

Principles of Biomedical Science (PLTW) YAG

PEIMS N1302092 | One Elective Credit | Full Year | 36 Weeks | Grades 9–12 | Project Lead The Way Biomedical Science

Course Information: PBS is a Texas state-approved innovative course providing foundational knowledge and skills in biology, anatomy and physiology, genetics, microbiology, epidemiology, clinical medicine, experimental design, and biomedical problem solving. The course is organized around the public TEA-approved PLTW scenarios and recommended activities: simulated forensic/death investigation; patient care through a simulated medical practice; genetics and molecular biology; investigation of a hospital outbreak; emergency response/public health; and a biomedical innovation/design experience. Professional communication, collaboration, ethics, career readiness, laboratory practice, technical documentation, and iterative problem solving spiral throughout. ACCESS supports biomedical career, education, credential, and postsecondary exploration.

GP	Wks	Unit & Focus	Major Learning Tasks & Assessments	Integrated EKS	Extension Activities
1	1–2	Unit 1 – Biomedical Science Launch: Careers, Teams, Ethics & Laboratory Practice	- Explore biomedical professionals who research, diagnose and treat medical conditions - Establish professional communication, teamwork, peer feedback, ethics and laboratory-notebook expectations - Practice measurement, equipment selection, protocol adherence and data display - Introduce experimental design, credible research and technical documentation - Launch biomedical career notebook/portfolio	- PBS1(A–C) - PBS2(A–G) - PBS3(A–F) - PBS4(A–D) - PBS6(D,F,I–J) - PBS7(A)	- ACCESS: biomedical careers/postsecondary pathways - PLTW career notebook - Lab safety/protocol performance
1	3–6	Unit 2 – Forensic Biomedical Investigation: Evidence, Anatomy & Cause of Death	- Investigate simulated death/crime-scene evidence using biomedical professional roles - Collect, organize and interpret evidence; distinguish variables/controls and identify error - Connect organ structure/function, body systems and homeostasis to evidence - Use medical/scientific terminology and technical documentation - Develop an evidence board and simulated autopsy/cause-of-death report	- PBS2(A–G) - PBS3(A–F) - PBS5(A–D) - PBS6(A–L) - PBS7(A,E) - PBS8(A–G) - PBS9(A–C,E,G–I)	- Forensic professional connection - Evidence-board presentation - Career notebook update
1	7–9	Unit 3 – Clinical Medicine I: Patient Records, Vital Signs, Diagnostics & Homeostasis	- Use a simulated patient portal/medical practice to collect and document patient information - Practice vital-sign collection/interpretation and explain accurate records/HIPAA - Select and interpret appropriate diagnostic information - Analyze how lifestyle/environment and body-system interactions affect health - Develop evidence-based patient communication and care recommendations within the scenario	- PBS2(B,E,G) - PBS5(A–D) - PBS8(A–G) - PBS9(A–J,L–M)	- Patient-care simulation - Vital-sign lab - ACCESS: diagnostic/therapeutic careers
2	10–12	Unit 4 – Molecular Biology I: DNA, RNA, Proteins, Cell Division & Mutation	- Model DNA/RNA structure, replication and protein synthesis - Relate genes, alleles, chromosomes, proteins and traits - Analyze protein structure/function and consequences of mutation - Compare mitosis and meiosis and connect cell division to genetic diversity - Investigate environmental influences on genetic mutation	- PBS5(C–D) - PBS6(A–L) - PBS10(A–F) - PBS12(A–E)	- Molecular modeling - Scientific journal/database research - Genetics career connection
2	13–15	Unit 5 – Molecular Biology II: Inheritance, Genetic Risk & Biotechnology	- Analyze karyotypes, Punnett squares and pedigrees to predict inheritance - Apply DNA extraction/restriction digestion/gel electrophoresis concepts and interpret results - Use bioinformatics to compare genetic information - Communicate genetic risk information for a simulated family/patient audience - Evaluate ethical implications of genetic testing, research and biomedical technologies	- PBS2(A–G) - PBS4(A–D) - PBS5(A–D) - PBS7(B–D) - PBS9(A–C,F–J) - PBS11(A–E)	- Genetic counseling simulation - Gel/DNA investigation - Bioinformatics activity
2	16–17	Unit 6 – Total Care Clinic: Integrated Diagnosis & Treatment	- Evaluate a simulated new patient using history, family information, vital signs and laboratory evidence - Synthesize clinical and genetic information to identify a condition - Explain disease causes and impacts on body systems - Compare viable treatment/management options and communicate recommendations - Complete an integrated clinical case report	- PBS5(A–D) - PBS8(A–G) - PBS9(A–J,L–M) - PBS10–11 reinforcement - PBS2(A–G)	- Simulated clinic case conference - Patient-friendly communication - Career role reflection
2	18	Semester 1 Exam – Principles of Biomedical Science	- Cumulative assessment of biomedical foundations, forensic investigation, clinical medicine, anatomy/physiology, genetics and laboratory practices - Performance/data-analysis component - Semester portfolio/career notebook review	Cumulative: PBS1–12 as introduced	Targeted review/remediation

