GEORGIA | PEACH STATE PATHWAYS

Career, Technical, & Agricultural Education

FOUNDATION SKILLS

PATHWAY: All Pathways

COURSE: All CTAE Courses

UNIT 4.1: Problem Solving and Critical Thinking

INTRODUCTION

Annotation:

In this unit, students will discuss and complete activities in problem solving and critical thinking.

Grade(s):

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

Time: Two 50 minute periods.

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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:

CTAE-FS-4 Problem Solving and Critical Thinking: Learners define and solve problems, and use problem-solving and improvement methods and tools.

GPS Academic Standards:

National / Local Standards / Industry / ISTE:

ESS03 Problem-Solving and Critical Thinking: Solve problems using critical thinking skills (analyze, synthesize, and evaluate) independently and in teams. Solve problems using creativity and innovation.

UNDERSTANDINGS & GOALS

Enduring Understandings: Enduring understandings are statements summarizing important ideas and have lasting value beyond the classroom. They synthesize what students should understand – not just know.

Students will recognize the importance of problem solving and critical thinking and will be able to apply concepts to real world situations.

Essential Questions: Essential questions probe for deeper meaning and understanding while fostering the development of critical thinking and problem-solving skills. Example: Why is life-long learning important in the modern workplace?

- Why are problem solving skills important?
- Why are critical thinking skills important?
- In what situations can you use problem solving and critical thinking skills?

Knowledge from this Unit: Factual information.

Skills from this Unit: Performance.

- Students will improve problem solving skills.
- Students will improve critical thinking skills.

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
_X_ Dialogue and Discussion
__ Student/teacher conferences
__ Partner and small group discussions
_X_ 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: Class Starters

Assessment(s) Description/Directions:

These activities are designed to be class starters. Explain problem to class and have students complete the activities.

TASK 1:

INTRODUCTION: This is a class starter activity to begin discussion about critical thinking and problem solving in the career pathway. Explain to the students that you want to discuss the importance of thinking through problems and logical thinking. Read the problem to the class or provide each student with a handout (minus the answers) and ask them to try to find the missing dollar. This is an old brain-teaser activity adopted for CTAE use.

PROBLEM: Three students checked into a hotel room during a school trip. The room cost was $130 total. The school paid $100 in advance for the room, leaving a balance of $30. The students paid $10 each at check-in to cover the $30 balance. After they went to the room the manager realized that he had overcharged them since the convention rate was $125 for the room. The manager gave a clerk $5 to return to the students. On the way to their room the clerk could not decide how he was going to split $5 among three people. He decided to keep $2 for his trouble and make the math easier. The clerk gave $1 to each student. The three students had now paid $9 each, or a total of $27. This, plus the $2 the clerk kept for himself, makes a total of $29. What happened to the other dollar?

ASSIGNMENT:

1. Write an explanation of what happened to the missing dollar.

2. Determine how much each member should have received if the clerk had split the $5 among the three members?

SOLUTION:

1. Nothing happened to the dollar. All the money is still there. They paid $9 each for a total of $27. Plus the $3 they got back is a total of $30. They were supposed to pay $25 but they actually paid $27 because the clerk kept $2.

($25 for the room + $2 for the clerk = $27)

$30 initial charge - $3 refund = $27

Each paid $9 and $9 x 3 = $27

The trick is in the statement, "The three students had now paid $9 each, or a total of $27. This plus the $2 the clerk kept makes a total of $29."

The $27 is the total payment and $2 is a cost, not a payment. It just happens to add up to $29 giving the illusion of a missing dollar.

2. Each student should have gotten back $1.67 – rounded up from $1.6666666. ($5 divided by three students = $1.666...)

TASK 2:

Use the following exercise as mental set, class starter or as an end of class activity. The activity will determine the number of students in your class and your age. Read aloud, project or write the instructions on the board and ask students to complete the exercise without sharing information. This will require that they determine the number of students in the class. The teacher should either give them the number or have a designated student count for the class. The activity will take about 10 minutes.

This activity uses different numbers in step 5 for different years. The activity can be updated for the next year by incrementing the numbers in Step 5 by one.

2008 Version
(For use in 2008 only)

1. Start with the number of students in your class.
2. Multiply this number by 2.
3. Add 5
4. Multiply it by 50.
5. If you have already had your birthday this year add 1758. If you haven't, add 1757.
6. Now subtract the four-digit year that you were born.

The first two digits of the result is the number of students in your class and the two digits to the right is YOUR AGE!

2009 Version
(For use in 2009 only)
1. Start with the number of students in your class.
2. Multiply this number by 2.
3. Add 5
4. Multiply it by 50.
5. If you have already had your birthday this year add 1759. If you haven't, add 1758.
6. Now subtract the four-digit year that you were born.

The first two digits of the result is the number of students in your class and the two digits to the right is YOUR AGE!

2010 Version
(For use in 2010 only)
1. Start with the number of students in your class.
2. Multiply this number by 2.
3. Add 5
4. Multiply it by 50.
5. If you have already had your birthday this year add 1760. If you haven't, add 1759.
6. Now subtract the four-digit year that you were born.

The first two digits of the result is the number of students in your class and the two digits to the right is YOUR AGE!

2011 Version
(For use in 2011 only)
1. Start with the number of students in your class.
2. Multiply this number by 2.
3. Add 5
4. Multiply it by 50.
5. If you have already had your birthday this year add 1761. If you haven't, add 1760.
6. Now subtract the four-digit year that you were born.

The first two digits of the result is the number of students in your class and the two digits to the right is YOUR AGE!

2012 Version
(For use in 2008 only)
1. Start with the number of students in your class.
2. Multiply this number by 2.
3. Add 5
4. Multiply it by 50.
5. If you have already had your birthday this year add 1762. If you haven't, add 1761.
6. Now subtract the four-digit year that you were born.

The first two digits of the result is the number of students in your class and the two digits to the right is YOUR AGE!

1. Did the activity yield the correct number of students in the class and your age?
2. How does this math activity work?

Attachments for Assessment(s): Please list.

LEARNING EXPERIENCES

Instructional planning: Include lessons, activities and other learning experiences in this section with a brief description of the activities to ensure student acquisition of the knowledge and skills addressed in the standards. Complete the sequence of instruction for each lesson/task in the unit.

Sequence of Instruction

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

CTAE-FS-4 Problem Solving and Critical Thinking: Learners define and solve problems, and use problem-solving and improvement methods and tools.

2. Review Essential Questions.

- Why are problem solving skills important?

- Why are critical thinking skills important?
- In what situations can you use problem solving and critical thinking skills?

3. Discussion

Discuss problem solving skills.

Discuss critical thinking skills.

Start discussion on how the assessment activity works.

4. Assessment Activity.

Attachments for Learning Experiences: Please list.

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

CULMINATING PERFORMANCE TASK (Optional)

Culminating Unit Performance Task Title:

Culminating Unit Performance Task Description/Directions/Differentiated Instruction:

Attachments for Culminating Performance Task: Please list.

UNIT RESOURCES

Web Resources:

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

Materials & Equipment:

What 21st Century Technology was used in this unit:

- ☐ Slide Show Software
- ☐ Interactive Whiteboard
- ☐ Student Response System
- ☐ Web Design Software
- ☐ Animation Software
- ☐ Email
- ☐ Graphing Software
- ☐ Calculator
- ☐ Desktop Publishing
- ☐ Blog
- ☐ Wiki
- ☐ Website
- ☐ Audio File(s)
- ☐ Graphic Organizer
- ☐ Image File(s)
- ☐ Video
- ☐ Electronic Game or Puzzle Maker