project AGRICULTURE Activity	BIOLOGY 30
	CONCEPTUAL and PROCEDURAL KNOWLEDGE
SPARK LEARNING SOURCE How is biotechnology part of smart agriculture? Biotechnologies shape food production and the provision of an adequate and accessible food supply. **LEARNING SOURCE** How can biotechnologies affect biodiversity? **BUILD COMPETENCIES** Discover biotechnologies	**Unit C: Cell Division, Genetics and Molecular Biology** 30-C1.1sts Explain that science and technology are developed to meet societal needs and expand human capability (SEC1) • Evaluate how knowledge of cell division or development of nanotechnology might be applied to the regulation of cancerous growth in plants or animals • Discuss and assess the impact of research in plant and animal reproduction on our understanding of mitosis and meiosis in humans (cloning, chromosome shortening) 30-C2.1sts Explain that decisions regarding the application of scientific and technological development involve a variety of perspectives, including social, cultural, environmental, ethical and economic considerations (SEC4b) [ICT F2-4.2, F3-4.1] • Discuss the contributions of Aboriginal peoples in the development of early plant hybrids • Discuss the application of genetic crosses in the development of specific breeds or hybrids (wheat and corn). 30-C3.5k Explain, in general, how cells may be transformed by inserting new DNA sequences into their genomes 30-C3.1sts Explain that science and technology have both intended and unintended consequences for humans and the environment (SEC3) [ICT F3-4.1] • Discuss the implications for society of corporations being able to patent genes, such as the gene for herbicide resistance in canola • Assess the concerns and benefits of genetically modified organisms, such as transgenic food organisms or tree cloning for reforestation 30-C3.2sts Explain that scientific research and technological development help achieve a sustainable society, economy and environment (SEC4a) [ICT F2-4.2, F2-4.8] • Discuss the Human Genome Project and the potential of proteomic technologies, in terms of the needs, interests and financial support of society • Discuss biotechnology and gene replacement therapy in the treatment of human genetic disorders • Assess the impact and value of DNA sequencing on the study of genetic relationships and variations in population ecology • Explore the application of nanotechnology and its implications for clinical diagnostics, pharmacology, biological research or proteomic programs. 30-C3.5k Explain, in general, how cells may be transformed by inserting new DNA sequences into their genomes 30-C3.6k Explain how a random change (mutation) in the sequence of bases results in abnormalities or provides a source of genetic variability 30-C3.2s Conduct investigations into relationships between and among observable variables and use a broad range of tools and techniques to gather and record data and information • Construct models of DNA to demonstrate the general structure and base arrangement (PR-ST2) [ICT C6-4.4] • Perform an investigation to extract DNA from cells in green peas, beans, bananas or onions (PR-NS2, PR-NS3, PR-NS4, PR-NS5)

The **SPARK** learning source can be used to introduce and "spark" discussion and investigations about connections between biotechnologies and agriculture. Encourage students to explore the INVESTIGATE MORE questions for further research into the application of genetic technologies in agriculture.

The **LEARNING SOURCE and BUILD COMPETENCIES** activity can meet specific learning outcomes in the Biology 30 curriculum and can provide a follow up of these concepts.