

# Clinton-Glen Gardner School District



## Curriculum Management System

### Computer Technology

### Grade 8

**August 2015**

For adoption by all regular education programs as specified and for adoption or adaptation by all Special Education Programs in accordance with Board of Education Policy #2200

BOE APPROVED August 25, 2015

# **CLINTON-GLEN GARDNER SCHOOL DISTRICT**

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## **Acknowledgments**

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Writers' Names: Kyle Rehrig

21<sup>st</sup> Century Life and Careers Integration: Jessica Latanzio Crespo  
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# Clinton-Glen Gardner School District

## **Mission**

The mission of the Clinton-Glen Gardner School District is to inspire our students to become contributing members of society who are independent, innovative, life-time learners equipped with the necessary skills to meet the demands of our ever-changing world.

## **Philosophy**

New technologies are evolving at a rapid rate with both frequent advancements of existing technologies and the creation of new ones. It is important that all students understand and develop familiarity with these ever-emerging technologies and have the ability to execute basic computer skills to choose, operate, and troubleshoot applications in school, at home, and later in the workplace. Technology is uniquely positioned to transform learning, to foster critical thinking, creativity, and innovation, and to prepare students to thrive in a global society. As digital learners, students are able to acquire and apply content knowledge and skills through active exploration, interaction, and collaboration with others. Doing so will enable students to function in our evolving society as informed, productive members of while broadening their understanding, use and application of state of the art technology. Technology enables students to solve real world problems, enhance life, and extend human capability as they meet the challenges of a dynamic global society. The curriculum assists students in accomplishing the following goals:

- Applying information-literacy skills to access, manage, and communicate information using a range of technological tools
- Integrating technology with content area learning
- Obtaining, comprehending, and manipulating information to attain goals
- Exploring and experiencing existing technology
- Demonstrating competency in using technology as a tool for learning

## New Jersey State Department of Education Core Curriculum Content Standards

### **A note about Technology Standards and Cumulative Progress Indicators:**

In October of 2014, the NJDOE adopted the following technology standards:

8.1 Educational Technology ([Word](#) | [PDF](#)): All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate, and to create and communicate knowledge.

8.2 Technology Education, Engineering, Design, and Computational Thinking - Programming ([Word](#) | [PDF](#)): All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.

According to the International Society for Technology Education, "advances in technology have drastically changed the way we interact with the world and each other. The digital age requires that we understand and are able to harness the power of technology to live and learn". To this end, our current curriculum is undergoing a year long process of reflection and revision to ensure that the design process builds in our students the recognition that success is not merely identifying a problem but working through a process--- and that failure is not an end but rather a point for reevaluation. Computational thinking provides an organizational means of approaching life and its tasks. It develops an understanding of technologies and their operations and provides students with the abilities to build and create knowledge and new technologies. Not all students will be programmers, but they should have an understanding of how computational thinking can build knowledge and control technology. For example, in grade 8, we are supplementing our current curriculum with Lego EV3 Design Engineering Projects that let students work with open-ended problem solving activities, in a context which makes it fun and engaging to learn using Science, Technology, Engineering and Mathematics.

The projects combine science and mathematics concepts with soft skills, such as creative thinking, problem solving, teamwork and communication skills, boosting 21st century learning skills. All projects follow a design engineering process as used by engineers in various industries. The design engineering process provides a structured flow through the activities. Students are guided through the process starting with a design brief which explains the challenge, using videos of robots in action to make real life connections, and includes a final project which can be shared and presented. It is our goal to adapt these learning activities for grades K-7 after our initial implementation in grade 8.

