



# ENGINEERING

Georgia CTAE Resource Network  
PEACH STATE PATHWAYS



## UNIT: 6 UNIVERSAL SYSTEMS MODEL



### INTRODUCTION

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**Course:** Foundations of Engineering (ET-FET)

#### Unit Development Template Annotation

The universal systems model explains how parts of technology work together to achieve a goal. Engineers must understand how systems work and incorporate this into their designs.

#### Grade(s)

- 9-Ninth
- 10-Tenth
- 11-Eleventh
- 12-Twelfth

#### Approximate Duration

- 3 days

#### Author

- Matthew Flanders

**Students with disabilities:** For students with disabilities, each instructor should refer to the student's IEP to be sure that the accommodations specified in the IEP are being provided within the classroom setting. Instructors should also familiarize themselves with the provisions of Behavior Intervention Plans that may be part of a student's IEP. Frequent consultation with a student's special education instructor will be beneficial in providing appropriate differentiation within any given instructional activity or requirement.



## STANDARDS

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### Focus Standards

ENGR-FET-3 – Students will explain the universal systems model.

ENGR-STEM-1 – Students will recognize the systems, components, and processes of a technological system.

ENGR-STEM-6 – Students will enhance reading by developing vocabulary and comprehension skills associated with text materials, problem descriptions, and laboratory activities associated with engineering and technology education.

CTAE-FS-11 Entrepreneurship: Learners demonstrate understanding of concepts, processes, and behaviors associated with successful entrepreneurial performance.

### Complementary Standards

ELA10C1. The student demonstrates understanding and control of the rules of the English language, realizing that usage involves the appropriate application of conventions and grammar in both written and spoken formats.



## UNDERSTANDING AND GOALS

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### Unit Understandings, Themes, and Concepts

Student will understand the parts of the universal systems model.

### Primary Learning Goals

What is the universal systems model?

What are the parts of the universal systems model?

Who develops technology?

What are the seven types of inputs?



## BALANCED ASSESSMENT

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### Assessment Method/Type

Quiz

### Assessment Title

Systems Quiz



## UNIT PERFORMANCE TASK(S)

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### Performance Task Title

1. "Size Up the System" worksheet
2. Candy Bar Presentation
3. Production Game

### Description/Directions

1. Worksheet on parts of a system.
2. Listen during the presentation portion of the candy bar activity and observe if the students understand the material.
3. See "Production Game" document for complete directions.

### Rubric for Performing Task

1. Check for accuracy.
2. Check to make sure they have the correct items in the input, process and feedback column.
3. Make sure the students follow the rules and keep up with their accounting sheets. They should fill out the follow-up sheet after the activity.



## SEQUENCE OF INSTRUCTION AND LEARNING

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### Sequence of Instruction and Learning

#### Day 1

- Discuss how different two very different items are designed and then made (ex. A car and a chair). Then show how the overall process is similar.
- Read and discuss the chapter in your textbook related to the Universal Systems Model. (If Applicable)
- Present the Universal Systems Model PowerPoint

#### Day 2

- Students will complete the "Size Up the System" worksheet.
- Students will design a new candy bar and draw out the wrapper on paper.

- They should complete a list of the inputs, processes and outputs and present to the class
- Discuss with students some of the technology and steps in making the candy bar that they may have missed.

### **Day 3**

- Play the “Production Game” for 3/4 of class. *(Note: Read through this thoroughly before giving to the students. This activity requires at least 30 minutes of prep time for the assorted paper and printing of the money. Cutting the paper into fourths will make it last longer and won’t use up your materials.)*
- Finalize the team totals and discuss the outcomes and possible causes of them.
- Systems Quiz