



Entry Level Assessment Blueprint

Biotechnology



Test Code: 4275 / Version: 01

Specific Competencies and Skills Tested in this Assessment:

Knowledge of Biotechnology

- Define biotechnology and its applications (e.g., agricultural, forensics, environmental, medical, food sciences)
- Demonstrate knowledge of events of biotechnology related to genetics
- Demonstrate knowledge of scientists who have shaped biotechnology (e.g., genetics, sterilization categories)
- Demonstrate understanding of the central dogma of molecular biology

Laboratory Knowledge and Skills

- Demonstrate competency in calibrating and using laboratory equipment
- Demonstrate knowledge of quality control related to validation
- Perform basic laboratory math skills in relation to material or solution preparation
- Interpret graphical data
- Demonstrate the ability to design an appropriate scientific experiment (e.g., steps in the method, independent variables, dependent variables)
- Identify different concepts of recombinant techniques
- Demonstrate the principles of electrophoresis
- Explain the process of Polymerase Chain Reaction (PCR)
- Explain various separation techniques related to proteins



Aseptic/Sterile Techniques

- Explain aseptic technique
- Demonstrate the concepts of microbial culture
- Identify and use Personal Protective Equipment (PPE)
- Demonstrate knowledge of related equipment
- Demonstrate knowledge of types of pathogens

Ethics

- Demonstrate knowledge of bioethics
- Demonstrate knowledge of professional ethics
- Demonstrate knowledge of how to effectively research and cite information

Specific Competencies and Skills (continued)

Safety in the Biotechnology Laboratory

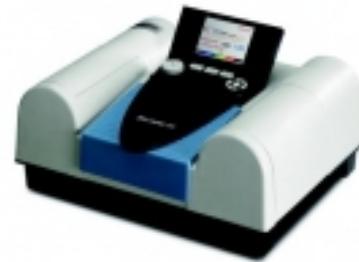
- Demonstrate knowledge of general precautions for personal laboratory safety
- Demonstrate ability to implement safety protocols
- Follow SDS guidelines for handling, storage, and disposal of hazardous material
- Demonstrate knowledge of safety in compliance with OSHA
- Demonstrate awareness of safety items in a laboratory

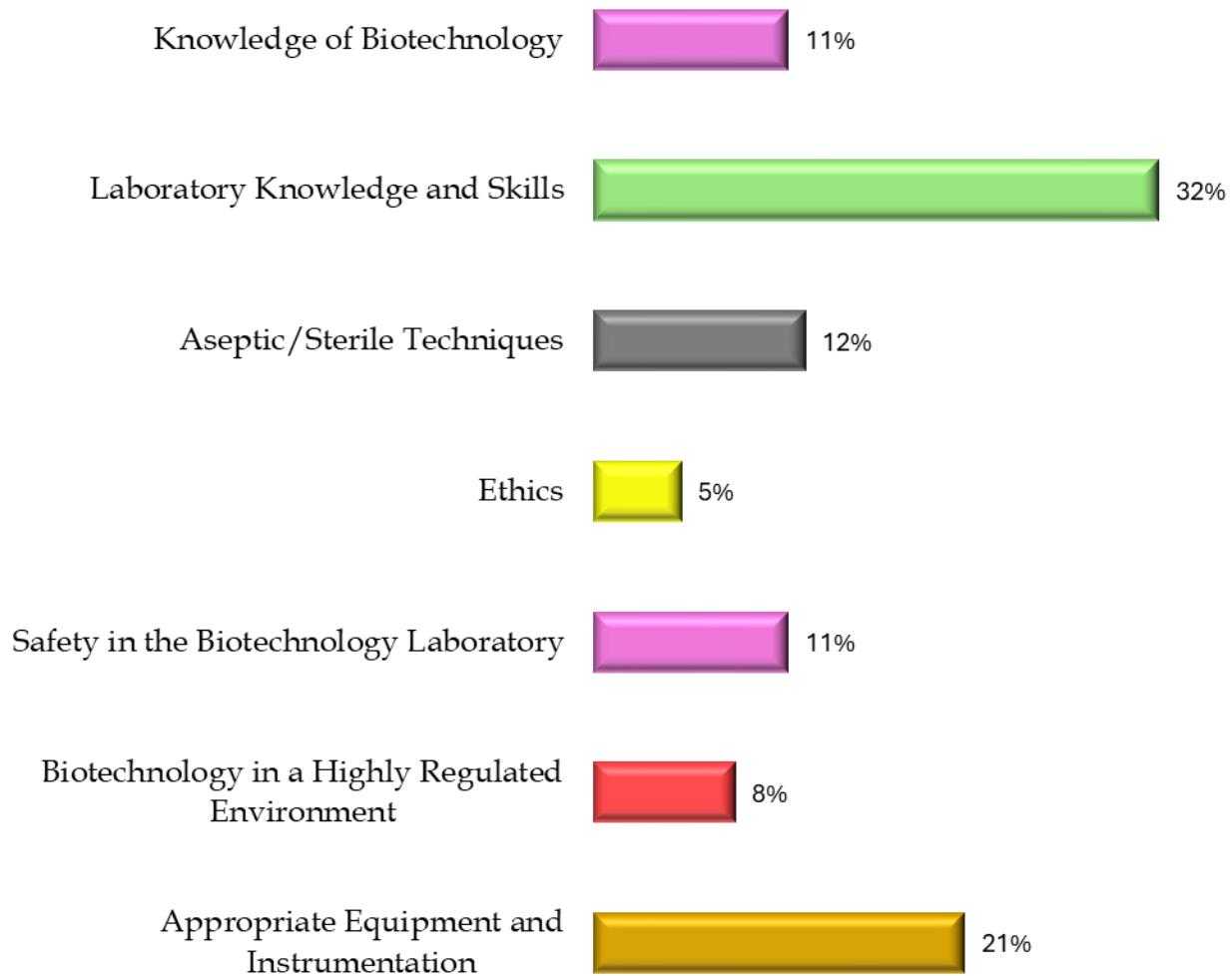
Biotechnology in a Highly Regulated Environment

