Measuring What Matters in CTE®

Teacher Assessment Blueprint

Biotechnology

Test Code: 5189 / Version: 01

General Assessment Information

Blueprint Contents

Test Type: The Biotechnology assessment is included in NOCTI's Teacher assessment battery. Teacher assessments measure an individual's technical knowledge and skills in a proctored proficiency examination format. These assessments are used in a large number of states as part of the teacher licensing and/or certification process, assessing competency in all aspects of a particular industry. NOCTI Teacher tests typically offer both a written and performance component that must be administered at a NOCTI-approved Area Test Center. Teacher assessments can be delivered in an online or paper/pencil format.

Revision Team: The assessment content is based on input from subject matter experts representing the state of Pennsylvania.

CIP Code

41.0101- Biotechnician/Biotechnology Laboratory Technician

Learning that works for America CTE™

Career Cluster 8 - Health Science

o*net™ in*it

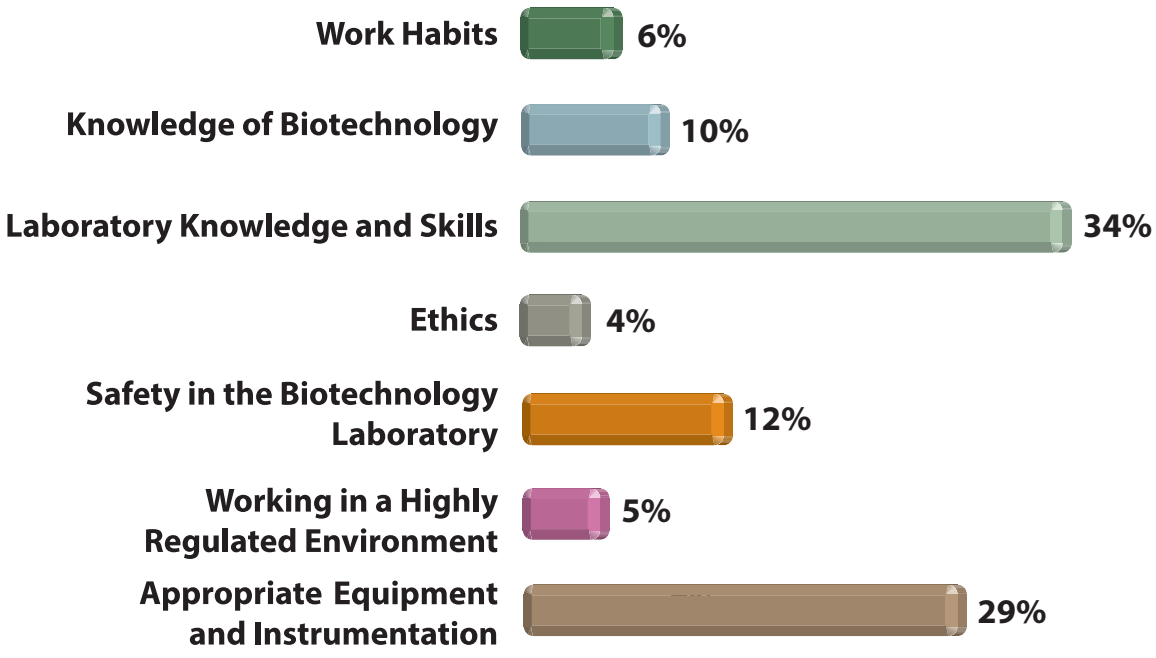
43-91111.01
Bioinformatics Technicians

Written Assessment

NOCTI written assessments consist of questions to measure an individual's factual theoretical knowledge.

Administration Time: 3 hours
Number of Questions: 191
Number of Sessions: This assessment may be administered in one, two, or three sessions.

Areas Covered



Specific Standards and Competencies Included in this Assessment

Work Habits

- Demonstrate professional work habits
- Demonstrate the ability to organize, implement, and troubleshoot specific tasks
- Demonstrate the ability to work in teams and as an individual

Knowledge of Biotechnology

- Define biotechnology and its role
- Demonstrate knowledge of the history of biotechnology
- Describe the life cycle of biotechnology product development
- Identify the application of the biotechnology industry
- Describe careers in biotechnology

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Specific Standards and Competencies (continued)

