

Board Approved August 2017

Department Applied Technology

Course JAVA Game Design

Week	Marking Period 1	Week	Marking Period 3
1	Introduction to Alice	21	Introduction to Greenfoot
2	Continue	22	Little Crab part 1
3	Program Design and Implementation	23	Continue
4	Continue	24	Fat Cat
5	Assemble of coded Objects	25	Fat Cat catches Pizza flying pizzas and slices
6	Continue	26	Finish the Crab game
7	Class, Objects, Methods and Parameters	27	Fat Cat looks for pizza if it avoid mean animal
8	Continue	28	Cool Cat plays the Piano
9	Continue	29	Making Music: On screen Piano
10	Events and Event Handling	30	Piano continue
Week	Marking Period 2	Week	Marking Period 4
11	Events and Event Handling	31	Interacting objects: Newton's Lab
12	continue	32	Shoot interactive full program
13	continue	33	Continue
14	Using Functions and Control Statements	34	Continue
15	continue	35	Asteroids
16	continue	36	Continue
17	continue	37	Continue
18	Definite and Conditional Loops	38	The Greeps Competition
19	continue	39	Continue
20	Final projects	40	Continue

Time Frame	Week 1 – Week 2					
Topics						
Introduction to Alice						
Enduring Questions						
What is Alice? Why do we learn how to program computers? What is a basic computer program and how is it structured? What is object-oriented/visual programming and what are it's key concepts?						
Enduring Understandings						
The idea and concept of basic program structure, content and use. How to construct programs using an object-oriented/visual programming language.						
Alignment to NJSLS						
TEC.9-12.8.1.12 TEC.9-12.8.2.12						
Key Concepts and Skills						
Defining what a computer program is and what are its intentions. Defining basic program design through technical writing and flowcharting. Debugging and what it means to correct a flawed program. Understanding and construction of Alice programming concepts : virtual world, objects and 3d models, three dimensions and six directions, center of an object, distance, position, animation.						
Learning Activities						
Technical writing activity. Hands-On programming with manipulative. Flowchart design and debugging project. Exploration and usage of Alice programming concepts.						
Assessments						
Completing exercise questions. Project, assignment and lab completion. Chapter assessment and chapter project/lab.						
21st Century Skills						
X	Creativity	X	Critical Thinking		Communication	Collaboration
X	Life & Career Skills	X	Information Literacy	X	Media Literacy	
Interdisciplinary Connections						
Connections with mathematics and business curriculum.						
Technology Integration						
Use of internet, A.I. toy cars, personal computer and various software resources.						

Time Frame	Week 2 – Week 4						
Topics							
Program Design and Implementation							
Enduring Questions							
How do we frame out the ideas of a computer program?							
What is a scenario and a story board and how do we use these tools to outline our idea?							
What are the differences between a visual and textual story board?							
What are the definitions and structures that make up a basic Alice program?							
What is the difference between <i>Do together</i> and <i>Do in order</i> ?							
Enduring Understandings							
The fundamental concepts of Alice programming.							
The ability to take an idea and design a story board from that scenario to create a program.							
The differences between sequential and simultaneous programming.							
Alignment to NJSL							
TEC.9-12.8.1.12							
TEC.9-12.8.2.12							
Key Concepts and Skills							
A scenario is a problem statement that defines the parameters of the program to be created.							
A story board can be visual or textual.							
A program consists of lines of code that specify the actions objects are to perform.							
The characters found in Alice are known as objects.							
Program code is structured in <i>Do in order</i> , <i>Do together</i> blocks or combinations of both.							
Complicated programs/animations can be comprised of smaller and simpler programs/animations.							
Learning Activities							
Scenario identification activity.							
Story board design and drawing project.							
In order or together discovery event.							
Vocabulary and concept comprehension exploration.							
Lesson exercises and questions followed by hands-on program creation/combination.							
Assessments							
At home learning activities.							
Completing exercise questions and activities.							
Project, assignment and lab completion.							
Chapter assessment and chapter project/lab.							
21st Century Skills							
X	Creativity	X	Critical Thinking		Communication	X	Collaboration
X	Life & Career Skills	X	Information Literacy	X	Media Literacy		
Interdisciplinary Connections							
Connections with industrial arts, electronics and robotics.							
Technology Integration							
Use of internet, personal computer and various software resources.							