Grade 8  
Computer Technology  
Scope and Sequence

Quarter I	
<p><b>Topic: Spreadsheet</b></p> <p>I. Data input II. Mathematical Formulas III. Chart creation</p>	<p><b>Topic: Multimedia – Public Service Announcement</b></p> <p>I. Creation of storyboard/Gather props/backgrounds II. Shoot still photos III. Use media program to create movie     a. Title, video effects, audio</p>
<p><b>Topic: Internet Research</b></p> <p>I. Use Internet resources to plan a 5 day vacation</p>	<p><b>Topic: Robotics</b></p> <p>I. Construct, program and test robotics</p>
<p><b>21<sup>st</sup> Century Skills</b> (The ones that apply for this unit are in bold)</p> <ul style="list-style-type: none"> <li>· <b>Creativity &amp; Innovation</b></li> <li>· <b>Critical Thinking &amp; Problem Solving</b></li> <li>· <b>Communication &amp; Collaboration</b></li> <li>· <b>Media Literacy</b></li> <li>· <b>Information Literacy</b></li> <li>· <b>Information, Communication &amp; Technology</b></li> </ul>	
<p><b>21<sup>st</sup> Century Themes</b> (The ones that apply for this unit are in bold)</p> <ul style="list-style-type: none"> <li>· Global Awareness</li> <li>· <b>Financial, Economic, Business and Entrepreneurial Literacy</b></li> <li>· Civic Literacy</li> <li>· Health Literacy</li> <li>· Environmental Literacy</li> </ul>	
<p><b>Assessment</b></p> <p>District Benchmark</p>	
<p><b>Differentiation</b></p> <p>The technology classroom offers a one-to-one environment in which each student has access to a computer; therefore, students have their own “differentiation in a box.” While each student has the same tools, those tools can be manipulated in ways that serve individual needs. Also, a one-to-one environment simplifies other aspects of differentiation, because students have ready access to differentiated content, tools for differentiated learning processes, and resources for creating differentiated products. The instructor will also use the following guidelines to inform the nature of differentiation:</p> <ul style="list-style-type: none"> <li>● Choosing learning goals</li> <li>● Making practical pedagogical decisions about the nature of the learning experience</li> <li>● Selecting and sequencing activity types to combine to form the learning experience</li> <li>● Selecting formative and summative assessment strategies that will reveal what and how well students are learning</li> <li>● Selecting tools and resources that will best help students to benefit from the learning experience being planned.</li> </ul>	

This framework emphasizes that the selection of tools and resources should follow naturally from the specific needs of the student. This model increases the likelihood of seamless, successful technology instruction that meets the needs of all learners. For specific examples, <http://www.learnnc.org/lp/editions/every-learner/67>

Suggested days of Instruction	Curriculum Management System <u>Subject/Grade Level:</u> Grade 8 Computer Technology	Topic: Spreadsheet	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) The student will be able to:	Essential Questions, Conceptual Understandings	Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model
5	<p>1.1. Use a spreadsheet as a table tool, for mathematical formulas and to create charts. (8.1.8.A.4)</p> <p>1.2. Identify spreadsheet columns, rows and cells.</p> <p>1.3. Use the auto-fill feature.</p> <p>1.4. Format cells using borders, colors, alignments, wrap text.</p> <p>1.5. Enter basic arithmetic formulas and sum feature.</p> <p>1.6. Insert and delete rows and columns.</p> <p>1.7. Change width and height of rows and columns.</p> <p>1.8. Create charts from data.</p> <p>1.9. Develop strategies to reinforce positive attitudes and productive behaviors</p>	<p><b>Essential Questions:</b> Based on appearance, what could a spreadsheet be used for? How does the mathematical component add to the function of a spreadsheet? Why would you choose to use a chart instead of statistical data?</p> <p><b>Conceptual Understandings:</b> The use of technology and digital tools requires knowledge and appropriate use of operations and related applications.</p>	<p><b>Learning Activities:</b> Creation of exercise chart Store inventory Class conducted surveys and polls Daily Activity analysis</p> <p><b>Assessment Models:</b> Completion of class assignments that include chart creation, simple formulas, chart making</p> <p><b>Additional Resources:</b> Microsoft Excel</p>