Laboratory Knowledge and Skills

- Demonstrate competency in validating and using laboratory equipment
- Demonstrate competency in using computer office applications
- Perform basic laboratory math skills
- Apply statistical analysis to interpret data
- Demonstrate the ability to use the scientific method
- Properly prepare buffers and solutions
- Demonstrate the concepts of recombinant technology
- Demonstrate the principles of DNA isolation
- Perform Polymerase Chain Reaction (PCR)
- Perform electrophoresis
- Perform separation techniques
- Explain and perform aseptic technique
- Demonstrate the concepts of microbial culture
- Demonstrate the concept of mammalian cell culture
- Demonstrate the concept of laboratory automation
- Perform basic spectrophotometer assays

Ethics

- Demonstrate the knowledge of bioethics
- Demonstrate the knowledge of professional ethics

Safety in the Biotechnology Laboratory

- Demonstrate general requirements for laboratory safety
- Identify and use personal protective equipment (PPE)
- Demonstrate ability to implement safety protocols
- Follow SDS guidelines for handling, storage, and disposal of hazardous material
- Demonstrate knowledge of safety regulatory agencies, such as OSHA

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Specific Standards and Competencies (continued)

Working in a Highly Regulated Environment

- Perform documentation according to regulatory agency standards
- Demonstrate an ability to maintain records in accordance with Intellectual Property Law
- Document lab activities and findings according to guidelines

Appropriate Use of Equipment and Instrumentation

- Use laboratory glassware
- Use volumetric equipment
- Use electrophoresis equipment
- Use a spectrophotometer
- Use balances
- Demonstrate knowledge of autoclaves
- Use centrifuges
- Use pH meters
- Demonstrate knowledge of thermocyclers
- Use microscopes
- Demonstrate knowledge of laboratory hoods for worker protection
- Demonstrate knowledge of temperature regulating devices (e.g., water baths, incubators)
- Demonstrate knowledge of chromatographic equipment

Sample Questions

The central dogma of biotechnology is

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

A program designed to copy itself onto other software, and to spread through multiple computers when the software is used, is called a

A. bacteria
B. bug
C. germ
D. virus

The study of the conduct that governs the behavior of a person or profession is called

A. ethics
B. morals
C. values
D. principles

The federal agency responsible for promoting public health through regulation and supervision of food, cosmetics, and drug products is the

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

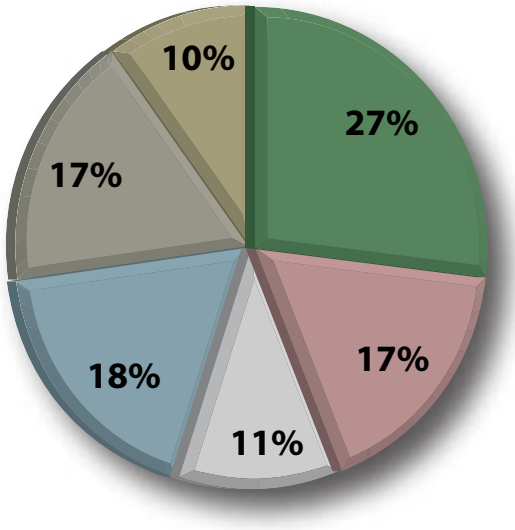
When dispensing the liquid from a micropipette, a lab technician must always

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

Performance Assessment

NOCTI performance assessments allow individuals to demonstrate their acquired skills by completing actual jobs using the tools, materials, machines, and equipment related to the technical area.

Administration Time: 2 hours, 5 minutes
Number of Jobs: 6



Areas Covered:

27% Colony Isolation and Streaking Bacteria
Participant will wear PPE, prepare workstation with disinfectant or lab mat, label plates, use inoculating loop, maintain sterile technique, and demonstrate good laboratory practice.

17% Using Volumetric Equipment: Using Micropipettes
Participant will set micropipettes, choose the P1000 micropipette, and demonstrate good laboratory practice.

11% Using Volumetric Equipment: Serological Pipettes
Participant will measure volume in tubes to 5.0 ml, record color and volume data, and demonstrate good laboratory practice.

18% Making a Molar Solution
Participant will calculate, massing NaC1, prepare and store salt solution, and demonstrate good laboratory practice.

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Areas Covered (continued)

17% Making a Dilution and Using a Spectrophotometer
Participant will wear proper PPE, prepare dilution, use a spectrophotometer, and demonstrate good laboratory practice.

10% Generating and Utilizing a Standard Curve
Participant will generate a standard curve and determine concentrations.

Sample Job

Colony Isolation and Streaking Bacteria

Maximum Time: 15 minutes

Participant Activity: Using the equipment provided, the participant will streak bacteria for single colony isolation from the liquid broth culture on to one agar plate.