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CURRICULUM FOR AGRICULTURAL SCIENCE EDUCATION

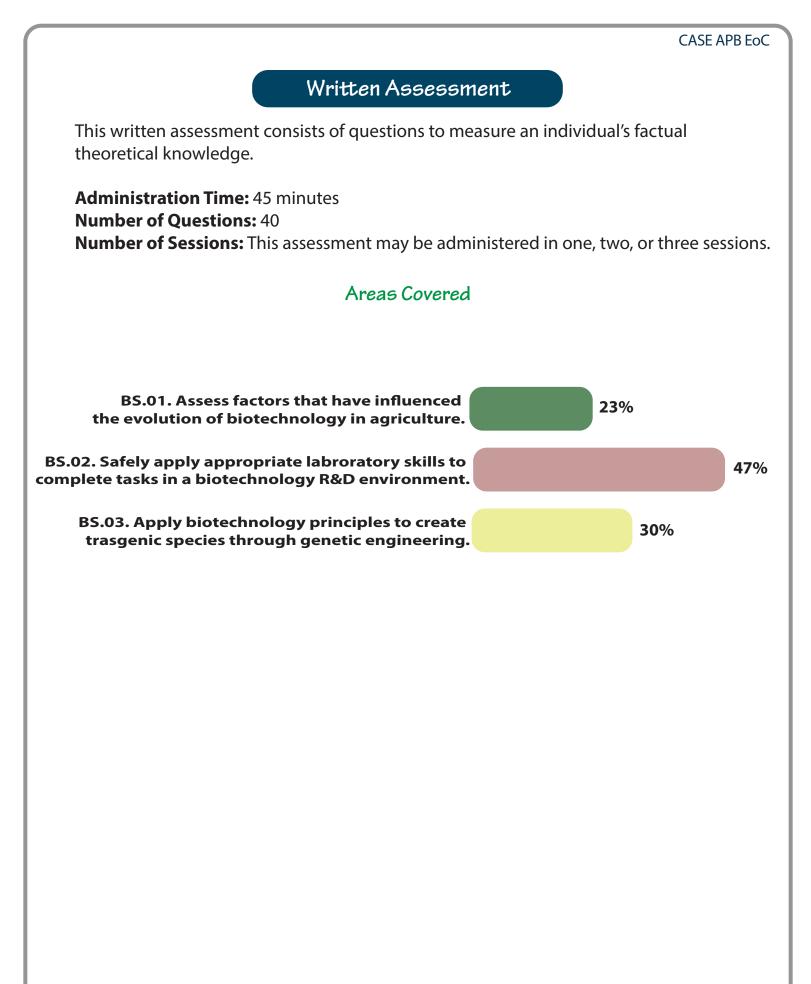# Animal and Plant Biotechnology End-of-Course Assessment (APB EoC)

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Test Type: The CASE Animal and Plant Biotechnology (APB) End-of-Course Assessment is based on CASE Animal and Plant Biotechnology course concepts and aligned National AFNR Common Career Technical Core Standards, as provided by a CASE certified instructor. Eligible participants can earn certification and an accompanying digital badge.

CASE 4 Learning is an initiative of the National Council for Agricultural Education. The end-of-course (EoC) assessments were developed by CASE to align with CASE concepts and National AFNR Common Career Technical Core Standards. The assessments are available through NOCTI, serving as the CASE partner for third-party delivery. EoC assessments serve as a measurement of student success that is statewide, valid, and reliable, and comparable across the state these end-of-course assessments meet Perkins V requirements.

Written Assessment

This written assessment consists of questions to measure an individual's factual theoretical knowledge.

Administration Time: 45 minutes
Number of Questions: 40
Number of Sessions: This assessment may be administered in one, two, or three sessions.

Areas Covered

BS.01. Assess factors that have influenced the evolution of biotechnology in agriculture. 23%

BS.02. Safely apply appropriate labroratory skills to complete tasks in a biotechnology R&D environment. 47%

BS.03. Apply biotechnology principles to create trasgenic species through genetic engineering. 30%

Specific Competencies and Skills Tested in this Assessment

BS.01. Assess factors that have influenced the evolution of biotechnology in agriculture.
- APB 1.1 Biotechnology has foundations in historical technologies and uses new fields of study.
- APB 4.1 Genetic testing is used to make production decisions and identify GMOs.
- APB 4.4.3 The precautionary principle is a guiding statement for biotechnology ethics.
- APB 5.2 Regulatory agencies monitor biotech products in order to ensure safety.

BS.02. Safely apply appropriate laboratory skills to complete tasks in a biotechnology R&D environment.
- APB 1.2 Working in a biotechnology lab requires diligence following safety procedures and rules.
- APB 1.3 Understanding DNA structure is essential for bioengineering processes.
- APB 2.1 DNA is extracted from cellular matter to be studied.
- APB 4.3 The immune response of mammals can be used to detect proteins of interest.
- APB 5.1 Research is question driven and backed by literature reviews and experimentation.

BS.03. Apply biotechnology principles to create transgenic species through genetic engineering.
- APB 2.2 Transformation is used to synthetically produce proteins for increased production.
- APB 3.1 Transcription and translation are processes that produce proteins.
- APB 4.2 Plants are genetically modified to improve products by inserting genes into cells.
- APB 4.4 Biotechnological practices use naturally occurring processes for industrial applications.

Sample Questions

How has biotechnology evolved
      A. Biotechnology applications have been developed from ancient practices such as selective breeding and fermentation
      B. Biotechnology applications have only been used in the last century
      C. Biotechnology applications have only been developed for agricultural purposes
      D. Biotechnology applications have always been socially acceptable

Which of the following is a chemical extraction method used to extract DNA from a cell?
      A. Cell lysis solution
      B. Freezing the cell
      C. Mashing the cell
      D. Transcription

When transcription takes place, what nucleotide would need to be produced to match the original sequence "GAT"?
      A. CUA
      B. CTA
      C. GUT
      D. CTA

Sample Questions (continued)

Scientists will create "knock-out" animals by replacing an active gene with an inactive gene. What would the value of this practice be?

A. To research the effect of one gene

B. To produce transgenic animals

C. To improve the animal

D. To produce additional stem cells

If a researcher wanted to learn more about the best procedure for a biotechnology application, what should he or she do first?

A. Literature review

B. Publishing research in a journal

C. Conducting experiments

D. Developing a hypothesis