Catasauqua Area School District
Planned Course of Study

Course Title: Future Ready/STEAM

Grade Level(s): 7

Course Description

The class is designed to engage all students in real world, hands-on, collaborative learning applying concepts of science, technology, engineering, arts and mathematics. Students will have an understanding of the history and importance of computer science as we prepare them for the future. Students will use computer programming to complete tasks and solve problems related to the real world.

During the course students will also be immersed in an exploratory learning environment where they will gain further depth of knowledge while building on life skills. Students will self-evaluate, reflecting upon their progress, points of interest, experiences, and talents.

Essential Questions & Competencies

What is technology and how does it work?
How can I use computer programming to complete a task?
How are computers used to solve problems in the real world?
What are the connections between computer science and other subject areas?
How do computer science skills help prepare students for success in careers?

Engage in public discussion on computer science topics.
Develop as learners, users, and creators of computer science.
Understand the importance of computing and technology in the real world.
Prepare for the future and workplace.

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Course Syllabus			
Course Content	**Tentative Timeframe**	**National Standards CSTA**	**State Standards**
Code.org	10 days	1A-AP-08 1A-AP-09 1A-AP-10 1A-AP-11 1A-AP-12 1A-AP-14 1B-AP-08 1B-AP-09 1B-AP-10 1B-AP-11 1B-AP-12 1B-AP-13 1B-AP-14 1B-AP-15 1B-AP-16 1B-AP-17 1B-DA-06 1B-DA-07 1B-NI-04 1B-NI-05 1B-IC-18 1B-IC-20 1B-IC-21	1A-AP-08 1A-AP-09 1A-AP-10 1A-AP-11 1A-AP-12 1A-AP-14 1B-AP-08 1B-AP-09 1B-AP-10 1B-AP-11 1B-AP-12 1B-AP-13 1B-AP-14 1B-AP-15 1B-AP-16 1B-AP-17 1B-DA-06 1B-DA-07 1B-NI-04 1B-NI-05 1B-IC-18 1B-IC-20 1B-IC-21
Everfi 7th - Financial Future Smart	6 days	2-IC-20 2-IC-23 1B-NI-04	2-IC-20 2-IC-23 1B-NI-04 2A.B.C.D 3A.B ST 4.1 ST 5.1.2.4 ST-ET3.1.2.4 ST-ET 5.1.2 13.1.5 13.2.5 13.3.5 13.4.5

STEAM Challenges 7th - Sphero Maze	5 days	2.AP.12 2.AP.13 2-AP-17 2-AP-18 2-AP-19 1A-AP-08 1A-AP-09 1A-AP-10 1A-AP-11 1A-AP-12 1A-AP-14 1B-AP-08 1B-AP-09 1B-AP-10 1B-AP-11 1B-AP-12 1B-AP-13 1B-AP-14 1B-AP-15 1B-AP-16 1B-AP-17	2.AP.12 2.AP.13 2-AP-17 2-AP-18 2-AP-19 1A-AP-08 1A-AP-09 1A-AP-10 1A-AP-11 1A-AP-12 1A-AP-14 1B-AP-08 1B-AP-09 1B-AP-10 1B-AP-11 1B-AP-12 1B-AP-13 1B-AP-14 1B-AP-15 1B-AP-16 1B-AP-17 3.4.5.C1 3.4.6.C1 3.4.7.C1 3.4.8.C1 3.4.5.C23.4.6.C2 3.4.7.C2 3.4.8.C2
Tinkercad with 3D printing	3 days	1B-AP-08 1B-AP-09 1B-AP-10 1B-AP-11 1B-AP-12 1B-AP-13 1B-AP-14 1B-AP-15 1B-AP-16 1B-AP-17 2-AP-10	1B-AP-08 1B-AP-09 1B-AP-10 1B-AP-11 1B-AP-12 1B-AP-13 1B-AP-14 1B-AP-15 1B-AP-16 1B-AP-17 2-AP-10
Common Sense Media - Digital Citizenship	6 days	2-IC-20 2-IC-21 2-IC-22 2-IC-23	2-IC-20 2-IC-21 2-IC-22 2-IC-23
Cybersecurity (7th)	10 days	1A-NI-04 1B-NI-04 1B-NI-05 2-NI-04 2-NI-05 2-NI-06	1A-NI-04 1B-NI-04 1B-NI-05 2-NI-04 2-NI-05 2-NI-06

