

PLTW Biomedical Competency Profile

Laboratory Skills

Demonstrates proper microscope technique to examine slides
Completes a dissection to explore anatomy
Uses Vernier probes and LabVIEW software to collect data
Constructs 3-D biological and molecular models
Uses proper laboratory techniques to produce chromosome spreads
Isolates DNA from cells
Separates DNA fragments by gel electrophoresis
Analyzes gel electrophoresis results
Uses aseptic technique to sample and transfer bacterial cells
Uses proper Gram staining techniques to stain and observe bacteria
Performs and analyzes antibiotic efficiency testing
Analyzes bones to determine gender, age, stature and ethnicity
Digests DNA samples using restriction enzymes
Analyzes restriction fragment length polymorphisms (RFLPs) using gel electrophoresis
Analyzes bone breaks shown in X-rays
Investigates effects of environment on enzyme function
Measures peripheral pulses using Doppler ultrasound
Produces and analyzes pedigree charts
Constructs muscles and organs on a skeletal model
Uses molecular databases to search for DNA sequences and identify pathogens
Computes and performs serial dilutions
Performs and analyzes ELISA testing to determine the concentration of bacteria
Mates streptomycin resistant *E. coli* with an ampicillin resistant strain of *E. coli*
Engineers plasmid to include specific piece of genetic code
Amplifies a segment of DNA using PCR
Identifies single nucleotide polymorphisms in DNA
Tests ability to taste PTC and relates this trait to laboratory genetic testing results
Analyzes prenatal screening results
Designs and creates a simple model of an arm
Performs a simulated DNA microarray to analyze the gene expression patterns
Tests the effectiveness of various sunscreens or types of cloth against UV light using UV sensitive yeast cells
Performs marker analysis to detect genetic mutations
Completes an alignment to arrange DNA sequences side-by-side to determine SNPs
Inserts plasmid DNA into bacterial cells
Isolates proteins using column chromatography
Performs protein gel electrophoresis

Clinical Investigation / “Playing House M.D.”

Prepares a written and oral presentation about an assigned disease
Analyzes a case study and creates a presentation of findings
Creates an evidence board with a team
Maintains case notes of an outbreak investigation
Compiles a patient case file tracing disease in human systems

Research and Development

Applies biology notebook standards and protocols when documenting work
Demonstrates time management skills as related to a project
Illustrates effective experimental design
Uses proper techniques to measure and properly document data
Properly document research
Uses appropriate research techniques to assess primary scientific literature
Objectively evaluate experimental data and draw conclusions bases on data
Uses the Experimental Design Process to plan and carry out experiments

Communication Skills

Plan and compose a written experimental report
Plan and compose a written patient case file
Develop and present a written grant proposal
Designs an informative handout that explains biological concepts and disease
Write an investigative summary report on disease outbreak
Design and create tables, charts, and graphs
Complete a portfolio displaying projects and demonstrating skills learned in each of the four PLTW Biomedical Science courses
Write a resume to prepare for an interview
Complete a mock job interview

Personal Qualities

Work effort
Safety habits
Work area organization
On-task behavior
Responsibility
Initiative
Team work
Respect
Interpersonal skills