3	19–21	Unit 7 – Microbiology Foundations: Cells, Aseptic Technique & Culturing	• Differentiate prokaryotic/eukaryotic cells and relate cell structure to function • Connect cells, tissues, organs and systems and analyze membrane/homeostasis relationships • Identify macromolecule roles in human biology • Demonstrate aseptic technique and successful culturing practices using appropriate instructional organisms/materials • Apply experimental design and laboratory documentation	• PBS6(A–L) • PBS7(A–G) • PBS12(A–E) • PBS8(B,E–G)	• Microscopy/culture lab • Aseptic-technique performance • Microbiology career research
3	22–24	Unit 8 – Hospital Outbreak: Epidemiology, Infection & Public Health	• Investigate a mysterious infection in a simulated local hospital • Analyze evidence to determine why/how patients are becoming ill • Use experimental data, cultures/models and credible research to identify likely transmission patterns • Design a strategy to resolve the outbreak and prevent recurrence • Communicate public-health recommendations to appropriate audiences	• PBS2(A–G) • PBS3(A–F) • PBS5(A–D) • PBS6(A–L) • PBS7(A–G) • PBS9(E–M) • PBS12(A–E)	• Outbreak investigation • Epidemiology data analysis • Public-health presentation
3	25–27	Unit 9 – Emergency Medicine: Assessment, Stabilization & Drug/Body-System Response	• Take the simulated role of an emergency medical response team • Assess/stabilize a patient during a limited-access emergency scenario • Investigate bleeding control, drug delivery/metabolism and body-system responses • Apply diagnostic reasoning, communication and patient privacy principles • Evaluate how anatomy/physiology and homeostatic feedback guide emergency decisions	• PBS8(A–G) • PBS9(A–J) • PBS2(B,E,G) • PBS5(B–D) • PBS6(H,L)	• Emergency-response simulation • Body-system model • Health-care professional connection
4	28–30	Unit 10 – Public Health Design: Crisis Response & Health Technology	• Analyze local/global health crisis or disaster needs • Propose public-health strategies and disease/injury prevention measures • Plan a digital/app-based solution to trace outbreaks, improve emergency response or serve another public-health function • Define design requirements/constraints, compare solution paths and test a proposed solution • Address ethical/social implications and communicate the design	• PBS4(A–D) • PBS5(A–I) • PBS9(K–M) • PBS2(A–G) • PBS3(A–F)	• Public-health app design • ACCESS: health informatics/public health careers • Peer design review
4	31–33	Unit 11 – Biomedical Innovation Incubator: Engineering, Research & Design	• Complete biomedical engineering/research challenges that reinforce course laboratory and problem-solving skills • Synthesize credible sources and define a biomedical need/problem • Develop design requirements/constraints and compare alternatives • Build/model/test a solution and use unexpected results to improve the design • Document data, iteration and team project management	• PBS3(A–F) • PBS4(A–D) • PBS5(A–I) • PBS6(A–L) • PBS7(A–G)	• Biomedical engineering challenge • Innovation mentor/guest professional • Design portfolio
4	34–35	Unit 12 – Biomedical Science Capstone: Integrated Case, Career & Communication	• Complete an integrated biomedical case/problem drawing on clinical medicine, genetics, microbiology and anatomy/physiology • Analyze experimental/clinical data and defend an evidence-based solution • Prepare a professional technical report and presentation for a defined audience • Reflect on collaboration, ethics, innovation and societal impact • Finalize biomedical career/postsecondary portfolio	• PBS1(A–C) • PBS2(A–G) • PBS3(A–F) • PBS4(A–D) • PBS5(A–I) • PBS6–12 reinforcement	• ACCESS: pathway planning • Capstone presentation • Career portfolio defense
4	36	Semester 2 Exam & Biomedical Science Showcase	• Cumulative assessment across all PBS knowledge and skills • Laboratory/data interpretation and clinical/problem-solving component • Final biomedical portfolio and showcase	• Cumulative: PBS1–12	• PLTW-aligned showcase • Targeted remediation

