



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

DEPARTMENT Mathematics COURSE Game Design

Curriculum Development Timeline

School: Ocean Township High School

Course: Game Design

Department: Mathematics

Board Approval	Supervisor	Notes
August 2013	Janet Bluefield	Born Date
August 2017	Nichole Kerney	Revisions
August 2019	Nichole Kerney	Review
August 2022	Gerard Marrone	Alignment to Standards

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DEPARTMENT Mathematics COURSE Game Design

Township of Ocean Pacing Guide			
Week	Marking Period 1	Week	Marking Period 3
1	Introduction to Alice	11	Introduction to Greenfoot
2	Programming: Assemble of Coded Objects	12	Programming with Greenfoot
3	Class, Objects, Methods and Parameters	13	Programming with Greenfoot
4	Class, Objects, Methods and Parameters	14	Programming with Greenfoot
5	Events and Event Handling	15	Arrays
Week	Marking Period 2	Week	Marking Period 4
6	Events and Event Handling	16	Arrays
7	Using Functions and Control Statements	17	Interacting objects: Newton's Lab and Asteroids
8	Using Functions and Control Statements	18	Interacting objects: Newton's Lab and Asteroids
9	Definite and Conditional Loops	19	The Greeps Competition
10	Definite and Conditional Loops	20	The Greeps Competition

Core Instructional & Supplemental Materials including various levels of Texts

Textbooks: Greenfoot, Pearson Prentice Hall and Learning to Program with Alice
Supplemental: Computer software and Labs associated with the textbook.

Time Frame	1 Week (5 blocks)
Topic	

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DEPARTMENT Mathematics

COURSE Game Design

Introduction to Alice

Alignment to Standards

8.1.12.AP.9, 8.1.12.AP.6, 8.1.12.DA.4, 8.1.12.AP.1, 8.1.12.CS.1, 8.1.12.DA.2,
RS.9-10.4, RST.11-12.4

Learning Objectives and Activities

SWBAT answer the following 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 its key concepts?
- How do we frame out the idea of a computer program?
- What is a scenario and a storyboard and how do we use these tools to outline our idea?
- What are the differences between a visual and textual storyboard?
- What are the definitions and structures that make up a basic Alice program?
- What is the difference between Do together and Do in order?

SWBAT demonstrate understanding of the following:

- The idea and concept of basic program structure, content and use.
- How to construct programs using an object-oriented/visual programming language.
- The fundamental concepts of Alice programming.
- The ability to take an idea and design a storyboard from that scenario to create a program.
- The differences between sequential and simultaneous programming.

Learning Activities:

- Technical writing activity.
- Hands-On programming with manipulative.
- Flowchart design and debugging project.
- Exploration and usage of Alice programming concepts.
- Scenario identification activity.
- Storyboard 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

Formative:

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DEPARTMENT Mathematics

COURSE Game Design

- Classwork
- Teacher Observation
- Class Debate of Approaches

Summative:

- Project and lab completion

Alternative:

- Individual or group productive struggle assessment during introductory lessons

Interdisciplinary Connections

ELA:

RST.9-10.3: Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.

RST.9-10.4: Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9-10 texts and topics.

WHST.9-10.6: Use technology, including the Internet, to produce, share, and update writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.

CS&DT: 8.1.12.DA.1: Create interactive data visualizations using software tools to help others better understand real world phenomena, including climate change.

Career Readiness, Life Literacies, and Key Skills

9.2.12.CAP.3: Investigate how continuing education contributes to one's career and personal growth.

9.2.12.CAP.4: Evaluate different careers and develop various plans (e.g. costs of public, private, training schools) and timetables for achieving them, including educational/training requirements, costs, loans, and debt repayment.

9.2.12.CAP.5: Assess and modify a personal plan to support current interests and postsecondary plans.

9.2.12.CAP.6: Identify transferable skills in career choices and design alternative career plans based on those skills.

9.2.12.CAP.7: Use online resources to examine licensing, certification, and credentialing requirements at the local, state, and national levels to maintain compliance with industry requirements in areas of career interest.

9.2.12.CAP.8: Determine job entrance criteria (e.g., education credentials, math/writing/reading comprehension tests, drug tests) used by employers in various industry sectors.

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9.3.IT-PRG-6: Program a computer application using the appropriate programming language.

9.3.IT-WD.4: Design, create and publish a digital communication product based on customer needs.

9.3.ST.2: Use technology to acquire, manipulate, analyze and report data.

9.3.ST-SM.1: Apply science and mathematics to provide results, answers and algorithms for engineering and technological activities.

Technology Integration

All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaboratively and to create and communicate knowledge.

- 9.4.8.TL.6: Collaborate to develop and publish work that provides perspectives on a real-world problem.

Students will access computer software programs to further investigate lesson concepts and demonstrate understanding of standards.

- 9.4.8.TL.3: Select appropriate tools to organize and present information digitally.

Students will use internet based game sites such as Quizizz, Kahoot and Quizlet live to reflect on their learning progress.

- 9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems.

Additional resources and extension activities will be posted on Google Classroom in order to encourage students to reflect on their learning and expand on their knowledge.

- 9.4.12.TL.4: Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem.

Career Education

CRP4: Communicate clearly and effectively with reason.

CRP6: Demonstrate creativity and innovation.

CRP8: Utilize critical thinking to make sense of problems and persevere in solving them.

CRP11: Use technology to enhance productivity.

Time Frame

1 Week (5 blocks)

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DEPARTMENT Mathematics COURSE Game Design

Topic
Programming: Assembly of Coded Objects
Alignment to Standards
8.1.12.AP.9, 8.1.12.AP.6, 8.1.12.DA.4, 8.1.12.AP.1, 8.1.12.CS.1, 8.1.12.DA.2, RS.9-10.4, RST.11-12.4, 9.4.12.CT.1, 9.4.12.CT.2, 9.4.12.CT.3
Learning Objectives and Activities
<p>SWBAT answer the following questions:</p> <ul style="list-style-type: none">• 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>SWBAT demonstrate understanding of the following:</p> <ul style="list-style-type: none">• 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>Learning Activities:</p> <ul style="list-style-type: none">• 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.
Assessments
<p><u>Formative:</u></p> <ul style="list-style-type: none">• Daily Practice Problems• Teacher Observation• Entrance/Exit Cards <p><u>Summative:</u></p> <ul style="list-style-type: none">• Project and lab completion <p><u>Alternative:</u></p>

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COURSE Game Design

- Observation Assessment

Interdisciplinary Connections

ELA:

RST.9-10.4: Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9-10 texts and topics.

WHST.9-10.6: Use technology, including the Internet, to produce, share, and update writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.

Career Readiness, Life Literacies, and Key Skills

9.3.IT-PRG-6: Program a computer application using the appropriate programming language.

9.3.IT-WD.4: Design, create and publish a digital communication product based on customer needs.

9.3.ST.4 Understand the nature and scope of the Science, Technology, Engineering & Mathematics Career Cluster and the role of STEM in society and the economy.

9.3.ST-SM.2: Apply science and mathematics concepts to the development of plans, processes and projects that address real world problems.

Technology Integration

All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaboratively and to create and communicate knowledge.

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Additional resources and extension activities will be posted on Google Classroom in order to encourage students to reflect on their learning and expand on their

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DEPARTMENT Mathematics COURSE Game Design

knowledge.

- 9.4.12.TL.4: Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem.

Career Education

CRP4: Communicate clearly and effectively with reason.

CRP8: Utilize critical thinking to make sense of problems and persevere in solving them.

CRP11: Use technology to enhance productivity.

Time Frame	2 Weeks (10 blocks)
Topic	
Classes, Objects, Methods, and Parameters	
Alignment to Standards	
8.1.12.AP.9, 8.1.12.AP.6, 8.1.12.DA.4, 8.1.12.AP.1, 8.1.12.CS.1, 8.1.12.DA.2, RS.9-10.4, RST.11-12.4, 9.4.12.CT.1, 9.4.12.CT.2, 9.4.12.CT.3	
Learning Objectives and Activities	
<p>SWBAT answer the following questions:</p> <ul style="list-style-type: none"> • 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>SWBAT demonstrate understanding of the following:</p> <ul style="list-style-type: none"> • 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>Learning Activities:</p> <ul style="list-style-type: none"> • Step by step concept discovery exercises. • Vocabulary and concept comprehension exploration. • Long-term program development adding each new concept and control as it is 	

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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.

Assessments

Formative:

- Classwork
- Class Debate of Approaches
- Entrance/Exit Cards

Summative:

- Project and lab completion

Alternative:

- Individual or group productive struggle assessment during introductory lessons

Interdisciplinary Connections

ELA:

RST.9-10.3: Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.

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Career Readiness, Life Literacies, and Key Skills

9.3.IT-PRG-5: Apply an appropriate software development process to design a software application.

9.3.IT-PRG-6: Program a computer application using the appropriate programming language.

9.3.IT-WD.4: Design, create and publish a digital communication product based on customer needs.

9.3.ST.4: Understand the nature and scope of the Science, Technology, Engineering & Mathematics Career Cluster and the role of STEM in society and the economy

9.3.ST.6: Demonstrate technical skills needed in a chosen STEM field.

Technology Integration

All students will use digital tools to access, manage, evaluate, and synthesize

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information in order to solve problems individually and collaboratively and to create and communicate knowledge.

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Career Education

CRP6: Demonstrate creativity and innovation.

CRP8: Utilize critical thinking to make sense of problems and persevere in solving them.

CRP11: Use technology to enhance productivity.

Time Frame	2 Weeks (10 blocks)
Topic	
Events and Event Handling	
Alignment to Standards	
8.1.12.AP.9, 8.1.12.AP.6, 8.1.12.AP.7, 8.1.12.DA.4, 8.1.12.AP.1, 8.1.12.CS.1, 8.1.12.DA.2, RS.9-10.4, RST.11-12.4, 9.4.12.CT.1, 9.4.12.CT.2, 9.4.12.CT.3	
Learning Objectives and Activities	
SWBAT answer the following questions:	
<ul style="list-style-type: none"> • How does a programmer use interaction from the user to control the flow of 	

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programming?

- What is an Event, how is it handled and what are its effects?
- Is incremental debugging and testing useful to the modern programmer?

SWBAT demonstrate understanding of the following:

- 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.

Learning Activities:

- Incremental development is another debugging technique.
- Project: A real-life representation of an even and its effects. This is followed by student research on actual computer events and their causes 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

Formative:

- Classwork
- Teacher Observation

Summative:

- Project and lab completion

Alternative:

- Individual or group productive struggle assessment during introductory lessons

Interdisciplinary Connections

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and to display information flexibly and dynamically.

Career Readiness, Life Literacies, and Key Skills

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Technology Integration

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Career Education

CRP8: Utilize critical thinking to make sense of problems and persevere in solving them.

CRP11: Use technology to enhance productivity.

Time Frame

2 Weeks (10 blocks)

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Topic
Using Functions and Control Statements
Alignment to Standards
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Learning Objectives and Activities
<p>SWBAT answer the following questions:</p> <ul style="list-style-type: none">• Will functions and control statements allow you to check certain conditions in a world while it is running?• Can a function be used inside a method?• What is a return statement and how can it be used to convey information?• Are there more ways to use functions and Boolean operators in different aspects of Alice programming? <p>SWBAT demonstrate understanding of the following:</p> <ul style="list-style-type: none">• A function is similar to a method in the way that it is a collection of instructions.• The if/else statement can be used to call a method.• Every function must have a return statement. <p>Learning Activities:</p> <ul style="list-style-type: none">• Exploration Activity: if/else function related to traffic problems.• Project: the need to write your own function.• Partner activity where one student is the function and the other is the return statement.• Guided examples on using an if statement to control calling a method.• Tips & Techniques quest to understand random number and random motion.• Chapter projects and exercises.
Assessments
<p><u>Formative:</u></p> <ul style="list-style-type: none">• Teacher Observation• Class Debate of Approaches• Entrance/Exit Cards <p><u>Summative:</u></p> <ul style="list-style-type: none">• Project and lab completion <p><u>Alternative:</u></p> <ul style="list-style-type: none">• Observation Assessment

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COURSE Game Design

Interdisciplinary Connections

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Career Readiness, Life Literacies, and Key Skills

9.3.IT-PRG-6- Program a computer application using the appropriate programming language.

9.3.IT-WD.4: Design, create and publish a digital communication product based on customer needs.

9.3.ST-SM.2: Apply science and mathematics concepts to the development of plans, processes and projects that address real world problems.

9.3.ST.4: Understand the nature and scope of the Science, Technology, Engineering & Mathematics Career Cluster and the role of STEM in society and the economy.

Technology Integration

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Career Education

CRP4: Communicate clearly and effectively with reason.

CRP8: Utilize critical thinking to make sense of problems and persevere in solving them.

CRP11: Use technology to enhance productivity.

Time Frame	2 Weeks (10 blocks)
Topic	
Definite and Conditional Loops	
Alignment to Standards	
8.1.12.AP.9, 8.1.12.AP.6, 8.1.12.AP.7, 8.1.12.DA.4, 8.1.12.AP.1, 8.1.12.CS.1, 8.1.12.DA.2, RS.9-10.4, RST.11-12.4, 9.4.12.CT.1, 9.4.12.CT.2, 9.4.12.CT.3	
Learning Objectives and Activities	
<p>SWBAT answer the following questions:</p> <ul style="list-style-type: none"> • 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? <p>SWBAT demonstrate understanding of the following:</p> <ul style="list-style-type: none"> • A counted loop allows you to specify exactly how many times 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. <p>Learning Activities:</p> <ul style="list-style-type: none"> • 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	

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Formative:

- Daily Practice Problems
- Teacher Observation
- Entrance/Exit Cards

Summative:

- Project and lab completion

Alternative:

- Observation Assessment

Interdisciplinary Connections

ELA:

RST.9-10.4: Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9-10 texts and topics.

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Career Readiness, Life Literacies, and Key Skills

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9.3.IT-PRG-6: Program a computer application using the appropriate programming language.

9.3.IT-WD.4: Design, create and publish a digital communication product based on customer needs.

9.3.ST.6: Demonstrate technical skills needed in a chosen STEM field.

Technology Integration

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Additional resources and extension activities will be posted on Google Classroom in order to encourage students to reflect on their learning and expand on their knowledge.

- 9.4.12.TL.4: Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem.

Career Education

CRP8: Utilize critical thinking to make sense of problems and persevere in solving them.

CRP11: Use technology to enhance productivity.

Time Frame	1 Week (5 blocks)
Topic	
Introduction to Greenfoot	
Alignment to Standards	
8.1.12.AP.9, 8.1.12.AP.6, 8.1.12.DA.4, 8.1.12.AP.1, 8.1.12.CS.1, 8.1.12.DA.2, RS.9-10.4, RST.11-12.4, 9.4.12.CT.1, 9.4.12.CT.2, 9.4.12.CT.3	
Learning Objectives and Activities	
<p>SWBAT answer the following questions:</p> <ul style="list-style-type: none"> • What is the Greenfoot interface? • How do objects interact with each other? • How do you invoke methods? • How do you run a scenario? <p>SWBAT demonstrate understanding of the following:</p> <ul style="list-style-type: none"> • Students will be able to read and understand a class diagram. • Students will be able to add objects into the world. <p>Learning Activities:</p> <ul style="list-style-type: none"> • To understand the concepts of objects 	

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Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

DEPARTMENT Mathematics

COURSE Game Design

- PowerPoint
- Exercise questions
- Asteroid Lab

Assessments

Formative:

- Daily Practice Problems
- Teacher Observation
- Class Debate of Approaches

Summative:

- Project and lab completion

Alternative:

- Individual or group productive struggle assessment during introductory lessons

Interdisciplinary Connections

ELA:

RST.9-10.4: Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9-10 texts and topics.

Career Readiness, Life Literacies, and Key Skills

9.3.IT-PRG-6: Program a computer application using the appropriate programming language.

9.3.IT-WD.4: Design, create and publish a digital communication product based on customer needs.

9.3.ST-SM.1: Apply science and mathematics to provide results, answers and algorithms for engineering and technological activities.

9.3.ST.2: Use technology to acquire, manipulate, analyze and report data.

Technology Integration

All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaboratively and to create and communicate knowledge.

- 9.4.8.TL.6: Collaborate to develop and publish work that provides perspectives on a real-world problem.

Students will access computer software programs to further investigate lesson concepts and demonstrate understanding of standards.

- 9.4.8.TL.3: Select appropriate tools to organize and present information

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DEPARTMENT Mathematics COURSE Game Design

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Students will use internet based game sites such as Quizizz, Kahoot and Quizlet live to reflect on their learning progress.

- 9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems.

Additional resources and extension activities will be posted on Google Classroom in order to encourage students to reflect on their learning and expand on their knowledge.

- 9.4.12.TL.4: Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem.

Career Education

CRP4: Communicate clearly and effectively with reason.

CRP6: Demonstrate creativity and innovation.

CRP8: Utilize critical thinking to make sense of problems and persevere in solving them.

CRP11: Use technology to enhance productivity.

Time Frame	3 Weeks (15 blocks)
Topic	
Programming with Greenfoot	
Alignment to Standards	
8.1.12.AP.9, 8.1.12.AP.6, 8.1.12.DA.4, 8.1.12.AP.1, 8.1.12.CS.1, 8.1.12.DA.2, RS.9-10.4, RST.11-12.4, 9.4.12.CT.1, 9.4.12.CT.2, 9.4.12.CT.3	
Learning Objectives and Activities	
<p>SWBAT answer the following questions:</p> <ul style="list-style-type: none"> • How do you write code? • How do you make a crab move and 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? • What is a constructor used for and how do you instantiate? • How do you create new object? 	

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DEPARTMENT Mathematics COURSE Game Design

- What is the proper method for assigning variables?
- How do you create a counter?
- Can students call methods?
- Can the students use keyboard to control the object?
- Why would you randomize the behavior?
- Can students use conditional statements?

SWBAT demonstrate understanding of the following:

- Use inheritance to create another animal.
- The concept and the application of a class.
- The concept of calling methods and writing conditional statement.
- You can control objects using the keyboard.
- Writing a loop allows you to repeat code.

Learning Activities:

- Little-Crab Lab
- Exercise questions
- PowerPoint
- Worksheet
- Fat Cat Lab

Assessments

Formative:

- Classwork
- Teacher Observation
- Class Debate of Approaches
- Entrance/Exit Cards

Summative:

- Project and lab completion

Alternative:

- Observation Assessment

Interdisciplinary Connections

ELA:

RST.9-10.3: Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.

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DEPARTMENT Mathematics

COURSE Game Design

WHST.9-10.6: Use technology, including the Internet, to produce, share, and update writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.

Career Readiness, Life Literacies, and Key Skills

9.3.IT-PRG-6: Program a computer application using the appropriate programming language.

9.3.IT-WD.4: Design, create and publish a digital communication product based on customer needs.

9.3.ST-SM.2: Apply science and mathematics concepts to the development of plans, processes and projects that address real world problems.

9.3.ST.4 Understand the nature and scope of the Science, Technology, Engineering & Mathematics Career Cluster and the role of STEM in society and the economy.

Technology Integration

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DEPARTMENT Mathematics COURSE Game Design

them.

CRP11: Use technology to enhance productivity.

Time Frame	2 Weeks (10 blocks)
Topic	
Arrays	
Alignment to Standards	
8.1.12.AP.9, 8.1.12.AP.6, 8.1.12.DA.4, 8.1.12.AP.1, 8.1.12.CS.1, 8.1.12.DA.2, RS.9-10.4, RST.11-12.4, 9.4.12.CT.1, 9.4.12.CT.2, 9.4.12.CT.3	
Learning Objectives and Activities	
<p>SWBAT answer the following questions:</p> <ul style="list-style-type: none">• How is an array declared?• How is data put into the array?• What is an initializer list?• What is an Array Index Out Of Bounds Exception?• What is the difference between an array and a two-dimensional array?• 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? <p>SWBAT demonstrate understanding of the following:</p> <ul style="list-style-type: none">• Arrays are used to store data and can hold primitive data/objects.• An array can only hold one type of data.• Arrays are zero based.• Strings are objects that can be used as a single variable.• Array can hold objects that are string.• Logical operators are used to combine multiple Boolean statements. <p>Learning Activities:</p> <ul style="list-style-type: none">• Labs 6.1, 6.7 on page 315• Exercise questions• PowerPoint• Piano Lab	

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DEPARTMENT Mathematics

COURSE Game Design

Assessments

Formative:

- Teacher Observation
- Entrance/Exit Cards

Summative:

- Project and lab completion

Alternative:

- Observation Assessment

Interdisciplinary Connections

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DEPARTMENT Mathematics COURSE Game Design

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Career Education

CRP4: Communicate clearly and effectively with reason.

CRP11: Use technology to enhance productivity.

Time Frame	2 Weeks (10 blocks)
Topic	
Interacting Objects: Newton's Lab and Asteroids	
Alignment to Standards	
8.1.12.AP.9, 8.1.12.AP.6, 8.1.12.DA.4, 8.1.12.AP.1, 8.1.12.CS.1, 8.1.12.DA.2, RS.9-10.4, RST.11-12.4, 9.4.12.CT.1, 9.4.12.CT.2, 9.4.12.CT.3	
Learning Objectives and Activities	
<p>SWBAT answer the following questions:</p> <ul style="list-style-type: none"> • 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? • 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? 	

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SWBAT demonstrate understanding of the following:

- The for-each loop is suited to process all elements of a collection.
- Classes can access and use other methods for different classes.
- The object in the Asteroids work hold rectangular shape.

