Washington Township Public Schools
Office of Curriculum & Instruction

Course: Advanced Placement Computer Science with Java

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nder the Direction of: Carole English

Description:

This full year course follows the successful completion of the "Introduction to Co or better. It focuses on the many advanced data structures and concepts not presente of the Java programming language as the "tool" to using these data structures and c Advanced Placement test in Computer Science.

To succeed, the student should be willing to work individually, participate in class their own in a timely fashion, should be capable of logical thinking, being able to bre tasks, and should be able to follow directions.

Objectives of this course include understanding the basic elements of computer ha and good style; acquiring fluency in writing Java code; code clarity and documentati control structures and recursion; designing software solutions to problems; modular data types such as lists, stacks, queues and binary trees; familiarity with "big-O" ana searching and sorting algorithms; class libraries; using and writing Java classes; deta accompanying exercises and questions provided by the College Board; and ethical a

Grading is based on the students' participation, individual program design, grou scores on tests, quizzes, group and final projects, midterm exam and final exam.

Joseph A. Vandenberg: *Assistant Superintendent for Curriculum & Instruction*
Barbara E. Marciano: *Director of Elementary Education*
Jack McGee: *Director of Secondary Education*

Written: February 2008
Revised: JUNE 2012
BOE Approval: AUGUST 2012

DEMONSTRABLE PROFICIENCIES

COURSE TITLE: Advanced Placement Computer Science with Java

CLASSWORK REQUIREMENTS

Homework on a regular basis, reading assignments, preparing for quizzes and tests, midterm and final examinations, successfully completing programming projects, neatness, attention to detail, prepared with proper materials such as pen or pencil, paper, notebook, and textbook.

ATTITUDE & BEHAVIOR

Effort, cooperation, perseverance, following directions and specifications, pride in work, self-control, respect for others, responsibility, paying attention, taking notes and referencing them, proper use of equipment, furniture and supplies, ethics in not pirating software nor in copying other student's work.

COURSE OBJECTIVES/OVERVIEW

A. COURSE CONTENT: Java classes, objects, events; Java syntax, style; data type variables, arithmetic operations; Boolean expressions, if-else statements; method constructors, fields; strings; arrays; while, for, do-while; searching, sorting, other a algorithms; streams, files; graphics; GUI components, events; mouse, keyboard, sounds, images; OOP concepts, object-oriented design.

B. SKILLS: Students will read & write Java programs that include documentation & demonstrate readability and aesthetics; understand & modify the APCS “Case Stu

C. APPRECIATION OF CONCEPTS: coding conventions; documentation conventio social issues: privacy, piracy, ethics; object-oriented programming.

ATTENDANCE

Attendance: Refer to Board of Education Policy

GRADING PROCEDURES

The final grade will be a composite of: quiz scores, test scores, programming grades, midterm and final examination scores, and participation reflecting the student's mastery of the areas enumerated above. No one of the grade components will be weighed more than 40%. The student can pass the course with an overall average of 70%. The specific grading system will be explained to the students by the individual teacher.

MAJOR UNITS OF STUDY

Course Title: Advanced Placement Computer Science with Java

I.	An Introduction to Hardware, Software, and the Internet
II.	An Introduction to Software Development
III.	Objects and Classes
IV.	Algorithms
V.	Java Syntax and Style
VI.	Data Types, Variables, and Arithmetic
VII.	Boolean Expressions and *if..else* Statements
VIII.	Iterative Statements: *while, for, do..while*
IX.	Implementing Classes and Using Objects
X.	Strings
XI.	Class Hierarchies and Interfaces
XII.	Arrays and *ArrayLists*
XIII.	Searching and Sorting
XIV.	Streams and Files
XV.	Supplemental Unit: Advanced Placement Computer Science Case Study
XVI.	Graphics
XVII.	GUI Components and Events
XVIII.	Mouse, Keyboard, Sounds and Images
XIX.	Big-O Analysis and Algorithms

Unit Overview

Course Title: Advanced Placement Computer Science with Java

Unit #: **UNIT 1 OVERVIEW** **Unit Title:** An Introduction to Hardware, Software, and the Internet

Unit Description:

Covers the basics of the hardware and software that comprises a “Computer System,” and discusses the development and utilization of the Internet

Enduring Understandings/Generalizations

Students will understand that:

Computer developments have come a long way in a very short period of time.
Hardware, software, and programs must work together in an integrated environment in order to produce good, working programs.

Guiding Questions

1. Describe the relationship between hardware and software.
2. Describe the steps involved in program compilation and execution.
3. Identify input and output devices.
4. What do programmers do?
5. What is the Internet and how is it useful?

CURRICULUM – Unit Plan

Course Title: AP Computer Science with Java

Unit Title: 1: An Introduction to Hardware, Software, and the Internet

Time Allocation: 3 weeks

Core Content Standards and Cumulative Progress Indicators:

8.1.12.A.1,5	8.2.12.A1	8.2.12.E,1	8.1.12.F.1
8.1.12.D.2	8.2.12.C.3	8.2.12.F.1,3	8.2.12.D.1
A.SSE.1a			

Objectives:

- Describe the relationship between hardware and software
- Define various types of software and how they are used.
- Identify basic computer hardware and explain what it does.
- Explain how the hardware components execute programs and manage data.
- Explain the importance of the Internet and the World Wide Web

A. CONTENT/SKILLS	B. LEARNING ACTIVITIES	C. SUGGESTED MATERIALS	D. STUDENT EVALUATION
Hardware Overview The CPU Memory Secondary Storage Devices Input & Output Devices Software Overview What do Programmers Do? Representation of Information Numbers Characters The Internet	Students read Chapter 1 Notes on Hardware Discuss input/output devices Notes on Software overview Discussion on “Programming” as a profession. Notes on number & character representation Notes/discussion on the Internet, the World Wide Web, URL’s, LANs and WANs, etc. Students complete review questions Quiz Unit Test	**Text**: Java Methods A & AB, Litvin & Litvin, Skylight Software, Inc., Massachusetts, 2006. **Software**: MetroWerks CodeWarrior Academic version 8 or later, Apple Server software and Remote Desktop software. **Equipment**: Macintosh computer system for each student with above software installed, on each computer, a dedicated classroom server containing ANAT software, video projection system on large 10’ screen, markerboards and dry-erase pens.	Successful and timely completion of homework assignments Successful and timely completion of worksheets Successful and timely completion of methods and programming assignments Successful and timely maintenance of a separate class reference/notebook, including all classroom notes, worksheets, homework, programs, etc., and a “Topical Index” updated daily. Quizzes evaluating student proficiency in writing methods dealing with topics of the chapter Unit test evaluating student understanding of the concepts covered in the chapter reading assignments and notes, and in the programming assignments

Unit Modifications for Special Population Students:

Struggling Learners	Gifted and Talented Students (Challenge Activities)	English Language Learners	Learners with an IEP	Learners with a 504
Rephrase questions for student clarification.	Ask reflective and extension questions to build on classroom knowledge to develop a deeper understanding.	Use a translator device.	Each special education student has in Individualized Educational Plan (IEP) that details the specific accommodations, modifications, services, and support needed to level the playing field. This will enable that student to access the curriculum to the greatest extent possible in the least restrictive environment. These include: • Variation of time: adapting the time allotted for learning, task completion, or testing • Variation of input: adapting the way instruction is delivered • Variation of output: adapting how a student can respond to instruction • Variation of size: adapting the number of items the student is expected to complete • Modifying the content, process or product Additional resources are outlined to facilitate appropriate behavior and increase student engagement. The most frequently used modifications and accommodations can be viewed here. Teachers are encouraged to use the Understanding by Design Learning Guidelines (UDL). These guidelines offer a set of concrete suggestions that can be applied to any discipline to ensure that all learners can access and participate in learning opportunities. The framework can be viewed here www.udlguidelines.cast.org	Refer to page four in the Parent and Educator Resource Guide to Section 504 to assist in the development of appropriate plans.
Preferential seating – close proximity to teacher.	Pose “What if…” questions.	Provide access to language dictionary, instructor, or any other means to help interpret any language/communication difficulties.		
Redirect student attention.	Have the students share their knowledge	Rephrase questions for student clarification.		
After school availability for help.		Have student create vocabulary flash cards in addition to topical index.		
Internet resources (videos on topic, websites relevant to the particular topic, etc.).				

Unit Overview

Course Title: AP Computer Science with Java

Unit #: **UNIT 2 OVERVIEW** **Unit Title:** An Introduction to Software Development

Unit Description:

Presents the types of software components and packages and how software is developed.
Presents “object-oriented programming.”

Enduring Understandings/Generalizations

Students will understand that:

The “object” is the “basic unit” of the Java language.
Objects are declared, defined and used to form building blocks of programs.

Guiding Questions

1. What’s the difference between primitive data and objects?
2. How do you create and use variables?
3. How do you create and use objects?

CURRICULUM – Unit Plan

Course Title: AP Computer Science with Java

Unit Title: 2. An Introduction to Software Development

Time Allocation: 4 weeks

Core Content Standards and Cumulative Progress Indicators:

8.1.12.A.1,5	8.2.12.A1	8.2.12.E,1	8.1.12.F.1
8.1.12.D.2	8.2.12.C.3	8.2.12.F.1,3	8.2.12.D.1
A.SSE.1a	F.IF4	S.ID	

Objectives:

- Understand compilers and Interpreters.
- Explore software components and packages.
- Understand "object-oriented programming."
- Explore different ways of developing output.

A. CONTENT/SKILLS	B. LEARNING ACTIVITIES	C. SUGGESTED MATERIALS	D. STUDENT EVALUATION
Compilers & Interpreters Software Components & Packages Lab: Three Ways to Say Hello Object-Oriented Programming Lab: More Ways to Say Hello	Students read Chapter 2 Notes on Compilers & Interpreters Students work through "Hello" lab Discussion of "object-oriented programming Students work through "More Ways to Say Hello" lab Students complete review questions Quiz Unit Test	**Text**: Java Methods A & AB, Litvin & Litvin, Skylight Software, Inc., Massachusetts, 2006. **Software**: MetroWerks CodeWarrior Academic version 8 or later, Apple Server software and Remote Desktop software. **Equipment**: Macintosh computer system for each student with above software installed, on each computer, a dedicated classroom server containing ANAT software, video projection system on large 10' screen, markerboards and dry-erase pens.	Successful and timely completion of homework assignments Successful and timely completion of worksheets Successful and timely completion of methods and programming assignments Successful and timely maintenance of a separate class reference/notebook, including all classroom notes, worksheets, homework, programs, etc., and a "Topical Index" updated daily. Quizzes evaluating student proficiency in writing methods dealing with topics of the chapter Unit test evaluating student understanding of the concepts covered in the chapter reading assignments and notes, and in the programming assignments

Unit Modifications for Special Population Students:

Struggling Learners	Gifted and Talented Students (Challenge Activities)	English Language Learners	Learners with an IEP	Learners with a 504
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Preferential seating – close proximity to teacher.	Pose “What if…” questions.	Provide access to language dictionary, instructor, or any other means to help interpret any language/communication difficulties.		
Redirect student attention.	Have the students share their knowledge	Rephrase questions for student clarification.		
After school availability for help.		Have student create vocabulary flash cards in addition to topical index.		
Internet resources (videos on topic, websites relevant to the particular topic, etc.).				

Unit Overview

Course Title: Advanced Placement Computer Science with Java

Unit #: **UNIT 3 OVERVIEW** **Unit Title:** Objects and Classes

Unit Description:
Introduces the basic development of “objects” and “classes”

Enduring Understandings/Generalizations

Students will understand that:
The “object” is the center of the “programming universe” in the Java language
Objects are defined by classes
Classes are written in a specific way, based on Java standards

Guiding Questions

1. What is an “object”
2. How are objects defined
3. What is a “class?”
4. How are “methods” developed to define an object?
5. How are objects called (used)?
6. What is “Inheritance?”

CURRICULUM – Unit Plan

Course Title: AP Computer Science with Java

Unit Title: 3. Objects and Classes

Time Allocation: 3 weeks

Core Content Standards and Cumulative Progress Indicators:

8.1.12.A.1,5	8.2.12.A1	8.2.12.E,1	8.1.12.F.1	
8.1.12.D.2	8.2.12.C.3	8.2.12.F.1,3	8.2.12.D.1	
A.SSE.1a	F.IF4	S.ID		

Objectives:

- Define an "object"
- Demonstrate sample objects
- Define a "class"
- Demonstrate sample classes
- Define fields, constructors, and methods
- Define "Inheritance"

A. CONTENT/SKILLS	B. LEARNING ACTIVITIES	C. SUGGESTED MATERIALS	D. STUDENT EVALUATION
Sample objects Sample classes Sample fields Sample constructors Sample methods Case Study: First Steps Lab: First Steps Inheritance	Students read Chapter 3 Notes on "objects" Discuss sample objects Notes on "classes" Discuss sample classes Notes on fields, constructors, and methods Notes on "inheritance" Students complete review questions Quiz Unit Test	**Text**: Java Methods A & AB, Litvin & Litvin, Skylight Software, Inc., Massachusetts, 2006. **Software**: MetroWerks CodeWarrior Academic version 8 or later, Apple Server software and Remote Desktop software. **Equipment**: Macintosh computer system for each student with above software installed, on each computer, a dedicated classroom server containing ANAT software, video projection system on large 10' screen, markerboards and dry-erase pens.	Successful and timely completion of homework assignments Successful and timely completion of worksheets Successful and timely completion of methods and programming assignments Successful and timely maintenance of a separate class reference/notebook, including all classroom notes, worksheets, homework, programs, etc., and a "Topical Index" updated daily. Quizzes evaluating student proficiency in writing methods dealing with topics of the chapter Unit test evaluating student understanding of the concepts covered in the chapter reading assignments and notes, and in the programming assignments

Unit Modifications for Special Population Students:

Struggling Learners	Gifted and Talented Students (Challenge Activities)	English Language Learners	Learners with an IEP	Learners with a 504
Rephrase questions for student clarification.	Ask reflective and extension questions to build on classroom knowledge to develop a deeper understanding.	Use a translator device.	Each special education student has in Individualized Educational Plan (IEP) that details the specific accommodations, modifications, services, and support needed to level the playing field. This will enable that student to access the curriculum to the greatest extent possible in the least restrictive environment. These include: • Variation of time: adapting the time allotted for learning, task completion, or testing • Variation of input: adapting the way instruction is delivered • Variation of output: adapting how a student can respond to instruction • Variation of size: adapting the number of items the student is expected to complete • Modifying the content, process or product Additional resources are outlined to facilitate appropriate behavior and increase student engagement. The most frequently used modifications and accommodations can be viewed here. Teachers are encouraged to use the Understanding by Design Learning Guidelines (UDL). These guidelines offer a set of concrete suggestions that can be applied to any discipline to ensure that all learners can access and participate in learning opportunities. The framework can be viewed here www.udlguidelines.cast.org	Refer to page four in the Parent and Educator Resource Guide to Section 504 to assist in the development of appropriate plans.
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Redirect student attention.	Have the students share their knowledge	Rephrase questions for student clarification.		
After school availability for help.		Have student create vocabulary flash cards in addition to topical index.		
Internet resources (videos on topic, websites relevant to the particular topic, etc.).				

Unit Overview

Course Title: Advanced Placement Computer Science with Java

Unit #: **UNIT 4 OVERVIEW** **Unit Title:** Algorithms

Unit Description:
Learning how to design “algorithms” to define classes & programs

Enduring Understandings/Generalizations

Students will understand that:
“Algorithms” are important in developing objects, classes and programs
Iteration and recursion are fundamental in developing programs

Guiding Questions

1. What is an “algorithm?”
2. How are algorithms useful in designing objects, classes and programs?
3. What is iteration?
4. What is recursion?

CURRICULUM – Unit Plan

Course Title: AP Computer Science with Java

Unit Title: 4. Algorithms

Time Allocation: 6 weeks

Core Content Standards and Cumulative Progress Indicators:

8.1.12.A.1,5	8.2.12.A1	8.2.12.E,1	8.1.12.F.1
8.1.12.D.2	8.2.12.C.3	8.2.12.F.1,3	8.2.12.D.1
A.SSE.1a,4	F.IF4	S.ID	

Objectives:

- Define the properties of algorithms
- Explore the different types of iterations
- Explore the concept of recursion
- Develop recursive methods
- Work through GCF case study
- Define and work with Lists
- Work through File Manager case study

A. CONTENT/SKILLS	B. LEARNING ACTIVITIES	C. SUGGESTED MATERIALS	D. STUDENT EVALUATION
Properties of algorithms Iterations Recursion Case Study: Euclid's GCF Algorithm Working with Lists Case Study: File Manager	Students read Chapter 4 Notes on properties of algorithms Notes on iteration Notes on recursion Students work through case study on GCFs Notes on Lists Students work through case study on File Manager Students complete review questions Quiz Unit Test	**Text**: Java Methods A & AB, Litvin & Litvin, Skylight Software, Inc., Massachusetts, 2006. **Software**: MetroWerks CodeWarrior Academic version 8 or later, Apple Server software and Remote Desktop software. **Equipment**: Macintosh computer system for each student with above software installed, on each computer, a dedicated classroom server containing ANAT software, video projection system on large 10' screen, markerboards and dry-erase pens.	Successful and timely completion of homework assignments Successful and timely completion of worksheets Successful and timely completion of methods and programming assignments Successful and timely maintenance of a separate class reference/notebook, including all classroom notes, worksheets, homework, programs, etc., and a "Topical Index" updated daily. Quizzes evaluating student proficiency in writing methods dealing with topics of the chapter Unit test evaluating student understanding of the concepts covered in the chapter reading assignments and notes, and in the programming assignments

Unit Modifications for Special Population Students:

Struggling Learners	Gifted and Talented Students (Challenge Activities)	English Language Learners	Learners with an IEP	Learners with a 504
Rephrase questions for student clarification.	Ask reflective and extension questions to build on classroom knowledge to develop a deeper understanding.	Use a translator device.	Each special education student has in Individualized Educational Plan (IEP) that details the specific accommodations, modifications, services, and support needed to level the playing field. This will enable that student to access the curriculum to the greatest extent possible in the least restrictive environment. These include: • Variation of time: adapting the time allotted for learning, task completion, or testing • Variation of input: adapting the way instruction is delivered • Variation of output: adapting how a student can respond to instruction • Variation of size: adapting the number of items the student is expected to complete • Modifying the content, process or product Additional resources are outlined to facilitate appropriate behavior and increase student engagement. The most frequently used modifications and accommodations can be viewed here. Teachers are encouraged to use the Understanding by Design Learning Guidelines (UDL). These guidelines offer a set of concrete suggestions that can be applied to any discipline to ensure that all learners can access and participate in learning opportunities. The framework can be viewed here www.udlguidelines.cast.org	Refer to page four in the Parent and Educator Resource Guide to Section 504 to assist in the development of appropriate plans.
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Redirect student attention.	Have the students share their knowledge	Rephrase questions for student clarification.		
After school availability for help.		Have student create vocabulary flash cards in addition to topical index.		
Internet resources (videos on topic, websites relevant to the particular topic, etc.).				

Unit Overview

Course Title: Advanced Placement Computer Science with Java

Unit #: **UNIT 5 OVERVIEW** **Unit Title:** Java Syntax and Style

Unit Description:
Investigate different and “conventions” of Java syntax and style

Enduring Understandings/Generalizations

Students will understand that:
There are “finer details” to writing code.

