



ENGINEERING & TECHNOLOGY

PATHWAY: Engineering

COURSE: Foundations of Engineering and Technology

UNIT 1: Engineering & Technology: An Overview including Careers



INTRODUCTION

Annotation: Briefly describe the unit topics, tasks, methods, etc.

In this unit students will compare the study of engineering to the study of technology and the different career paths that are available.

Grade(s):

X	9 th
X	10 th
X	11 th
X	12 th

Time:

4 Hours

Author:

Charles J. Kachmer

Additional Author(s):

Students with Disabilities:

For students with disabilities, the instructor should refer to the student's IEP to be sure that the accommodations specified are being provided. 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.



FOCUS STANDARDS

GPS Focus Standards: Please list the standard and elements covered.

ENGR-FET-1 – Students will describe the career pathways that are encompassed by Georgia Engineering and Technology Education.

CTAE-FS-5 – Information Technology Applications: Learners use multiple information technology devices to access, organize, process, transmit, and communicate information.

CTAE-FS-9 – Ethics and Legal Responsibilities: Learners commit to work ethics, behavior, and legal responsibilities in the workplace.

GPS Academic Standards:

National / Local Standards / Industry / ISTE:



UNDERSTANDINGS & GOALS

Enduring Understandings:

Students will begin to understand how engineering and technology contribute to society, as well as potential career opportunities in the engineering and technology fields.

Essential Questions:

1. What are the differences between technology and engineering?
2. What are the seven essential elements of all technology/engineering systems?
3. What are the potential career opportunities related to engineering and technology?
4. What are the education requirements for professional engineers and engineering technologists?

Knowledge from this Unit: Factual information.

1. Students will gain the knowledge of different career paths within the field of Engineering.
2. Students will understand the different disciplines of an Engineer.
3. Students will understand the differences between Engineering and Technology.

Skills from this Unit: Performance.

Students will...

- List the seven essential elements of all technology systems.
- Analyze the contributions of all academics to the study of engineering.
- Compare and contrast the definitions of engineering and technology.
- List human needs satisfied by engineering.
- Identify potential career opportunities related to engineering and technology.
- Explain the educational requirements and professional expectations associated with a chosen technological career path.



ASSESSMENT(S)

Assessment Method Type: Select one or more of the following. Please consider the type(s) of differentiated instruction you will be using in the classroom.

- Pre-test
- Objective assessment - multiple-choice, true- false, etc.
 - Quizzes/Tests
 - Unit test
- Group project
- Individual project
- Self-assessment - May include practice quizzes, games, simulations, checklists, etc.
 - Self-check rubrics
 - Self-check during writing/planning process
 - Journal reflections on concepts, personal experiences and impact on one's life
 - Reflect on evaluations of work from teachers, business partners, and competition judges
 - Academic prompts
 - Practice quizzes/tests
- Subjective assessment/Informal observations
 - Essay tests
 - Observe students working with partners
 - Observe students role playing
- Peer-assessment
 - Peer editing & commentary of products/projects/presentations using rubrics
 - Peer editing and/or critiquing
- Dialogue and Discussion
 - Student/teacher conferences
 - Partner and small group discussions
 - Whole group discussions
 - Interaction with/feedback from community members/speakers and business partners
- Constructed Responses
 - Chart good reading/writing/listening/speaking habits
 - Application of skills to real-life situations/scenarios
- Post-test

Assessment(s) Title:

Careers in Engineering

Assessment(s) Description/Directions:

Use the attached PowerPoints to lead class discussions. There are two assignments that will assist in assessing student learning in a performance basis. The first allows students to pick an engineering discipline and develop a presentation they can give to the class. The second is a document in Adobe of an index card that students can fill out using the internet. Print this on card stock.

Attachments for Assessment(s): Please list.



LEARNING EXPERIENCES

Sequence of Instruction

1. Identify the Standards. Standards should be posted in the classroom for each lesson.

ENGR-FET-1 – Students will describe the career pathways that are encompassed by Georgia Engineering and Technology Education.

