academic Standards: ELA.11-12.W.8 & 9, ELA.11-12.RI.7, 6.RP.A.3, HS.L2U1.21
Work-Based Learning: Industry lab simulation (joint dissection, range of motion, ATP and muscle contraction, cardiac output, exercise physiology, EKG, muscle stamina)
Technical Standard: 4.1, 11.6

Unit Name: (5) Protection (3 weeks)

- The Skin (5.1) Bones (5.2), Lymph and Blood Cells (5.3)
- The Electron Transport Chain and ATP Synthase

BACE Standards: 7(2), 8(2,7,14)
CTSO Integration (Leadership Skills): CTSO Meeting (Every other week)
Professional Skills: Not explicitly listed
Academic Standards: ELA.11-12.W.8 & 9, ELA.11-12.RI.7
Work-Based Learning: Industry lab simulation (tissue analysis [microscope], antibody analysis and blood typing)
Technical Standard: 14(1-4)

Unit Name: (6) Homeostasis (1 week)

- Health and Wellness (6.1)
- Reproduction

BACE Standards: 3(15,16)
CTSO Integration (Leadership Skills): HOSA National Conference, CTSO Meeting (Every other week)
Professional Skills: Not explicitly listed
Academic Standards: ELA.11-12.W.8 & 9, ELA.11-12.RI.7, HS.L1U1.20, HS.L3U1.24
Work-Based Learning: Industry lab simulation (capstone case study)
Technical Standard: 3(4-6)

HBS End-of-course (EOC) Assessment District Post-Assessment

Year 2- Semester 1

BIO201 Medical Interventions

(19 weeks)

Pre-Unit Name: Lab Orientation (1 week)

- Lab Overview
 - Safety
 - Resume & Cover Letter review / Interview prep
- Professional Skills: 4(A-F), 7(B)
Academic Standards: ELA.11-12.W.4, ELA.11-12.W.5, G-GMDD.A.3
Work-based Learning: Resume, Cover Letter, Mock Interviews
Technical Standards: 1(1-10), 2(1-3)

Unit Name: (1) How to Fight Infection (4.5 weeks)

- The Mystery Infection (1.1), Antibiotic Treatment (1.2), The Aftermath-Hearing Loss (1.3), Vaccination (1.4)
- vCell Lines
BACE Standards: 1(6,7,8,9), 2(7), 4(1,2,3,6,11,12,15), 6(2,4) 7(1,3,5,10,11) 8(2,3,4,6,10,14)
CTSO Integration (Leadership Skills): CTSO Meeting (Every other week)
Professional Skills: Not explicitly listed
Academic Standards: ELA.11-12.W.8 & 9, ELA.11-12.RI.7
Work-Based Learning: Industry lab simulation
Technical Standard: 5.2-5.3,5.5, 7.1-7.5, 8.2-8.7, 8.9, 8.15,9.2,9.7, 10.1-10.4,11.6, 13.1-13.7, 13.9

Unit Name: (2) How to Screen- What is in Your Genes (4.5 weeks)

- Genetic Testing and Screening (2.1), Our Genetic Future (2.2)
 - Bio-material Preparation & Storage
- BACE Standards: 1(6,7,8,9),2(7),4(1,2,3,6,11,12,15), 6(2,4) 7(1,3,5,10,11), 13(1,3,4,5,6,7,9)
CTSO Integration (Leadership Skills): CTSO Meeting (Every other week)
Professional Skills: Not explicitly listed
Academic Standards: ELA.11-12.W.8 & 9, ELA.11-12.RI.7, HS.L3U3.26, HS+B.L3U1.10 &12, HS.L4U1.27, HS+B.L4U1.13
Work-Based Learning: Industry lab simulation, Guest Speaker and tour (Geneticist, TGen)
Technical Standard: 5.2-5.3,5.5, 7.1-7.5, 8.2-8.7, 8.9, 8.15,9.2,9.7, 10.1-10.4,11.6, 13.1-13.7, 13.9

Unit Name: (3) How to Conquer Cancer (4.5 weeks)

- Detecting Cancer (3.1), Reducing Cancer Risk (3.2), Treating Cancer (3.3), Building a Better Cancer Treatment (3.4)
 - Spectrophotometry
- BACE Standards: 2(2-3), 9(1-3)
CTSO Integration (Leadership Skills): HOSA Fall Leadership Conference
Professional Skills: 3(A-E)
Academic Standards: ELA.11-12.W.8 & 9, ELA.11-12.RI.7, HS.L1U3.23
Work-Based Learning: Industry lab simulation
Technical Standards: 2.1-2.3, 8.5, 9.1

Unit Name: (4) How to Prevail When Organs Fail (4.5 weeks)

- Manufacturing Human Proteins (4.1), Organ Failure (4.2), Transplant (4.3), ●Building a Better Body (4.4), Manufacturing Human Proteins (4.1)
- Chromatography
BACE Standards: 3(1,6,7)
CTSO Integration (Leadership Skills): CTSO Meeting (Every other week)
Professional Skills: Not explicitly listed
Academic Standards: ELA.11-12.W.8 & 9, ELA.11-12.RI.7
Work-Based Learning: Industry lab simulation, tour (Banner Brain Center)
Technical Standard: 8.17, 9.6

MI End-of-course (EOC) Assessment

Year 2- Semester 2

BIO202 Biomedical Innovation

(16 weeks)