Time Frame	Week 4 – Week 6						
Topics							
Programming: Assembly of Coded Objects							
Enduring Questions							
<p>What are the 4 different components that make up an Alice program? What is a function and how is it used? How do we use Boolean and conditional programming functions to control our programs? Are Loops necessary in modern programming?</p>							
Enduring Understandings							
<p>The ability to create more complex Alice programs using instruction statements, control structure, functions and expressions. The simplicity of Boolean functions and conditional statements. An understanding of code structure, loops and nested components to control flow and outcome.</p>							
Alignment to NJSL							
<p>TEC.9-12.8.1.12 TEC.9-12.8.2.12</p>							
Key Concepts and Skills							
<p>Functions can be used in Alice to ask questions about properties of the objects within its world. When a function is called it returns a specific and expected value. A Boolean function returns either true or false. An expression may use an arithmetic operation to compute a numeric value. An expression can be used conditional to produce a Boolean outcome. Conditional execution control structure in the form of an <i>if-else</i> can be used to direct program flow. Repetition of a control structure is called a loop.</p>							
Learning Activities							
<p>Exploration activity on the decision making process. Drawing project using electrical circuits to introduce conditional statements. Flowchart design and debugging exercises. Vocabulary and Algebra literacy exercises on arithmetic operators and Boolean statements. Exploration and usage of Alice programming concepts.</p>							
Assessments							
<p>Completing select chapter exercise questions. Project, assignment and lab completion. Participation and group idea presentation. Chapter assessment and chapter project/lab.</p>							
21st Century Skills							
X	Creativity	X	Critical Thinking	X	Communication	X	Collaboration
X	Life & Career Skills	X	Information Literacy	X	Media Literacy		
Interdisciplinary Connections							
Connections with mathematics, electronics and robotics.							
Technology Integration							
Use of switches, breadboard circuitry, internet, personal computer and various software resource							

Time Frame	Week 6 – Week 9						
Topics							
Classes, Objects, Methods and Parameters							
Enduring Questions							
<p>What are the basic programming components of an object-oriented language? How do we use Classes, Objects, Methods and Worlds in Alice? What two different Methods are possible in a programming environment? What is a parameter and how does it define a programs output? Can we pull all of our Alice information and create our own style of programming?</p>							
Enduring Understandings							
<p>A Class defines a particular Object, while a Method is a coordinated sequence of instructions to be carried out by the Object or the World level in general.. The understanding of how a parameter or multiple parameters control the programs input and boundaries to produce an expected outcome.</p>							
Alignment to NJSL							
<p>TEC.9-12.8.1.12 TEC.9-12.8.2.12</p>							
Key Concepts and Skills							
<p>Programs can effect an object directly or the entire world as a whole. To run(or execute) a method, the method must be called. Parameters are used for communication with a method.. A parameter must be declared and represent a value of a particular type. A new class can be created by defining class-level methods or inheritance.</p>							
Learning Activities							
<p>Step by step concept discovery exercises. Vocabulary and concept comprehension exploration. Long-term program development adding each new concept and control as it is discovered. Free short programming unit on student choice of topic combining all concepts acquired. Lesson exercises and questions followed by hands-on group program creation/combination.</p>							
Assessments							
<p>At home learning activities. Quiz on the interaction of Classes, Objects, Methods and parameters in Alice? Completing exercise questions and activities. Group project, assignment and lab completion. Chapter assessment and long term programming assignment.</p>							
21st Century Skills							
X	Creativity	X	Critical Thinking		Communication	X	Collaboration
	Life & Career Skills	X	Information Literacy		Media Literacy		
Interdisciplinary Connections							
Connections with mathematics curriculum.							
Technology Integration							
Use of internet, personal computer and various software resources.							

Time Frame	Week 10 – Week 13						
Topics							
Events and Event Handling							
Enduring Questions							
How does a programmer use interaction from the user to control the flow of programming? What is an Event , how is it handled and what are it's effects? Is incremental debugging and testing useful to the modern programmer?							
Enduring Understandings							
Creating Events of all types will allow a programmer to build more interesting worlds such as game animations and simulations. The Event Handler will control the action as well as the reaction to whatever input is required. The Event Editor handles debugging/testing of the many complicated events running in our programming environment.							
Alignment to NJSLs							
TEC.9-12.8.1.12 TEC.9-12.8.2.12							
Key Concepts and Skills							
An Event is something that happens. An Event is created by user input. Each time an Event occurs it's corresponding or reaction Event is carried out by the Event Handler. Incremental development means write and test small pieces of your program one at a time until completion. Incremental development is another debugging technique.							
Learning Activities							
Project: A real-life representation of an even and it's effects. This is followed by student research on actual computer events and their cause and effects. The project is completed with a presentation of a unique fiction event that require human input to be completed. Individual programming lab on the basic uses of Events and Event Handling. Partner vs. Incidental Development debugging techniques.							
Assessments							
Completion of Cause/Effect Project with presentation. Test on Vocabulary from (weeks 1 through 13) Completing exercise questions and activities. Individual program lab completion and debugging exercise. Chapter assessment and end of unit programming assignment.							
21st Century Skills							
X	Creativity	X	Critical Thinking		Communication	X	Collaboration
X	Life & Career Skills	X	Information Literacy		Media Literacy		
Interdisciplinary Connections							
Connections with mathematics, english and social studies curriculum.							
Technology Integration							
Use of internet, personal computer and various software resources.							

Time Frame	Week 14 – Week 17						
Topics							
Using Functions and Control Statements							
Enduring Questions							
<p>Will functions and control statements allow you to check certain conditions in a world while it is running?</p> <p>Can a function be used inside a method?</p> <p>What is a return statement and how can it be used to convey information?</p> <p>Are there more ways to use functions and boolean operators in different aspects of Alice programming?</p>							
Enduring Understandings							
<p>A function is similar to a method in the way that it is a collection of instructions.</p> <p>The if/else statement can be used to call a method.</p> <p>Every function must have a return statement.</p>							
Alignment to NJSL							
<p>TEC.9-12.8.1.12</p> <p>TEC.9-12.8.2.12</p>							
Key Concepts and Skills							
<p>An if statement is a block of program code that allows for the conditional execution of that code. If/else is used with many different function or control methods. An <i>if</i> is the question and a negative result to the question is the <i>else</i>.</p> <p>Function can be written to compute and return other values other than true or false.</p>							
Learning Activities							
<p>Exploration Activity: if/else function related to traffic problems.</p> <p>Project: the need to write your own function.</p> <p>Partner activity where one student is the function and the other is the return statement.</p> <p>Guided examples on using an if statement to control calling a method.</p> <p>Tips & Techniques quest to understand random number and random motion.</p> <p>Chapter projects and exercises.</p>							
Assessments							
<p>Completing exercise questions.</p> <p>Project, assignment and lab completion.</p> <p>Participation and partner work.</p> <p>Chapter assessment and chapter project/lab.</p>							
21st Century Skills							
X	Creativity	X	Critical Thinking	X	Communication	X	Collaboration
	Life & Career Skills		Information Literacy		Media Literacy		
Interdisciplinary Connections							
Technology Integration							
Use of internet, personal computer and various software resources.							

Time Frame	Week 17 – Week 20						
Topics							
Definite and Conditional Loops							
Enduring Questions							
Can a Loop be used for more than flow control? Are timers and counters useful in Alice programming? What are the dangers and pitfalls of nested loops?							
Enduring Understandings							
A counted loop allows you to specify exactly how many time a block of code will be repeated. A While statement is a loop that allows you to repeat a block of code depending upon true conditions not count. Definite and conditional loops can be very useful but can become complicated.							
Alignment to NJSL							
TEC.9-12.8.1.12 TEC.9-12.8.2.12							
Key Concepts and Skills							
The counted loop statement can be used to repeat instruction. A defined count is the key to the counted loop(if and while) statement. A count must be a positive whole number or infinity. A negative count will not run and an infinite count will run until program shut down. Loops can be nested in other loops.							
Learning Activities							
Guided examples on loops. Student practice on mini-programs using more than one loop and a counter. Group exercise on the executable computer virus(the never ending loop). Chapter projects and exercises.							
Assessments							
Mini-program presentation. Group project completion and presentation. Quiz on cumulative vocabulary acquired. Chapter assessment and chapter project/lab. Final project.							
21st Century Skills							
X	Creativity	X	Critical Thinking	X	Communication	X	Collaboration
	Life & Career Skills		Information Literacy		Media Literacy		
Interdisciplinary Connections							
Connections to business curriculum.							
Technology Integration							
Use of internet, personal computer and various software resources.							

