STEM Cycle 6 Overview

Content Area: **Engineering**
Course(s): **STEM 7, STEM Cycle**
Time Period:
Length: **35 Days**
Status: **Published**

Cover

EAST BRUNSWICK PUBLIC SCHOOLS

East Brunswick New Jersey

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Course Adoption: 2/10/1989

Curriculum Adoption: 2/10/1989

Date of Last Revision Adoption: 9/1/2017

Course Overview

COURSE DESCRIPTION

This technology course will introduce the students to hands-on problem solving activities, which emphasize the concepts, skills, and processes of solving various problems. "Experience is a great teacher." This statement explains that we learn best and retain information best with the experience of actually doing something. STEM Education is the edifice for students to apply the knowledge and perform hands-on applications.

Students will be introduced to various problems where they will be expected to design, construct, test, and evaluate the work that they have done. This sequence is the application of the design loop, which is part of the foundation of this course. The sequence for instruction of this course is based on a 7-week cycle time frame.

COURSE SCOPE AND SEQUENCE

Sequential Unit Description	Other Pacing Guide References	Proficiency (Summative) Assessments
Unit 1 • Introduction To Technology o Definition o History o Invention/Innovation o Areas of Technology o Systems • mm	2 Weeks	• Folder Cover • Safety Pledge • Introduction to Technology Packet • Technology Poster Challenge • Teacher observation of Student Progress
Unit 2 • Design Process/Design Challenge o Design Process/Design Loop o Problem Solving o Safety o Teamwork	1 Week	• Wind Racers Packet/Project • Introduction to Technology Packet • Teacher observation of Student Progress

- Sketching
- Managing Resources

Unit 3 • Structural Engineering o Structural Properties o Strength and Shapes o Forces o Loads o Tool Safety o Measurement o Scale Drawing o Reading a ruler o Efficiency	4 Weeks	• Forces Packet • Reading a Ruler Worksheet • Big Inch Worksheet • Measuring Drawing Activity/Worksheet • Force Tower Packet/Project • Force Tower Review Worksheet

CONTENT FOCUS AREA AND COURSE NAME

Course Name: STEM 6 Cycle - #3803

Course Number	School Numbers	Course Level	Grade(s)	Credits	Min. Per Week	Elective/Required	Initial Course Adopted
3803	056	S	6	0.00	210	R	10/28/88

Textbooks and Other Resources

Gradwell, John B., Welch, M. & Martin, E. (2004). Technology - shaping our world. Tinley Park, Illinois: The Goodheart-Wilcox Company.

Gray, Michael & Daugherty, Michael. (2004). Factors that Influence Students to Enroll in Technology Education Programs. Journal of Technology Education, 15:2, 5-19.

Hutchinson, J. & Karsnitz, J. (1994) Design and Problem Solving in Technology. New York: Glencoe-McGraw Hill.

ITEA. (2000). Standards for Technological Literacy: Content for the Study of Technology. Reston, VA: Author.

ITEA. (2003). Advancing Excellence in Technological Literacy: Student Assessment, Professional Development, and Program Standards. Reston, VA: Author.

MCREL Mid-Continent Research for Education Learning Technology Standards Retrieved from {http://www.mcrel.org/compendium/Standard.asp?SubjectID=19}

Wright, R. Thomas & Brown, R.A. (2004) Technology Design and Applications. Tinley Park, Illinois: The Goodheart-Wilcox Company.

Brusic, Fales, Kuetemeyer. (2008) Technology Engineering & Design. New York, New York: Glencoe McGraw Hill.

