SUBJECT: AP Computer Science Principles	GRADE: 10-12
Unit Title: Creative Development	**Time Frame: Throughout course**
UNIT OVERVIEW	
This unit explores the creative development process and how it applies to computer science. These concepts are touched on throughout the course.	
LRG SKILLS AND DISPOSITIONS	**PA STANDARDS**
Critical Thinking and Problem Solving: Create Task (S4C)	**3B.AP.20** **3B.AP.21** **3B.AP.22** **3B.AP.23** **3B.AP.24**
COMPETENCIES	**LEARNING TARGETS**
I can use best practices while programming	• I can explain why collaboration is important for industry and why I need to cooperate with my peers to be at my best. • I understand the benefits of assembling a diverse team. • I can facilitate collaboration among group members • I understand the importance of user participation in program development. • I understand that programs are developed by groups of people and new programs are often written by expanding on the programs already written by others. • I can explain why programmers use comments and/or documentation to explain the purpose of their program code to themselves, collaborators, and others. • I understand that errors are an inevitable part of programming but understanding the different types of errors is essential to being a proficient programmer. • I can develop a testing scheme to ensure that programs are working as intended.
I can approach a challenge with computational thinking	• I understand that all computing innovations and programs are designed with a purpose

I can demonstrate an understanding of many digital devices	• I can show that a computer program is a collection of statements that are executed according to the rules of the programming language. • I understand that computer programs take inputs in a variety of fashions to influence the program's behavior.
I can code a program to express an idea or solve a problem.	• I can create a program that takes inputs in a variety of fashions to influence the program's behavior.

SUBJECT: AP Computer Science Principles	**GRADE: 9-12**
Unit Title: Data	**Time Frame: Primarily the third marking period, but touched on throughout the course.**
UNIT OVERVIEW	
This unit explores the importance of Data in computer science. Different types of data, the storage of data, the analysis of data.	
LRG SKILLS AND DISPOSITIONS	**PA STANDARDS**
Critical Thinking and Problem Solving: Simulations (S4C)	**B.DA.01** **B.DA.02** **B.DA.03** **B.DA.04** **B.DA.05** **B.DA.06** **B.DA.07**
COMPETENCIES	**LEARNING TARGETS**
I can use best practices while programming	• I can extract knowledge from data and metadata while staying aware of the difference between causation and correlation. • I can explain the steps of processing information so programmers can gain useful insight and knowledge about the data.
I can code a program to express an idea or solve a problem	• I can demonstrate how to process data and use a program to create common algorithms for analyzing data.

I can demonstrate an understanding of many digital devices	• I can understand how data come in all form on computing devices and how, at their simplest level, data are represented by bits. • I understand that using bits to represent data is not without consequences, and we will look at overflow, round-off, and other errors. • I can convert between binary numbers and decimal numbers. We will also compare and order binary numbers. • I can explain how compressing data can be done in a variety of different ways. • I can identify some of the potential issues that come with analyzing data.

SUBJECT: AP Computer Science Principles	**GRADE: 9-12**
Unit Title: Algorithms and Programming	**Time Frame: Most of the first and second marking periods and then reinforced throughout the course.**
UNIT OVERVIEW	
In this Unit students will plan, create, test, refine, and present algorithms and programs they've written.	
LRG SKILLS AND DISPOSITIONS	**PA STANDARDS**
Critical Thinking and Problem Solving: Python Programming (S4C)	**3B.AP.12** **3B.AP.13** **3B.AP.14** **3B.AP.15**
COMPETENCIES	**LEARNING TARGETS**
I can code a program to express an idea or solve a problem	• I can create variables and assign them different values and different data types. • I can use mathematical Expressions in my programs. • I can create Strings and manipulate them.

	• I can use boolean expressions and conditionals in my program to direct program flow and output. • I can create programs using nested conditionals • I can develop programs that use iteration • I can plan and create original algorithms and debug them as needed • I can create and use lists in my programs • I can create a program that uses binary search • I can plan and create procedures and call those procedures as needed in my program. • I can import libraries into a program I'm writing and utilize the capabilities of the library in my program • I can create random values, whether they be numbers or a selection from an existing list.
I can approach a challenge with computational thinking	• I can identify data abstraction and explain why it is useful in programming. • I can calculate the efficiency of various algorithms • I understand that some problems are not solvable with computer science
I can demonstrate an understanding of many digital devices	• I understand the importance that computer science and simulation play in our society and how they help develop solutions to complex problems

SUBJECT: AP Computer Science Principles	**GRADE: 9-12**
Unit Title: Computing Systems and Networks	**Time Frame: Third and Fourth Marking Periods**
UNIT OVERVIEW	
In this unit students will explore the Internet and the World Wide Web	
LRG SKILLS AND DISPOSITIONS	**PA STANDARDS**
Critical Thinking and Problem Solving: Cybersecurity and Computer	**3A.IC.24** **3B.AP.18**

Systems (S4C)	**3B.IC.26**
COMPETENCIES	**LEARNING TARGETS**
I can demonstrate an understanding of many digital devices	• I can explain how computers send and receive information using computer systems, computer networks, and packets. • I can explain how computer systems and networks facilitate the transfer of data. • I can evaluate different networks to identify vulnerabilities and determine the benefits of fault tolerance. • I can differentiate different network solutions that are fault-tolerant and how that facilitates the transfer of data. • I can explain how parallel and distributed computing leverage multiple computers to solve complex problems or process large data sets more quickly.

SUBJECT: AP Computer Science Principles	**GRADE: 9-12**
Unit Title: The Impact of Computing	**Time Frame: Throughout the Course**
UNIT OVERVIEW	
In this unit students will explore the impacts, both positive and negative that computing has on society and individuals	
LRG SKILLS AND DISPOSITIONS	**PA STANDARDS**
Critical Thinking and Problem Solving: Impacts of Computing (S4C)	**3B.IC.25** **3B.IC.26** **3B.IC.27** **3B.IC.28**
COMPETENCIES	**LEARNING TARGETS**
I can use best practices while programming	• I understand that a computing innovation can be both beneficial and harmful.

	I understand how a computing innovation can have an impact beyond its intended purpose. ● I understand how the use of computing can raise legal and ethical concerns. ● I understand the risks to privacy from collecting and storing personal data on a computer. ● I can identify how computing resources can be misused and how they can be protected. ● I can identify how unauthorized access is gained to computing resources.
I can demonstrate an understanding of many digital devices	● I understand what is meant by the digital divide ● I understand what computing bias is and how it can be unintentionally introduced into programs ● I understand how using crowdsourcing can expand the advantages of computer science and expand a computer's reach