

VITAL INFORMATION

Subject(s):	Careers, Computer Fundamentals 1-2
Topic or Unit of Study:	Software Development
Grade/Level:	9-12
Objective:	Objective: At the conclusion of this lesson students will be able to: <ol style="list-style-type: none">1. Extract user input from a control.2. Display computed output in a control.3. Use comments in code for documentation purposes.4. Program arithmetic operations.5. Call a standard library function (Val) with parameters.
Summary:	Students create a simple calculator in Visual Basic. It takes two numbers as input and calculates a single answer as output, initially supporting addition, subtraction, multiplication, and division operations. A video tutorial guides them through form creation and coding the first addition button. Students are then expected to complete the three remaining buttons on their own. An example of the final form layout is provided for reference.

IMPLEMENTATION

Learning Context:	Students have completed a Hello World program in order to familiarize themselves with the development environment. That program has very little functionality, so now it is time to put the computer to work. Students "teach" the machine how to compute and output an answer from the input it receives.
Procedure:	<ol style="list-style-type: none">1. Display for students the class web page where there is a screen shot of the calculator, a link to the video tutorial, and instructions for how to write comments in their code. Make sure they know the symbols that Visual Basic uses for arithmetic operations (+-*/*). They should know where to look if they forget: the help system. Also inform them that they should test thoroughly, since not just any numbers can be added, subtracted, etc. Solicit examples of potential problems to sample what students know and to get them all headed in the right direction. They will be asked about this during evaluation.2. Ensure that students are equipped with headphones and have them follow the tutorial and build the example up through the button used for addition. They should continue on their own with the remaining

three arithmetic operations, which should be straightforward after the first is complete.

3. When students feel they have finished the assignment, check their work based on the rubric below. The program should work for all signed integer input except for division by zero, which they should have tested. They should know that blank numbers, decimal numbers, and excessively large numbers cause problems.

Differentiated Instruction:

Since the tempo and volume and even size of the video tutorial can be changed, students can differentiate at least these aspects on their own. This production does have a voice track to accompany the visual. It does not have a transcript, however. Some students find written instructions quicker and easier to use.

Sample Student Products:

The video shows approximately half the result dynamically and the screen shot shows it all statically.

Collaboration:

Students will work individually.

Time Allotment:

1 class period. 55 Min. per class.

Author's Comments & Reflections:

Reflections will follow in a diary entry.

Re. time allotment: If the opening comments are kept brief and all problems have been ironed out with the Hello World program, this lesson can probably be completed in one class period.

MATERIALS AND RESOURCES

Instructional Materials:

The video tutorial is not easily uploaded. I am attaching a PDF of the web page for this lesson from the new class web site. It is not available from outside the school.

Attachments

1. My Calculator

Resources:

- Technology resources:
Visual Basic, Windows Media Player

STANDARDS & ASSESSMENT

Standards:

 **AZ- Career and Technical Education Programs**

- **Level :** Career Preparation (Grades 10 - 12)
- **Program :** Information Technology CIP No. 15.1200
 - **Option :** Software Development - Option C
 - **Competency :** *3.0 DEVELOP APPROPRIATE WORK HABITS FOR SUCCESSFUL EMPLOYMENT IN INFORMATION TECHNOLOGY
 - **Indicator :** 3.3 Complete tasks accurately
 - **Indicator :** 3.4 Complete tasks with minimal supervision
 - **Competency :** *9.0 UTILIZE TECHNOLOGY REQUIRED IN AN INFORMATION

TECHNOLOGY WORKPLACE

■ **Indicator** : 9.2 Demonstrate basic usage of computers such as input, storage, and output

■ **Indicator** : 9.5 Apply folder and directory management techniques

• **Competency** : 16.0 PARTICIPATE IN INFORMATION TECHNOLOGY WORK-BASED LEARNING EXPERIENCES

■ **Indicator** : 16.1 Use technology appropriate for a job in information technology

• **Competency** : 27.C DEMONSTRATE PROGRAM ANALYSIS AND DESIGN

■ **Indicator** : 27.4c Determine input and output

■ **Indicator** : 27.7c Develop a testing plan

■ **Indicator** : 27.8c Write documentation

• **Competency** : 28.C USE SOFTWARE TO CREATE PROGRAMS

■ **Indicator** : 28.1c Enter and modify code using a program editor

■ **Indicator** : 28.2c Compile and execute programs

■ **Indicator** : 28.3c Correct syntax errors

■ **Indicator** : 28.5c Use recognized conventions for naming identifiers and formatting code

• **Competency** : 29.C TEST AND DEBUG TO VERIFY PROGRAM OPERATION

■ **Indicator** : 29.1c Test individual program modules

• **Competency** : 30.C WRITE CODE TO PERFORM ARITHMETIC CALCULATIONS

■ **Indicator** : 30.1c Identify and use arithmetic operators correctly applying the order of operations with respect to programming

■ **Indicator** : 30.2c Interpret and construct mathematical formulas

• **Competency** : 31.C EMPLOY MODULARITY IN WRITING PROGRAMS

■ **Indicator** : 31.1c Call standard library functions

■ **Indicator** : 31.2c Utilize parameters to pass data into program modules

■ **Indicator** : 31.4c Write and use modules that return values

Assessment/Rubrics:

Rubrics

1. <u>My Calculator</u>
