Title of planned course: Introduction to Computer Programming

Subject Area: Business

Grade Level: 9-12

Course Description: This introductory programming course, using Alice 2.2, is designed to introduce students to basic programming. Alice uses the modern approach to computer programming known as OOP or Object Oriented Programming. A “hands-on” approach will be used to allow students to practice the principles of the Alice language.

Time/Credit for this Course: 0.5 Academic Year / 0.5 Credits

Curriculum Writing Committee: Kari Maskalis
Curriculum Map

**Unit 1:** Introduction to Alice

**Unit 2:** Program Design and Implementation

**Unit 3:** Built-in Functions and Expression

**Unit 4:** Classes, Objects, Methods and Parameters

**Unit 5:** Events and Event Handling

**Unit 6:** Functions and If/Else

**Unit 7:** Definite and Conditional Loops

**Unit 8:** Recursion

**Unit 9:** Lists and List Processing

**Unit 10:** Variables and Inheritance
Wilson Area School District
Planned Course Materials

**Course Title:** Introduction to Computer Programming

**Teacher Resources:**
- www.alice.org
- www.aliceprogramming.net
- http://www.cs.duke.edu/csed/alice/aliceInSchools/
- http://www.dickbaldwin.com/tocalice.htm
- http://www.alice.org/community/
- www.bluepelicanjava.com
Curriculum Scope & Sequence

**Planned Course:** Introduction to Computer Programming

**Unit:** Introduction to Programming

**Time frame:** 1-2 weeks

**State Standards:** 5.4.12.D, G-K

**Essential content/objectives:** At end of the unit, students will be able to:
- Define computer programming
- Summarize the history of computer programming
- Identify current challenges within the computer programming field
- Understand the benefits of using Alice.

**Core Activities:** Students will complete/participate in the following:
- Alice Tutorial #1
- Alice Tutorial #2
- Alice Tutorial #3
- Alice Tutorial #4
- The Essentials of Alice (Bunny)
- The Essentials of Alice (Kangaroo)
- Shark Attack
- Getting Started Space

**Extensions:**
- Fish Fairy
- Princess and Dragon

**Remediation:**
- Tutoring
- Resubmission of previous programmed worlds

**Instructional Methods:**
- Direct instruction
- Guided and independent practice
- Projects

**Materials & Resources:**
- Computer, Internet, and Projector
- SMART Board
- Alice software
Assessments:

- **Formative:**
  - Observation
  - Multi-level questioning
  - Discussion, class assignments

- **Summative:**
  - Projects
Curriculum Scope & Sequence

Planned Course: Introduction to Computer Programming

Unit: Program Design and Implementation

Time frame: 1-2 weeks

State Standards: 5.4.12.D, G-K

Essential content/objectives: At end of the unit, students will be able to:
- Demonstrate proper use of control statements
- Select arguments that support the intended program actions
- Export code for printing.

Core Activities: Students will complete/participate in the following:
- Skater World
- Outdoor Adventure
- How Tall Are You?
- Decisions and Functions Assessment

Extensions:
- Working with Numbers
- Properties and Functions
- Transformations Challenge
- Headshots

Remediation:
- Tutoring
- Resubmission of previous programmed worlds

Instructional Methods:
- Direct instruction
- Guided and independent practice
- Projects

Materials & Resources:
- Computer, Internet, and Projector
- SMART Board
- Alice software

Assessments:
- Formative:
  - Observation
  - Multi-level questioning
  - Discussion, class assignments
- Summative:
  - Projects
Curriculum Scope & Sequence

**Planned Course:**  Introduction to Computer Programming

**Unit:**  Built-in Functions and Expression

**Time frame:**  1-2 weeks

**State Standards:**  5.4.12.D, G-K

**Essential content/objectives:**  At end of the unit, students will be able to:
- Explain the relationship between method calls and arguments
- Write their own methods
- Modify the properties of an object
- Create and rename new objects from predefined classes.

**Core Activities:**  Students will complete/participate in the following:
- Kangaroo Visits Friend
- Parameter’s Assessment
- Creating Simple Objects
- Texture Map Assessment
- Making Objects Move in Unison
- Lists Assessment
- Sharing Alice

**Extensions:**
- Changing Color Advanced Functions
- Random Numbers Assessment
- Making Folders in the Local Gallery

**Remediation:**
- Tutoring
- Resubmission of previous programmed worlds

**Instructional Methods:**
- Direct instruction
- Guided and independent practice
- Projects

**Materials & Resources:**
- Computer, Internet, and Projector
- SMART Board
- Alice software
Assessments:

- **Formative:**
  - Observation
  - Multi-level questioning
  - Discussion, class assignments

- **Summative:**
  - Projects
Curriculum Scope & Sequence

**Planned Course:** Introduction to Computer Programming

**Unit:** Classes, Objects, Methods and Parameters

**Time frame:** 1-2 weeks

**State Standards:** 5.4.12.D, G-K

**Essential content/objectives:** At end of the unit, students will be able to:
- Explain the relationship between method calls and arguments
- Use variable in expressions to calculate new results
- Understand the difference between methods and functions
- Implement visual effects and animation.

**Core Activities:** Students will complete/participate in the following:
- Scene Changes using Environment
- Scene Changes Using Lens Cap
- Bunny Eat Broccoli
- Simple Loops Assessment
- Lights Camera Action
- BDE Assessment

**Extensions:**
- Repetition Everywhere
- Repetition Assessment
- Simple Quiz
- Simple Quiz Assessment

**Remediation:**
- Tutoring
- Resubmission of previous programmed worlds

**Instructional Methods:**
- Direct instruction
- Guided and independent practice
- Projects

**Materials & Resources:**
- Computer, Internet, and Projector
- SMART Board
- Alice software
Assessments:

- Formative:
  - Observation
  - Multi-level questioning
  - Discussion, class assignments

- Summative:
  - Projects
Curriculum Scope & Sequence

Planned Course:  Introduction to Computer Programming

Unit:  Events and Event Handling

Time frame:  1-2 weeks

State Standards:  5.4.12.D, G-K

Essential content/objectives:  At end of the unit, students will be able to:
  ● Break down a program into smaller pieces by using objects and writing their own methods
  ● Explain the purpose of using parameters in writing programs
  ● Understand the need for writing your own function
  ● Write class-level functions.

Core Activities:  Students will complete/participate in the following:
  ● Changing Camera Views
  ● Checking for Collisions
  ● Click on Object to Answer
  ● Quiz Using Ask User
  ● Click on the Match

Extensions:
  ● Visual Lists
  ● Shark vs. TRex
  ● Making Billboards
  ● Let’s Play Catch
  ● What Can We Burn

Remediation:
  ● Tutoring
  ● Resubmission of previous programmed worlds

Instructional Methods:
  ● Direct instruction
  ● Guided and independent practice
  ● Projects

Materials & Resources:
  ● Computer, Internet, and Projector
  ● SMART Board
  ● Alice software
Assessments:

- Formative:
  - Observation
  - Multi-level questioning
  - Discussion, class assignments

- Summative:
  - Projects
Curriculum Scope & Sequence

**Planned Course:** Introduction to Computer Programming

**Unit:** Functions and If/Else

**Time frame:** 1-2 weeks

**State Standards:** 5.4.12.D, G-K

**Essential content/objectives:** At end of the unit, students will be able to:
- Identify the events that fire once and those that fire repeatedly
- Create events to respond to user input
- Understand the BDE event
- Explain how events make programs interactive
- Implement events to build sophisticated program code.

**Core Activities:** Students will complete/participate in the following:
- Restricting Events
- Animating Objects
- Playing Music
- Creating Poses
- Historical Tour
- Book Report

**Extensions:**
- Alice Buys a Scooter
- Stopwatch
- Countdown Timer
- Scorekeeper Object

**Remediation:**
- Tutoring
- Resubmission of previous programmed worlds

**Instructional Methods:**
- Direct instruction
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- Projects

**Materials & Resources:**
- Computer, Internet, and Projector
- SMART Board
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Assessments:

- Formative:
  - Observation
  - Multi-level questioning
  - Discussion, class assignments

- Summative:
  - Projects
Curriculum Scope & Sequence

**Planned Course:** Introduction to Computer Programming

**Unit:** Definite and Conditional Loops

**Time frame:** 1-2 weeks

**State Standards:** 5.4.12.D, G-K

**Essential content/objectives:** At end of the unit, students will be able to:
- Define events
- Use events to monitor conditions and variable changes
- Use relational operators for condition based decisions
- Determine Boolean results.

