Course Title: Computer and Information Technology	**Length of Course:** 9 weeks
Grade Level(s): 8	**Periods Per Cycle:** 6
Units of Credit: N/A	**Length of Period:** 47 minutes
Classification: Required	**Total Instructional Time:** 37 hours

Course Description

The driving emphasis of this course is to provide students with a continuing skill set for 21st century learning, particularly in terms of systems analysis, design thinking, and project management. Today's life and work environments require far more than the ability to follow directions. The ability to navigate the complex life and work environments in the globally competitive information age requires flexible problem-solvers who can handle sudden changes to rules, who don't need to be supervised to get the job done, and who can lead when necessary. The students will complete projects where they are required to determine and use the appropriate technology tool(s) for the task at hand in a manner that allows seamless transfer of created objects and documents to flow easily between the selected tools without outside intervention.

Instructional Strategies, Learning Practices, Activities, and Experiences

Student-Driven Workshop Environment	Bell Ringers	Cooperative Learning (flexible groups)
eLearning/Blended Learning	Closure	Video Tutorials and Demonstrations
Project-Based Learning	Interaction Sequence	Advanced Problem Solving
Simulations and Game-Based Learning	Blogging	

Assessments

Online Asynchronous Discussion	Interaction Sequence	Reflective Writing
Closure	Skill Checklists	Multimedia Presentations/Projects
Project-Based Learning	Observation	Screencasting and Screenshots
Rubrics	Interview/Dialog	

Materials/Resources

Computers
Personal Devices, Bring Your Own Device
  (BYOD)
NetOp
3D Printer

Construct 2 (soon 3)
Unity
Headphones/Microphones
Cameras

Schoology
Adobe Creative Suite
Solidworks/Sketchup

Adopted: 11/15/95
Revised: 9/17/03; 8/17/09; 5/19/14; **5/21/18**

eLearning and Learning Management Systems	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Schoology, Google Classroom The students will: • Participate in an online course. • Use remote trouble-shooting skills to navigate technical and comprehension-related issues. • Use multiple learning management systems. • Participate in content-specific asynchronous discussion forums. • Submit multimedia projects online both publicly and privately. • Assist one another and ask for help in the most efficient and effective ways. • Recognize and use various elearning lingo, such as "facilitator," "participant," and "forum."	The students will: • Observe social norms established in online environments for the good of the community in their digital communications (Netiquette). • Participate regularly in an online social environment for the purpose of professional and academic growth. • Use online networks to assist classmates and demonstrate appropriate and professional communications (LEADERSHIP AND RESPONSIBILITY). PA Core Standards **15.4.8.A:** ~ Analyze the influence of emerging technologies on daily life. **15.4.8.B:** ~ Interpret and apply appropriate social, legal, ethical, and safe behaviors of digital citizenship. **15.4.8.F:** ~ Identify network communication technologies. **15.4.8.M:** ~ Explore and describe how emerging technologies are used across different career paths. Common Core **CC.3.6.6-8.A.** ~ Write arguments focused on discipline-specific content. **CC.3.6.6-8.C.** ~ Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. **CC.3.6.6-8.E.** ~ Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently. ISTE NETS (International Society for Technology – National Education Technology Standards) **NETS 6.A** ~ Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication. **NETS 7.B** ~ Students use collaborative technologies to work with others, including peers, experts or community members, to examine issues and problems from multiple viewpoints. **NETS 7.C** ~ Students contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.

Programming Concepts	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
At least once/cycle the students will focus on: Coding and Programming Using: • Code Combat • Code.org • Tynker • Unity3d Computational Concepts • Sequence - identifying a series of steps for a task • Loops - running the same sequence multiple times • Parallelism - making things happen at the same time • Events - one thing causing another thing to happen • Conditionals - making decisions based on conditions • Operators - support for mathematical and logical • Expressions – data storing, retrieving, and updating values Computational Practices • Testing and debugging - making sure that things work – and finding and fixing mistakes • Reusing and remixing - making something by building on what others, or you, have done • Abstracting and modularizing - building something large by putting together collections of smaller parts	The students will: • Design and analyze dynamic systems, a characteristic activity in both the media and in science today, with considerations of how end-users interact with said systems. • Explicate and defend their ideas, describe issues and interactions at a meta-level, create and test hypotheses, and reflect on the impact of their solutions on others. • Develop an understanding of programming and computational concepts. • Develop fluency with computational concepts (i.e. sequence, loops, and events) and practices (i.e. iterative and incremental development, testing and debugging, reusing and remixing). **PA Academic Standards** **15.4.8.G:** ~ Create an advanced digital project using appropriate software/application for an authentic task. **15.4.8.H:** ~ Explain the differences between a scripting language and a coding language. **15.4.8.I:** ~ Solve a problem with an algorithm. **15.4.8.M:** ~ Explore and describe how emerging technologies are used across different career paths. **CSTA K-12 CS Standards** (endorsed by PA but not yet PA Academic) **2-AP-11 6-8** ~ Create clearly named variables that represent different data types and perform operations on their values. **2-AP-12 6-8** ~ Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals. **2-AP-13 6-8** ~ Decompose problems and subproblems into parts to facilitate the design, implementation, and review of programs. **2-AP-14 6-8** ~ Create procedures with parameters to organize code and make it easier to reuse. **ISTE NETS** **NETS 5.B** ~ Students collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making. **NETS 5.D** ~ Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.