Guiding Questions

1. What are the various Java styles?
2. What are common programming “conventions?”
3. How are spaces, indentation, and naming conventions aid “readability” of a program?

CURRICULUM – Unit Plan

Course Title: AP Computer Science with Java

Unit Title: 5. Java Syntax and Style

Time Allocation: 3 weeks

Core Content Standards and Cumulative Progress Indicators:

8.1.12.A.1,5	8.2.12.A1	8.2.12.E,1	8.1.12.F.1
8.1.12.D.2	8.2.12.C.3	8.2.12.F.1,3	8.2.12.D.1
	F.IF4	S.ID	

Objectives:

- Demonstrate good documentation.
- Explore reserved words.
- Enumerate rules for programmer-defined identifiers
- Examine Java syntax and explore style "conventions."
- Examine statements, blocks & indentation as documentation

A. CONTENT/SKILLS	B. LEARNING ACTIVITIES	C. SUGGESTED MATERIALS	D. STUDENT EVALUATION
Using comments Reserved words Programmer-defined names Syntax vs. style Statements, blocks, indentation Lab: Correcting Syntax Errors	Students read Chapter 5 Notes on documentation Notes on Java syntax & style Discuss programming conventions Discuss readability Students work through lab: Correcting Syntax Errors Students complete review questions Quiz Unit Test	**Text**: Java Methods A & AB, Litvin & Litvin, Skylight Software, Inc., Massachusetts, 2006. **Software**: MetroWerks CodeWarrior Academic version 8 or later, Apple Server software and Remote Desktop software. **Equipment**: Macintosh computer system for each student with above software installed, on each computer, a dedicated classroom server containing ANAT software, video projection system on large 10' screen, markerboards and dry-erase pens.	Successful and timely completion of homework assignments Successful and timely completion of worksheets Successful and timely completion of methods and programming assignments Successful and timely maintenance of a separate class reference/notebook, including all classroom notes, worksheets, homework, programs, etc., and a "Topical Index" updated daily. Quizzes evaluating student proficiency in writing methods dealing with topics of the chapter Unit test evaluating student understanding of the concepts covered in the chapter reading assignments and notes, and in the programming assignments

Unit Modifications for Special Population Students:

<table>
<tr><th>Struggling Learners</th><th>Gifted and Talented Students (Challenge Activities)</th><th>English Language Learners</th><th>Learners with an IEP</th><th>Learners with a 504</th></tr>
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Variation of size: adapting the number of items the student is expected to complete
Modifying the content, process or product
Additional resources are outlined to facilitate appropriate behavior and increase student engagement. The most frequently used modifications and accommodations can be viewed here.
Teachers are encouraged to use the Understanding by Design Learning Guidelines (UDL). These guidelines offer a set of concrete suggestions that can be applied to any discipline to ensure that all learners can access and participate in learning opportunities. The framework can be viewed here www.udlguidelines.cast.org</td><td>Refer to page four in the Parent and Educator Resource Guide to Section 504 to assist in the development of appropriate plans.</td></tr>
<tr><td>Preferential seating – close proximity to teacher.</td><td>Pose “What if…” questions.</td><td>Provide access to language dictionary, instructor, or any other means to help interpret any language/communication difficulties.</td><td></td></tr>
<tr><td>Redirect student attention.</td><td>Have the students share their knowledge</td><td>Rephrase questions for student clarification.</td><td></td></tr>
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Unit Overview

Course Title: Advanced Placement Computer Science with Java

Unit #: **UNIT 6 OVERVIEW** **Unit Title:** Data Types, Variables, and Arithmetic

Unit Description:
Introduces the concept of “scope”
Examines basic data types, assignments, operators, and conversions.

Enduring Understandings/Generalizations

Students will understand that:
Constants, variables and objects have specific “scopes” that need to be considered.
There are differences between the primitive & the programmer-defined data types
Java uses compound assignment and increment operators.

Guiding Questions

1. What are the primitive data types?
2. What is the String class and how are its methods used?
3. How is “scope” defined and what is its importance?
4. What are the compound assignment and increment operators?

CURRICULUM – Unit Plan

Course Title: AP Computer Science with Java

Unit Title: 6. Data Types, Variables, and Arithmetic

Time Allocation: 3 weeks

Core Content Standards and Cumulative Progress Indicators:

8.1.12.A.1,5	8.2.12.A1	8.2.12.E,1	8.1.12.F.1
8.1.12.D.2	8.2.12.C.3	8.2.12.F.1,3	8.2.12.D.1
A.SSE.1a	F.IF4	S.ID	

Objectives:

- Declaring fields and local variables
- Using the primitive data types
- Exploring the String class
- Declaring and using constants
- Observing the scope of variables and constants
- Developing arithmetic expressions
- Using compound assignment and increment operators
- converting numbers and objects to Strings

A. CONTENT/SKILLS	B. LEARNING ACTIVITIES	C. SUGGESTED MATERIALS	D. STUDENT EVALUATION
Declaring fields Declaring local variables Primitive data types The String class Constants Scope of variables and constants Arithmetic expressions Compound assignment and increment operators Converting numbers and objects into Strings Lab: Pi Chart	Students read Chapter 6 Notes on declaring fields and local variables Notes on the primitive data types Notes on the String class Notes on scope Notes on arithmetic expressions Notes on compound assignment and increment operators Notes on converting numbers and objects into Strings Students work through lab: Pi Chart Students complete review questions Quiz Unit Test	**Text**: Java Methods A & AB, Litvin & Litvin, Skylight Software, Inc., Massachusetts, 2006. **Software**: MetroWerks CodeWarrior Academic version 8 or later, Apple Server software and Remote Desktop software. **Equipment**: Macintosh computer system for each student with above software installed, on each computer, a dedicated classroom server containing ANAT software, video projection system on large 10' screen, markerboards and dry-erase pens.	Successful and timely completion of homework assignments Successful and timely completion of worksheets Successful and timely completion of methods and programming assignments Successful and timely maintenance of a separate class reference/notebook, including all classroom notes, worksheets, homework, programs, etc., and a "Topical Index" updated daily. Quizzes evaluating student proficiency in writing methods dealing with topics of the chapter Unit test evaluating student understanding of the concepts covered in the chapter reading assignments and notes, and in the programming assignments

Unit Modifications for Special Population Students:

Struggling Learners	Gifted and Talented Students (Challenge Activities)	English Language Learners	Learners with an IEP	Learners with a 504
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Redirect student attention.	Have the students share their knowledge	Rephrase questions for student clarification.		
After school availability for help.		Have student create vocabulary flash cards in addition to topical index.		
Internet resources (videos on topic, websites relevant to the particular topic, etc.).				

Unit Overview

Course Title: Advanced Placement Computer Science with Java

Unit #: **UNIT 7 OVERVIEW** **Unit Title:** Boolean Expressions and *if..else* Statements

Unit Description:
Examination of Relational and Logical operators, precedence & short-circuit evaluation of compound conditions.

Enduring Understandings/Generalizations

Students will understand that:
Relational and logical operations are handled differently & should be kept separate.
Compound conditioning has a precedence order and short-circuit evaluation adds to efficiency.
There is a *best* decision structure for each particular situation.

Guiding Questions

1. What is the precedence order of relational operators?
2. What is the precedence order of logical operators?
3. How does short-circuit evaluation effect precedence order and the way you code compound conditions?
4. What is the best decision structure to use in a particular situation?

CURRICULUM – Unit Plan

Course Title: AP Computer Science with Java

Unit Title: 7. Boolean Expressions and *if..else* Statements

Time Allocation: 3 weeks

Core Content Standards and Cumulative Progress Indicators:

8.1.12.A.1,5	8.2.12.A1	8.2.12.E,1	8.1.12.F.1
8.1.12.D.2	8.2.12.C.3	8.2.12.F.1,3	8.2.12.D.1
A.SSE.1a			

Objectives:

- Use *if..else* statements properly.
- Proper use of the B*oolean* data type.
- Explore relational operators & their negation.
- Explore logical operators & their negation.
- Explore compound conditions & short-circuit evaluation.
-

A. CONTENT/SKILLS	B. LEARNING ACTIVITIES	C. SUGGESTED MATERIALS	D. STUDENT EVALUATION
If..else statements *Boolean* data type Relational operators Logical operators Order of operations (precedence) Short-circuit evaluation *If..else..if* & nested *if..else* Case Study & Lab: Rolling Dice The *switch* statement Enumerated data types Case Study & Lab: Rolling Dice Concluded	Students read Chapter 7 Notes on booleans Notes of relational operators Notes on logical operators Notes on precedence (order of Operations) Illustration of short-circuit evaluation Notes on *if..else* statements Notes on nested *if..else*'s Notes on *switch* statements Students work through lab: Rolling Dice Notes on enumerated data types Students work through Case Study Rolling Dice Concluded Students complete review questions Quiz Unit Test	**Text**: Java Methods A & AB, Litvin & Litvin, Skylight Software, Inc., Massachusetts, 2006. **Software**: MetroWerks CodeWarrior Academic version 8 or later, Apple Server software and Remote Desktop software. **Equipment**: Macintosh computer system for each student with above software installed, on each computer, a dedicated classroom server containing ANAT software, video projection system on large 10' screen, markerboards and dry-erase pens.	Successful and timely completion of homework assignments Successful and timely completion of worksheets Successful and timely completion of methods and programming assignments Successful and timely maintenance of a separate class reference/notebook, including all classroom notes, worksheets, homework, programs, etc., and a "Topical Index" updated daily. Quizzes evaluating student proficiency in writing methods dealing with topics of the chapter Unit test evaluating student understanding of the concepts covered in the chapter reading assignments and notes, and in the programming assignments

Unit Modifications for Special Population Students:

<table>
<tr><th>Struggling Learners</th><th>Gifted and Talented Students (Challenge Activities)</th><th>English Language Learners</th><th>Learners with an IEP</th><th>Learners with a 504</th></tr>
<tr><td>Rephrase questions for student clarification.</td><td>Ask reflective and extension questions to build on classroom knowledge to develop a deeper understanding.</td><td>Use a translator device.</td><td rowspan="6">Each special education student has in Individualized Educational Plan (IEP) that details the specific accommodations, modifications, services, and support needed to level the playing field. This will enable that student to access the curriculum to the greatest extent possible in the least restrictive environment. These include:
Variation of time: adapting the time allotted for learning, task completion, or testing
Variation of input: adapting the way instruction is delivered
Variation of output: adapting how a student can respond to instruction
Variation of size: adapting the number of items the student is expected to complete
Modifying the content, process or product
Additional resources are outlined to facilitate appropriate behavior and increase student engagement. The most frequently used modifications and accommodations can be viewed here.
Teachers are encouraged to use the Understanding by Design Learning Guidelines (UDL). These guidelines offer a set of concrete suggestions that can be applied to any discipline to ensure that all learners can access and participate in learning opportunities. The framework can be viewed here www.udlguidelines.cast.org</td><td rowspan="2">Refer to page four in the Parent and Educator Resource Guide to Section 504 to assist in the development of appropriate plans.</td></tr>
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<tr><td>Redirect student attention.</td><td>Have the students share their knowledge</td><td>Rephrase questions for student clarification.</td><td></td></tr>
<tr><td>After school availability for help.</td><td></td><td>Have student create vocabulary flash cards in addition to topical index.</td><td></td></tr>
<tr><td>Internet resources (videos on topic, websites relevant to the particular topic, etc.).</td><td></td><td></td><td></td></tr>
</table>

Unit Overview

Course Title: Advanced Placement Computer Science with Java

Unit #: **UNIT 8 OVERVIEW** **Unit Title:** Iterative Statements: *while, for, do..while*

Unit Description:
Compare & contrast the three iterative structures & choose the best one to use in any particular situation.

Enduring Understandings/Generalizations

Students will understand that:

1. There are particular situations when a *do..while* statements should be used.
2. There are particular situations when a *for* statement is useful.
3. There are particular situations when *while* statements are useful.
4. There is a “best” iterative structure to use in any particular situation.

Guiding Questions

1. When are *do..while* statements used?
2. When are *for* statements useful?
3. When are *while* statements used?
4. What is the best iterative structure to use for “*this*” situation?

CURRICULUM – Unit Plan

Course Title: AP Computer Science with Java

Unit Title: 8. Iterative Statements: *while, for,* and *do..while*

Time Allocation: 3 weeks

Core Content Standards and Cumulative Progress Indicators:

8.1.12.A.1,5	8.2.12.A1	8.2.12.E,1	8.1.12.F.1
8.1.12.D.2	8.2.12.C.3	8.2.12.F.1,3	8.2.12.D.1
A.SSE.1a			

Objectives:

- Explore the *do..while* loop and its proper use.
- Explore the *for* loop and its proper use.
- Explore the *while* loop and its proper use.
- Determine the best iterative loop to use in any given situation.
- Examine the proper and improper use of *return* and *break* statements
- Examine the use of nested loops.

A. CONTENT/SKILLS	B. LEARNING ACTIVITIES	C. SUGGESTED MATERIALS	D. STUDENT EVALUATION
The *do..while* loop The *for* loop The *while* loop Proper selection of iterative structures for a particular situation Proper and improper use of *return* and *break* statements Lab: Perfect Numbers	Students read Chapter 8 Notes on *do..while* loops Notes on *for* loops Notes on *while* loops Discuss the proper use of each Discuss the "best" use for each of the iterative statements Demonstrate nested loops Students work though lab: Perfect Numbers Students complete review questions Quiz Unit Test	**Text**: Java Methods A & AB, Litvin & Litvin, Skylight Software, Inc., Massachusetts, 2006. **Software**: MetroWerks CodeWarrior Academic version 8 or later, Apple Server software and Remote Desktop software. **Equipment**: Macintosh computer system for each student with above software installed, on each computer, a dedicated classroom server containing ANAT software, video projection system on large 10' screen, markerboards and dry-erase pens.	Successful and timely completion of homework assignments Successful and timely completion of worksheets Successful and timely completion of methods and programming assignments Successful and timely maintenance of a separate class reference/notebook, including all classroom notes, worksheets, homework, programs, etc., and a "Topical Index" updated daily. Quizzes evaluating student proficiency in writing methods dealing with topics of the chapter Unit test evaluating student understanding of the concepts covered in the chapter reading assignments and notes, and in the programming assignments

Unit Modifications for Special Population Students:

Struggling Learners	Gifted and Talented Students (Challenge Activities)	English Language Learners	Learners with an IEP	Learners with a 504
Rephrase questions for student clarification.	Ask reflective and extension questions to build on classroom knowledge to develop a deeper understanding.	Use a translator device.	Each special education student has in Individualized Educational Plan (IEP) that details the specific accommodations, modifications, services, and support needed to level the playing field. This will enable that student to access the curriculum to the greatest extent possible in the least restrictive environment. These include: • Variation of time: adapting the time allotted for learning, task completion, or testing • Variation of input: adapting the way instruction is delivered • Variation of output: adapting how a student can respond to instruction • Variation of size: adapting the number of items the student is expected to complete • Modifying the content, process or product Additional resources are outlined to facilitate appropriate behavior and increase student engagement. The most frequently used modifications and accommodations can be viewed here. Teachers are encouraged to use the Understanding by Design Learning Guidelines (UDL). These guidelines offer a set of concrete suggestions that can be applied to any discipline to ensure that all learners can access and participate in learning opportunities. The framework can be viewed here www.udlguidelines.cast.org	Refer to page four in the Parent and Educator Resource Guide to Section 504 to assist in the development of appropriate plans.
Preferential seating – close proximity to teacher.	Pose “What if…” questions.	Provide access to language dictionary, instructor, or any other means to help interpret any language/communication difficulties.		
Redirect student attention.	Have the students share their knowledge	Rephrase questions for student clarification.		
After school availability for help.		Have student create vocabulary flash cards in addition to topical index.		
Internet resources (videos on topic, websites relevant to the particular topic, etc.).				

Unit Overview

Course Title: Advanced Placement Computer Science with Java

Unit #: **UNIT 9 OVERVIEW** **Unit Title:** Implementing Classes and Using Objects

Unit Description:

Distinguishes *public* vs. *private* features of a class.
Details defining methods and constructors.
Details calling methods, accessing fields, and passing parameters.

Enduring Understandings/Generalizations

Students will understand that:

Methods and constructors are the “building blocks” of classes.
It is important to distinguish public from private data & declare them accordingly.
Constructors and methods are invoked by “calling” them by name and passing to them their required parameters.

Guiding Questions

1. What is the difference between *public* and *private* data?
2. How are methods and constructors invoked?
3. What are parameters and how are they used?

CURRICULUM – Unit Plan

Course Title: AP Computer Science with Java

Unit Title: 9. Implementing Classes and Using Objects

Time Allocation: 3 weeks

Core Content Standards and Cumulative Progress Indicators:

8.1.12.A.1,5	8.2.12.A1	8.2.12.E,1	8.1.12.F.1
8.1.12.D.2	8.2.12.C.3	8.2.12.F.1,3	8.2.12.D.1
A.SSE.1a		S.ID	

Objectives:

- Compare/contrast *public* vs. *private* data
- Instruct how to create constructors
- Determine how to define methods
- Show how to invoke methods and access fields
- Demonstrate how to "pass" data through parameters
- Demonstrate "overloaded" methods

A. CONTENT/SKILLS	B. LEARNING ACTIVITIES	C. SUGGESTED MATERIALS	D. STUDENT EVALUATION
Public vs. *private* features of a class Constructors References to objects Defining methods Calling methods & accessing fields Passing parameters to constructors and methods The *return* statement Case Study & Lab: Snack Bar Overloaded methods Static fields and methods Case Study & Lab: Snack Bar Concluded	Students read Chapter 9 Discuss *private* vs. *public* data and reasons for each Notes on references to objects Demonstrate defining methods Discuss calling methods and accessing fields Demonstrate parameter passing to constructors and methods Notes on the use of the *return* statement Case study & lab: Snack Bar Notes on static fields and methods Notes on overloading methods Case study & lab: Snack Bar Concluded Students complete review questions Quiz Unit Test	**Text**: Java Methods A & AB, Litvin & Litvin, Skylight Software, Inc., Massachusetts, 2006. **Software**: MetroWerks CodeWarrior Academic version 8 or later, Apple Server software and Remote Desktop software. **Equipment**: Macintosh computer system for each student with above software installed, on each computer, a dedicated classroom server containing ANAT software, video projection system on large 10' screen, markerboards and dry-erase pens.	Successful and timely completion of homework assignments Successful and timely completion of worksheets Successful and timely completion of methods and programming assignments Successful and timely maintenance of a separate class reference/notebook, including all classroom notes, worksheets, homework, programs, etc., and a "Topical Index" updated daily. Quizzes evaluating student proficiency in writing methods dealing with topics of the chapter Unit test evaluating student understanding of the concepts covered in the chapter reading assignments and notes, and in the programming assignments

Unit Modifications for Special Population Students:

Struggling Learners	Gifted and Talented Students (Challenge Activities)	English Language Learners	Learners with an IEP	Learners with a 504
Rephrase questions for student clarification.	Ask reflective and extension questions to build on classroom knowledge to develop a deeper understanding.	Use a translator device.	Each special education student has in Individualized Educational Plan (IEP) that details the specific accommodations, modifications, services, and support needed to level the playing field. This will enable that student to access the curriculum to the greatest extent possible in the least restrictive environment. These include: • Variation of time: adapting the time allotted for learning, task completion, or testing • Variation of input: adapting the way instruction is delivered • Variation of output: adapting how a student can respond to instruction • Variation of size: adapting the number of items the student is expected to complete • Modifying the content, process or product Additional resources are outlined to facilitate appropriate behavior and increase student engagement. The most frequently used modifications and accommodations can be viewed here. Teachers are encouraged to use the Understanding by Design Learning Guidelines (UDL). These guidelines offer a set of concrete suggestions that can be applied to any discipline to ensure that all learners can access and participate in learning opportunities. The framework can be viewed here www.udlguidelines.cast.org	Refer to page four in the Parent and Educator Resource Guide to Section 504 to assist in the development of appropriate plans.
Preferential seating – close proximity to teacher.	Pose “What if…” questions.	Provide access to language dictionary, instructor, or any other means to help interpret any language/communication difficulties.		
Redirect student attention.	Have the students share their knowledge	Rephrase questions for student clarification.		
After school availability for help.		Have student create vocabulary flash cards in addition to topical index.		
Internet resources (videos on topic, websites relevant to the particular topic, etc.).				

Unit Overview

Course Title: Advanced Placement Computer Science with Java

Unit #: **UNIT 10 OVERVIEW** **Unit Title:** Strings

Unit Description:
Intensive study of the String class, it methods, and string treatment and manipulation.

Enduring Understandings/Generalizations

Students will understand that:
The String class is not primitive and needs to be treated differently.
Numbers can be converted into Strings and numbers can be extracted from Strings.
The String class has plentiful methods useful in String manipulations to achieve desired effects

Guiding Questions

1. How does the String class differ in treatment and handling from the primitive data types?
2. Enumerate the String class methods and explain their usefulness in String manipulation

CURRICULUM – Unit Plan

Course Title: AP Computer Science with Java

Unit Title: 10. Strings

Time Allocation: 3 weeks

Core Content Standards and Cumulative Progress Indicators:

8.1.12.A.1,5	8.2.12.A1	8.2.12.E,1	8.1.12.F.1
8.1.12.D.2	8.2.12.C.3	8.2.12.F.1,3	8.2.12.D.1
A.SSE.1a			

Objectives:

- Differentiate between literal strings and the String data type
- Examine the String constructor methods
- Discuss the "immutability" of Strings
- Examine the String manipulation methods
- Learn how to format numbers into Strings
- Learn how to extract numbers from Strings
- Discuss the character methods of the String class

A. CONTENT/SKILLS	B. LEARNING ACTIVITIES	C. SUGGESTED MATERIALS	D. STUDENT EVALUATION
Literal Strings *String* constructors & Immutability *String* methods Formatting numbers into Strings Extracting numbers from Strings *Character* methods Lab: Lipograms The *StringBuffer* class	Students read Chapter 10 Differentiate literal Strings from the *String* data type Examine *String* constructors and discuss their immutability List and demonstrate uses of the *String* class methods Demonstrate formatting numbers into Strings Demonstrate extracting numbers from Strings List and demonstrate uses of the *Character* methods Students work through Lab: Lipograms Students complete review questions Quiz Unit Test	**Text**: Java Methods A & AB, Litvin & Litvin, Skylight Software, Inc., Massachusetts, 2006. **Software**: MetroWerks CodeWarrior Academic version 8 or later, Apple Server software and Remote Desktop software. **Equipment**: Macintosh computer system for each student with above software installed, on each computer, a dedicated classroom server containing ANAT software, video projection system on large 10' screen, markerboards and dry-erase pens.	Successful and timely completion of homework assignments Successful and timely completion of worksheets Successful and timely completion of methods and programming assignments Successful and timely maintenance of a separate class reference/notebook, including all classroom notes, worksheets, homework, programs, etc., and a "Topical Index" updated daily. Quizzes evaluating student proficiency in writing methods dealing with topics of the chapter Unit test evaluating student understanding of the concepts covered in the chapter reading assignments and notes, and in the programming assignments

Unit Modifications for Special Population Students:

Struggling Learners	Gifted and Talented Students (Challenge Activities)	English Language Learners	Learners with an IEP	Learners with a 504
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Redirect student attention.	Have the students share their knowledge	Rephrase questions for student clarification.		
After school availability for help.		Have student create vocabulary flash cards in addition to topical index.		
Internet resources (videos on topic, websites relevant to the particular topic, etc.).				

Unit Overview

Course Title: Advanced Placement Computer Science with Java

Unit #: **UNIT 11 OVERVIEW** **Unit Title:** Class Hierarchies and Interfaces

Unit Description:
Illustrates the concepts of class hierarchies, polymorphism, superclasses and subclasses and how they interface.

Enduring Understandings/Generalizations

Students will understand that:
Classes are frequently defined as “subclasses” from other “superclasses”
“Polymorphism” is an important aspect of object-oriented languages

Guiding Questions

1. What is “polymorphism?”
2. What is the relationship between ‘subclasses” and “superclasses?”
3. How do you access superclasses constructors & methods?

CURRICULUM – Unit Plan

Course Title: AP Computer Science with Java

Unit Title: 11. Class Hierarchies and Interfaces

Time Allocation: 3 weeks

Core Content Standards and Cumulative Progress Indicators:

8.1.12.A.1,5	8.2.12.A1	8.2.12.E,1	8.1.12.F.1	
8.1.12.D.2	8.2.12.C.3	8.2.12.F.1,3	8.2.12.D.1	
A.SSE.1a	F.IF4	S.ID		

Objectives:

- Define and demonstrate "polymorphism"
- Observe class hierarchies
- Demonstrate abstract classes
- Learn how to invoke superclasses' constructors & methods
- Demonstrate the use of interfaces

A. CONTENT/SKILLS	B. LEARNING ACTIVITIES	C. SUGGESTED MATERIALS	D. STUDENT EVALUATION
Class hierarchies Polymorphism Abstract classes Invoking superclass's constructors Calling superclass's methods Case Study: Dance Studio Interfaces Case Study: Dance Studio Concluded	Students read Chapter 11 Define polymorphism Demonstrate class hierarchies Discuss and provide samples of abstract classes Demonstrate how to invoke super-Class' constructors and methods Students work though case study: Dance Studio Notes on interfaces Students work through case study: Dance Studio Concluded Students complete review questions Quiz Unit Test	**Text**: Java Methods A & AB, Litvin & Litvin, Skylight Software, Inc., Massachusetts, 2006. **Software**: MetroWerks CodeWarrior Academic version 8 or later, Apple Server software and Remote Desktop software. **Equipment**: Macintosh computer system for each student with above software installed, on each computer, a dedicated classroom server containing ANAT software, video projection system on large 10' screen, markerboards and dry-erase pens.	Successful and timely completion of homework assignments Successful and timely completion of worksheets Successful and timely completion of methods and programming assignments Successful and timely maintenance of a separate class reference/notebook, including all classroom notes, worksheets, homework, programs, etc., and a "Topical Index" updated daily. Quizzes evaluating student proficiency in writing methods dealing with topics of the chapter Unit test evaluating student understanding of the concepts covered in the chapter reading assignments and notes, and in the programming assignments

Unit Modifications for Special Population Students:

Struggling Learners	Gifted and Talented Students (Challenge Activities)	English Language Learners	Learners with an IEP	Learners with a 504
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Redirect student attention.	Have the students share their knowledge	Rephrase questions for student clarification.		
After school availability for help.		Have student create vocabulary flash cards in addition to topical index.		
Internet resources (videos on topic, websites relevant to the particular topic, etc.).				

Unit Overview

Course Title: Advanced Placement Computer Science with Java

Unit #: **UNIT 12 OVERVIEW** **Unit Title:** Arrays and ArrayLists

Unit Description:
Examines the use of arrays and ArrayLists, distinguishing their differences.

Enduring Understandings/Generalizations

Students will understand that:
Arrays are very useful in data organization
ArrayLists have advantages and disadvantages over arrays
Arrays and ArrayLists can be added to & deleted from

Guiding Questions

1. What is an array?
2. What is an ArrayList and how does it differ from an array?
3. How are arrays and ArrayLists declared, loaded, manipulated, and displayed?
4. How do you add data to an array or ArrayList?
5. How do you delete data from an array or ArrrayList?

CURRICULUM – Unit Plan

Course Title: AP Computer Science with Java

Unit Title: 12. Arrays and ArrayLists

Time Allocation: 4 weeks

Core Content Standards and Cumulative Progress Indicators:

8.1.12.A.1,5	8.2.12.A1	8.2.12.E,1	8.1.12.F.1
8.1.12.D.2	8.2.12.C.3	8.2.12.F.1,3	8.2.12.D.1
A.SSE.1a	F.IF4	S.ID	

Objectives:

- Examine, create and use one-dimensional arrays
- Examine the ArrayList class, and compare/contrast it to arrays
- Learn the ArrayLists constructors and methods
- Enumerate the ArrayList's pitfalls
- Using the "for each" loop
- Insert and delete elements from arrays and ArrayLists
- Examine, create and use two-dimensional arrays

A. CONTENT/SKILLS	B. LEARNING ACTIVITIES	C. SUGGESTED MATERIALS	D. STUDENT EVALUATION
One-dimensional arrays Lab: Fortune Teller The *ArrayList* class *ArrayList*'s constructors & methods *ArrayList*'s pitfalls Iterations and the "for each" loop Inserting and removing elements Lab: Creating An Index For a Document Two-dimensional arrays Case study & lab: Chomp	Students read Chapter 12 Notes on one-dimensional arrays and their usefulness Students work through lab: Fortune Teller Notes on the *ArrayList* class Examine *ArrayList*'s constructors and methods Notes on iterations and the "for each" loop Demonstrate how to insert and delete elements Students work through lab: Creating An Index For A Document Notes on two-dimensional arrays Students complete review questions Quiz Unit Test	**Text**: Java Methods A & AB, Litvin & Litvin, Skylight Software, Inc., Massachusetts, 2006. **Software**: MetroWerks CodeWarrior Academic version 8 or later, Apple Server software and Remote Desktop software. **Equipment**: Macintosh computer system for each student with above software installed, on each computer, a dedicated classroom server containing ANAT software, video projection system on large 10' screen, markerboards and dry-erase pens.	Successful and timely completion of homework assignments Successful and timely completion of worksheets Successful and timely completion of methods and programming assignments Successful and timely maintenance of a separate class reference/notebook, including all classroom notes, worksheets, homework, programs, etc., and a "Topical Index" updated daily. Quizzes evaluating student proficiency in writing methods dealing with topics of the chapter Unit test evaluating student understanding of the concepts covered in the chapter reading assignments and notes, and in the programming assignments

Unit Modifications for Special Population Students:

Struggling Learners	Gifted and Talented Students (Challenge Activities)	English Language Learners	Learners with an IEP	Learners with a 504
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Redirect student attention.	Have the students share their knowledge	Rephrase questions for student clarification.		
After school availability for help.		Have student create vocabulary flash cards in addition to topical index.		
Internet resources (videos on topic, websites relevant to the particular topic, etc.).				

Unit Overview

Course Title: Advanced Placement Computer Science with Java

Unit #: **UNIT 13 OVERVIEW** **Unit Title:** Searching and Sorting

Unit Description:
Demonstrates, compares and contrasts the “classic” searching and sorting techniques

Enduring Understandings/Generalizations

Students will understand that:
There is a “best” method of searching an array or ArrayList depending on the criteria and data.
There is a “best” method of sorting an array or ArrayList depending on the criteria and data.

Guiding Questions

1. What are advantages of the binary search over the sequential search?
2. Compare/contrast the various sorts studied.

CURRICULUM – Unit Plan

Course Title: AP Computer Science with Java

Unit Title: 13. Searching and Sorting

Time Allocation: 4 weeks

Core Content Standards and Cumulative Progress Indicators:

8.1.12.A.1,5	8.2.12.A1	8.2.12.E,1	8.1.12.F.1
8.1.12.D.2	8.2.12.C.3	8.2.12.F.1,3	8.2.12.D.1
A.SSE.1a			

Objectives:

- Learning how to use the *equals, compareTo,* and *compare* methods
- Differentiate between the sequential and binary search
- Compare/contrast the various "classic" sorting methods

A. CONTENT/SKILLS	B. LEARNING ACTIVITIES	C. SUGGESTED MATERIALS	D. STUDENT EVALUATION
The *equals, compareTo,* and *compare* methods Sequential and binary search Lab: Keeping Things In Order Selection sort Insertion sort Mergesort Quicksort Lab: Benchmarks *java.util.Arrays* *java.util.Collections*	Students read Chapter Demonstrate the *equals, compareTo,* and *compare* methods Compare/contrast sequential and binary searches Student work through lab: Keeping Things In Order Demonstrate selection sort Demonstrate insertion sort Demonstrate Mergesort Demonstrate Quicksort Students work through Lab: Benchmarks Students complete review questions Quiz Unit Test	**Text**: Java Methods A & AB, Litvin & Litvin, Skylight Software, Inc., Massachusetts, 2006. **Software**: MetroWerks CodeWarrior Academic version 8 or later, Apple Server software and Remote Desktop software. **Equipment**: Macintosh computer system for each student with above software installed, on each computer, a dedicated classroom server containing ANAT software, video projection system on large 10' screen, markerboards and dry-erase pens.	Successful and timely completion of homework assignments Successful and timely completion of worksheets Successful and timely completion of methods and programming assignments Successful and timely maintenance of a separate class reference/notebook, including all classroom notes, worksheets, homework, programs, etc., and a "Topical Index" updated daily. Quizzes evaluating student proficiency in writing methods dealing with topics of the chapter Unit test evaluating student understanding of the concepts covered in the chapter reading assignments and notes, and in the programming assignments

Unit Modifications for Special Population Students:

Struggling Learners	Gifted and Talented Students (Challenge Activities)	English Language Learners	Learners with an IEP	Learners with a 504
Rephrase questions for student clarification.	Ask reflective and extension questions to build on classroom knowledge to develop a deeper understanding.	Use a translator device.	Each special education student has in Individualized Educational Plan (IEP) that details the specific accommodations, modifications, services, and support needed to level the playing field. This will enable that student to access the curriculum to the greatest extent possible in the least restrictive environment. These include: • Variation of time: adapting the time allotted for learning, task completion, or testing • Variation of input: adapting the way instruction is delivered • Variation of output: adapting how a student can respond to instruction • Variation of size: adapting the number of items the student is expected to complete • Modifying the content, process or product Additional resources are outlined to facilitate appropriate behavior and increase student engagement. The most frequently used modifications and accommodations can be viewed here. Teachers are encouraged to use the Understanding by Design Learning Guidelines (UDL). These guidelines offer a set of concrete suggestions that can be applied to any discipline to ensure that all learners can access and participate in learning opportunities. The framework can be viewed here www.udlguidelines.cast.org	Refer to page four in the Parent and Educator Resource Guide to Section 504 to assist in the development of appropriate plans.
Preferential seating – close proximity to teacher.	Pose “What if…” questions.	Provide access to language dictionary, instructor, or any other means to help interpret any language/communication difficulties.		
Redirect student attention.	Have the students share their knowledge	Rephrase questions for student clarification.		
After school availability for help.		Have student create vocabulary flash cards in addition to topical index.		
Internet resources (videos on topic, websites relevant to the particular topic, etc.).				

Unit Overview

Course Title: Advanced Placement Computer Science with Java

Unit #: **UNIT 14 OVERVIEW** **Unit Title:** Streams and Files

Unit Description:
Demonstrates disk access: reading and writing text files

Enduring Understandings/Generalizations

Students will understand that:
Text files are used frequently
It is important to learn how to read and write text files to disk

Guiding Questions

1. How do you read a text file from a disk?
2. How do you create and write text files to a disk?

CURRICULUM – Unit Plan

Course Title: AP Computer Science with Java

Unit Title: 14. Streams and Files

Time Allocation: 2 weeks

Core Content Standards and Cumulative Progress Indicators:

8.1.12.A.1,5	8.2.12.A1	8.2.12.E,1	8.1.12.F.1
8.1.12.D.2	8.2.12.C.3	8.2.12.F.1,3	8.2.12.D.1
A.SSE.1a			

Objectives:

- Learn to use pathnames
- Learn to use the *java.io.File* class
- Learn how to read a text file on a disk
- Learn how to write a text file to a disk

A. CONTENT/SKILLS	B. LEARNING ACTIVITIES	C. SUGGESTED MATERIALS	D. STUDENT EVALUATION
Pathnames The *java.io.File* class Reading from a text file Writing to a text file Lab: Choosing Words	Students read Chapter Notes on and examine pathnames Discuss the *java.io.File* class Notes on reading from a text file Notes on writing to a text file Students work through Lab: Choosing Words Students do review questions Quiz Unit Test	**Text**: Java Methods A & AB, Litvin & Litvin, Skylight Software, Inc., Massachusetts, 2006. **Software**: MetroWerks CodeWarrior Academic version 8 or later, Apple Server software and Remote Desktop software. **Equipment**: Macintosh computer system for each student with above software installed, on each computer, a dedicated classroom server containing ANAT software, video projection system on large 10' screen, markerboards and dry-erase pens.	Successful and timely completion of homework assignments Successful and timely completion of worksheets Successful and timely completion of methods and programming assignments Successful and timely maintenance of a separate class reference/notebook, including all classroom notes, worksheets, homework, programs, etc., and a "Topical Index" updated daily. Quizzes evaluating student proficiency in writing methods dealing with topics of the chapter Unit test evaluating student understanding of the concepts covered in the chapter reading assignments and notes, and in the programming assignments

Unit Modifications for Special Population Students:

Struggling Learners	Gifted and Talented Students (Challenge Activities)	English Language Learners	Learners with an IEP	Learners with a 504
Rephrase questions for student clarification.	Ask reflective and extension questions to build on classroom knowledge to develop a deeper understanding.	Use a translator device.	Each special education student has in Individualized Educational Plan (IEP) that details the specific accommodations, modifications, services, and support needed to level the playing field. This will enable that student to access the curriculum to the greatest extent possible in the least restrictive environment. These include: • Variation of time: adapting the time allotted for learning, task completion, or testing • Variation of input: adapting the way instruction is delivered • Variation of output: adapting how a student can respond to instruction • Variation of size: adapting the number of items the student is expected to complete • Modifying the content, process or product Additional resources are outlined to facilitate appropriate behavior and increase student engagement. The most frequently used modifications and accommodations can be viewed here. Teachers are encouraged to use the Understanding by Design Learning Guidelines (UDL). These guidelines offer a set of concrete suggestions that can be applied to any discipline to ensure that all learners can access and participate in learning opportunities. The framework can be viewed here www.udlguidelines.cast.org	Refer to page four in the Parent and Educator Resource Guide to Section 504 to assist in the development of appropriate plans.
Preferential seating – close proximity to teacher.	Pose “What if…” questions.	Provide access to language dictionary, instructor, or any other means to help interpret any language/communication difficulties.		
Redirect student attention.	Have the students share their knowledge	Rephrase questions for student clarification.		
After school availability for help.		Have student create vocabulary flash cards in addition to topical index.		
Internet resources (videos on topic, websites relevant to the particular topic, etc.).				

Unit Overview

Course Title: Advanced Placement Computer Science with Java

Unit #: **UNIT Supplement OVERVIEW** **Unit Title:** AP Computer Science “Case Study”

Unit Description:

Work through, become familiar with, and be able to manipulate & change the “official” Advanced Placement Computer Science “Case Study,” required as part of the AP Computer Science Examination

Enduring Understandings/Generalizations

Students will understand that:

The AP Computer Science Case Study is a significant part of the AP Computer Science Examination
The students are required to become very familiar with the case study and be able to modify it to give specifications

Guiding Questions

1. What is the significance of the AP Computer Science case study?
2. How is it put together
3. How would you modify it to given specifications?