	<p>that impact critical thinking and problem-solving skills. (9.1.8.A.1)</p> <p>1.10. Determine an individual's responsibility for personal actions and contributions to group activities. (9.1.8.C.1)</p> <p>1.11. Model leadership skills during classroom and extra-curricular activities. (9.1.8.C.3)</p>		
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Suggested days of Instruction	Curriculum Management System <u>Subject/Grade Level:</u> Grade 8 Computer Technology	Topic: Stop Motion Video	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) The student will be able to:	Essential Questions, Conceptual Understandings	Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model
10	<p>2.1. Create a multimedia presentation including sound and images. (8.1.8.A.3)</p> <p>2.2. Determine the benefits of a wide range of digital tools by using them to solve problems. (8.1.8.A.5)</p> <p>2.3. Synthesize and publish information about a local or global issue or event on a collaborative, web-based service (also known as a shared hosted service). (8.1.8.B.1)</p> <p>2.4. Create a storyboard for their stop motion video.</p> <p>2.5. Create or locate backdrops, props and characters.</p> <p>2.6. Shoot still photos or video for their movie.</p> <p>2.7. Transfer photos into software and edit if necessary; import to movie making software.</p>	<p><b>Essential Questions:</b> How can information be presented to the public? How do adding images, movement, and/or sounds to the written word make the message clearer?</p> <p><b>Conceptual Understandings:</b> The use of technology and digital tools requires knowledge and appropriate use of operations and related applications.</p> <p>The use of digital tools and media-rich resources enhances creativity and the construction of knowledge.</p>	<p><b>Learning Activities:</b> Create storyboard for message Taking still and/or video Creation of public service announcement</p> <p><b>Assessment Models:</b> Completion of public service announcement Multi-media presentation with clear message</p> <p><b>Additional Resources:</b> iMovie- movie creation software Still and video cameras Clay/action figures Sound effects website (<a href="http://www.findsounds.com">www.findsounds.com</a>) School wiki</p>

	<p>2.8. Adjust length of time photo is on screen.</p> <p>2.9. Create a title, add video, record dialog and sound effects.</p> <p>2.10. Convert their movies to dvd format.</p> <p>2.11. Upload videos to wiki.</p> <p>2.12. Develop strategies to reinforce positive attitudes and productive behaviors that impact critical thinking and problem-solving skills. (9.1.8.A.1)</p> <p>2.13. Implement problem-solving strategies to solve a problem in school or the community. (9.1.8.A.2)</p> <p>2.14. Summarize strategies used by various organizations and agencies to solve problems that impact communities, and compare them with strategies used by similar organizations in another state or country. (9.1.8.A.3)</p> <p>2.15. Determine an individual's responsibility for personal actions and contributions to group activities. (9.1.8.C.1)</p> <p>2.16. Demonstrate the</p>		
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	<p>use of compromise, consensus, and community building strategies for carrying out different tasks, assignments, and projects. (9.1.8.C.2)</p> <p>2.17. Employ appropriate conflict resolution strategies. (9.1.4.D.1)</p> <p>2.18. Compare and contrast nuances in verbal and nonverbal communication in different cultures that may result in misinterpretation and misunderstanding. (9.1.8.D.4)</p> <p>2.19. Explain technology has strengthened the role of digital media in the global society. (9.1.8.E.1)</p> <p>2.20. Analyze the role of digital media in sales and marketing and in delivering cultural, political, and other societal messages. (9.1.8.E.2)</p> <p>2.21. Differentiate between explicit and implicit digital media messages, and discuss the impact on individuals, groups, and society as a whole. (9.1.8.E.3)</p> <p>2.22. Demonstrate how productivity and accountability contribute to realizing</p>		
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	individual or group work		
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Suggested days of Instruction	Curriculum Management System <u>Subject/Grade Level:</u> Grade 8 Computer Technology	Topic: Internet Research	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) The student will be able to:	Essential Questions, Conceptual Understandings	Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model
5	<p>3.1. Select and use appropriate tools and digital resources to accomplish a variety of tasks and to solve problems. (8.1.8.A.5)</p> <p>3.2. Gather and analyze findings using data collection technology to produce a possible solution for a content-related or real-world problem. (8.1.8.E.1, 9.2.8.E.1, 9.2.8.E.2)</p> <p>3.3. Use a web-based travel site to create travel plans for given dates.</p> <p>3.4. Choose interesting activities to participate in on vacation.</p> <p>3.5. Keep track of expenses for travel, lodging, food and activities in a spreadsheet. (9.2.8.E.2, 9.2.8.E.3, 9.2.8.E.5)</p>	<p><b>Essential Questions:</b> Why would using the Internet be more effective in planning a vacation than magazines or books? What do you need to consider when choosing a locale, hotel, restaurant, and planned activities? Why do most families only take a vacation once a year?</p> <p><b>Conceptual Understandings:</b> The use of technology and digital tools requires knowledge and appropriate use of operations and related applications.</p> <p>Effective use of digital tools assists in gathering and managing information.</p>	<p><b>Learning Activities:</b> Entering appropriate data on travel websites to find flights and/or hotel information</p> <p>Using spreadsheet as both a table (for itinerary) and keeping track of vacation costs.</p> <p><b>Assessment Models:</b> Completion of cost analysis and itinerary for 5-day vacation for four.</p> <p><b>Additional Resources:</b> Travel websites Predesigned spreadsheet</p>

