



PISCATAWAY TOWNSHIP SCHOOLS

Teresa M. Rafferty
Superintendent of Schools

Dr. Frank Ranelli
Assistant Superintendent

Introduction to Programming

Content Area: 9-12th grade

Grade Span:

Revised by:

Presented by:

Approval date:

Members of the Board of Education

William Irwin, President
Alexandra Lopez, Vice President
Tom Connors
Ralph Johnson
Adelita Deepan
Atif Nazir
Shantell Cherry
Isaac Peng
Ira D. Stern

Piscataway Township Schools

1515 Stelton Road
Piscataway, NJ 08854-1332
732 572-2289, ext. 2561
Fax 732 572-1540
www.piscatawayschools.org

COURSE OVERVIEW

Description		
Goals		
Scope and Sequence		
Unit	Topic	Length
Unit 1	Alice 2.2- Alice in Action with Java	
Unit 2	Fundamentals of Java	
Resources		
Core Text: Suggested Resources:		

ALL UNITS: INSTRUCTIONAL FOCUS

Summary and Rationale	
State Standards	
Standard	
CPI #	Cumulative Progress Indicator (CPI)
Standard	
CPI #	Cumulative Progress Indicator (CPI)

UNIT 1: Alice 2.2- Alice in Action with Java

Summary and Rationale	
Recommended Pacing	
State Standards	
Standard	
CPI #	Cumulative Progress Indicator (CPI)
Standard	
CPI #	Cumulative Progress Indicator (CPI)
Standard	
CPI #	Cumulative Progress Indicator (CPI)
Standard	
CPI #	Cumulative Progress Indicator (CPI)
Instructional Focus	
Unit Enduring Understandings	
<ul style="list-style-type: none"> Technology is a tool that can assist problem solving and enhance the discovery of new ideas. Mathematics is based on patterns, relationships, and a defined set of rules that interconnect and explain all mathematical concepts and natural phenomena. There are a variety of forms of computation and the one you choose is based on the content in the problem. 	

- Problem solving is a process of analyzing the situation, selecting an appropriate method, implementing it and evaluating the procedure and the result for reasonableness and the degree of accuracy.
- Numbers, variables, and symbols are elements of a language that is used to model and express mathematical meanings and relationships.
- Effective communicators in mathematics choose genre based on audience, purposes, and what is being communicated. (genre = is a socially taught way of communicating what you know within a discipline)
- There are a variety of ways to process data, predict outcomes, and enumerate possibilities and the ones chosen are based on the information available, the audience, and ethical considerations.

Unit Essential Questions

- What is the purpose of technology?
- What is mathematics?
- What is the best way to compute it?
- What is the most effective way to solve a problem?
- Is math a language?
- What is the best way to communicate mathematically?
- What is the best way to use data?

Objectives

Students will know:

Students will be able to:

- Exploring Alice and Object-Oriented Programming
- Downloading, Installing and Running Alice.
- User Stories, Story board-Sketches and Transition Diagram.
- Program Implementation in Alice
- Position and Orientation of Objects
- Project one – Creating an Alice World
- Alice interfaces, work area, other elements.
- World Methods for Scene's and Shorts
- Object Methods for Object Behavior
- Reusing code from one program into another.
- Using Dummies to position objects
- Thinking in 3D
- Developing software methods.
- Method variables.
- Parameters
- Properties Variables
- Creating and using Functions
- Project two – Developing the ice Skater Routine
- Programming with Logical Structures
- The Boolean type
- The If Statement
- The For Statement
- The While Statement
- Flow-control in functions

- The List Structure
- The Array Structure
- Project three – Programming with Logical Structures
- Algorithms, Linear Sequences, Branching, Looping, and Boolean Logic
- Even – Driven Programming with Alice
- Handling mouse Clicks
- Handling Key Presses
- Using 3D text
- Project four – Creating a Skate Simulator with Interactive User Controls.
- Events in an Existing Alice World

Resources

Core Text:

Suggested Resources:

UNIT 2: Fundamentals of Java

Summary and Rationale	
Recommended Pacing	
State Standards	
Standard	
CPI #	Cumulative Progress Indicator (CPI)
Standard	
CPI #	Cumulative Progress Indicator (CPI)
Standard	
CPI #	Cumulative Progress Indicator (CPI)
Standard	
CPI #	Cumulative Progress Indicator (CPI)
Instructional Focus	
Unit Enduring Understandings	
<ul style="list-style-type: none"> • Technology is a tool that can assist problem solving and enhance the discovery of new ideas. • Mathematics is based on patterns, relationships, and a defined set of rules that interconnect and explain all mathematical concepts and natural phenomena. • Problem solving is a process of analyzing the situation, selecting an appropriate method, implementing it and evaluating the procedure and the result for reasonableness and the degree of accuracy. 	

- There are a variety of ways to process data, predict outcomes, and enumerate possibilities and the ones chosen are based on the information available, the audience, and ethical considerations.
- Spatial sense and various geometric terms, concepts, and properties are used to model, identify, interpret, and describe relationships as they exist in the world; the terms, properties, and concepts chosen are based on the situation and what is to be communicated.
- Effective communicators in mathematics choose genre based on audience, purpose, and what is being communicated. (genre = is a socially taught way of communicating what you know within a discipline)
- There are a variety of ways to process data, predict outcomes, and enumerate possibilities and the ones chosen are based on the information available, the audience, and the ethical considerations.
- There are a variety of units and tools for measuring real-world phenomena and the appropriateness of choice is based on what is being measured and why.

Unit Essential Questions

- What is the purpose of technology?
- What is mathematics?
- What is the most effective way to solve a problem? What is the best answer?
- What is the best way to compute it?
- What is the best way to use geometry?
- What is the best way to communicate mathematically?
- What is the best way to use data? How do we know we know? How certain do we have to be?
- What is the best way to measure?

Objectives

Students will know:

Students will be able to:

- From Alice to Java
- The Object List
- The Operator List
- Understanding Eclipse IDE
- Writing, Compiling, Running and Testing java program using Eclipse
- Java Basics
- Comments
- Import statements and packages
- The Simplest Java Program
- Some Java Statements
- The Software Engineering Process
- Java's Primitive Data Types
- Reference types
- The String class and it's methods
- The Math Class, how to use it and its application
- The Random Number Class
- The Decimal Format Class
- Syntax, Errors and Debugging
- Terminal I/O for Different Data Types
- Methods, void and non-void

- Method design and signature
- Method libraries
- Instance Methods
- Program Design revisited.
- Introduction to Control Statements
- If and if-else statements, while statements, for statements, nested control statements and break statement.
- Errors in Loops.
- Structure and Behavior of Methods.
- Scope and Lifetime of Variables.
- Turtle Graphics: Colors, Pen Widths, and Movements.
- Logical Operations
- Testing if Statements
- Nested if Statements
- Logical errors in Nested ifs
- Nested Loops
- Improving the user interface
- A Menu-Driven Conversion Program
- The GUI Program Explained
- Files and Exceptions
- File object
- Reading, Writing and Closing file
- Throwing exceptions
- Try Catch block
- The finally Block
- Class variables and methods
- Introduction to defining classes.
- The internal structure of Classes and Objects.
- Editing, Compiling and Testing classes.
- Executing, debugging, and testing hints
- Graphics

Resources

Core Text:

Suggested Resources: