PROGRAMMING IN VISUAL BASIC
GRADERS 10-12

THE EWING PUBLIC SCHOOLS
2099 Pennington Road
Ewing, NJ 08618

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Superintendent

In accordance with The Ewing Public Schools' Policy 2230, Course Guides, this curriculum has been reviewed and found to be in compliance with all policies and all affirmative action criteria.
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Introduction

Visual Basic is used to create Windows, Web and command applications. It will provide tools that allow a programmer to build a Windows application without having to write many lines of code. It is the goal of this course to provide students the best possible introduction to programming as well as develop problem-solving skills.

Students will investigate the fundamental logic of computer programming and design, construct and evaluate programs in Visual Basic. After being introduced to Visual Basic as a first programming language, students can then go on to discover other languages such as Java or C++ or Processing.
Unit 1: Fundamentals of Programming in Visual Basic (19 Days)

Why Is This Unit Important?

Visual Basic is used to create applications for Microsoft Windows. It includes tools that allow the programmer to build a Windows application without having to write many lines of code. The concepts explained in this chapter include procedures, assignment and numeric expressions. The Form, Label, MainMenu, RadioButton and Button control are also introduced.

Enduring Understandings:

1. A Windows application is event-driven
2. Much of the data processed by computers consists of numbers.
3. Two primary types of data can be processed by Visual Basic: numbers and strings
4. Data can be stored in files and assessed through Input# statements or supplied by a user in a text or input box

Essential Questions:

1. What does the Visual Basic screen look like?
2. What role does arithmetic play in VB?

Acquired Knowledge:

1. To know what it means to develop a Visual Basic application
2. To recognize a Visual Basic Environment
3. To design a user interface using text boxes, label boxes, picture boxes and command buttons
4. Understand what an event procedure is.
5. Know what ANSI (or ASCII) standard is
6. Know the built-in functions.

Acquired Skills:

1. Create and manipulate text boxes, command buttons, picture boxes, and label boxes.
2. Write three different event procedures (LostFocus, GotFocus, and click)
3. Perform arithmetic operations
4. Display numbers, strings and pictures at run-time
5. Format output
Benchmark or Major Assessments:

Formative Assessments:

Summative Assessments:
1. Programming Project requiring that the students write a program utilizing all of the elements presented in this unit. See pp 137-138 in textbook.
2. Test: Write a line of code, write a program, determine the output.

Interdisciplinary Connections:
1. Order of operations, meaning of variables and formulas, functions, function parameters, tables - Math

Accommodations and Modifications:
1. Rephrase written directions or provide verbal directions
2. Preferential seating
3. Extended time during school hours
4. One on one instruction by teacher or peer

Extensions:
1. Provide an opportunity to write a program to convert US Customary System lengths in miles, yards, feet and inches to a Metric System length in kilometers, meters and centimeters.

List of Applicable NJCCS and Standards/CPIs:
- 4.1.12.B1,3,4
- 4.3.12.A1, B2

Teacher Resources:
Unit 2: General Procedures of Computer Programming (15 Days)

Why Is This Unit Important?

This unit will allow students to understand the importance of procedures in computer programming.

Enduring Understandings:

1. Visual Basic has two devices, Sub procedures and Function procedures that are used to manage problems.
2. There are two ways to pass variable by value.
3. Programs are coded using three logical structures

Essential Questions:

1. How do programmers handle large problems effectively?
2. What are the three logical structures of sequences, decisions and loops

Acquired Knowledge:

1. Know the benefits of Sub procedures.
2. Know the role of parameters
3. Understand the difference between arguments and parameters
4. Understand how Local and Form-level Variables effect the programming code
5. Cite reasons for using Sub procedures.
7. Understand how to use global variables

Acquired Skills:

1. Be able to transfer of the value of a parameter to its calling argument
2. Demonstrate the two ways to pass variable by value.
3. Break a problem into individual tasks or modules.
4. Use global variables
5. Apply stepwise refinement techniques.

Benchmark or Major Assessments:

Formative Assessments:

1. Exercises for each skill can be located in the textbook located on pp. 7-33 to 7-40 of An Introduction to Programming Using Microsoft Visual Basic.Net
Summative Assessments:

1. Programming Projects can be located on pp. 196-198 of VB textbook. (see teacher resources)

Accommodations and Modifications:

1. Rephrase written directions or provide verbal directions
2. Preferential seating
3. Extended time during school hours
4. One on one instruction by teacher or peer

Extensions:

1. Advanced exercises can be located on pp. 7-41 of An Introduction to Programming Using Microsoft Visual Basic.Net.

Interdisciplinary Connections:

• Pythagorean Theorem, compound interest - Math

List of Applicable NJCCS and Standards/CPIs:

• 4.2.12.E.1
• 4.3.12.C.1
• 4.5 A and B

Teacher Resources:

Unit 3: Decisions of Computer Programming (18 Days)

Why Is This Unit Important?

This unit will introduce the students to decision structures that control the flow of a program, round-off error, and counter variables. Creating algorithms, using logical operators, and generating random numbers are also discussed.

Enduring Understandings:

1. The role of conditions in computer programming.
2. The role of If Blocks in computer programming.

Essential Questions:

1. Why does VB allow a value to appear in two different value lists?

Acquired Knowledge:

1. Know what a condition is.
2. To know and understand the syntax of an If Block
3. Explain what a selector does.

Acquired Skills:

1. Write programs the require the use of If statements
2. Demonstrate how to determine the size and complexity of a block using If, End If, Else and Elself clauses.
3. Explain when Select Case Blocks are used.
4. Write and evaluate the conditions of an If statement.