Time Frame	1 Week						
Topic							
Introduction to Greenfoot							
Essential Questions							
What is the Greenfoot interface? How do objects interact with each other? How do you invoke methods? How do you run a scenario?							
Enduring Understandings							
Students will be able to read and understand a class diagram. Students will be able to add object into the world.							
Alignment to NJSLS							
<i>TEC.9-12.8.1.12</i>			<i>TEC.9-12.8.2.12</i>				
Key Concepts and Skills							
To understand the concepts of objects							
Learning Activities							
PowerPoint Exercise questions Asteroid Lab							
Assessments							
Exercise questions Worksheet Test/Quiz							
21st Century Skills							
x	Creativity	x	Critical Thinking	x	Communication	x	Collaboration
x	Life & Career Skills	x	Information Literacy	x	Media Literacy		
Interdisciplinary Connections							
Connection with Math and Business Curriculum							
Technology Integration							
Use of internet, personal commuter and various software resources							

Time Frame	2 Weeks						
Topic							
Little Crab							
Essential Questions							
How do you write code?							
How do you make a crab move?							
How do you make a crab move in a random position?							
How does the crab react when it reaches the end of the world?							
How does the programmer make the keyboard work?							
How does the programmer put sound into program?							
Enduring Understandings							
The concepts inheritance.							
How and when to use conditional statements.							
Return types for methods							
Alignment to NJSLS							
<i>TEC.9-12.8.1.12</i>			<i>TEC.9-12.8.2.12</i>				
Key Concepts and Skills							
Method Calls							
Parameters							
If-Statements							
Dot Notation							
Adding Objects							
Comments							
Learning Activities							
Little-Crab Lab							
Exercise questions							
PowerPoint							
Assessments							
Exercise questions							
Worksheet							
Test/Quiz							
21st Century Skills							
x	Creativity	x	Critical Thinking	x	Communication	x	Collaboration
x	Life & Career Skills	x	Information Literacy	x	Media Literacy		
Interdisciplinary Connections							
Connection with Math and Business Curriculum							
Technology Integration							
Use of internet, personal commuter and various software resources							

Time Frame	1.5 weeks						
Topic							
Fishing the Crab Game							
Essential Questions							
What is a constructor used for? How do you instantiate a constructor? How do you create new object? What is the proper method for assigning variables? How do you create a counter?							
Enduring Understandings							
The concept and the application of a class.							
Alignment to NJSLs							
<i>TEC.9-12.8.1.12</i>			<i>TEC.9-12.8.2.12</i>				
Key Concepts and Skills							
Constructor Instance variables Assignment The key work “new”. If-Else Statements							
Learning Activities							
Little Crab Lab Exercise questions PowerPoint							
Assessments							
Exercise questions Worksheet Test/Quiz							
21st Century Skills							
x	Creativity	x	Critical Thinking	x	Communication	x	Collaboration
x	Life & Career Skills	x	Information Literacy	x	Media Literacy		
Interdisciplinary Connections							
Connection with Math and Business Curriculum							
Technology Integration							
Use of internet, personal commuter and various software resources							

Time Frame	1 Week						
Topic							
Fat Cat							
Essential Questions							
Can students call methods?							
Can students use conditional statement?							
Enduring Understandings							
The concept of calling methods and writing conditional statement.							
Alignment to NJSL							
<i>TEC.9-12.8.1.12</i>				<i>TEC.9-12.8.2.12</i>			
Key Concepts and Skills							
Assignment							
The key work “new”.							
If-Else Statements							
Learning Activities							
Worksheet							
PowerPoint							
Assessments							
Exercise questions							
Worksheet							
Test/Quiz							
21st Century Skills							
x	Creativity	x	Critical Thinking	x	Communication	x	Collaboration
x	Life & Career Skills	x	Information Literacy	x	Media Literacy		
Interdisciplinary Connections							
Connection with Math and Business Curriculum							
Technology Integration							
Use of internet, personal computer and various software resources							

