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