Benchmark or Major Assessments:

Formative Assessments:

1. Lab project- pp 218 – 219 in VB text.
2. Programming exercises pp. 218-219
3. Lab Assignment – Popcorn Order Application

Summative Assessments:

Interdisciplinary Connections:
1. Boolean Algebra and logic, probability, quadratic equations - Math

Accommodations and Modifications:
1. Rephrase written directions or provide verbal directions
2. Preferential seating
3. Extended time during school hours
4. One on one instruction by teacher or peer

Extensions:
1. Advanced exercises can be located on p. 5-35, An Introduction to Programming Using Microsoft Visual Basic.Net

List of Applicable NJCCS and Standards/CPIs:
- 4.3.12.D2
- 4.4.12.B1
- 4.5 A and B

Teacher Resources:
Unit 4: Repetition (12 Days)

Why Is This Unit Important?

This unit will explain computer programming concepts which include looping structures to control program flow, accumulator variables and flags. Other concepts such as The String class, Char structure, Unicode and the Like operator will be discussed.

Enduring Understandings:

1. Understand the importance of looping
2. Understand the relationship between counters, accumulators, flags, EOF function and Nested loops.

Essential Questions:

1. Why is looping important of computer programming?
2. How will the information used in this unit be used again?

Acquired Knowledge:

1. Explain the purpose of a Do loop.
2. Know vocabulary: Counters, accumulators, flags, EOF function and Nested loops.
3. Know the purpose of For….Next Loops

Acquired Skills:

1. Calculate useful quantities for which you do not know a simple formula.
2. Demonstrate how a flag and nested loops are used.

Benchmark or Major Assessments:

Formative Assessments:

1. Write a program that allows the user to play hangman against the computer.
2. Complete selected exercises, An Introduction to Programming Using Microsoft Visual Basic.Net, pp. 6-27 to 6-32
3. Rewrite the program segment using a For..Next Step look, then write the output for the program

Summative Assessments:

3. Compound Interest Project: Microsoft Visual Basic Programming Projects Activities Workbook pp. 87-90
4. Test: short answer based on vocabulary, correct errors in a code, write a code that prompts user.

Interdisciplinary Connections:

1. Fibonacci Sequence, Exponential Growth, Modulus Division, Coefficient of Restitution, Loan Amortization, Flow Charts, Sum of Sequences - Math, Physics, Business

Accommodations and Modifications:

1. Rephrase written directions or provide verbal directions
2. Preferential seating
3. Extended time during school hours
4. One on one instruction by teacher or peer

Extensions:

1. Select a challenging project from, An Introduction to Programming Using Microsoft Visual Basic.Net, pp. 6-27 to 6-32

List of Applicable NJCCS and Standards/CPIs:

- 4.3.12.C 1
- 4.5C 3,4
- 4.5D, E
- 9.2.12.C 3

Teacher Resources:

Unit 5: Arrays (11 Days)

Why Is This Unit Important?

This unit will explore the concepts of composite data types including arrays and structures. Enumerated types are also discussed and Dynamic arrays and the linear search algorithm is explained.

Enduring Understandings:

1. Demonstrate an understanding of how to use an array.
2. Understand how to extend the concept of arrays to controls and then modify program by creating the controls at run-time.
3. Understand what an array is

Essential Questions:

1. How are control and variable arrays used differently?

Acquired Knowledge:

1. Know what a two-dimensional, parallel, dynamic array is.
2. Discuss how to implement the Concentration Game using words
3. Demonstrate how to use the different arrays mentioned in this unit.
4. Know what Dim and ReDim statements are.
5. Bubble sort and Shell sort are two of the best-known methods for ordering

Acquired Skills:

1. Create and access VB arrays
2. implement a complex array problem through the use of functions
3. Use an array of controls at design time and run-time
4. Use the correct VB syntax to create and initialize two dimensional arrays.
5. Use two-dimensional array to store tables of information within a Visual Program.

Benchmark or Major Assessments:

Formative Assessments:

Summative Assessments:

1. Chapter Test: Written questions and programming problems

Interdisciplinary Connections:


Accommodations and Modifications:

1. Rephrase written directions or provide verbal directions
2. Preferential seating
3. Extended time during school hours
4. One on one instruction by teacher.
5. Work with student partner

Extensions:


List of Applicable NJCCS and Standards/CPIs:

- 4.4 12A
- 4.4.12B
- 4.5 C 3,4
- 4.5 D, E

Teacher Resources:

Unit 6: Sequential Files (11 Days)

Why Is This Unit Important?

This unit will provide an overview of sequential file input and output.

Enduring Understandings:

1. Discover the need for data files
2. Learn a simplified syntax to read and write comma-separated data from an to sequential files.
3. Learn how to write formatted text to a sequential file.
4. Understand Open Modes, Input, Output and Append.
5. Understand control break processing

Essential Questions:

1. Why are sequential files important?

Acquired Knowledge:

1. Know what file input and out (file I/O) are.
2. Know when a file can be accessed.
3. Recall key terms: access, file I/O, file number, Personal Information Manager (PIM)

Acquired Skills:

1. Write programs to manipulate sequential files by using Open Modes, Input, Output and Append.
2. Use stream readers and writers as an alternative to open modes input-output.
3. Use try-catch-finally block and trap an error
4. Use control break processing
5. Incorporate list boxes, combo boxes and Open File Dialogue Controls into a VB program
6. Use and modify the properties of list boxes and combo boxes.

Benchmark or Major Assessments:

Formative Assessments:

Summative Assessments:


Interdisciplinary Connections:


Accommodations and Modifications:

1. Rephrase written directions or provide verbal directions
2. Preferential seating
3. Extended time during school hours
4. One on one instruction by teacher.
5. Work with student partner

Extensions:


List of Applicable NJCCS and Standards/CPIs:

- 4.5 D
- 4.5.C 3,4

Teacher Resources: