

WARREN COUNTY SCHOOL DISTRICT Planned Instruction

Course Title: AP Computer Science

Course Number: 00289

Suggested Educational Level(s): 11-12

Suggested Periods Per Week: 5 **Length of Period:** 40 minutes

Suggested Length Of Course: 180 days

Units Of Credit (If Appropriate): 1

Date Written: March 1, 2000 **Date Approved:** August 8, 2005

Date Reviewed: July 20, 2005 **Implementation Year:** 2005/2006

Teacher Certification Required: BS/BA Secondary Education/Mathematics

Standards Addressed (code): 2.1.11A 2.4.11A 2.5.11C 2.11.11A
2.2.11A 2.4.11D 2.5.11D 2.11.11B
2.3.11A 2.4.11E 2.8.11B 2.11.11C
2.3.11D 2.5.11A 2.8.11D 2.11.11D

Relationship to Other Planned Instruction: AP Computer Science is the second course of programming language.

Prerequisites: Computer Science (minimum grade of 85% required, or approval of teacher)

Special Requirements:

Students will have individual access to a classroom computer with a system that is capable of compiling large programs in a matter of seconds

Writing Team:
Members Susan Webber
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Members Virginia Barrett
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Standards addressed (code and description):

2.1.11 Numbers, Number Systems and Number Relationships

2.2.11 Computation and Estimation

2.3.11 Measurement and Estimation

2.4.11 Mathematical Reasoning and Connections

2.5.11 Mathematical Problem Solving and Communication

2.8.11 Algebra and Functions

2.11.11 Concepts of Calculus

COURSE DESCRIPTION

This course is comparable to a first-year course in computer science at the college level. It emphasizes the development of computer programs, while providing a more formal and in-depth study of algorithms, data structures, design, and abstraction. The course is intended to serve both as a course for students interested in majoring in computer science and as a course for students who will major in other disciplines that require significant involvement with technology. The course will follow the recommended syllabus for AP Computer Science A, with students prepared to write the AP Exam in the Spring.

Outline of Content Sequence and Recommended Time (weeks or days):

15 days	I.	Review of the basics of programming
15 days	II.	Review of control statements
20 days	III.	Implementing classes
20 days	IV.	Active objects
5 days	V.	Overview of the Marine Biology Simulation
35 days	VI.	Interfaces and polymorphism
30 days	VII.	Inheritance
30 days	VIII.	Modifying the Marine Biology Simulation
<u>10 days</u>	IX.	Review and test strategies
180 days		

Specific Educational Objectives to be Taught:

I. Review of the basics of programming (2.1.11A; 2.2.11 A; 2.4.11E; 2.5.11C; 2.8.11B,D)

- Using the developmental environment
- ObjectDraw library
- Declaring variables
- Classes
- Syntax error
- Numerical calculations
- Parameters
- Data types

II. Review of control statements (2.4.11C; 2.5.11B,C; 2.8.11D)

- Simple and compound Boolean expressions
- Use of various iterative statements
- Reading documentation and call methods

III. Implementing classes (2.1.11A; 2.2.11A; 2.3.11A,D; 2.4.11A,D,E; 2.5.11A,C,D; 2.8.11B,D; 2.11.11A,B,C,D)

- Static final variables
- Array lists
- Recursion
- Creating methods with appropriate parameter lists
- Writing constructors and implementing methods for a class
- Distinguish between instance variables, local variables, and formal parameters
- Write programs composed of at least two classes

IV. Active objects (2.1.11A; 2.2.11A; 2.3.11A,D; 2.4.11A,D,E; 2.5.11A,C,D; 2.8.11B,D; 2.11.11A,B,C,D)

- Review loops
- Writing methods
- Appropriate use of while loops
- Writing programs with multiple classes

V. Overview of Marine Biology Simulation (2.4.11A; 2.5.11A)

- Expose students to the case study
- Develop test cases to evaluate the program

VI. Interfaces and polymorphism (2.1.11A; 2.2.11A; 2.3.11A,D; 2.4.11A,D,E; 2.5.11A,C,D; 2.8.11B,D; 2.11.11A,B,C,D)

- Developing reusable solutions
- Converting between types
- Polymorphism
- Using a strategy interface for improving reusability
- Access control
- Graphical user interfaces (optional)

VII. Inheritance (2.1.11A; 2.2.11A; 2.3.11A,D; 2.4.11A,D,E; 2.5.11A,C,D; 2.8.11B,D; 2.11.11A,B,C,D)

- Inheritance hierarchies
- Inheriting instance fields and methods
- Subclass construction
- Converting from subclasses to superclasses
- Access control
- Examine the code for the Marine Biology Simulation
- Graphical user interfaces (optional)

VIII. Modifying the Marine Biology Simulation (2.1.11A; 2.2.11A; 2.3.11A,D; 2.4.11A,D,E; 2.5.11A,C,D; 2.8.11B,D; 2.11.11A,B,C,D)

- Lab activities to modify the case study
- Write a class that extends another class in the case study
- Use inheritance to modify the case study

Summative Assessments:

No formal summative assessment is required.

Required/Approved Textbooks and Materials:

Book Title: Computing Concepts With Java Essentials

Publisher: John Wiley & Sons, Inc.

ISBN #: 0-471-24371-X

Copyright: 2003

Date of Adoption: August, 2004

Book Title: Computing Concepts With Java Essential, Advanced Placement Computer Science Study Guide.

Publisher: John Wiley & Sons, Inc.

ISBN#: 0-471-44939-3

Copyright: 2004

Date of Adoption: August 2004

Book Title: 125 Multiple-Choice Questions in Java

Publisher: Skylight Publishing and Continental Mathematics League

ISBN#: 0-9727055-0-3

Copyright: 2003

Date of Adoption: August 2004

Additional Resources:

Book Title: Big Java

Publisher: John Wiley & Sons, Inc.

Book Title: Addison Wesley's Review for the AP Computer Science Exam in Java

Publisher: Pearson Addison-Wesley

Book Title: Java Methods, An Introduction to Object-Oriented Programming

Publisher: Skylight Publishing

Book Title: Introduction to Computer Science Using Java

Publisher: Glencoe/McGraw Hill Publishing Co.

Book Title: Fundamentals of Java, Second Edition

Publisher: Southwestern Publishing Co.