CURRICULUM – Unit Plan

Course Title: AP Computer Science with Java

Unit Title: Supplement: Advance Placement Computer Science Case Study

Time Allocation: 5 weeks

Core Content Standards and Cumulative Progress Indicators:

8.1.12.A.1,5	8.2.12.A1	8.2.12.E,1	8.1.12.F.1
8.1.12.D.2	8.2.12.C.3	8.2.12.F.1,3	8.2.12.D.1

Objectives:

- To become familiar with the AP Computer Science case study
- To understand how all of its components interact with one another
- To be able to modify the case study to meet design criteria

A. CONTENT/SKILLS	B. LEARNING ACTIVITIES	C. SUGGESTED MATERIALS	D. STUDENT EVALUATION
AP Computer Science Case Study Become familiar with all of its components Modify it to meet given specifications	Students read through the Case Study Students work through the questions in each chapter Students work through the modification labs Students actively participate in the "role play" of the case study Students complete sample AP questions regarding the case study Students do review questions Quiz Unit Test	**Text**: Java Methods A & AB, Litvin & Litvin, Skylight Software, Inc., Massachusetts, 2006. **Software**: MetroWerks CodeWarrior Academic version 8 or later, Apple Server software and Remote Desktop software. **Equipment**: Macintosh computer system for each student with above software installed, on each computer, a dedicated classroom server containing ANAT software, video projection system on large 10' screen, markerboards and dry-erase pens.	Successful and timely completion of homework assignments Successful and timely completion of worksheets Successful and timely completion of methods and programming assignments Successful and timely maintenance of a separate class reference/notebook, including all classroom notes, worksheets, homework, programs, etc., and a "Topical Index" updated daily. Quizzes evaluating student proficiency in writing methods dealing with topics of the chapter Unit test evaluating student understanding of the concepts covered in the chapter reading assignments and notes, and in the programming assignments

Unit Modifications for Special Population Students:

Struggling Learners	Gifted and Talented Students (Challenge Activities)	English Language Learners	Learners with an IEP	Learners with a 504
Rephrase questions for student clarification.	Ask reflective and extension questions to build on classroom knowledge to develop a deeper understanding.	Use a translator device.	Each special education student has in Individualized Educational Plan (IEP) that details the specific accommodations, modifications, services, and support needed to level the playing field. This will enable that student to access the curriculum to the greatest extent possible in the least restrictive environment. These include: • Variation of time: adapting the time allotted for learning, task completion, or testing • Variation of input: adapting the way instruction is delivered • Variation of output: adapting how a student can respond to instruction • Variation of size: adapting the number of items the student is expected to complete • Modifying the content, process or product Additional resources are outlined to facilitate appropriate behavior and increase student engagement. The most frequently used modifications and accommodations can be viewed here. Teachers are encouraged to use the Understanding by Design Learning Guidelines (UDL). These guidelines offer a set of concrete suggestions that can be applied to any discipline to ensure that all learners can access and participate in learning opportunities. The framework can be viewed here www.udlguidelines.cast.org	Refer to page four in the Parent and Educator Resource Guide to Section 504 to assist in the development of appropriate plans.
Preferential seating – close proximity to teacher.	Pose “What if…” questions.	Provide access to language dictionary, instructor, or any other means to help interpret any language/communication difficulties.		
Redirect student attention.	Have the students share their knowledge	Rephrase questions for student clarification.		
After school availability for help.		Have student create vocabulary flash cards in addition to topical index.		
Internet resources (videos on topic, websites relevant to the particular topic, etc.).				

Unit Overview

Course Title: Advanced Placement Computer Science with Java

Unit #: **UNIT 15 OVERVIEW** **Unit Title:** Graphics

Unit Description:
Demonstrates the availability and use of graphics units available in Java

Enduring Understandings/Generalizations

Students will understand that:
Graphics can be created and modified in Java

Guiding Questions

1. What classes/methods are available for creating graphics in Java
2. How are they used in conjunction with each other to create graphics of given criteria?

CURRICULUM – Unit Plan

Course Title: AP Computer Science with Java

Unit Title: 15. Graphics

Time Allocation: 4 weeks

Core Content Standards and Cumulative Progress Indicators:

8.1.12.A.1,5	8.2.12.A1	8.2.12.E,1	8.1.12.F.1	
8.1.12.D.2	8.2.12.C.3	8.2.12.F.1,3	8.2.12.D.1	
A.SSE.1a	F.IF4	G.MD1,3		

Objectives:

- Learn the coordinates of the graphics window
- Use the *paint, paintComponent,* and *repaint* methods
- Learn how to choose and use colors in graphics
- Learn how to draw shapes
- Learn how to change fonts and add text to graphics

A. CONTENT/SKILLS	B. LEARNING ACTIVITIES	C. SUGGESTED MATERIALS	D. STUDENT EVALUATION
The *paint, paintComponent,* and *repaint* methods Coordinates Colors Drawing Shapes Fonts and text Case Study and Lab: Pieces Of The Puzzle	Students read Chapter 15 Notes on the *paint, paintComponent,* and *repaint* methods Notes on the coordinates of the graphics window Demonstrate drawing shapes Notes on changing fonts and adding text to graphics Students work though Case Study and Lab: Pieces of the Puzzle Students complete review questions Quiz Unit Test	**Text**: Java Methods A & AB, Litvin & Litvin, Skylight Software, Inc., Massachusetts, 2006. **Software**: MetroWerks CodeWarrior Academic version 8 or later, Apple Server software and Remote Desktop software. **Equipment**: Macintosh computer system for each student with above software installed, on each computer, a dedicated classroom server containing ANAT software, video projection system on large 10' screen, markerboards and dry-erase pens.	Successful and timely completion of homework assignments Successful and timely completion of worksheets Successful and timely completion of methods and programming assignments Successful and timely maintenance of a separate class reference/notebook, including all classroom notes, worksheets, homework, programs, etc., and a "Topical Index" updated daily. Quizzes evaluating student proficiency in writing methods dealing with topics of the chapter Unit test evaluating student understanding of the concepts covered in the chapter reading assignments and notes, and in the programming assignments

Unit Modifications for Special Population Students:

Struggling Learners	Gifted and Talented Students (Challenge Activities)	English Language Learners	Learners with an IEP	Learners with a 504
Rephrase questions for student clarification.	Ask reflective and extension questions to build on classroom knowledge to develop a deeper understanding.	Use a translator device.	Each special education student has in Individualized Educational Plan (IEP) that details the specific accommodations, modifications, services, and support needed to level the playing field. This will enable that student to access the curriculum to the greatest extent possible in the least restrictive environment. These include: • Variation of time: adapting the time allotted for learning, task completion, or testing • Variation of input: adapting the way instruction is delivered • Variation of output: adapting how a student can respond to instruction • Variation of size: adapting the number of items the student is expected to complete • Modifying the content, process or product Additional resources are outlined to facilitate appropriate behavior and increase student engagement. The most frequently used modifications and accommodations can be viewed here. Teachers are encouraged to use the Understanding by Design Learning Guidelines (UDL). These guidelines offer a set of concrete suggestions that can be applied to any discipline to ensure that all learners can access and participate in learning opportunities. The framework can be viewed here www.udlguidelines.cast.org	Refer to page four in the Parent and Educator Resource Guide to Section 504 to assist in the development of appropriate plans.
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Redirect student attention.	Have the students share their knowledge	Rephrase questions for student clarification.		
After school availability for help.		Have student create vocabulary flash cards in addition to topical index.		
Internet resources (videos on topic, websites relevant to the particular topic, etc.).				

Unit Overview

Course Title: Advanced Placement Computer Science with Java

Unit #: **UNIT 16 OVERVIEW** **Unit Title:** GUI Components and Events

Unit Description:
Examines the Graphical User Interface and its usage

Enduring Understandings/Generalizations

Students will understand that:
The GUI is available to make graphical interface connections between programs and user interactions

Guiding Questions

1. What GUI components are available to help support user interaction?
2. How are they invoked and implemented?

CURRICULUM – Unit Plan

Course Title: AP Computer Science with Java

Unit Title: 16. GUI Components and Events

Time Allocation: 3 weeks

Core Content Standards and Cumulative Progress Indicators:

8.1.12.A.1,5	8.2.12.A1	8.2.12.E,1	8.1.12.F.1
8.1.12.D.2	8.2.12.C.3	8.2.12.F.1,3	8.2.12.D.1
A.SSE.1a		G.MD1,3	

Objectives:

• Using the GUI components and events to make graphic user interfacing easier

A. CONTENT/SKILLS	B. LEARNING ACTIVITIES	C. SUGGESTED MATERIALS	D. STUDENT EVALUATION
Pluggable look and feel Basic *Swing* components and their events Layouts Menus Case Study and Lab: The Ramblecs Game	Students read Chapter 16 Notes on the GUI components Demonstrate use of the components and their events Demonstrate layouts and menus Students work through Case Study And Lab: The Ramblecs Game Students complete review questions Quiz Unit Test	**Text**: Java Methods A & AB, Litvin & Litvin, Skylight Software, Inc., Massachusetts, 2006. **Software**: MetroWerks CodeWarrior Academic version 8 or later, Apple Server software and Remote Desktop software. **Equipment**: Macintosh computer system for each student with above software installed, on each computer, a dedicated classroom server containing ANAT software, video projection system on large 10' screen, markerboards and dry-erase pens.	Successful and timely completion of homework assignments Successful and timely completion of worksheets Successful and timely completion of methods and programming assignments Successful and timely maintenance of a separate class reference/notebook, including all classroom notes, worksheets, homework, programs, etc., and a "Topical Index" updated daily. Quizzes evaluating student proficiency in writing methods dealing with topics of the chapter Unit test evaluating student understanding of the concepts covered in the chapter reading assignments and notes, and in the programming assignments

Unit Modifications for Special Population Students:

<table>
<tr><th>Struggling Learners</th><th>Gifted and Talented Students (Challenge Activities)</th><th>English Language Learners</th><th>Learners with an IEP</th><th>Learners with a 504</th></tr>
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Modifying the content, process or product
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</table>

Unit Overview

Course Title: Advanced Placement Computer Science with Java

Unit #: **UNIT 17 OVERVIEW** **Unit Title:** Mouse, Keyboard, Sounds and Images

Unit Description:
Provides information on how to access the mouse and keyboard to make sounds and images.