Unit Name: (1) Design of an Effective ER (2 weeks)

- Identity- Human (1.1)
 - Bioinformatic Resources
- BACE Standards: 3(1,6,7)
- CTSO Integration (Leadership Skills): HOSA Online Testing
- Professional Skills: 1(A-D), 2(A-C), 7(A-C), 8(A-I)
- Academic Standards: ELA.11-12.SL.4 & 6, ELA.11-12.W.8 & 9, ELA.11-12.RI.7
- Work-Based Learning: Industry lab simulation (triage simulation)
- Technical Standard: 4(1-4), 8.1, 1.1-1.5, 12

Unit Name: (2) Physiology (2 weeks)

- Exploring Human Physiology (2.1)
 - Bioinformatic Resources
- BACE Standards: 3(4,5,15,16)
- CTSO Integration (Leadership Skills): CTSO Meeting (Every other week)
- Professional Skills: Not explicitly listed
- Academic Standards: ELA.11-12.W.8 & 9, ELA.11-12.RI.7,6.RP.A.3, 6.EE.A.2, A-CED.A.1
- Work-Based Learning: Industry lab simulation (Scientific research and literature review, physiology [audiology, biofeedback, blood pressure, calorimetry, EKG, heart rate, lung capacity, muscle stamina, reaction time, reflex])
- Technical Standard: 4(2-4)

Unit Name: (3) Medical Innovations (2 weeks)

- Design of Medical Innovation (3.1)
 - Quality Control Procedures
- BACE Standards: 3(1,6,7)
- CTSO Integration (Leadership Skills): CTSO Meeting (Every other week)
- Professional Skills: 3(A-E)
- Academic Standards: ELA.11-12.W.8 & 9, ELA.11-12.RI.7
- Work-Based Learning: Industry lab simulation (biomedical design innovation), Guest speaker (Biomedical engineer)
- Technical Standard: 1(6-10), 5.1, 5.6, 6(1-4)

Unit Name: (4) Environmental Health (2 weeks)

- Investigating Environmental Health (4.1)
 - Quality Control Procedures
- BACE Standards: 3(14) 4(10)
- CTSO Integration (Leadership Skills): CTSO Meeting (Every other week)
- Professional Skills: 8(A-I)
- Academic Standards: ELA.11-12.W.8 & 9, ELA.11-12.RI.7, HS.E1U1.11, HS+E.E1U1.5, HS.L2U3.18
- Work-Based Learning: Industry lab simulation (environmental exposure analysis, water contamination analysis, testing of dose-response relationships / toxicology)

Technical Standard: 6.1-6.2,6.4,12.9,13.7-13.8

Unit Name: (5) Public Health (2 weeks)

- Combating a Public Health Issue (5.1)
 - Biopharmaceuticals
- BACE Standards: 5(4,5), 9(4-6), 3(1)
- CTSO Integration (Leadership Skills): HOSA State Conference
- Professional Skills: 6(A-C), 8(A-I)
- Academic Standards: ELA.11-12.W.8 & 9, ELA.11-12.RI.7, ELA.11-12.SL.3, ELA.11-12.W.2,6.RP.A.3, 6.EE.A.2, A-CED.A.1, HS.E1U3.14, HS+E.E1U3.9-10, HS.L2U3.18
- Work-Based Learning: Industry lab simulation (epidemiological study design, contact tracing, grant proposals), Guest speaker (public health/environmental health)
- Technical Standard: 14.1-14.4

AHA CPR/AED

Unit Name: (6) Molecular Biology (2 weeks)

- Molecular Biology in Action (6.1)
 - Biopharmaceuticals
- BACE Standards: 2(1,8), 3(6-14)
- CTSO Integration (Leadership Skills): CTSO Meeting (Every other week)
- Professional Skills: Not explicitly listed
- Academic Standards: ELA.11-12.W.8 & 9, ELA.11-12.RI.7, HS.P1U3.4
- Work-Based Learning: Industry lab simulation (nucleic acid extraction, GAPDH PCR, gel electrophoresis, PCR Kleen purification, ligation and transformation, microbial culturing, Aurum plasmid purification, sequencing and bioinformatics)
- Technical Standard: 4.1, 7(1-5), 8(14, 16), 11(2, 5)

Unit Name: (7) Forensic Autopsy (2 weeks)

- Forensic Autopsy (7.1)
- BACE Standards: 6(8(2,3,4))
- CTSO Integration (Leadership Skills): HOSA Online Testing, CTSO Meeting (Every other week)
- Professional Skills: Not explicitly listed
- Academic Standards: ELA.11-12.W.8 & 9, ELA.11-12.RI.7
- Work-Based Learning: Industry lab simulation (forensic autopsy [fetal pig]), Guest speaker (Forensics unit)
- Technical Standard: 3.1-3.3

Unit Name: (8) Independent Project (2 weeks)

- Independent Project (8.1)
- BACE Standards: 8(1), 9(7-9)
- CTSO Integration (Leadership Skills): HOSA Nationals, CTSO Meeting (Every other week)
- Professional Skills: 3(A-E), 5(A-E)
- Academic Standards: ELA.11-12.W.8 & 9, ELA.11-12.RI.7

Work-Based Learning: Industry lab simulation (biomedical independent capstone project / innovation)
Technical Standard: 3.4-3.6

BI End-of-course (EOC) Assessment
BACE Biotechnician Assistant Credentialing Exam

ADE Skill Standards Assessment