Grading and Evaluation Guidelines

GRADING PROCEDURES

In terms of proficiency level the East Brunswick grades equate to:

A Excellent - Advanced Proficient

B Good Above Average - Proficient

C Fair - Proficient

D Poor - Minimally proficient

F Failing - Partially Proficient

The final course proficiency grade will be based on students' performance throughout the course based on the identified New Jersey Core Content Standards for career and technical education (CPI's up to and including grade eight). Students' individual grades will be based on performance in:

COURSE EVALUATION

Course achievement will be evaluated based on the percent of all pupils who achieve the minimum level of proficiency (final average grade) in the course. Student achievement levels above minimum proficiency will also be reported. Final grades and marking period grades will be analyzed by staff for the total cohort and for sub-groups of students to determine course areas requiring greater support or modification.)

Other Details

71004 Principles of Engineering
Principles of Engineering courses provide an understanding of the engineering/technology field. Students typically explore how engineers use various technology systems and manufacturing processes to solve problems; they may also gain an appreciation of the social and political consequences of technological change.

Standards

TECH.8.2.5.A.1	Compare and contrast how products made in nature differ from products that are human made in how they are produced and used.
TECH.8.2.5.A.2	Investigate and present factors that influence the development and function of a product and a system.
TECH.8.2.5.A.3	Investigate and present factors that influence the development and function of products and systems, e.g., resources, criteria and constraints.

TECH.8.2.5.A.4	Compare and contrast how technologies have changed over time due to human needs and economic, political and/or cultural influences.
TECH.8.2.5.A.5	Identify how improvement in the understanding of materials science impacts technologies.
TECH.8.2.5.B. 6	Compare and discuss how technologies have influenced history in the past century.
TECH.8.2.5.B.1	Examine ethical considerations in the development and production of a product through its life cycle.
TECH.8.2.5.B.2	Examine systems used for recycling and recommend simplification of the systems and share with product developers.
TECH.8.2.5.B.3	Investigate ways that various technologies are being developed and used to reduce improper use of resources.
TECH.8.2.5.B.4	Research technologies that have changed due to society's changing needs and wants.
TECH.8.2.5.B.5	Explain the purpose of intellectual property law.
TECH.8.2.5.B.CS4	The influence of technology on history.
TECH.8.2.5.C.1	Collaborate with peers to illustrate components of a designed system.
TECH.8.2.5.C.2	Explain how specifications and limitations can be used to direct a product's development.
TECH.8.2.5.C.3	Research how design modifications have lead to new products.
TECH.8.2.5.C.4	Collaborate and brainstorm with peers to solve a problem evaluating all solutions to provide the best results with supporting sketches or models.
TECH.8.2.5.C.5	Explain the functions of a system and subsystems.
TECH.8.2.5.C.6	Examine a malfunctioning tool and identify the process to troubleshoot and present options to repair the tool.
TECH.8.2.5.C.7	Work with peers to redesign an existing product for a different purpose.
TECH.8.2.5.D.1	Identify and collect information about a problem that can be solved by technology, generate ideas to solve the problem, and identify constraints and trade-offs to be considered.
TECH.8.2.5.D.2	Evaluate and test alternative solutions to a problem using the constraints and trade-offs identified in the design process to evaluate potential solutions.
TECH.8.2.5.D.3	Follow step by step directions to assemble a product or solve a problem.
TECH.8.2.5.D.4	Explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved.
TECH.8.2.5.D.5	Describe how resources such as material, energy, information, time, tools, people and capital are used in products or systems.
TECH.8.2.5.D.6	Explain the positive and negative effect of products and systems on humans, other species and the environment, and when the product or system should be used.
TECH.8.2.5.D.7	Explain the impact that resources such as energy and materials used in a process to produce products or system have on the environment.
TECH.8.2.5.E.1	Identify how computer programming impacts our everyday lives.
TECH.8.2.5.E.2	Demonstrate an understanding of how a computer takes input of data, processes and stores the data through a series of commands, and outputs information.
TECH.8.2.5.E.3	Using a simple, visual programming language, create a program using loops, events and procedures to generate specific output.
TECH.8.2.5.E.4	Use appropriate terms in conversation (e.g., algorithm, program, debug, loop, events, procedures, memory, storage, processing, software, coding, procedure, and data).