Enduring Understandings/Generalizations

Students will understand that:
There are methods useful in mouse and keyboard user-interaction.
They are useful in creating seamless user/program interaction, in making sounds and accessing images.

Guiding Questions

1. What methods are available to observing mouse and keyboard interaction?
2. How can the be tied to sound and image activations?

CURRICULUM – Unit Plan

Course Title: AP Computer Science with Java

Unit Title: 17. Mouse, Keyboard, Sounds and Images

Time Allocation: 3 weeks

Core Content Standards and Cumulative Progress Indicators:

8.1.12.A.1,5	8.2.12.A1	8.2.12.E,1	8.1.12.F.1
8.1.12.D.2	8.2.12.C.3	8.2.12.F.1,3	8.2.12.D.1
A.SSE.1a			

Objectives:

- Learning how to handle mouse events
- Learn how to handle keyboard events
- Learn how to add sounds and images to programs based on user-interactions

A. CONTENT/SKILLS	B. LEARNING ACTIVITIES	C. SUGGESTED MATERIALS	D. STUDENT EVALUATION
Mouse events handling Keyboard events handling Case Study and Lab: Drawing Editor Sounds and images Case Study and Lab: Ramblecs Concluded	Students read Chapter 17 Notes on mouse and keyboard Events Demonstrate use of these events Students work through Case Study and Lab: Drawing Editor Notes on adding sounds and images to user-interactive programs Students work through Case Study and Lab: Ramblecs Concluded Students complete review questions Quiz Unit Test	**Text**: Java Methods A & AB, Litvin & Litvin, Skylight Software, Inc., Massachusetts, 2006. **Software**: MetroWerks CodeWarrior Academic version 8 or later, Apple Server software and Remote Desktop software. **Equipment**: Macintosh computer system for each student with above software installed, on each computer, a dedicated classroom server containing ANAT software, video projection system on large 10' screen, markerboards and dry-erase pens.	Successful and timely completion of homework assignments Successful and timely completion of worksheets Successful and timely completion of methods and programming assignments Successful and timely maintenance of a separate class reference/notebook, including all classroom notes, worksheets, homework, programs, etc., and a "Topical Index" updated daily. Quizzes evaluating student proficiency in writing methods dealing with topics of the chapter Unit test evaluating student understanding of the concepts covered in the chapter reading assignments and notes, and in the programming assignments

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Internet resources (videos on topic, websites relevant to the particular topic, etc.).				

Cross-Content Standards Analysis

Course Title: Advanced Placement Computer Science with Java **Grade:** 9-12

Unit Title:	Visual and Performing Arts	Comp. Health & Physical Ed.	Language Arts Literacy	Mathematics	Science	Social Studies	World Languages	Technology	21st Century Life & Career Skills
1. Introduction to Hardware, Software and the Internet			W.11-12.1, 4 SL. 11-12.1 RST.11-12.3-5		5.1.12.B.2				9.1.12.A.1 9.1.12.B.1-3 9.1.12.F.2 9.4.12.A.2,5,12,16
2. Introduction to Software Development			W.11-12.1, 4 SL. 11-12.1 RST.11-12.3-5		5.1.12.B.2				9.1.12.A.1 9.1.12.B.1-3 9.1.12.F.2 9.4.12.A.2,5,12,16
3. Objects and Classes			W.11-12.1, 4 SL. 11-12.1 RST.11-12.3-5		5.1.12.B.2				9.1.12.A.1 9.1.12.B.1-3 9.1.12.F.2 9.4.12.A.2,5,12,16
4. Algorithms			W.11-12.1, 4 SL. 11-12.1 RST.11-12.3-5		5.1.12.B.2				9.1.12.A.1 9.1.12.B.1-3 9.1.12.F.2 9.4.12.A.2,5,12,16
5. Java Syntax and Style			W.11-12.1, 4 SL. 11-12.1 RST.11-12.3-5		5.1.12.B.2				9.1.12.A.1 9.1.12.B.1-3 9.1.12.F.2 9.4.12.A.2,5,12,16
6. Data Types, Variables, and Arithmetic			W.11-12.1, 4 SL. 11-12.1 RST.11-12.3-5		5.1.12.B.2				9.1.12.A.1 9.1.12.B.1-3 9.1.12.F.2 9.4.12.A.2,5,12,16
7. Boolean Expressions			W.11-12.1, 4 SL. 11-12.1 RST.11-12.3-5		5.1.12.B.2				9.1.12.A.1 9.1.12.B.1-3 9.1.12.F.2 9.4.12.A.2,5,12,16

***All core content areas may not be applicable in a particular course.**

Cross-Content Standards Analysis

Course Title: Advanced Placement Computer Science with Java **Grade:** 9-12

Unit Title:	Visual and Performing Arts	Comp. Health & Physical Ed.	Language Arts Literacy	Mathematics	Science	Social Studies	World Languages	Technology	21st Century Life & Career Skills
8. Iterative Statements			W.11-12.1, 4 SL. 11-12.1 RST.11-12.3-5		5.1.12.B.2				9.1.12.A.1 9.1.12.B.1-3 9.1.12.F.2 9.4.12.A.2,5,12,16
9. Implementing Classes & Using Classes			W.11-12.1, 4 SL. 11-12.1 RST.11-12.3-5		5.1.12.B.2				9.1.12.A.1 9.1.12.B.1-3 9.1.12.F.2 9.4.12.A.2,5,12,16
10. Strings			W.11-12.1, 4 SL. 11-12.1 RST.11-12.3-5		5.1.12.B.2				9.1.12.A.1 9.1.12.B.1-3 9.1.12.F.2 9.4.12.A.2,5,12,16
11. Class Hierarchies and Interfaces			W.11-12.1, 4 SL. 11-12.1 RST.11-12.3-5		5.1.12.B.2				9.1.12.A.1 9.1.12.B.1-3 9.1.12.F.2 9.4.12.A.2,5,12,16
12. Arrays and ArrayLists			W.11-12.1, 4 SL. 11-12.1 RST.11-12.3-5		5.1.12.B.2				9.1.12.A.1 9.1.12.B.1-3 9.1.12.F.2 9.4.12.A.2,5,12,16
13. Searching and Sorting			W.11-12.1, 4 SL. 11-12.1 RST.11-12.3-5		5.1.12.B.2				9.1.12.A.1 9.1.12.B.1-3 9.1.12.F.2 9.4.12.A.2,5,12,16
14. Streams and Files			W.11-12.1, 4 SL. 11-12.1 RST.11-12.3-5		5.1.12.B.2				9.1.12.A.1 9.1.12.B.1-3 9.1.12.F.2 9.4.12.A.2,5,12,16

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Cross-Content Standards Analysis

Course Title: Advanced Placement Computer Science with Java **Grade:** 9-12

Unit Title:	Visual and Performing Arts	Comp. Health & Physical Ed.	Language Arts Literacy	Mathematics	Science	Social Studies	World Languages	Technology	21st Century Life & Career Skills
Supplement: AP Computer Science Case Study			W.11-12.1, 4 SL. 11-12.1 RST.11-12.3-5		5.1.12.B.2				9.1.12.A.1 9.1.12.B.1-3 9.1.12.F.2 9.4.12.A.2,5,12,16
15. Graphics			W.11-12.1, 4 SL. 11-12.1 RST.11-12.3-5		5.1.12.B.2				9.1.12.A.1 9.1.12.B.1-3 9.1.12.F.2 9.4.12.A.2,5,12,16
16. GUI Components and Events			W.11-12.1, 4 SL. 11-12.1 RST.11-12.3-5		5.1.12.B.2				9.1.12.A.1 9.1.12.B.1-3 9.1.12.F.2 9.4.12.A.2,5,12,16
17. Mouse, Keyboard, Sound & Images			W.11-12.1, 4 SL. 11-12.1 RST.11-12.3-5		5.1.12.B.2				9.1.12.A.1 9.1.12.B.1-3 9.1.12.F.2 9.4.12.A.2,5,12,16

***All core content areas may not be applicable in a particular course.**

Washington Township Public Schools
Department of Student Personnel Services

CURRICULUM MODIFICATION

The regular curriculum is modified for Special Education students enrolled in both self-contained and resource center classes.

Each special education student has in Individualized Educational Plan (IEP) that details the specific accommodations, modifications, services, and support needed to level the playing field. This will enable that student to access the curriculum to the greatest extent possible in the least restrictive environment. These include:

Variation of time: adapting the time allotted for learning, task completion, or testing
Variation of input: adapting the way instruction is delivered
Variation of output: adapting how a student can respond to instruction
Variation of size: adapting the number of items the student is expected to complete
Modifying the content, process or product

Additional resources are outlined to facilitate appropriate behavior and increase student engagement. The most frequently used modifications and accommodations can be viewed here.

Teachers are encouraged to use the Understanding by Design Learning Guidelines (UDL). These guidelines offer a set of concrete suggestions that can be applied to any discipline to ensure that all learners can access and participate in learning opportunities. The framework can be viewed here www.udlguidelines.cast.org