S.T.E.M. Technologies II

CTE

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Planning Period: 3rd Period   E-mail: ballen@bcbe.org

Course Description

This course is aligned with the International Technology Education Association's Standards for Technological Literacy and introduces students to the sixteen career clusters and the pathways associated with each. Students gain knowledge and skills in the application, design, production, and assessment of products, services, and systems in a variety of areas including, but not limited to, medical, agriscience, energy and power, communications, transportation, manufacturing, and construction technologies.

Prerequisite

N/A

Course Goals

1. Describe the scope of technology.
2. Explain core concepts of technology.
3. Describe the role of society in the development and use of technology
4. Summarize the cultural, economic, environmental, political, and historical effects of technology.
5. Identify creative attributes of design, including brainstorming, modeling, testing, evaluating, and modifying
6. Demonstrate technology design processes for solving problems in and beyond the laboratory and classroom.
7. Select correct tools needed to operate and maintain technology products and systems.
8. Identify advances and innovations in energy and power technologies
9. Identify advances and innovations in communication and information technologies
10. Identify advances and innovations in transportation technologies
11. Explain concepts associated with construction technologies.
12. Recognize Alabama's sixteen career clusters and associated pathways and their relationships to technology.

Course Outline

The following outline is tentative. Please check Google Classroom for specific assignments and deadlines.

- Orientation of Course & Safety Rules
- Nature of Technology
- Technology and Society
- The Engineering Design Process
- Abilities for a Technological World
- Graphics in Manufacturing
- The Design World

Credentialing/Culminating Project

N/A

Essential questions

1. How does technology guide today's society?
2. What knowledge, skills, and processes should the student gain by completing the technology and society objective?
3. How will membership and participation in the Technology Student Association (TSA) contribute to the student's mastery of the course objectives and ITEA's Standards for Technological Literacy?
4. What safety considerations should be emphasized?
5. What is design the design process and how is it applied to problem solving?
6. How do you apply the design process to solve problems?
7. What tools should be used to operate and maintain technology products?
8. What impacts does technology have on society?

9. What knowledge, skills, and processes should the student gain by completing objectives for The Designed World?
10. How will membership and participation in the Technology Student Association (TSA) contribute to the student's mastery of the course objectives and ITEA's Standards for Technological Literacy?
11. How will membership and participation in the Technology Student Association (TSA) contribute to the student's consideration of the needs for a balance between technical skills and knowledge when planning for a future career?
12. What safety considerations should be understood, respected and emphasized?

Embedded Numeracy

This course contains mathematics vocabulary for almost every unit. Students will complete assignments that require mathematic skills.

EXAMPLE: Unit Conversion in manufacturing: Use known units of measurement to convert all given component units into total millimeter length. Calculate the total length of an axle needed in MILLIMETERS for a dragster using the following components:

BalsaUSA dragster blank 3.9cm W
Pitsco Px front wheels with hubs 3/8" deep
Wheel bushings $^1/_{16}$" W
1mm clearance between wheel and dragster body

3.9(10mm) + 3/8"(2)=6/8"=3/4"to a decimal = .75"

You know there is 25.4mm in an inch.
.75"x 25.4mm= 19.05mm for 2 wheels

Convert $^1/_{16}$ into a decimal by dividing numerator by denominator = .0625in.
Again, convert inches to millimeters by multiplying by 25.4
.0625 x 25.4 = 1.58mm(2 wheels) = 3.175mm

Combine all:
 39mm + 19.05mm + 3.175mm + 2mm = 63.225mm axle length needed.

This math unit is integrated with the TSA CTSO competitive event Metric Dragster to design and manufacture the highest performing CO_2 dragster vehicle. It also illustrates and introduces the importance of calculating the Mass and choice of materials.

Following a lesson about Mass of an object. Directions: Mass is a measurement of the amount of matter or material an object contains. The mass of an object depends on its volume and the density of the object's material. Use the formula and table to complete the worksheet.

Material	Density (g/cm³)
Brass	8.55
Basswood	0.41
Balsa Wood	0.17

Sample questions: What is the mass of a brass axle that has a volume of 0.318 cm^3? What is the mass of a dragster body with a volume of 150 cm^3 if it is made of balsawood versus basswood?

Explain how the weight of the truck changed even though there was no change to what was in the truck. In your response, be sure to include:
● The difference between mass and weight.
● Why the elevation of the two locations is important?
Be sure to consider the completeness of your response, supporting details, and accurate use of vocabulary.

Embedded Literacy

This course contains technical reading and writing in every unit. Students will complete assignments that require these skills on a regular basis.

EXAMPLE: Read the Introduction to Technology textbook, Chapter 2 Concepts of Technology passage on Resources-Past and Present; "Technology requires knowledge, skill, raw materials, tools, and energy to create products and services".

Then answer the following prompt: Explain giving at least one example for each: manufacturing, transportation, communication and bio-medical technologies; how skills and creativity lead to new opportunities for inventions, innovations, and technological refinement. Create a document in either MS365 or Google Docs and upload into your class period.

Assessment Procedures/Grading Scale

All class work and projects will be assigned a point value based on the difficulty and depth of the project. All points earned will be divided by the possible points to determine the student's grade within each category of work. Categories and their percentage of total grade are:

   Formative/Summative Assessments – 60%   Inside of Classwork – 40%   Outside of Classwork – (part of Inside Of Classwork)

Make-up Work

Students who find it necessary to be absent are expected to make-up their missed assignments and tests within 6 school days of the students return. Work can ONLY be made up if the absence is EXCUSED. If you are unable to complete make-up work in class, it is your responsibility to arrange a time with the teacher to complete your work.

Other

We will strictly adhere to the School Student Handbook. This course will follow the attendance policy as stated by the Baldwin County Board of Education. All requests for accommodation for this course or any school event are welcome

from students and parents. Accommodations for students with Individual Education Plans (IEP's) or Personalized Education Plans (PEP's or 504's) or English as a Second Language (ESL Plan) will be followed. **Conferences may be scheduled upon request.**

Students are encouraged to join the Technology Student Association. See your Career-Tech teacher for membership information about the possible activities available to students with an interest or passion in technical areas.

COVID-19

Instruction in this class might be recorded or streamed live. Any recordings will be available to students enrolled in this class. This is intended to supplement the classroom experience. Students are expected to follow appropriate school system and campus-wide policies and maintain the security of passwords used to access classroom recordings. Live streaming and recordings may not be captured or reproduced, shared with those not in the class, or uploaded to other online environments. Doing so would be a breach of the Baldwin County Public School System's Acceptable Use Policy. If I, or an administrator, plan to use any recordings, beyond the classroom environment, students identifiable in the recordings will either be de-identified or will be notified prior to in order to obtain proper consent prior to such use.