Learning Activities:

- Newton's Lab
- Exercise questions
- PowerPoint
- Asteroids Lab
- Exercise questions
- PowerPoint

Assessments

Formative:

- Classwork
- Teacher Observation

Summative:

- Project and lab completion

Alternative:

- Individual or group productive struggle assessment during introductory lessons

Interdisciplinary Connections

ELA:

WHST.9-10.6: Use technology, including the Internet, to produce, share, and update writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.

Career Readiness, Life Literacies, and Key Skills

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Technology Integration

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COURSE Game Design

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- 9.4.12.TL.4: Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem.

Career Education

CRP4: Communicate clearly and effectively with reason.

CRP8: Utilize critical thinking to make sense of problems and persevere in solving them.

CRP11: Use technology to enhance productivity.

Time Frame	2 Weeks (10 blocks)
Topic	
The Greeps Competition	
Alignment to Standards	
8.1.12.AP.9, 8.1.12.AP.6, 8.1.12.DA.4, 8.1.12.AP.1, 8.1.12.CS.1, 8.1.12.DA.2, RS.9-10.4, RST.11-12.4, 9.4.12.CT.1, 9.4.12.CT.2, 9.4.12.CT.3	
Learning Objectives and Activities	
SWBAT answer the following questions:	

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COURSE Game Design

- 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?

SWBAT demonstrate understanding of the following:

- Greeps are not intelligent and can only perform limited movement.
- Greeps need to be told and prepared for anything they may encounter.

Learning Activities:

- If statements
- Calling methods
- How to access random values
- Greeps competition

Assessments

Formative:

- Classwork
- Daily Practice Problems
- Teacher Observation
- Class Debate of Approaches

Summative:

- Project and lab completion

Benchmark:

- Cumulative Final Project

Alternative:

- Observation Assessment
- Individual or group productive struggle assessment during introductory lessons

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COURSE Game Design

Career Readiness, Life Literacies, and Key Skills

9.2.12.CAP.3: Investigate how continuing education contributes to one's career and personal growth.

9.2.12.CAP.4: Evaluate different careers and develop various plans (e.g. costs of public, private, training schools) and timetables for achieving them, including educational/training requirements, costs, loans, and debt repayment.

9.2.12.CAP.5: Assess and modify a personal plan to support current interests and postsecondary plans.

9.2.12.CAP.6: Identify transferable skills in career choices and design alternative career plans based on those skills.

9.2.12.CAP.7: Use online resources to examine licensing, certification, and credentialing requirements at the local, state, and national levels to maintain compliance with industry requirements in areas of career interest.

9.2.12.CAP.8: Determine job entrance criteria (e.g., education credentials, math/writing/reading comprehension tests, drug tests) used by employers in various industry sectors.

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Modifications (ELL, Special Education, At Risk Students, Gifted & Talented, & 504 Plans)

ELL:

- Work toward longer passages as skills in English increase
- Use visuals
- Introduce key vocabulary before lesson
- Teacher models reading aloud daily
- Provide peer tutoring
- Use of Bilingual Dictionary
- Guided notes and/or scaffold outline for written assignments
- Provide students with English Learner leveled readers.

Supports for Students With IEPs:

- Allow extra time to complete assignments or tests
- Guided notes and/or scaffold outline for written assignments
- Work in a small group
- Allow answers to be given orally or dictated
- Use large print books, Braille, or books on CD (digital text)
- Follow all IEP modifications

At-Risk Students:

- Guided notes and/or scaffold outline for written assignments
- Introduce key vocabulary before lesson
- Work in a small group

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- Lesson taught again using a differentiated approach
- Allow answers to be given orally or dictated
- Use visuals / Anchor Charts
- Leveled texts according to ability

Gifted and Talented:

- Create an enhanced set of introductory activities (e.g. advance organizers, concept maps, concept puzzles)
- Provide options, alternatives and choices to differentiate and broaden the curriculum
- Organize and offer flexible small group learning activities
- Provide whole group enrichment explorations
- Teach cognitive and methodological skills
- Use center, stations, or contracts
- Organize integrated problem-solving simulations
- Propose interest-based extension activities
- Expose students to beyond level texts.

Supports for Students With 504 Plans:

- Follow all the 504 plan modifications
- Text to speech/audio recorded selections
- Amplification system as needed
- Leveled texts according to ability
- Fine motor skill stations embedded in rotation as needed
- Modified or constrained spelling word lists
- Provide anchor charts with high frequency words and phonemic patterns

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