

STEM-Integrated, Modified 7-E Learning Plan Template

CHALLENGE, PROBLEM or PROJECT:	To use a microcontroller in the design of a sensor, actuator, or servo circuit that addresses a practical need or communicates a particular theme or message.
UNIT:	
MATH/SCIENCE/ TECHNOLOGY CONNECTIONS:	<ul style="list-style-type: none"> ● Numbers and Number Sense ● Computation and Estimation ● Measurement and Geometry ● Patterns, Functions and Algebra ● Program Design ● Scientific Investigation, Reasoning, and Logic ● Force Motion and Energy ● Basic Principles of Electricity ● Experimental Design and Product Design ● Basic Electrical Circuits ● Engineering Design Processes
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Stage 1 - Desired Results
<p>Established Goals: Identify and draw the components of a basic circuit; Identify the purpose, components, and applications of microcontrollers; identify the four standard parts of computer program; prepare a computer program from a blank template; and create a device with the circuit and program developed.</p>

<p>Prior Knowledge Needed <i>(include vocabulary):</i> <i>Series and parallel circuits, simple fractions, degrees of a circle, clockwise and counterclockwise</i></p>
<p>Objectives to be addressed in this lesson: <i>(include specific competencies, Standards, and language objectives)</i></p> <p>Math SOL's</p> <ul style="list-style-type: none"> ● Numbers and Number Sense (4.1, 4.2, 5.2, 6.2, 6.3, ● Computation and Estimation (4.4, 4.5, 5.4, 6.5, 6.6, ● Measurement and Geometry (4.8, 5.9, 5.11, 5.12, G.10) ● Patterns, Functions and Algebra (4.15, 5.18, 5.19 ● Program Design (COM.2; COM.7; COM.8) <p>Science SOL's</p>

- Scientific Investigation, Reasoning, and Logic (4.1 b, c, d, l, and m; 6.1 i; LS.1 c,d,f, PS.1 d; ES.1 b, Bio.1 i; CH.1 h)
- Force Motion and Energy (4.3 a, b, d, f)
- Basic Principles of Electricity (PS.11 a, c, d)
- Experimental Design and Product Design (PH.1 d,f,g)
- Basic Electrical Circuits (PH.11 a, b, c, d)

Technology

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Enduring Understandings: Participants will understanding that: 1. 2.	Essential Questions: 1. 2.
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Language Objectives
Reading: Preparation, review Listening: Initial instructions, collaborating Speaking: Summarizing, mentoring, asking questions Writing: Documentation, sharing and reporting, summarizing Key vocabulary:

Stage 2 - Assessment Evidence
(Include both Formative and Summative Assessments.)

Performance Tasks: Students will develop skills in (1) (2) (3) (4) (5) (6)	Other Evidence: Students will be evaluated on: <ul style="list-style-type: none">••••••
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Stage 3 - STEM-Integrated Learning Activities / Instruction

Lesson Elements 7E Model	Teacher Notes (and resources)
1. ENGAGE -- Introduce the lesson using the <i>Challenge Question</i> as the HOOK.	
2. ELICIT -- Students identify what they NEED TO KNOW/KNOW/HOW TO FIND OUT to solve the <i>Challenge</i> .	<i>Design Process Step: Identify the problem.</i>
3. EXPLORE -- Students build an understanding of knowledge/skills related to specific topics within the standards-based curriculum.	<i>Design Process Step: Criteria and Constraints</i>
4. EXPLAIN -- Students share findings from EXPLORATIONS and determine what knowledge/skills will help solve the <i>Challenge</i> .	<i>Design Process Step: Brainstorm solutions and pick one.</i>
5. ELABORATE -- Using what was learned, solve the design challenge.	<i>Design Process Step: Build a model or prototype.</i> <i>Design Process Step: Test your solution.</i> <i>Design Process Step: Re-design and re-test.</i>
6. EVALUATE -- Students demonstrate their understanding with presentations or published students' products. A variety of formative and summative assessments are used to evaluate student understanding. STEM Notebooks provide ongoing assessment.	<i>Design Process Step: Share your solution.</i>
7. EXTEND -- Students make connections to other real-world problems. STEM Career connections are made.	

DIFFERENTIATION

Accommodations:

Other support:

- Remediation
- Enrichment or early finishers
- Various learning styles
- Limited English proficiency

OTHER INTEGRATION (Interdisciplinary Connections)

(Include any overlapping concepts and big ideas from other disciplines. Delete the rest.)

- Language Arts:
- Math:
- Science:
- Social Sciences:
- Health/PE
- World Languages:
- Economics/Finance:
- Other Technical, Technology or Engineering:
- Entrepreneurship or Business:
- Visual or Performing Arts:

WRAP-UP (Closure and links to next lesson)

(Review enduring understanding(s), essential questions.)

TEACHER REFLECTION

- How much time was spent at each level on the Gradual Release of Responsibility chart?
 - WE DO IT TOGETHER
 - YOU DO IT WITH PEERS
 - YOU DO IT ALONE OR DO SOMETHING NEW
- Were my students engaged throughout the lesson?
- Did the students respond to "How" and "Why" questions?

This is a template. Please choose "File, Make a Copy..." to begin your lesson.

Shortcut: <http://bit.ly/33cVRyq>

- Did my students have an opportunity to discuss and/or write about the topic?
- What changes would I make next time the lesson is taught?
- What steps do I need to take next in this topic? Are there areas that need re-teaching?