

MODULE AGR3100: BIOTECHNOLOGY

Level: Advanced

Theme: Technology and Applications

Prerequisite: None

Module Description: Students present the results of research on applications of biotechnology in agriculture and food production.

Module Parameters: Access to resources on current applications of biotechnology in agriculture and food production.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> describe the history and development of biotechnology 	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> a teacher-prepared assessment in which the student demonstrates knowledge of: <ul style="list-style-type: none"> the nature of biotechnology and basic genetic terms basic methods used to alter plant and animal characteristics moral and ethical issues associated with developments in biotechnology. <p><i>Assessment Tool</i> Agriscience and Technology, <i>Section I: Biotechnology</i></p> <p><i>Standard</i> <i>Response indicating 60% mastery</i></p>	25
<ul style="list-style-type: none"> identify the benefits and costs associated with applications of biotechnology in agriculture and food production 	<ul style="list-style-type: none"> a presentation or report on the benefits and costs associated with one or more applications of biotechnology in each of the following areas: <ul style="list-style-type: none"> product and market development industry diversification production efficiency disease and pest control. <p><i>Assessment Tool</i> <i>Presentations/Reports: Advanced Level, AGRPRE-3</i></p> <p><i>Standard</i> <i>Complete the presentation or report to a standard of 3 on the rating scale</i></p>	25

MODULE AGR3100: BIOTECHNOLOGY (continued)

Concept	Specific Learner Expectations	Notes
Nature and History (continued)	<p><i>The student should:</i></p> <ul style="list-style-type: none"> • describe basic vocabulary and techniques used in genetic engineering; e.g.: <ul style="list-style-type: none"> – chromosome – gene – gene mapping – gene splicing – cloning • outline present and emerging applications of biotechnology in major sectors of Alberta’s economy; e.g.: <ul style="list-style-type: none"> – agriculture – health care – mining – forestry – energy – tourism. 	<p>Discuss applications of genetic engineering in selecting and breeding desirable characteristics.</p>
Applications	<ul style="list-style-type: none"> • describe specific applications of biotechnology in agriculture and food production; e.g.: <ul style="list-style-type: none"> – product and market development – industry diversification – production efficiency – disease and pest control • describe environmental, economic and ethical issues related to developments in biotechnology; e.g.: <ul style="list-style-type: none"> – use of natural resources – control and patenting of life forms – impact of genetically altered organisms – food quality and safety – world food supply • predict possible effects of new biotechnologies on producers, processors, consumers and governments • explain the role of legislation in regulating developments in biotechnology. 	<p>View the video entitled <i>Guess What’s Coming to Dinner</i> for an interesting account of applications of biotechnology (see Section I: Learning Resource Guide).</p> <p>Research applications of:</p> <ul style="list-style-type: none"> • artificial insemination • embryo transplant • hormones • growth supplements. <p>Discuss the risks and benefits.</p>

MODULE AGR3100: BIOTECHNOLOGY (continued)

Concept	Specific Learner Expectations	Notes
Research Project	<p><i>The student should:</i></p> <ul style="list-style-type: none"> • identify a specific problem in agriculture and food production recently addressed through biotechnology; e.g.: <ul style="list-style-type: none"> – production costs – product quality – market supply – environmental impact • identify key stakeholder groups affected by the problem • describe funding and partnerships that were established to address the problem • explain applications of biotechnology in dealing with the problem; e.g.: <ul style="list-style-type: none"> – principles of genetic engineering – scientific design – experimental outcomes • describe the social, economic and environmental consequences of experimental outcomes • make recommendations regarding the use of biotechnology and practical solutions to the problem; e.g.: <ul style="list-style-type: none"> – management actions – further research. 	Keep research projects relevant to personal needs and living experiences.