

# Comp. Sci. 6: Computer Programing with Scratch

Math Department  
Verona Public School District

## Curriculum Overview

### Verona Public Schools Mission Statement:

The mission of the Verona Public Schools, the center of an engaged and supportive community, is to empower students to achieve their potential as active learners and productive citizens through rigorous curricula and meaningful, enriching experiences.

### Course Description:

Computer Programing with Scratch introduces students to the intellectual, physical dimension, and affective dimensions of computer programing. Students will engage with and explore the Scratch Programming Theater and concentrate on how items are sequenced – by identifying and specifying an ordered series of instructions to produce interactions among characters, costumes, backdrops, scripts, and a stage.

### Prerequisite(s):

None

### Standard 8: Technology Standards

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| <b>8.1: Educational Technology:</b> <i>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.</i>  | <b>8.2: Technology Education, Engineering, Design, and Computational Thinking-Programming:</b> <i>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.</i> |
| <ul style="list-style-type: none"> <li>X A. Technology Operations and Concepts</li> <li>X B. Creativity and Innovation</li> <li>  C. Communication and Collaboration</li> <li>X D. Digital Citizenship</li> <li>  E. Research and Information Fluency</li> <li>X F. Critical thinking, problem solving, and decision making</li> </ul> | <ul style="list-style-type: none"> <li>X A. The Nature of Technology: Creativity and Innovation</li> <li>  B. Technology and Society</li> <li>X C. Design</li> <li>  D. Abilities for a Technological World</li> <li>X E. Computational Thinking: Programming</li> </ul>   |

### Standard 9: 21<sup>st</sup> Century Life and Careers

|   |  |   |  |
|---|--|---|--|
| <b>9.1 Career Ready Practices:</b> <i>These practices outline the skills that all individuals need to have to truly be adaptable, reflective, and proactive in life and careers. These are researched practices that are essential to career readiness.</i>   | <b>9.2: Personal Financial Literacy:</b> <i>This standard outlines the important fiscal knowledge, habits, and skills that must be mastered in order for students to make informed decisions about personal finance. Financial literacy is an integral component of a student's college and career readiness, enabling students to achieve fulfilling, financially-secure, and successful careers.</i> | <b>9.3: Career Awareness, Exploration &amp; Preparation:</b> <i>This standard outlines the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.</i> | <b>9.3: Career and Technical Education:</b> <i>This standard outlines what students should know and be able to do upon completion of a CTE Program of Study.</i>   |
| <ul style="list-style-type: none"> <li>1. Act as a responsible and contributing citizen and employee.</li> <li>X 2. Apply appropriate academic and technical skills.</li> <li>3. Attend to personal health and financial well-being.</li> <li>X 4. Communicate clearly and effectively and with reason.</li> <li>5. Consider the environmental, social, and economic impact of decisions.</li> <li>X 6. Demonstrate creativity and innovation.</li> <li>7. Employ valid and reliable research strategies.</li> <li>X 8. Utilize critical thinking to make sense of problems and persevere in solving them.</li> <li>9. Model integrity, ethical leadership, and effective management.</li> <li>10. Plan education and career paths aligned to personal goals.</li> <li>X 11. Use technology to enhance productivity.</li> <li>12. Work productively in teams while using cultural global competence.</li> </ul> | <ul style="list-style-type: none"> <li>A. Income and Careers</li> <li>B. Money Management</li> <li>C. Credit and Debt Management</li> <li>D. Planning, Saving, and Investing</li> <li>E. Becoming a Critical Consumer</li> <li>F. Civic Financial Responsibility</li> <li>G. Insuring and Protecting</li> </ul>  | <ul style="list-style-type: none"> <li>A. Career Awareness (K-4)</li> <li>X B. Career Exploration (5-8)</li> <li>C. Career Preparation (9-12)</li> </ul>  | <ul style="list-style-type: none"> <li>A. Agriculture, Food &amp; Natural Res.</li> <li>B. Architecture &amp; Construction</li> <li>C. Arts, AV Technology &amp; Comm.</li> <li>D. Business Management &amp; Admin.</li> <li>E. Education &amp; Training</li> <li>F. Finance</li> <li>G. Government &amp; Public Admin.</li> <li>H. Health Science</li> <li>I. Hospital &amp; Tourism</li> <li>J. Human Services</li> <li>K. Information Technology</li> <li>L. Law, Public, Safety, Corrections &amp; Security</li> <li>M. Manufacturing</li> <li>N. Marketing</li> <li>X O. Science, Technology, Engineering &amp; Math</li> <li>P. Transportation, Distribution &amp; Log.</li> </ul> |

