Course Title:	Plant Breeding and Biotechnology (H)
Grade(s):	11th/12th

Course Description
This advanced course in Plant Breeding and Biotechnology offers a comprehensive exploration of genetic principles and biotechnological applications in crop improvement. Students will engage with cutting-edge research, hands-on experiments, and in-depth discussions to deepen their understanding of plant genetics, breeding methods, and the ethical considerations surrounding biotechnology in agriculture. By delving into topics such as genome editing, plant tissue culture technology, and sustainable biotechnology practices, students will gain valuable insights into the future of agriculture and the potential impacts of genetic engineering. Students will participate in hands-on laboratory experiments, as well as research about different topics related to the plant breeding and biotechnology career field.
Approved Curricular Materials/Textbook(s)

Unit Title	Unit Description (Include Unit Objectives)	Unit Pacing
Unit 1: Introduction to Plant Propagation Methods	This unit is designed for students to delve into the fascinating world of plant reproduction and propagation techniques. Students will explore various methods of plant propagation, from seed germination to stem cutting propagation, and analyze the environmental factors that influence successful propagation. Students will also begin to prepare plant material for future spring sales for Suffield Agriscience. This unit aims to foster curiosity, critical thinking, and practical skills in plant propagation while connecting students to real-world applications in agriculture and conservation efforts.	3 weeks
Unit 2: Introduction to Plant Breeding and Genetics	This unit is designed to explore the realms of plant genetics, DNA structure, gene expression, and crop evolution and domestication. Through a combination of theoretical learning, hands-on activities, and critical thinking exercises, students will develop a comprehensive understanding of these interconnected topics and their real-world implications. Students will identify how DNA is expressed in	3 weeks

	different horticultural crops, and research different hybrids that were created in the horticultural industry. Also, students will create a seed schedule to monitor and evaluate different plants' overall growth and health for future plant sales.	
Unit 3: Classical Plant Breeding Techniques	In this unit, students will explore the principles and techniques of classical plant breeding. They will demonstrate the methods used by early breeders to improve crop characteristics and understand how these techniques have laid the foundation for modern plant breeding practices. Students will identify different hybrids that are commonly used in the horticultural industry today, and research different mutations that occur in plants. Students will also create and demonstrate how to successfully complete a tissue culture propagation experiment. Through a combination of theoretical learning, practical exercises, and research projects, students will develop a comprehensive understanding of classical plant breeding techniques and their significance in agriculture.	5 weeks
Unit 4: Plant Biotechnology Techniques	In this unit, students will immerse themselves in the world of plant biotechnology. From understanding the basics of plant genetic engineering to exploring advanced methods such as CRISPR and genome editing, students will uncover the innovative ways in which biotechnology is revolutionizing the agriculture industry. The unit will also address ethical considerations surrounding the use of biotechnology in plants, encouraging students to critically evaluate the implications of these technologies. Through hands-on experiments and case studies, students will gain practical experience in applying plant biotechnology methods to address real-world challenges.	5 weeks
Unit 5: Plant Biotechnology Industry/Future Trends	This unit is designed for students to research the future trends of the cutting-edge advancements and potential applications of plant biotechnology. Throughout this unit, students will explore the current landscape of plant biotechnology, analyze emerging trends, and critically evaluate the ethical, social, and environmental implications associated with these advancements. Through a series of engaging activities, discussions, and assessments, students will develop a deep understanding of how plant biotechnology can address global challenges in agriculture, food security, and sustainability. By the end of this unit, students will present on the role of plant biotechnology in shaping our future, empowering them to propose innovative solutions to ethical dilemmas in the field.	3 weeks