Warren County School District

PLANNED INSTRUCTION

COURSE DESCRIPTION

Course Title: Designs in Bio-Related Technology

Course Number: 00753

Course Description and Prerequisites:

This course provides a broad overview of bio-related technologies as they relate to technology education. Students will study these systems from historical, current and potential future applications of bio-related technologies in a broad spectrum of industries/agencies. Students will participate in various laboratory and research activities as they identify and analyze bio-related products, services and processes. They will work individually and in groups to design, test, analyze and evaluate bio-related processes and products. Projects beyond course expectations may require a materials fee.

Final Required

Prerequisite: Technological Design and Systems

Suggested Grade Level: 10 – 12th

Length of Course: X One Semester _____Two Semesters _____Other

Units of Credit: ½

PDE *Certification and Staffing Policies and Guidelines (CSPG)* Required Teacher Certification(s) Technology Education CSPG#65

Certification verified by WCSD Human Resources Department:
X Yes ____No

Board Approved Textbooks, Software, Materials:
Title:
Publisher:
ISBN #:
Copyright Date:
Date of WCSD Board Approval:

BOARD APPROVAL:

Date Written: 10/9/06

Date Approved: _____

Implementation Year: 2008-2009

Suggested Supplemental Materials: None

Course Standards

PA Academic Standards:

3.1.10. (A,B,C,D,E) Unifying Themes
3.1.12. (A,B,C,D,E) Unifying Themes
3.2.10. (A,B,C,D) Inquiry and Design
3.2.12. (A,B,C,D) Inquiry and Design
3.3.10 (A,C) Biological Sciences
3.3.12 (A,C) Biological Sciences
3.4.10 (A,C) Physical Science, Chemistry & Physics
3.4.12 (A,C) Physical Science, Chemistry & Physics
3.5.10 (B,D) Earth Sciences
3.5.12 (B,D) Earth Sciences
3.6.10. (A,B,C) Technology Education
3.6.12. (A,B,C) Technology Education
3.7.10. (A,B,C,D,E) Technology Devices
3.7.12. (A,B,C,D,E) Technology Devices
3.8.10. (A,B,C) Science, Technology and Human Endeavors
3.8.12. (A,B,C) Science, Technology and Human Endeavors

WCSD Academic Standards: None

Industry or Other Standards: None

WCSD EXPECTATIONS

WCSD K-12 Expectations for instruction in writing, reading, mathematics and, technology have been developed and revised annually. The teacher will integrate all WCSD Expectations into this planned instruction

SPECIAL EDUCATION AND GIFTED REQUIREMENTS

The teacher shall make appropriate modifications to instruction and assessment based on a student's Individual Education Plan (I.E.P.) or Gifted Individual Education Plan (G.I.E.P.).

SPECIFIC EDUCATIONAL OBJECTIVES/CORRESPONDING STANDARDS AND ELIGIBLE CONTENT WHERE APPLICABLE

3.1.10 (A,B,C,D,E) Unifying Themes x – performance assessed during that semester

	Performance Indicator	1	2	Assessment
A.	Discriminate among the concepts of systems, subsystems, feedback and control in solving technological problems.			Formative Assessments: • Peer Assessment • Quizzes • Teacher Observation Summative Assessment: • Documentation / Portfolio • Project
B.	Describe concepts of models as a way to predict and understand science and technology.			
C.	Apply patterns as repeated processes or recurring elements in science and technology.			
D.	Apply scale as a way of relating concepts and ideas to one another by some measure.			
E.	Describe patterns of change in nature, physical and man made systems.			

3.1.12 (A,B,C,D,E) Unifying Themes

	Performance Indicator	1	2	Assessment
A.	Apply concepts of systems, subsystems, feedback and control to solve complex technological problems.			Formative Assessments: • Peer Assessment • Quizzes • Teacher Observation Summative Assessment: • Documentation / Portfolio • Project
B.	Apply concepts of models as a method to predict and understand science and technology.			
C.	Assess and apply patterns in science and technology.			
D.	Analyze scale as a way of relating concepts and ideas to one another by some measure.			
E.	Evaluate change in nature, physical systems and man made systems.			

3.2.10 (A,B,C,D,) Inquiry and Design

	Performance Indicator	1	2	Assessment
A.	Apply knowledge and understanding about the nature of scientific and technological knowledge.			Formative Assessments: • Peer Assessment • Quizzes • Teacher Observation Summative Assessment: • Documentation / Portfolio
B.	Apply process knowledge and organize scientific and technological phenomena in varied ways.			
C.	Apply the elements of scientific inquiry to solve problems			

D.	Identify and apply the technological Design process to solve problems.			Portfolio • Project

3.2.12 (A,B,C,D,) Inquiry and Design

	Performance Indicator	1	2	Assessment
A.	Evaluate the nature of scientific and technological knowledge.			Formative Assessments: • Peer Assessment • Quizzes • Teacher Observation Summative Assessment: • Documentation / Portfolio • Project
B.	Evaluate experimental information for appropriateness and adherence to relevant science processes.			
C.	Apply the elements of scientific inquiry to solve multi-step problems			
D.	Analyze and use the technological design process to solve problems.			

3.3.10 (A,C) Biological Sciences

	Performance Indicator	1	2	Assessment
A.	Explain the structural and functional similarities and differences found among living things.			Formative Assessments: • Peer Assessment • Quizzes • Teacher Observation Summative Assessment: • Documentation / Portfolio • Project
C.	Describe how genetic information is inherited and expressed.			

3.3.12 (A) Biological Sciences

	Performance Indicator	1	2	Assessment
A.	Explain the relationship between structure and function at all levels of organization.			Formative Assessments: • Peer Assessment • Quizzes • Teacher Observation Summative Assessment: • Documentation / Portfolio • Project
C.	Explain gene inheritance and expression at the molecular level.			

3.4.10 (A,C) Physical Science, Chemistry and Physics

	Performance Indicator	1	2	Assessment
A.	Explain the concepts about structure and properties of matter.			Formative Assessments: • Peer Assessment • Quizzes • Teacher Observation Summative Assessment: • Documentation / Portfolio • Project
C.	Distinguish among the principles of force and motion..			

3.4.12 (A,C) Physical Science, Chemistry and Physics

	Performance Indicator	1	2	Assessment
A.	Apply concepts about the structure and properties of matter			Formative Assessments: • Peer Assessment • Quizzes • Teacher Observation Summative Assessment: • Documentation / Portfolio • Project
C.	Apply the principles of motion and force			

3.5.10 (B,D) Earth Sciences

	Performance Indicator	1	2	Assessment
B.	Explain sources and uses of earth resources.			Formative Assessments: • Peer Assessment • Quizzes • Teacher Observation Summative Assessment: • Documentation / Portfolio • Project
D.	Assess the value of water as a resource.			

3.5.12 (B,D) Earth Sciences

	Performance Indicator	1	2	Assessment
B.	Analyze the availability, location and extraction of earth resources.			Formative Assessments: • Peer Assessment • Quizzes • Teacher Observation Summative Assessment: • Documentation / Portfolio • Project
D.	Analyze the principles and history of hydrology			

3.6.10 (A,B,C) Technology Education

	Performance Indicator	1	2	Assessment
A.	Apply biotechnologies that relate to related technologies of propagating, growing, maintaining, adapting, treating, and converting.			Formative Assessments: • Peer Assessment • Quizzes • Teacher Observation Summative Assessment: • Documentation / Portfolio • Project
B.	Apply knowledge of information technologies of encoding, transmitting, receiving, storing, retrieving and decoding.			
C.	Apply physical technologies of structural design, analysis and engineering, personnel relations, financial affairs, structural production, marketing, research and design to real world problems.			

3.6.12 (A,B,C) Technology Education

	Performance Indicator	1	2	Assessment
A.	Analyze biotechnologies that relate to propagating, growing, maintaining, adapting, treating and converting.			Formative Assessments: • Peer Assessment • Quizzes • Teacher Observation Summative Assessment: • Documentation / Portfolio • Project
B.	Analyze knowledge of information technologies of processes encoding, transmitting, receiving, storing, retrieving and decoding.			
C.	Analyze physical technologies of structural design, analysis and engineering, personnel relations, financial affairs, structural production, marketing, research and design to real world problems.			

3.7.10 (A,B,C,D,E) Technological Devices

	Performance Indicator	1	2	Assessment
A.	Identify and safely use a variety of tools, basic machines, materials and techniques to solve problems and answer questions.			Formative Assessments: • Peer Assessment • Quizzes • Teacher Observation Summative Assessment: • Documentation / Portfolio • Project
B.	Apply appropriate instruments and apparatus to accurately measure materials and processes.			
C.	Apply basic computer operations and concepts.			
D.	Utilize computer software to solve specific problems.			
E.	Apply basic computer communications systems			

3.7.12 (A,B,C,D,E) Technological Devices

	Performance Indicator	1	2	Assessment
A.	Apply advanced tools, materials and techniques to answer complex questions.			Formative Assessments: • Peer Assessment • Quizzes • Teacher Observation Summative Assessment: • Documentation / Portfolio • Project
B.	Evaluate appropriate instruments and apparatus to accurately measure materials and processes			
C.	Evaluate computer operations and concepts as to their effectiveness to solve specific problems.			
D.	Evaluate the effectiveness of computer software to solve specific problems.			
E.	Assess effectiveness of computer communication systems.			

3.8.10 (A,B,C) Science, Technology and Human Endeavors

	Performance Indicator	1	2	Assessment
A.	Analyze the relationship between societal demands and scientific and technological enterprises.			Formative Assessments: • Peer Assessment • Quizzes • Teacher Observation Summative Assessment: • Documentation / Portfolio • Project
B.	Analyze how human ingenuity and technological resources satisfy specific human needs and improve the quality of life.			
C.	Evaluate possibilities consequences and impacts of scientific and technological solutions.			

3.8.12 (A,B,C) Science, Technology and Human Endeavors

	Performance Indicator	1	2	Assessment
A.	Synthesize and evaluate the interactions and constraints of science and technology on society.			Formative Assessments: • Peer Assessment • Quizzes • Teacher Observation Summative Assessment: • Documentation / Portfolio • Project
B.	Apply the use of ingenuity and technological resources to solve specific societal needs and improve the quality of life.			
C.	Evaluate the consequences and impacts of scientific and technological solutions.			

ASSESSMENTS

PSSA Assessment Anchors Addressed: The teacher must be knowledgeable of the PDE Assessment Anchors and/or Eligible Content and incorporate them into this planned instruction. Current assessment anchors can be found at pde@state.pa.us.

Formative Assessments: The teacher will develop and use standards-based assessments throughout the course.

Portfolio Assessment: _X_ Yes ____ No

District-wide Final Examination Required: _X_ Yes ____ No

Course Challenge Assessment:
Written Test(s)
Performance Assessment(s)

REQUIRED COURSE SEQUENCE AND TIMELINE

Content Sequence	Dates
Definitions	1 week
History of Bio-Related Technology	1 week
Content Organizers for the Study of Bio-Related Technology	1 week
Applying Design in Bio-Related Technology	1 week to introduce
Presentation	1 week to present
Developing and Analyzing Bio-Related Technology Activities	13 weeks

Objectives:

1. Define and contrast biotechnology and bio-related technology and their implications to technology education.
2. Construct and examine a historical outline in the development and discoveries of bio-related technologies in selected topics or themes.
3. Identify, apply and assess appropriate science, technology and mathematic concepts in design and problem-solving activities in bio-related technology.
4. Define, apply and appraise the bio-related technology content areas of agriculture, bio-materials, genetic engineering, medical technology, regulation and safety, and resource recovery to selected topics of study.
5. Determine and evaluate influences to decisions about bio-related technologies including but not limited to social/cultural values, politics, legalities, the environment, economics, education and technology.
6. Determine and evaluate impacts of bio-related technology systems.
7. Investigate and assess career opportunities in bio-related technologies and identify educational requirements and technical skills for employment.

WRITING TEAM: Arthur Anderson , Elizabeth Anderson, , Patrick Cronmiller, David Krack, Andrew Perlstein, John Victor, Patrick Cronmiller

WCSD STUDENT DATA SYSTEM INFORMATION

1. Is there a required final examination? _X_ Yes ____ No
2. Does this course issue a mark/grade for the report card?
   _X_ Yes____ No
3. Does this course issue a Pass/Fail mark? ____ Yes _X_ No
4. Is the course mark/grade part of the GPA calculation?
   _X_ Yes ____ No
5. Is the course eligible for Honor Roll calculation? _X_ Yes ____ No
6. What is the academic weight of the course?
   ____ No weight/Non credit _X_ Standard weight
   ____ Enhanced weight (Describe)_____