Time Frame	1 Week						
Topic							
Fat Cat catching flying pizza's slices							
Essential Questions							
Can the students use keyboard to control the object?							
Can the students randomize the behavior?							
Enduring Understandings							
To use methods.							
To control objects using the keyboard.							
To use random movement.							
Alignment to NJSLS							
<i>TEC.9-12.8.1.12</i>				<i>TEC.9-12.8.2.12</i>			
Key Concepts and Skills							
keyboard control, methods, constructors, random, image switching							
Learning Activities							
Worksheet							
PowerPoint							
Assessments							
Exercise questions							
Worksheet							
Test/Quiz							
21st Century Skills							
x	Creativity	x	Critical Thinking	x	Communication	x	Collaboration
x	Life & Career Skills	x	Information Literacy	x	Media Literacy		
Interdisciplinary Connections							
Connection with Math and Business Curriculum							
Technology Integration							
Use of internet, personal commuter and various software resources							

Time Frame	1 Week						
Topic							
Fat Cat looks from pizza if it avoid mean animal.							
Essential Questions							
Can students use inheritance to create another animal.							
Can student use conditional statements?							
Enduring Understandings							
Inheritance							
Instance Variable							
Alignment to NJSLs							
<i>TEC.9-12.8.1.12</i>			<i>TEC.9-12.8.2.12</i>				
Key Concepts and Skills							
method call							
method definition							
sequence of statements							
if-statement							
instance variables							
Learning Activities							
Worksheet							
PowerPoint							
Assessments							
Exercise questions							
Worksheet							
Test/Quiz							
21st Century Skills							
x	Creativity	x	Critical Thinking	x	Communication	x	Collaboration
x	Life & Career Skills	x	Information Literacy	x	Media Literacy		
Interdisciplinary Connections							
Connection with Math and Business Curriculum							
Technology Integration							
Use of internet, personal commuter and various software resources							

Time Frame	1 Week						
Topic							
Cool Cat plays the Piano							
Essential Questions							
Can the students write a loop to repeat code?							
Enduring Understandings							
Method calls							
Alignment to NJSLS							
<i>TEC.9-12.8.1.12</i>			<i>TEC.9-12.8.2.12</i>				
Key Concepts and Skills							
For Loops							
Learning Activities							
Worksheet PowerPoint							
Assessments							
Exercise questions Worksheet Test/Quiz							
21st Century Skills							
x	Creativity	x	Critical Thinking	x	Communication	x	Collaboration
x	Life & Career Skills	x	Information Literacy	x	Media Literacy		
Interdisciplinary Connections							
Connection with Math and Business Curriculum							
Technology Integration							
Use of internet, personal commuter and various software resources							

Time Frame	3 Weeks						
Topic							
Arrays							
Essential Questions							
How is an array declared? How is data put into the array? What is an initializer list? What is an ArrayIndexOutOfBoundsException? What is the different between an array and a two-dimensional array?							
Enduring Understandings							
Arrays are used to store data. Arrays can hold primitive data and objects. An array can only hold one type of data. Arrays are zero based.							
Alignment to NJSLs							
<i>TEC.9-12.8.1.12</i>			<i>TEC.9-12.8.2.12</i>				
Key Concepts and Skills							
For loops Declaring variables							
Learning Activities							
Labs 6.1, 6.7 on page 315 Exercise questions PowerPoint							
Assessments							
Exercise questions Test/Quiz							
21st Century Skills							
x	Creativity	x	Critical Thinking	x	Communication	x	Collaboration
x	Life & Career Skills	x	Information Literacy	x	Media Literacy		
Interdisciplinary Connections							
Connection with Math and Business Curriculum							
Technology Integration							
Use of internet, personal commuter and various software resources							