3.6. Design and implement a project management plan using one or more problem-solving strategies.  
(9.1.8.A.4)

3.7. Assess data gathered to solve a problem for which there are varying perspectives (e.g., cross-cultural, gender-specific, generational), and determine how the data can best be used to design multiple solutions.  
(9.1.8.B.2)

3.8. Demonstrate how productivity and accountability contribute to realizing individual or group work goals within or outside the classroom.  
(9.1.8.F.1)

Suggested days of Instruction  20	Curriculum Management System <u>Subject/Grade Level:</u> Grade 8 Computer Technology	Topic: Robotics	
		Goal 4: The students will use the Lego Mindstorms EV3 kits and programming guides to build and program working models of robots. The students will learn to code using a block based programming method to instruct the robot to solve authentic real world tasks such as locating and removing objects from a defined space. Lego robotics provides a practical way to give students a good understanding of programming and how it directly influences our physical environment.	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) The student will be able to:	Essential Questions, Conceptual Understandings	Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model
	<p>4.1 Examine a system, consider how each part relates to other parts, and discuss a part to redesign to improve the system. <b>8.2.8.A.2</b></p> <p>4.2 Investigate a malfunction in any part of a system and identify its impacts. <b>8.2.8.A.3</b></p> <p>4.3 Explain how different teams/groups can contribute to the overall design of a product <b>8.2.8.C.1</b></p> <p>4.4 Collaborate to examine a malfunctioning system and identify the step-by-step process used to troubleshoot, evaluate and test options to repair the</p>	<p><b>Essential Questions:</b></p> <ul style="list-style-type: none"> <li>• What are robots and how are they used in society?</li> <li>• How is the field of robotics changing modern life?</li> <li>• How important is the Design Process when creating a robot to perform a specific tasks</li> <li>• What does it mean to code?</li> <li>• What is an algorithm?</li> <li>• How can I solve a larger problem by breaking it down into smaller steps?</li> <li>• Why is the robot not doing what I want it to do?</li> <li>• How does one troubleshoot and maintain a robotic system?</li> </ul> <p><b>Conceptual Understandings:</b></p> <ul style="list-style-type: none"> <li>• Engineering design is an interactive process with a defined cycle of steps</li> </ul>	<p><b>Learning Activities:</b> Lego® Education EV3 Intro to Programming Units: Moving Straight Turning Move Until Touch Move Until Near Turn for Angle Move Until Color Loops Switches Switch Loops Line Follower</p> <p><b>Assessment Models:</b> Completion of Lego® Education EV3 Intro to Programming Units. Daily Activity analysis</p> <p><b>Additional Resources:</b>  Lego® Education EV3 Base Kit</p> <p><a href="http://www.education.rec.ri.cmu.edu/roboticscurriculum/index.html">http://www.education.rec.ri.cmu.edu/roboticscurriculum/index.html</a></p>

product, presenting the better solution.

**8.2.8.C.6**  
4.5  
Build a prototype that meets a STEM-based design challenge using science, engineering, and math principles that validate a solution.

**8.2.8.D.3**  
4.6  
Demonstrate an understanding of the relationship between hardware and software.

**8.2.8.E.2**  
4.7  
Develop an algorithm to solve an assigned problem using a specified set of commands and use peer review to critique the solution.

**8.2.8.E.3**  
4.8  
Use appropriate terms in conversation (e.g., programming, language, data, RAM, ROM, Boolean logic terms).

**8.2.8.E.4**

- Robots can be controlled via coding
- Sensors allow robots to interact with the world
- Engineers work cooperatively in teams to accomplish a task
- Programming is based on a series of steps (algorithms) that define goals and rules
- Difficult problems can be solved by breaking them down into smaller components, building up toward the solution
- Computational thinking applies to the real world

<http://www.legoeducation.com/global.aspx>

<http://www.usfirst.org>

<http://www.odysseyofthemind.com>

Carnegie Mellon Robotics Academy

Lego Education

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Odyssey of the Mind – International education program