Course Title – Computer Programming I

Implement start year – 2014-2015

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Unit # 6 topic: Graphics

Students will be able to design and develop code that creates pictures using the graphing features of visual basic.net

Stage 1 – Desired Results

Established Goals

2009 NJCCC Standard(s), Strand(s)/CPI #
(http://www.nj.gov/education/cccs/2009/final.htm)

Common Core Curriculum Standards for Math and English
(http://www.corestandards.org/)

NJ World Class Standards
Content Area: 21st Century Life and Careers
(http://www.state.nj.us/education/cccs/standards/9/9-4-K.htm)

9.4.2 Create and use information technology strategies and project plans when solving specific problems to deliver a product that meets customer specifications.

9.3.7 Iterate through the design and development process to create a uniform web-based or digital product.

9.3.8 Participate in a user-focused design and development process to produce web-based and digital communication solutions.

21st Century Themes
(www.21stcenturyskills.org)

- ☒ Global Awareness
- ☐ Financial, Economic, Business and Entrepreneurial Literacy
- ☐ Civic Literacy
- ☐ Health Literacy
- ☐ Environmental Literacy

21st Century Skills

Learning and Innovation Skills:
- ☒ Creativity and Innovation
- ☒ Critical Thinking and Problem Solving
- ☒ Communication and Collaboration

Information, Media and Technology Skills:
- ☒ Information Literacy
- ☐ Media Literacy
- ☒ ICT (Information, Communications and Technology) Literacy

Life and Career Skills:
- ☒ Flexibility and Adaptability
- ☐ Initiative and Self-Direction
- ☐ Social and Cross-Cultural Skills

	☒Productivity and Accountability ☐Leadership and Responsibility
Enduring Understandings: *Students will understand that . . .* *EU 1* • Computer generated graphics are displayed differently on different systems and system settings *EU 2* • Complex graphical structures can be designed with small amounts of code EU 3 • Pre-Packaged graphical commands can be over written, overridden and modified EU 4 • Mathematical models allow for ease in working with interacting and interlaced graphics.	**Essential Questions:** *EU 1* • What effects does the system and setting settings have on the graphical display? • In what way can the effects of system displays and setting be overridden to achieve a more stable graphical display? *EU 2* • How can different structure be put into place that would allow for a small amount of code to produce a complex graphical structure? EU 3 • In what ways can these commands by overwritten, overridden or modified? EU 4 • When imbedding objects into other objects graphically, what kinds of mathematical models can be used?

Knowledge: *Students will know . . .*	**Skills:** *Students will be able to . . .*
EU 1 • that computer generated graphics are dependent on the systems graphical settings.. • *EU 2* • that all lines of code can be repeated. When graphical code is repeated with different parameters it can produce a complex graphical structure. EU 3 • that prepackaged graphical interfaces are preloaded with languages. These packages can be modified in the programs code. EU 4 • graphics is numeral in nature and therefore can be manipulated mathematically.	*EU 1* • Code for the display of graphics on a computer screen • Code for the display of graphics on an object *EU 2* • Design a complex graphical structure with a small amount of code. Using loops for methods. EU 3 • Write code that will modify the graphical command of an inherited graphics class. EU 4 • Make multiple graphics commands that will be embedded with each other and identify the effect they have on each other.

Stage 2 – Assessment Evidence

Recommended Performance Tasks: *Each unit must have at least 1 Performance Task. Consider the GRASPS form.*

Other Recommended Evidence: *Tests, Quizzes, Prompts, Self-assessment, Observations, Dialogues, etc.*

- Flow charts including program flow and looping processes
- Pseudo code: a handwritten version of the program where the code is not written in full but rather an idea of the program flow is hashed out on paper
- Algorithms: Written code of the mathematical process that will allow data to be put into an array and sorted. The mathematical process of searching for data using different techniques.
- Test/quizzes
- Class discussion
- Program maintenance. Revising a program to adjust to the needs of different data types and number of data members

Stage 3 – Learning Plan

Suggested Learning Activities to Include Differentiated Instruction and Interdisciplinary Connections: *Consider the WHERETO elements. Each learning activity listed must be accompanied by a learning goal of A= Acquiring basic knowledge and skills, M= Making meaning and/or a T= Transfer.*

- Create circle circumscribed within a square (T)
- Create a triangle and then allow the user to "scale-down" the triangle to a similar to the original (M)
- Create picture of a house using points (T)
- Create an animation of a snowy scene that utilizes random number generation (T)
- Create a scene that incorporates at least 2 figures, each drawn and filled with unique colors (T)

The following is the suggested sequence of learning activities and number of days for the Computer Programming I Class. (Approximate number of days: 26)

- Declaration of a graphics: making a new variable as type graphics
- Graphics and objects: Attaching the graphic variable to an object
- Form Locations: Using the form location and the object location to establish the graphics location
- Pixel Allocations: Determine the Allocation and Locations of Pixels
- Screen Resolution: Changing the screen resolution to manipulate graphics
- Draw and Fill Commands: Changing the parameter of the graphics command to color in graphical objects
- Parameters: Determine and use the parameters required to use graphics methods
- Arrays of type Point
- Angles and Sweep Angles
- Visible and hidden graphics

Vocabulary

- Pixel
- Resolution
- Axis
- Parameters
- Random Number Generator
- Scale
- Radius
- Animation