		2-IC-20 2-IC-23 1B-CS-01 1B-CS-02 1B-CS-03 2-CS-01	2-IC-20 2-IC-23 1B-CS-01 1B-CS-02 1B-CS-03 2-CS-01 3A-NI-04 3A-NI-05
Challenges/games	Time permitting		

Teaching Strategies Utilized

Direct Instruction
Individualized Instruction
Modeling
Simulations
Cooperative Learning
Class Discussions
Peer Tutoring
Testing of products
Use of online learning
Google classroom
Google assessments

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Objectives	Level of Ach.	Suggested Learning Activities	Forms of Assessment	National Standards CSTA	PA Stand.
The student will be able to: *Develop programs that respond to timed events* ● *Develop programs that respond to user input* ● *Create dance animations with code* ● *Translate movements into a series of commands.* ● *Identify and locate bugs in a program.* ● *Predict where a program will fail.* ● *Modify an existing program to solve errors.* ● *Reflect on the debugging process in an age-appropriate way.* ● *Order movement commands as sequential steps in a program.* ● *Represent an algorithm as a computer program.* ● *Develop problem solving and critical thinking skills by reviewing debugging practices.* ● *Create a program to complete an image using sequential steps.* ● *Break complex shapes into simple parts.* ● *Identify the benefits of using a loop structure instead of manual repetition.* ● *Break down a long sequence of instructions into the largest repeatable sequence.* ● *Employ a combination of sequential and looped commands to reach the end of a maze.* ● *Identify the benefits of using a loop structure instead of manual repetition.* ● *Differentiate between commands that need to be repeated in loops and commands that should be used on their own.* ● *Break complex tasks into smaller repeatable sections.* ● *Recognize large repeated patterns as made from smaller repeated patterns.* ● *Identify the benefits of using a loop structure instead of manual repetition.* ● *Break apart code into the largest repeatable sequences using both loops and nested loops.* ● *Recognize the difference between using a loop and a nested loop.*	AW K AP M R	Code.org students will program their own interactive dance party. This activity requires sound as the tool was built to respond to music. students will develop sequential algorithms to move a bird from one side of a maze to the pig at the other side. students will encounter puzzles that have been solved incorrectly. They will need to step through the existing code to identify errors, including incorrect loops, missing blocks, extra blocks, and blocks that are out of order. students will take control of the Artist to complete drawings on the screen. students will be using loops to help BB-8 traverse a maze more efficiently than before. students will learn how to program a loop to be inside of another loop.	Work ethic Completion of activity Use of knowledge gained in real world projects Evidence of learning Informal/formal assessments Teacher observations	1A-AP-08 1A-AP-09 1A-AP-10 1A-AP-11 1A-AP-12 1A-AP-14 1B-AP-08 1B-AP-09 1B-AP-10 1B-AP-11 1B-AP-12 1B-AP-13 1B-AP-14 1B-AP-15 1B-AP-16 1B-AP-17 1B-DA-06 1B-DA-07 1B-NI-04 1B-NI-05 1B-IC-18 1B-IC-20 1B-IC-21	1A-AP-08 1A-AP-09 1A-AP-10 1A-AP-11 1A-AP-12 1A-AP-14 1B-AP-08 1B-AP-09 1B-AP-10 1B-AP-11 1B-AP-12 1B-AP-13 1B-AP-14 1B-AP-15 1B-AP-16 1B-AP-17 1B-DA-06 1B-DA-07 1B-NI-04 1B-NI-05 1B-IC-18 1B-IC-20 1B-IC-21

