## Stem - Grade 4

**Somerville Public Schools**

<table>
<thead>
<tr>
<th>Days</th>
<th>12 weeks</th>
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</thead>
</table>
| NJSLS Standards: | 8.2.5.E.1 - 4  
8.2.5.C.6 | 8.1.5.A.1, 3  
8.2.5.C.2, 4, 6  
8.2.5.D.1 - 7 | 8.2.5.C.1, 4 - 6  
8.2.5.D.1 - 3, 6  
8.2.5.E.1 |
| Essential Question(s): | How do we program a computer? | How do we design and build a bridge? What makes a bridge well-built? What is civil engineering? | What are robots? How can we control them? What can they do? |
| Content: | Advancing the learning of visual programming | Using the engineering process to design a bridge | An introduction to robots and the practical application of programming |
| Skills and Topics: | ● A review of algorithms  
● Using nested and while loops  
● How to use functions  
● Review of events  
● Crowdsourcing  
● Internet safety and Digital Citizenship  
● Using cloud variables to create multiplayer games | ● Describe how everyday objects are designed to solve problems  
● Bridge design - the types of bridges  
● What is civil engineering?  
● The engineering design process  
● Push and pull forces - brainstorming design  
● Evaluating materials in building | ● Types of robots in everyday life  
● The functions of robots  
● Exploring robot sensors - simulating human responses  
● Programming robots - navigating mazes, collecting information, and meeting challenges  
● What is the future of robotics? |
| Formative Assessment | Teacher observations, code.org progress, daily | Teacher observation, intermediate deadlines, | Teacher observation, challenges, group progress |

*Adopted by the Somerville Board of Education on August 16, 2016*
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<table>
<thead>
<tr>
<th></th>
<th>progress updates, performance quizzes/challenges</th>
<th>daily/weekly challenges</th>
<th>updates, performance quizzes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Summative Assessment</strong></td>
<td>Scratch projects</td>
<td>Final Bridge design (weight-bearing contest)</td>
<td>Robot programming challenge</td>
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</tbody>
</table>
| **Interdisciplinary Connections** | Math: algorithms  
Social: How we behave on the web | Science: forces and balances  
LAL: reading about bridges | Math: graphing data  
LAL: robot stories, research |
| **Career Readiness Standards** | CRP2, CRP4, CRP6, CRP8, CRP11 | CRP1, CRP2, CRP4, CRP5, CRP6, CRP7, CRP8, CRP12 | CRP2, CRP4, CRP5, CRP6, CRP7, CRP8, CRP9, CRP11, CRP12 |
| **Resources/ Technology Used** | Code.org online tutorials,  
Scratch (scratch.mit.edu),  
SMART Board, YouTube,  
EdPuzzle, Google Classroom | EIE Designing Bridges Kit,  
SMART Board, YouTube,  
EdPuzzle, Google Classroom | Various robots (Sphero, Mindstorms, Meet Edison, Makerbot, Dash & Dot, etc.),  
Google Classroom, Google Docs, Edpuzzle, YouTube,  
SMART Board, various building supplies |
| **Modifications/Accommodations** | Video tutorials, shortening the code.org levels,  
individualized Scratch projects | Video tutorials/ examples,  
provided notes (google doc), glossary | Heterogeneous grouping, video resources, tiered challenges |