Sioux Central Community School District

High School Course Outline

Department: Agricultural Education

Course Title: Agricultural Biotechnology

Grade Level: 11-12

Length of Course: Semester

Brief Course Description:

Students will complete hands-on activities, projects, and problems designed to build content knowledge and technical skills in the field of biotechnology. Students are expected to become proficient at biotechnological skills involving micropipetting, bacterial cultures and transformations, electrophoresis, and polymerase chain reaction.

Students will maintain a research level *Laboratory Notebook* throughout the course documenting their experiences in the laboratory. Research and experimental design will be highlighted as students develop and conduct industry appropriate investigations.

Goals for Course/Essential Outcomes

3. Agriculture is a science that contributes to the development, improvement, and sustainability of living things.
6. Reading and writing interpretation skills are necessary for educational and professional development.
7. Safety is an attitude of personal responsibility that must be practiced in the agricultural classroom, laboratory, shop, greenhouse, and facilities.
9. The use of technology and computer applications is critical to modern agricultural practices.
10. Consideration of the ethical, environmental, social, and economic impacts of agricultural practices is essential to being a responsible, involved citizen.
11. Individuals involved with the processes of agricultural production must perform specific technical skills proficiently.
12. Critical thinking involves using a variety of problem-solving techniques in real-life contexts.

List from the Curriculum for Agricultural Science Education Major Concepts.

Outline of Content for Major Areas of Study:

Career Ready Practices
Communicate clearly, effectively and with reason.
Employ valid and reliable research strategies.

AFNR Career Cluster
Analyze how issues, trends, technologies and public policies impact systems in the Agriculture, Food & Natural Resources Career Cluster.

Biotechnology Systems Career Cluster
Assess factors that have influenced the evolution of biotechnology in agriculture (e.g., historical events, societal trends, ethical and legal implications, etc.).
Demonstrate proficiency by safely applying appropriate laboratory skills to complete tasks in a biotechnology research and development environment (e.g., standard operating procedures, record keeping, aseptic technique, equipment maintenance, etc.).
Demonstrate the application of biotechnology to solve problems in AFNR systems (e.g., bioengineering, food processing, waste management, horticulture, forestry, livestock, crops, etc.).

From the Common Career and Technical Core: Agriculture, Food, and Natural Resources (National) and CTE Standards 2019 Agriculture, Food, and Natural Resources (Iowa)

Grading Configuration:

- Classwork - conclusion questions, notebook checks: **50% of your grade**
- Projects & problems: **40% of your grade**
- SAE Foundational Exploration: **10% of your grade**

Semester Break-down:

A. Quarter 1/3 = 40%
B. Quarter 2/4 = 40%
C. Final = 20%

Supplementary Literature:

Brown, J. K. (2011). *Biotechnology: A laboratory skills course.* Hercules, CA: Bio-Rad Laboratories, Inc.

Daugherty, E. (2007). *Biotechnology: Science for the new millennium*. St. Paul, MN: Paradigm.

Herren, R. V. (2005). *Introduction to biotechnology: An agricultural revolution.* Clifton Park, NY: Delmar.

Other: Based upon the Curriculum for Agricultural Science Education (CASE) Animal and Plant Biotechnology course.