- Demonstrate knowledge of regulatory agencies and who and what they regulate
- Demonstrate an ability to maintain records
- Document lab research according to guidelines in a laboratory notebook

Appropriate Equipment and Instrumentation

- Determine appropriate general laboratory equipment for different jobs
- Accurately read various volumetric equipment
- Use microscopes
- Demonstrate knowledge of temperature regulating devices (e.g., water baths, stir plates/hot plates, incubators, freezers)
- Perform basic spectrophotometer assays



Written Assessment:**Administration Time:** 3 hours**Number of Questions:** 170**Areas Covered:**

Sample Questions:

The central dogma of molecular biology states that genetic information flows in only one direction. The correct order is

- A. protein to DNA to RNA
- B. RNA to DNA to protein
- C. RNA to protein to DNA
- D. DNA to RNA to protein

The most accurately used term that describes the process when changes occur in a Standard Operating Procedure (SOP) is

- A. update
- B. revision
- C. editing
- D. correction

Safety showers and eyewash stations need to be checked monthly to ensure

- A. the water pressure is adequate
- B. they are at the right height
- C. the heavy metal contents of the water are high
- D. the temperature is hot

The federal agency responsible for protecting people and the environment from significant health risks is the

- A. EPA
- B. OSHA
- C. FDA
- D. USDA

When dispensing the liquid from a micropipette into an Eppendorf or microcentrifuge tube, a lab technician must

- A. push plunger to the second stop
- B. push plunger to the first stop
- C. push the tip ejector button
- D. draw the plunger up

What technique is used to separate the components of a mixture?

- A. chromatography
- B. PCR
- C. micropipetting
- D. spectrophotometry

Sample Questions (continued)

The proper method to remove disposable gloves ensures that the

- A. gloves can be removed and reused
- B. gloved hand never touches skin or contaminates another surface
- C. gloves are removed by pulling from the fingertips
- D. SDS recommendations are followed

To validate a P1000 micropipette, 560 μ l of water should equal

- A. 0.56 mg
- B. 5.60 mg
- C. 0.56 g
- D. 5.60 g

To separate components based on their charge, use _____ column chromatography.

- A. ion-exchange
- B. gas
- C. size-exclusion
- D. thin-layer

The fire triangle refers to

- A. Class A, B, and C fires
- B. Class A, B, and C fire extinguishers
- C. physical, chemical, and biological fires
- D. heat, fuel, and oxygen needed to start a fire



Performance Assessment:**Administration Time:** 1 hour and 45 minutes**Number of Jobs:** 5**Areas Covered:****29% Colony Isolation Quadrant Streaking Bacteria Method**

Participant will use the equipment provided and streak bacteria using a quadrant streaking method, place agar plate in incubator, and ensure workstation is clean and ready for next laboratory session.

18% Using Volumetric Equipment: Micropipettes

Participant will demonstrate good laboratory practices for both Step 1 and Step 2 to set micropipettes, choose the appropriate micropipette for each provided volume, provide each for evaluation, label centrifuge tube, set the appropriate micropipette to provided measurement, and ensure workstation is clean and ready for next session.

13% Using Volumetric Equipment: Serological Pipettes

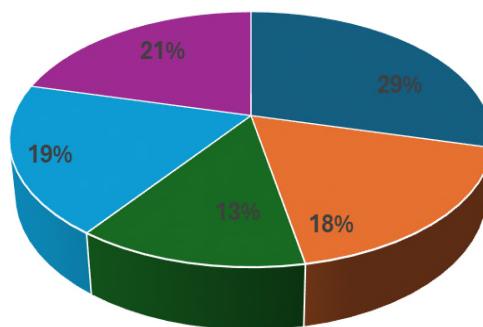
Participant will select from provided pipette pumps, and accurately pipette the stock solutions into labeled tubes, compete the table provided, and ensure that workstation is clean and ready for next laboratory session.

19% Making a Molar Solution

Participant will use the materials provided to make the correct amount of solution showing calculation, prepare the NaCl solution, store in properly labeled container, and ensure workstation is clean and ready for next laboratory session.

11% Making a Serial Dilution

Participant will use materials and equipment provided to make correct dilution, calculate final dilution, and ensure that workstation is clean and ready for next laboratory session..



Sample Job:	Colony Isolation Quadrant Streaking Bacteria Method
Maximum Time:	15 minutes
Participant Activity:	Using the equipment provided and aseptic technique, streak bacteria using a quadrant streaking method, place agar plate in incubator and alert evaluator, and ensure workstation is clean and ready for next laboratory session.