

GLENDALE UNIFIED SCHOOL DISTRICT

Middle School

June 17, 2014

Department: Industrial Education
Course Title: Introduction to STEM Technology
Course Number:
Grade Level: 7, 8
Semester Credits: 5
Recommended Prerequisite: None
Recommended Textbook:

Course Description: The Introduction to STEM (Science, Technology, Engineering, and Mathematics) Technology class provides students with structured inquiry and standards-based lessons that integrate the four disciplines of Science, Technology, Engineering, and Mathematics. Upon completion of the course, students will have an increased awareness of the academic requirements of STEM fields, occupations, and related careers. Hands-on, project-oriented activities will introduce STEM principles within the fields of robotics, solar energy, and electrical engineering.

I. Standards

A. Common Core State Standards: College and Career Readiness Anchor Standards for Reading

1. Key Ideas and Details

- a. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
- b. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.

- c. Analyze how and why individuals, events, and ideas develop and interact over the course of a text.

Introduction to STEM Technology

Page 2

2. Craft and Structure

- a. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
- b. Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.
- c. Assess how point of view or purpose shapes the content and style of a text.

3. Integration of Knowledge and Ideas

- a. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.
- b. Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.
- c. Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.

4. Range of Reading and Level of Text Complexity

- a. Read and comprehend complex literary and informational texts independently and proficiently.

B. Common Core State Standards: College and Career Readiness Anchor Standards for Writing

1. Text Types and Purposes

- a. Write arguments to support claims in an analysis of substantive topics or texts using valid reasoning and relevant and sufficient evidence.
- b. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

Introduction to STEM Technology
Page 3

- c. Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.

2. Production and Distribution of Writing

- a. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- b. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.
- c. Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.

3. Research to Build and Present Knowledge

- a. Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.
- b. Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.
- c. Draw evidence from literary and or informational texts to support analysis, reflection, and research.

4. Range of Writing

- a. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.

II. Sample Assessments and Assignments

- A. Quizzes
- B. Homework
- C. Classroom Participation
- D. Cooperative Projects
- E. Laboratory Experiments

Introduction to STEM Technology
Page 4

III. Topics of Study / Suggested Time Distribution

- A. Robotics 50%
 - 1. Introduction to Robotics
 - 2. NXT System, Sensors, Programming
 - 3. Classroom Engineering Discoveries
- B. Electricity and Electronics 25%
 - 1. Basic Components and Circuits
 - 2. Motors and Electricity
 - 3. Resistance
 - 4. Capacitors
- C. Sun Power and Solar Energy 25%
 - 1. How Your Solar Cell Works
 - 2. Solar Cell Circuits

3. The Solar Future

IV. Textbooks and Supplemental Materials

A. Adopted Textbook: None

B. Supplemental Materials

1. LEGO Mindstorms NXT Robots (9797 Education Base Set)
http://www.legoeducation.us/eng/product/lego_mindstorms_education_nxt_base_set/2095
2. LEGO Mindstorms NXT-G Education Version 2.1 programming software
http://www.legoeducation.us/eng/product/lego_mindstorms_education_nxt_software_2_1/2240
3. The LEGO Mindstorms NXT 2.0 Discovery Book: A Beginner's Guide to Building and Programming Robots by Laurens Valk
4. Classroom Activities for the Busy Teacher: NEXT (2nd Edition) by Damien Kee
5. Elenco Snap Circuits SC-850R Student Training Program
6. Your Solar Home – Student Guidebook by Rarus Institute – A Solar Schoolhouse Publication