Time Frame	1.5 Weeks						
Topic							
Making Music: An on-screen piano							
Essential Questions							
How does the mouse click activate the piano button to push down?							
How does the program know what note to play?							
How is an array used to hold the notes of the piano button?							
Enduring Understandings							
Strings are objects that can be used as a single variable.							
Array can hold object that are string.							
Logical operators are used to combine multiple Boolean statements.							
Alignment to NJSLS							
<i>TEC.9-12.8.1.12</i>				<i>TEC.9-12.8.2.12</i>			
Key Concepts and Skills							
Abstraction							
Loops							
Arrays							
While Loops							
Learning Activities							
Piano Lab							
Exercise questions							
PowerPoint							
Assessments							
Exercise questions							
Worksheet							
Test/Quiz							
21st Century Skills							
x	Creativity	x	Critical Thinking	x	Communication	x	Collaboration
x	Life & Career Skills	x	Information Literacy	x	Media Literacy		
Interdisciplinary Connections							
Connection with Math and Business Curriculum							
Technology Integration							
Use of internet, personal commuter and various software resources							

Time Frame	1 Week						
Topic							
Interacting objects: Newton's Lab							
Essential Questions							
How the keyword "this" is used for identifying a class variable or a constructor.							
How do you use a method from different classes?							
What is the difference between a private or public method?							
How do you apply gravitational pull to an object?							
Enduring Understandings							
The for-each loop is suited to process all elements of a collection.							
Classes can access and use other method for different classes.							
A List is an example of a collection.							
Alignment to NJSLs							
<i>TEC.9-12.8.1.12</i>			<i>TEC.9-12.8.2.12</i>				
Key Concepts and Skills							
List							
For-Each loop							
Private Methods							
Public Methods							
Learning Activities							
Newton's Lab							
Exercise questions							
PowerPoint							
Assessments							
Exercise questions							
Worksheet							
Test/Quiz							
21st Century Skills							
x	Creativity	x	Critical Thinking	x	Communication	x	Collaboration
x	Life & Career Skills	x	Information Literacy	x	Media Literacy		
Interdisciplinary Connections							
Connection with Math and Business Curriculum							
Technology Integration							
Use of internet, personal commuter and various software resources							

Time Frame	3 Weeks						
Topic							
Asteriods							
Essential Questions							
How does the rocket turn?							
How does the rocket fly forward?							
How does the proton wave work?							
Why does the asteroid hit the rocket when appears to just miss the rocket?							
How is casting used to get the scoreboard to work?							
Enduring Understandings							
The object in the Asteroids work hold rectangular shape.							
Alignment to NJSLS							
<i>TEC.9-12.8.1.12</i>			<i>TEC.9-12.8.2.12</i>				
Key Concepts and Skills							
Collections							
For Loops							
For-Each Loops							
Casting							
Learning Activities							
Asteroids Lab							
Exercise questions							
PowerPoint							
Assessments							
Exercise questions							
Worksheet							
Test/Quiz							
21st Century Skills							
x	Creativity	x	Critical Thinking	x	Communication	x	Collaboration
x	Life & Career Skills	x	Information Literacy	x	Media Literacy		
Interdisciplinary Connections							
Connection with Math and Business Curriculum							
Technology Integration							
Use of internet, personal commuter and various software resources							

Time Frame	3 Weeks						
Topic							
The Greeps Competition							
Essential Questions							
What direction does a Greep move?							
What happens when a Greep encounter water?							
How does a Greep know when it is at a tomato pile?							
Enduring Understandings							
Greeps are not intelligent.							
Greeps can only perform limited movement.							
Greeps need to be told and prepared for anything they may encounter,							
Alignment to NJSLS							
<i>TEC.9-12.8.1.12</i>				<i>TEC.9-12.8.2.12</i>			
Key Concepts and Skills							
If statements							
Calling methods							
How to access random values							
Learning Activities							
Greeps competition							
Assessments							
Seven additional maps							
21st Century Skills							
x	Creativity	x	Critical Thinking	x	Communication	x	Collaboration
x	Life & Career Skills	x	Information Literacy	x	Media Literacy		
Interdisciplinary Connections							
Connection with Math and Business Curriculum							
Technology Integration							
Use of internet, personal commuter and various software resources							