● *Describe when a loop, nested loop, or no loop is needed.* ● *Define circumstances when certain parts of a program should run and when they shouldn't.* ● *Determine whether a conditional is met based on criteria.* ● *Translate spoken language conditional statements into a program.* ● *Solve puzzles using a combination of looped sequences and conditionals.* ● *Distinguish between loops that repeat a fixed number of times and loops that repeat as long as a condition is true.* ● *Use a while loop to create programs that can solve problems with unknown values.* ● *Define circumstances when certain parts of a program should run and when they shouldn't.* ● *Determine whether a conditional is met based on criteria.* ● *Use functions to simplify complex programs.* ● *Use predetermined functions to complete commonly repeated tasks.* ● *Recognize when a function could help to simplify a program* ● *Categorize and generalize code into useful functions.* ● *Identify areas where they can use variables to modify quantities during runtime.* ● *Examine code to find places where variables can be substituted for specific values.*		Students will get the chance to practice ideas that they have learned up to this point students will begin to code with conditionals, allowing them to write code that functions differently depending on the specific conditions the program encounters. Students will practice while loops, until loops, and if / else statements. students will use functions in new ways by combining them with while loops and if / else statements. Students will be introduced to using functions on Code.org. students will explore the creation of repetitive designs using variables in the Artist environment. Students will learn how variables can be used to make code easier to write and easier to read. After guided puzzles, students will end in a freeplay level to show what they have learned and create their own designs. Learn how to create and edit sprites. Practice making games to share with your friends and family.			

		Learn to program your own sprite behaviors!			

Resources/Materials
Computers, iPads, code.org

Interdisciplinary Relationships
CSTA K-12 Computer Science Standards Common Core English Language Arts Standards L - Language SL - Speaking & Listening Common Core Math Standards MP - Math Practices G - Geometry OA - Operations And Algebraic Thinking NBT - Number And Operations In Base Ten MD - Measurement And Data Next Generation Science Standards ETS - Engineering in the Sciences

Catasauqua Area School District
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Grade Level: 7

Objectives	Level of Ach.	Suggested Learning Activities	Forms of Assessment	National Standards CSTA	PA Stand.
The student will be able to: *• Brainstorm current and future financial decisions and events* *• Create a timeline outlining their financial future* *• Apply comparison-shopping methods, such as gathering price and quality information, comparing spending & non-spending alternatives, and comparing unit price information to follow a budget.* *• Analyze whether information from sources are accurate and reliable when comparing products and services* *• Identify the pros and cons of using different payment types* *• Categorize a purchase as either a debit or credit transactions* *• Evaluate different career options based on job preferences and skills* *• Understand the costs and benefits of different post secondary paths* *● Create their own business plan for a product/service* *● Analyze sample business pitches for effectiveness* *● Write and present a business pitch for the class* *• Find companies on the New York Stock Exchange website*	AW K AP M R	Everfi Financial Future Smart Worksheets, Reading, Computer/iPad, Video, Reflections, Scenarios Welcome Mayor: Identify and reflect upon their personal values, financial habits and mindsets and complete a financial personality test. Brainstorm various financial decisions, expenses, and events anticipated in their lifetime and consider the steps they will need to take to face each. Smart Shopping: Allowing students to explore comparison-shopping methods and gain a better understanding of unit price calculations in a budget simulation. Ways to Pay: Students will explore the differences between payment types, the pros and cons of using debit and credit cards, as well as practice identifying whether a transaction	Work ethic Completion of activity Use of knowledge gained in real world projects Evidence of learning Informal/formal assessments Teacher observations	2-IC-20 2-IC-23 1B-NI-04	2-IC-20 2-IC-23 1B-NI-04

• *Identify stock information for companies listed on the New York Stock Exchange*		involved the use of a debit or credit card. Investing in You: Students will explore college and career options. Students will also gain a better understanding of the overall costs and benefits of different post-secondary paths. Growing a Business: Students will have learned about how to make adjustments to their business decisions to grow more capital for Mia's pet store. Your Financial Future: Students will compare stocks, bonds, and mutual funds based on their typical risk and return levels.			

Resources/Materials

Computers, iPads, EVERFI

Interdisciplinary Relationships

Common Career Technical Core, Common Core State Standards (Practices), Next Generation Science Standards, Code.org/CSTA Standards
Common Career Technical Core
Analyzing and interpreting data
CCSS.MATH.CONTENT.6.EE.C.9: Represent and analyze quantitative relationships between dependent and independent variables
CCSS.MATH.CONTENT.7.SP.C: Investigate chance processes and develop, use, and evaluate probability models*
CCSS.MATH.CONTENT.8.SP.A: Investigate patterns of association in bivariate data*
NGSS Practice 1: Asking questions (for science) and defining problems (for engineering)

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The student will be able to: • *Create a one-line program that moves Sphero at a steady speed for a specified amount of time* • *Perform measurements to determine the distance traveled.* • *Perform division to compare different measurements* • *Create a two-line program that moves Sphero to a certain position and then moves it back to where it started.* • *Perform division to calculate speeds* • *Perform division to calculate percentages* • *Create a two-line program to display a color for a certain length of time.* • *Have Sphero light up in colors.*	AW K AP M R	**Sphero Maze:** Create a maze and program a sphero to make its way through. Program the sphero to change colors, make sounds, change direction, and change speeds.	Work ethic Completion of activity Use of knowledge gained in real world projects Evidence of learning Informal/formal assessments Teacher observations	1A-AP-08 1A-AP-09 1A-AP-10 1A-AP-11 1A-AP-12 1A-AP-14 1B-AP-08 1B-AP-09 1B-AP-10 1B-AP-11 1B-AP-12 1B-AP-13 1B-AP-14 1B-AP-15 1B-AP-16 1B-AP-17	2.AP.12 2.AP.13 2-AP-17 2-AP-18 2-AP-19 1A-AP-08 1A-AP-09 1A-AP-10 1A-AP-11 1A-AP-12 1A-AP-14 1B-AP-08 1B-AP-09 1B-AP-10 1B-AP-11 1B-AP-12 1B-AP-13 1B-AP-14 1B-AP-15 1B-AP-16 1B-AP-17 3.4.5.C1 3.4.6.C1 3.4.7.C1 3.4.8.C1 3.4.5.C23. 4.6.C2 3.4.7.C2 3.4.8.C2

Resources/Materials

Sphero robots, Computers, iPads, Tape, Popsicle sticks, Cardboard boxes, Butcher paper

Interdisciplinary Relationships

Mathematics
Art
Engineering & Design
Science & Technology

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The student will be able to: *Apply design thinking methods to a real-world problem.* *Practice design and technical skills in a fun and nurturing environment.* *Students will be able to design, create, and print an object.*	AW K AP	**Tinkercad with 3D printing** Students will manipulate objects by size, shape, rotation, movement, viewing, and placement. Name ways people have used 3D printing. Find a repetitive pattern in code and use a loop.	Work ethic Completion of activity Use of knowledge gained in real world projects Evidence of learning Informal/formal assessments Teacher observations	1B-AP-08 1B-AP-09 1B-AP-10 1B-AP-11 1B-AP-12 1B-AP-13 1B-AP-14 1B-AP-15 1B-AP-16 1B-AP-17	1B-AP-08 1B-AP-09 1B-AP-10 1B-AP-11 1B-AP-12 1B-AP-13 1B-AP-14 1B-AP-15 1B-AP-16 1B-AP-17

Resources/Materials
Computer, iPad, 3D Printer, Tinkercad

Interdisciplinary Relationships
Science - Force, accuracy, Math- Precision and angles Engineering & Design Science & Technology

