Reading Public Schools

Instilling a joy of learning and inspiring the innovative leaders of tomorrow

Course Description

As stated by the College Board, Advanced Placement Computer Science A affords students the opportunity to explore to become familiar with the concepts and tools of computers science as they learn a subset of the Java programming language. They will do hands-on work to design, write, and test computer programs that solve problems or accomplish tasks. The course is the equivalent of a one-semester, introductory college course in computer science. More information about the requirements of the College Board AP Calculus AB course can be found at: https://apcentral.collegeboard.org/courses/ap-computer-science-a

Content Standards

BIG IDEA 1—MODULARITY

Incorporating elements of abstraction, by breaking problems down into interacting pieces, each with their own purpose, makes writing complex programs easier. Abstracting simplifies concepts and processes by looking at the big picture rather than being overwhelmed by the details. Modularity in object-oriented programming allows us to use abstraction to break complex programs down into individual classes and methods.

BIG IDEA 2—VARIABLES

Information used as a basis for reasoning, discussion, or calculation is referred to as data. Programs rely on variables to store data, on data structures to organize multiple values when program complexity increases, and on algorithms to sort, access, and manipulate this data. Variables create data abstractions, as they can represent a set of possible values or a group of related values.

BIG IDEA 3—CONTROL

Calculus allows us to analyze the behaviors of functions by relating limits to differentiation, integration, and infinite series and relating each of these concepts to the others.

BIG IDEA 4—IMPACT OF COMPUTING

Computers and computing have revolutionized our lives. To use computing safely and responsibly, we need to be

Computational Thinking Practices

1. **Program Design and Algorithm Development —**Determine required code segments to produce a given output.

2. **Code Logic**—Determine the output, value, or result of given program code given initial values

3. **Code Implementation** —Write and implement program code.

4. **Code Testing** —Analyze program code for correctness, equivalence, and errors.

5. **Documentation**—Describe the behavior and conditions that produce identified results in a program.

Math Curriculum Guide Overview

Curriculum Guide	Curriculum guides are public documents aligned with the Massachusetts Department of Education Curriculum Frameworks. They focus on the set of standards that students will learn within certain disciplines at appropriate grade levels. Each area of the curriculum is divided into general strands (broad categories) under which the standards fall. When we discuss "standards-based education" we mean that students are measured against their proficiency and growth towards meeting these standards. Curriculum Guides are intended for teachers, parents, and the wider school community as an overview document of the course of study for the year.
Content Standards	The Content Standards for AP Computer Science A are described at length in the College Board website. It can be found at: https://apcentral.collegeboard.org/pdf/ap-computer-science-a-course-and-exam-description.pdf?course=ap-computer-science-a
Mathematical Practice Standards	Mathematical Practice Standards are a set of skills/behaviors that are replicated in grades preK-12. These standards describe ways in which students engage with the mathematical content and the level of application grows increasingly complex as students progress vertically throughout their education.
Essential Questions	Essential questions are questions that are not answerable with an easy answer or a simple instruction. The purpose of essential questions is to provide opportunities for inquiry into the learning and act as an umbrella to anchor the unit/lesson.
Key Activities	Key Activities identified in Curriculum Guides are not intended to be exhaustive, nor are they intended to be prescriptive. The activities identified may function as a menu of curriculum resources from which educators identify the most appropriate tools to utilize in their classrooms.