Principles of Biomedical Science EKS Coverage Checklist

Coverage verification: All 12 Texas innovative-course knowledge and skills strands and all 82 student expectations are intentionally addressed in the 36-week PLTW-aligned sequence.

Strand	SEs	Knowledge & Skills Focus	YAG Placement	Coverage
PBS1	A-C	Career readiness: professions, education/licensure/salary/skills, societal impact	Units 1, 12; career connections throughout	100%
PBS2	A-G	Audience-specific professional, technical, medical, written/electronic communication	Units 1-12	100%
PBS3	A-F	Respect, teamwork, conflict resolution, peer review, project scheduling, collaborative tools	Units 1-12	100%
PBS4	A-D	Professional mindset; quality/team environment; biomedical ethics; research/product/legal issues	Units 1, 5, 10-12	100%
PBS5	A-I	Research/problem solving, math/data, design/innovation, requirements/constraints, iteration/testing	Units 2-3, 5-6, 8, 10-12	100%
PBS6	A-L	Experimental design, variables/controls, notebook, research, equipment, error, communication, protocol, data/calculations/conclusions	Units 1-2, 4, 7-8, 11-12	100%
PBS7	A-G	Measurement, solutions/concentrations, standard curve, micropipetting, microscopy, aseptic technique, culturing	Units 1, 5, 7-8, 11	100%
PBS8	A-G	Anatomy/physiology, system interactions, structure/function, homeostasis, feedback, biological models	Units 2-3, 6-9, 12	100%
PBS9	A-M	Clinical documentation, HIPAA, vital signs, diagnostics, diagnosis/treatment, lab results, disease, public health/prevention	Units 2-3, 5-6, 8-10, 12	100%
PBS10	A-F	Nucleic acids, proteins, replication/protein synthesis, mutation, environment, mitosis/meiosis	Units 4-6	100%
PBS11	A-E	Karyotypes, Punnett squares, pedigrees, molecular techniques, bioinformatics	Units 5-6	100%
PBS12	A-E	Prokaryotic/eukaryotic cells, organization, macromolecules, membranes/homeostasis, cell interactions	Units 4, 7-8	100%

Implementation Notes

- The instructional sequence is anchored to the public TEA-approved PLTW PBS course description and recommended activities. Teachers with access to the PLTW learning-management system should use the current PLTW lesson/activity/project/problem sequence and district pacing resources while ensuring every Texas EKS remains addressed.
- The public TEA framework specifically identifies simulated forensic/death investigations, digital patient-care scenarios, genetics/genetic-risk work, a Total Care Clinic case, hospital outbreak investigation, emergency medical response, public-health app design, and biomedical innovation/design experiences. These scenarios form the backbone of this YAG.
- Experimental design, general laboratory practices, technical documentation, collaboration, ethical reasoning, career readiness, and biomedical problem solving should spiral throughout the year rather than be taught only in their primary units.
- Use appropriate laboratory safety procedures and district-approved organisms/materials. Patient and forensic scenarios should remain simulated/de-identified and should not involve diagnosis of real individuals.
- ACCESS should support career exploration, education/licensure research, postsecondary planning, and connections to biomedical research, clinical medicine, public health, biotechnology, health informatics, and biomedical engineering.
- Weeks 18 and 36 are reserved for cumulative semester exams. No instructional unit crosses the semester boundary.