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Objectives	Level of Ach.	Suggested Learning Activities	Forms of Assessment	National Standards CSTA	PA Stand.
The student will be able to: ● *Make an inventory of their media choices and how those choices make them feel.* ● *Brainstorm personal strategies for balancing media use.* ● *Create personal guidelines for promoting healthy media balance.* ● *Explain why information about them and their behaviors is valuable to companies.* ● *Analyze how certain types of data are used by companies.* ● *Learn three strategies to limit individual data collection by companies.* ● *Define the term "digital footprint" and explain how it can affect their online privacy.* ● *Analyze how different parts of their digital footprint can lead others to draw conclusions -- both positive and negative -- about who they are.* ● *Use the Take a Stand thinking routine to examine a dilemma about digital footprints.* ● *Identify the role of social media in their lives.* ● *Reflect on the positive and negative effects social media use has on their relationships.*	AW K AP M R	Common Sense Media - Digital Citizenship: Student handouts family activities interactive online lessons pair-share videos **Media Balance & Well-Being** Find balance in our digital lives. **Privacy and security:** Design a new product and list the details it needs for success. **Digital Footprint and Identity:** Students learn about their digital footprint and the steps they can take to shape what others find and see about them. **Relationships and Communication:** Help students navigate the different feelings they may already be experiencing on social media. **Cyberbullying, digital drama and hate speech:**	Google quizzes Work ethic Completion of activity Worksheets Evidence of learning Informal/formal assessments Teacher observations	2-IC-20 2-IC-21 2-IC-22 2-IC-23	2-IC-20 2-IC-21 2-IC-22 2-IC-23

• *Recognize "red flag feelings" when using social media and use the Feelings & Options thinking routine to consider ways to handle them.* • *Consider the different perspectives of those involved in a cyberbullying incident.* • *Identify ways to be an upstander or ally to someone being bullied.* • *Problem-solve potential challenges to responding to cyberbullying.* • *Define the terms "copyright," "public domain," and "fair use."* • *Identify the purpose of the Four Factors of Fair Use.* • *Apply fair use to real-world examples, making a case for or against.*		Learn about the importance of empathy, how to consider others' feelings, and how to be an upstander when cyberbullying occurs. **News and Media Literacy:** Students analyze a framework they can use to better understand how fair use works in the real world.			

Resources/Materials
Computers, iPads, Google Classroom, Commonsense Media

Interdisciplinary Relationships
ELA - News & Media Literacy Social Emotional Learning- Cyberbullying

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The student will be able to: *Students can explain what cybersecurity is.* *Students can enumerate some reasons cybersecurity is important.* *Understand the structure of the Internet and discover how information is kept safe and private.* *Students will be able to describe how encryption works to protect privacy.* *Students learn the importance of securing information on the Internet.* *Create a presentation that will help a target audience feel comfortable with network security in the transmission of data over the Internet.*	AW K AP M R	Cybersecurity: **The Challenge:** Students will work in marketing teams to meet the challenge presented by Jupiter Motors (a letter sent to help market a new driverless car. **Modeling the Internet:** Students model the general transmission of a message through the Internet. Model how information is split into pieces, transmitted between a chain of computers, and then reassembled at its destination. **Encryption:** Explore two different historical methods of encrypting messages. **Presentation:** Deliver presentations to the class.	Checklists Worksheets Work ethic Completion of activity Use of knowledge gained in real world projects Evidence of learning Informal/formal assessments Teacher observations	1A-NI-04 1B-NI-04 1B-NI-05 2-NI-04 2-NI-05 2-NI-06 2-IC-20 2-IC-23 1B-CS-01 1B-CS-02 1B-CS-03 2-CS-01	1A-NI-04 1B-NI-04 1B-NI-05 2-NI-04 2-NI-05 2-NI-06 2-IC-20 2-IC-23 1B-CS-01 1B-CS-02 1B-CS-03 2-CS-01 3A-NI-04 3A-NI-05

Resources/Materials

Cybersecurity Kit, Computer, iPad, Worksheets, Notebooks

Interdisciplinary Relationships

History (decoding), math
Writing: Text Types and Purposes, Production and Distribution of Writing
Speaking and Listening: Comprehension and Collaboration, Presentation of Knowledge and Ideas