**Core Instructional Materials:**

- Scratch

**Differentiated Resources:**

- Edmoto

## Curriculum Scope & Sequence

**Subject/Grade Level: Comp Sci 6**

**Course: Computer Programming with Scratch**

**Overarching Essential Question:** What is the underlying logic of computer programming?

| Unit                                 | Duration      | New Jersey Core Curriculum Content Standards  | Transfer Goal(s)   | Enduring Understandings   | Essential Questions  |
|--------------------------------------|---------------|---|--|---|--|
| <b>1 – Dimensions of Programming</b> | <b>3 days</b> | 8.1.8.A.3 Create a multimedia presentation including sound and images.<br>8.1.8.A.5 Select and use appropriate tools and digital resources to accomplish a variety of tasks and to solve problems.<br>8.1.8.D.2 Summarize the application of fair use and Creative Commons guidelines.<br>8.2.8.E.3 Develop an algorithm to solve an assigned problem using a specified set of commands and use peer review to critique the solution. | Students will be able to independently use their learning to troubleshoot and debug their code.  | U1. Computer programming is constantly evolving and changing.<br>U2. There is more than one way to solve a problem.   | Q1. What are some problem solving techniques you can use when faced with a new challenge?<br>Q2. What does it mean to have rules?  |
| <b>2 – Sequencing Commands</b>       | <b>6 days</b> | 8.1.8.A.3 Create a multimedia presentation including sound and images.<br>8.1.8.A.5 Select and use appropriate tools and digital resources to accomplish a variety of tasks and to solve problems.<br>8.1.8.D.2 Summarize the application of fair use and Creative Commons guidelines.<br>8.2.8.E.3 Develop an algorithm to solve an assigned problem using a specified set of commands and use peer review to critique the solution. | Students will be able to independently use their learning to make a unique sequence of commands to make sprites interact within the scratch theater. | U1. An application, computer, device does what it is told through a set of instructions.<br>U2. Scratch runs on user-defined instructions.<br>U3. A complex activity is really a sequence of simple instructions.<br>U4. Debugging is a reoccurring theme and process when computer programming.<br>U5. Identifying strategies to help you debug is a time saving and crucial problem solving skill.<br>U6. One object can influence another. | Q1. Use the Scratch stage to create Scratch programs.<br>Q2. Use a variety of blocks to create a sequence of instructions.<br>Q3. Use critical thinking and peer advice to debug a program.<br>Q4. Solve a complex problem with a simple set of sequence instructions.<br>Q5. Snap block to create a sequence of instructions.<br>Q6. Express and connect a sequence of instructions.<br>Q7. Use positive and negative integers to make a sprite interact. |

| Unit                              | Duration | New Jersey Core Curriculum Content Standards   | Transfer Goal(s)  | Enduring Understandings   | Essential Questions   |
|-----------------------------------|----------|--|---|---|---|
| <b>3 – Scratch as Theater</b>     | 5 days   | <p>8.1.8.A.3 Create a multimedia presentation including sound and images.</p> <p>8.1.8.A.5 Select and use appropriate tools and digital resources to accomplish a variety of tasks and to solve problems.</p> <p>8.1.8.D.2 Summarize the application of fair use and Creative Commons guidelines.</p> <p>8.2.8.E.3 Develop an algorithm to solve an assigned problem using a specified set of commands and use peer review to critique the solution.</p> | Students will be able to independently use their learning to code for characters, costumes, backdrops, scripts, and a stage and employ loops, vents, and parallelism. | <p>U1. An event is one thing causing another thing to happen.</p> <p>U2. Parallelism is that things happen at the same time.</p> <p>U3. Loops can be created with virtually any set of instructions.</p> <p>U4. How loops and sequences are the same, yet different.</p> <p>U5. A sequence involves a set of mathematical expressions, e.g., x and y coordinates.</p>   | <p>Q1. How are loops and sequences the same, yet different?</p> <p>Q2. Where do you see loops in your everyday life?</p> <p>Q3. How are loops used to create specific sequences?</p>  |
| <b>4 - Collaborative Remixing</b> | 8 days   | <p>8.1.8.A.3 Create a multimedia presentation including sound and images.</p> <p>8.1.8.A.5 Select and use appropriate tools and digital resources to accomplish a variety of tasks and to solve problems.</p> <p>8.1.8.D.2 Summarize the application of fair use and Creative Commons guidelines.</p> <p>8.2.8.E.3 Develop an algorithm to solve an assigned problem using a specified set of commands and use peer review to critique the solution.</p> | Students will be able to independently use their learning engage in creative computing through reusing and remixing the code of others in new and unique ways.        | <p>U1. “Make a Block,” allows users to have sprites have two or more behaviors.</p> <p>U2. Synchronizing between sprites is vital with reusing and remixing.</p> <p>U3. Coordinating interactions between sprites ensure synchronicity.</p> <p>U4. A switch statement will change a sprite, costume, backdrop, etc.</p> <p>U5. A broadcast statement will display a user’s message.</p> <p>U6. A send and receive statement works with synchronizing and relaying messages.</p> | <p>Q1. When might you use a “Make a Block?”</p> <p>Q2. How would you explain “Make a Block?”</p> <p>Q3. How did it feel to remix someone else’s work?</p> <p>Q4. What test and debugging strategies did you use?</p> <p>Q5. How do you initiate a sprite’s action in a scene?</p> <p>Q6. What does the stage have in common with sprites?</p> |