**Core Activities:** Students will complete/participate in the following:
- Fader Objects
- Scene Changes
- Visual Arrays
- Nonvisual Arrays
- Coloring Randomly
- Timer
- Simple Collision
- Advanced Collision

**Extensions:**
- Harry Potter Challenge
- Fun with Squares
- Tic-Tac-Toe Challenge
- Trigonometry Prom Challenge
- Calculator Game Challenge

**Remediation:**
- Tutoring
- Resubmission of previous programmed worlds

**Instructional Methods:**
- Direct instruction
- Guided and independent practice
- Projects

**Materials & Resources:**
- Computer, Internet, and Projector
- SMART Board
- Alice software
Assessments:

- **Formative:**
  - Observation
  - Multi-level questioning
  - Discussion, class assignments

- **Summative:**
  - Projects
Curriculum Scope & Sequence

**Planned Course:** Introduction to Computer Programming

**Unit:** Recursion

**Time frame:** 1-2 weeks

**State Standards:** 5.4.12.D, G-K

**Essential content/objectives:** At end of the unit, students will be able to:
- Demonstrate knowledge of logical operators to create complex situations
- Create nested if/else statements and loops
- Utilize while and loop statements
- Use control loop variable
- Recognize proper decision control statements
- Describe how to use recursion in a program.

**Core Activities:** Students will complete/participate in the following:
- Distance Challenge
- Boat Racing Challenge
- Asteroids

**Extensions:**
- Building the solar System
- Let’s Race Keyboarding Game
- Alice Pong

**Remediation:**
- Tutoring
- Resubmission of previous programmed worlds

**Instructional Methods:**
- Direct instruction
- Guided and independent practice
- Projects

**Materials & Resources:**
- Computer, Internet, and Projector
- SMART Board
- Alice software
Assessments:
● Formative:
  o Observation
  o Multi-level questioning
  o Discussion, class assignments
● Summative:
  o Projects
Curriculum Scope & Sequence

**Planned Course:**  Introduction to Computer Programming

**Unit:**  Lists and List Processing

**Time frame:**  1-2 weeks

**State Standards:**  5.4.12.D, G-K

**Essential content/objectives:**  At end of the unit, students will be able to:
- Create lists and arrays
- Modify lists and arrays
- Compare and contrast lists and arrays
- Use an array visualization object.

**Core Activities:**  Students will complete/participate in the following:
- Create a Boat Racing Game
- Treasure Hunt
- Piñata Game
- Wizard Game

**Extensions:**
- Cooking Show
- Line Up
- Bunny Eats Broccoli Exercise
- Coloring Randomly Exercise

**Remediation:**
- Tutoring
- Resubmission of previous programmed worlds

**Instructional Methods:**
- Direct instruction
- Guided and independent practice
- Projects

**Materials & Resources:**
- Computer, Internet, and Projector
- SMART Board
- Alice software

**Assessments:**
- Formative:
Board Approved
April 2018

- Multi-level questioning
- Discussion, class assignments

- **Summative:**
  - Projects

**Curriculum Scope & Sequence**

**Planned Course:** Introduction to Computer Programming
**Unit:** Variable and Inheritance

**Time frame:** 1-2 weeks

**State Standards:** 5.4.12.D, G-K

**Essential content/objectives:** At end of the unit, students will be able to:
- Develop list methods and functions
- Access elements stored in lists and arrays
- Change the contents of lists
- Randomly select an object in a list or array.

**Core Activities:** Students will complete/participate in the following:
- Timer Exercise
- Wizard Game Exercise
- Line Up Exercise
- Alice Final Project

**Extensions:**
- Free Program

**Remediation:**
- Tutoring
- Resubmission of previous programmed worlds

**Instructional Methods:**
- Direct instruction
- Guided and independent practice
- Projects

**Materials & Resources:**
- Computer, Internet, and Projector
- SMART Board
- Alice software

**Assessments:**
- **Formative:**
  - Observation
  - Multi-level questioning
  - Discussion, class assignments
- **Summative:**
  - Projects