CTAE-FS-5 – Information Technology Applications: Learners use multiple information technology devices to access, organize, process, transmit, and communicate information.

CTAE-FS-9 – Ethics and Legal Responsibilities: Learners commit to work ethics, behavior, and legal responsibilities in the workplace.

2. Review Essential Questions.

1. What are the differences between technology and engineering?
2. What are the seven essential elements of all technology/engineering systems?
3. What are the potential career opportunities related to engineering and technology?
4. What are the education requirements for professional engineers and engineering technologists?

3. Identify and review the unit vocabulary.

Discipline

Role

Engineering

4. Assessment Activity.

1. Present Introduction to Engineering PowerPoint and lead class discussion. Ask students what they thought the field of engineering covered before they saw the presentation and whether their ideas about engineering have changed.

2. Present Careers in Engineering PowerPoint and lead class discussion. What do they think about Engineering as a possible career choice? What discipline would they want to follow and why.

3. Hand out Engineering Technician Worksheet for students to complete for a grade.

4. Introduce students to GCIS online.

5. Students complete assignment 1 (creating an engineering career PowerPoint) and present to class.

6. Students complete assignment 2 (Personal Career Planner).

Attachments for Learning Experiences: Please list.

Power point:

Careers in Engineering

Introduction to Engineering

Games:

Jeopardy-Engineering Careers

Matching-Engineering Duties

Careers in Engineering (directions for assignments 1 and 2)

Career Planner Cards

Notes & Reflections: May include notes to the teacher, pre-requisite knowledge & skills, suggestions, etc.



CULMINATING PERFORMANCE TASK (Optional)

Culminating Unit Performance Task Title:

Engineering Technician Worksheet

Culminating Unit Performance Task Description/Directions/Differentiated Instruction:

1. Hand out the Engineering Technician worksheet and allow students to complete it individually or in groups. This worksheet is a good basic introduction on what engineers do on a day to day basis. Assist students with the mathematical equations if they are having difficulty coming up with correct answers.
2. Print out assignment sheet on word document and allow students to use GCIS to develop a brief PowerPoint of one of the engineering disciplines. Students present these to class.
3. Print out Career Planner index cards (assignment 2) and allow students to do an assessment of their post-secondary plans.

Attachments for Culminating Performance Task: Please list.

Engineering Technician Worksheet

Rubric for Performance Task:

Rubric for PowerPoint project is listed on assignment sheet.

Rubric Points:

Slide 1: 2 points per required element (8 points max.)

Slide 2: 5 points for proper definition (5 points max.)

2.5 points for each job function described (5 points max.)

Slide 3: 2 points per educational institute listed (8 points max.)

Slide 4: 3 points per job opening listed (9 points max.)

Slide 5: 2.5 points per state and national average income (5 points max.)

Total Points earned: _____ / 40 = _____%



UNIT RESOURCES

Web Resources:

Georgia Career Information System
Monster.com
Hotjobs.com.

Attachment(s): Supplemental files not listed in assessment, learning experiences, and performance task.

Materials & Equipment:

Handouts, powerpoint screen, internet

What 21st Century Technology was used in this unit:

<input checked="" type="checkbox"/>	Slide Show Software	<input type="checkbox"/>	Graphing Software	<input type="checkbox"/>	Audio File(s)
<input type="checkbox"/>	Interactive Whiteboard	<input checked="" type="checkbox"/>	Calculator	<input checked="" type="checkbox"/>	Graphic Organizer
<input type="checkbox"/>	Student Response System	<input type="checkbox"/>	Desktop Publishing	<input checked="" type="checkbox"/>	Image File(s)
<input type="checkbox"/>	Web Design Software	<input type="checkbox"/>	Blog	<input type="checkbox"/>	Video
<input type="checkbox"/>	Animation Software	<input type="checkbox"/>	Wiki	<input checked="" type="checkbox"/>	Electronic Game or Puzzle Maker
<input type="checkbox"/>	Email	<input checked="" type="checkbox"/>	Website		