Project Management and Technology Fluency

CONTENT/KEY CONCEPTS	OBJECTIVES/STANDARDS
Five times/cycle the students will pursue individual projects. Today's life and work environments require far more than the ability to follow directions. The ability to navigate the complex life and work environments in the globally competitive information age requires flexible problem-solvers who can handle sudden changes to rules, who don't need to be supervised to get the job done, and who can lead when necessary. Students will complete projects where they are required to determine and use the appropriate technology tool(s) for the task at hand in a manner that allows seamless transfer of created objects and documents to flow easily between the selected tools without outside intervention. Concepts • Use a wide range of idea creation techniques (such as brainstorming). • Create new and worthwhile ideas (both incremental and radical concepts). • Elaborate, refine, analyze and evaluate their own ideas in order to improve and maximize creative efforts. • Analyze how parts of a whole interact with each other to produce overall outcomes in complex systems. • Knowing how to make appropriate personal and economic choices. • Use entrepreneurial skills to enhance workplace productivity and career options.	The students will: • Apply existing knowledge to create original works to complete a project. • Be able to determine and use the appropriate technology tool(s) for the task at hand in a manner that allows seamless transfer of created objects and documents to flow easily between the selected tools without outside intervention. • Use observations of examples of effective and ineffective design to develop strategies to improve communication, sustainability, and usability. PA Academic Standards **15.4.8.G:** ~ Create an advanced digital project using appropriate software/application for an authentic task. **15.4.8.K:** ~ Create a multimedia project using student-created digital media. ISTE NETS **NETS 1.A** ~ Students articulate and set personal learning goals, develop strategies leveraging technology to achieve them and reflect on the learning process itself to improve learning outcomes. **NETS 1.B** ~ Students build networks and customize their learning environments in ways that support the learning process. **NETS 1.C** ~ Students use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways. **NETS 1.D** ~ Students understand the fundamental concepts of technology operations, demonstrate the ability to choose, use, and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies. **NETS 4.A** ~ Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts, or solving authentic problems. **NETS 4.B** ~ Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks. **NETS 4.C** ~ Students develop, test, and refine prototypes as part of a cyclical design process. **NETS 4.D** ~ Students exhibit a tolerance for ambiguity, perseverance, and the capacity to work with open-ended problems.

Safe and Responsible Publishing, Netiquette and Digital Leadership	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Safe and Responsible Publishing The students will establish an online presence to facilitate an online portfolio to showcase work in an authentic way, discuss and examine safe practices that can be applied to their private blogs and Social Networking sites, such as Facebook and Twitter, and practice 21st century skills to succeed in a globally connected economy. Portfolios and Web Design The students will use Weebly or Google Sites to set up a site showcasing their professional work. Edmodo and Social/Professional Networking The students will: • Access Edmodo. • Review personal profile. • Join interest groups (based on projects). • Apply the conventions of sharing, embedding, linking, etc.	The students will: • Familiarize themselves with the workings of copyright and how they apply to what their post online. • Know how to protect their personal information online and avoid exposing themselves or their identity to danger. • Observe social norms established in online environments for the good of the community in their digital communications (Netiquette). • Participate regularly in an online social environment for the purpose of professional and academic growth. • Advocate and practice safe, legal, and responsible use of information and technology, which includes social media and mobile communications. • Use online networks to assist classmates and demonstrate appropriate and professional communications (LEADERSHIP AND RESPONSIBILITY). **PA Academic Standards** **15.4.8.A:** ~ Analyze the influence of emerging technologies on daily life. **15.4.8.B:** ~ Interpret and apply appropriate social, legal, ethical, and safe behaviors of digital citizenship. **CSTA K-12 CS Standards** (endorsed by PA but not yet PA Academic) **2-NI-05 6-8** ~ Explain how physical and digital security measures protect electronic information. **2-IC-23 6-8** ~ Describe tradeoffs between allowing information to be public and keeping information private and secure. **ISTE NETS** **NETS 2.A** ~ Students cultivate and manage their digital identity and reputation and are aware of the permanence of their actions in the digital world. **NETS 2.B** ~ Students engage in positive, safe, legal and ethical behavior when using technology, including social interactions online or when using networked devices. **NETS 2.C** ~ Students demonstrate an understanding of and respect for the rights and obligations of using and sharing intellectual property. **NETS 2.D** ~ Students manage their personal data to maintain digital privacy and security and are aware of data-collection technology used to track their navigation online. **NETS 6.A** ~ Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.

Systems Thinking and User-Centered Design	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
The students will apply concepts of "Systems-Thinking" and "User-Centered Design" in independent projects. Iteration Feedback Loop • Systems-Thinking: The students design and analyze dynamic systems, a characteristic activity in both the media and in science today. • Interdisciplinary Thinking: The students solve problems that require them to seek out and synthesize knowledge from different domains. They become intelligent and resourceful as they learn how to find and use information in meaningful ways. • User-Centered Design: The students act as sociotechnical engineers, thinking about how people interact with systems and how systems shape both competitive and collaborative social interaction. • Meta-Level Reflection: The students learn to explicate and defend their ideas, describe issues and interactions at a meta-level, create and test hypotheses, and reflect on the impact of their solutions on others.	The students will: • Use observations of examples of effective and ineffective design to develop strategies to improve communication, sustainability, and usability. • Design and analyze dynamic systems, a characteristic activity in both the media and in science today. • Solve problems that require them to seek out and synthesize knowledge from different domains as you find and apply information in meaningful ways. • Act as a sociotechnical engineer, thinking about how people interact with systems and how systems shape both competitive and collaborative social interaction as they develop an end-user experience. • Explicate and defend their ideas, describe issues and interactions at a meta-level, create and test hypotheses, and reflect on the impact of their solutions on others in developing and deploying an end-user experience. **PA Academic Standards** **15.4.8.G:** ~ Create an advanced digital project using appropriate software/application for an authentic task. **15.4.8.K:** ~ Create a multimedia project using student-created digital media. **CSTA K-12 CS Standards** (endorsed by PA but not yet PA Academic) **2-CS-01 6-8** ~ Recommend improvements to the design of computing devices, based on an analysis of how users interact with the devices. **2-CS-03 6-8** ~ Systematically identify and fix problems with computing devices and their components. **2-AP-13 6-8** ~ Decompose problems and sub problems into parts to facilitate the design, implementation, and review of programs. **ISTE NETS** **NETS 4.A** ~ Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts, or solving authentic problems. **NETS 4.C** ~ Students develop, test, and refine prototypes as part of a cyclical design process. **NETS 5.A** ~ Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models, and algorithmic thinking in exploring and finding solutions. **NETS 5.C** ~ Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.

Design Thinking, Applications and Productivity	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Throughout 7th and 8th grade, computer information technology (CIT) is this concept of matching appropriate technologies to problems and tasks. There are myriad applications available to students, web-based and local. There are also a host of emerging input technologies and peripheral devices beyond the standard computing setup. The students will learn what categories of applications are appropriate for any given task and how to use said applications in tandem to produce results and solve problems. Application Skills • Image handling and editing • Audio editing • Video editing • Illustration • Publishing • Resource management • Interactive and animation Device Skills • 3D printing • Vinyl cutting • Touch screen • Art tablet • Cameras • Mobile - Bring your own device (BYOD) • Cloud management	The students will: • Apply existing knowledge to create original works to complete a project. • Determine and use the appropriate technology tool(s) for the task at hand in a manner that allows seamless transfer of created objects and documents to flow easily between the selected tools without outside intervention. • Use observations of examples of effective and ineffective design to develop strategies to improve communication, sustainability, and usability. **PA Academic Standards** **15.4.8.G:** ~ Create an advanced digital project using appropriate software/application for an authentic task. **15.4.8.K:** ~ Create a multimedia project using student-created digital media. **15.4.8.D**: ~ Create projects using emerging input technologies. **15.4.8.M**: ~ Explore and describe how emerging technologies are used across different career paths. **15.4.8.C**: ~ Compare and contrast peripheral devices of computing systems for specific needs. **CSTA K-12 CS Standards** (endorsed by PA but not yet PA Academic) **1B-IC-19 3-5** ~ Brainstorm ways to improve the accessibility and usability of technology products for the diverse needs and wants of users. **1B-IC-20 3-5** ~ Seek diverse perspectives for the purpose of improving computational artifacts. **1B-IC-21 3-5** ~ Use public domain or creative commons media, and refrain from copying or using material created by others without permission. **ISTE NETS** **NETS 4.A** ~ Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts, or solving authentic problems. **NETS 4.B** ~ Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks. **NETS 4.C** ~ Students develop, test, and refine prototypes as part of a cyclical design process. **NETS 4.D** ~ Students exhibit a tolerance for ambiguity, perseverance, and the capacity to work with open-ended problems.