

# **Fairfield Public Schools**

## **High Enrichment Program**

*infusing*

**S.T.E.A.M.**

**(Science, Technology, Engineering, Arts  
and Mathematics)**

**Fairfield Public Schools**

**15 Knoll Road**

**Fairfield, NJ 07004**

**Committee:**

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## **Executive Summary**

The Fairfield Public School District offers a High Enrichment Program (H.E.P.) infusing S.T.E.A.M. (Science, Technology, Engineering, Arts and Math) that has been designed for students to maximize their learning experiences and deepen their understanding of all subjects within the gifted and talented curriculum. In order to prepare learners for the 21st century and life skills, the New Jersey and National Gifted and Talented Standards were incorporated into our program.

Gifted and talented students are those children who display outstanding intellectual ability, academic aptitude, creative thinking leadership or exceptional talents in the visual and performing arts by use of multiple criteria. Approximately 3-5% of the general population is gifted in each of these areas.

These students must have the opportunity to develop to their fullest potential. Our High Enrichment Program incorporating S.T.E.A.M. encourages, supports, and fosters independent thinkers for life and their careers.

All students in grades K-2 are provided enriching, differentiated experiences within the classroom. The aim is to remove the ceiling on what is learned and promote creativity and higher level cognitive skills. Students in grades 3-5 who are identified as intellectually gifted are provided with a pull-out enrichment program in which they are grouped with peers. These students are provided with a program of multi- and interdisciplinary units designed to encourage and develop knowledge acquisition, thinking skills, creative expression, and student interaction.

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## **HIGH ENRICHMENT PROGRAM GRADES K - 6**

### **Overview**

New Jersey's Administrative Code requires that school districts provide educational opportunities for exceptionally gifted and talented pupils. The Fairfield Board of Education recognized the need to establish a program where gifted youngsters could learn from interaction with peers of similar ability. The High Enrichment Program (HEP) has been established to assist and supplement the classroom teachers' efforts to recognize and challenge the needs of each child as an individual learner in order to help him/her develop to their fullest potential. HEP provides gifted pupils the opportunity to interact with pupils whose abilities commensurate with theirs. Through HEP, more differentiated educational experiences and services are provided, as well as learning opportunities that will deal with ideas, concepts, and topics at a level not routinely introduced at the student's grade level. HEP will help students develop task commitment by giving the students opportunities to make decisions and evaluate their own products and progress.

In Grades K-1, the HEP teacher provides enrichment for the entire class through in-class lessons. Throughout the year, the students are assessed and the students who are nominated by their teacher will be reviewed by a selection committee based on observations, report cards and the Screening Assessment for Gifted Elementary Students (SAGES-2) scores. These students will be identified to work with the HEP teacher in small groups. In Grade 2, all students will take a computer-based gifted and talented abilities assessment. In addition, the classroom teacher differentiates instruction in an effort to consistently meet the needs of the gifted learner.

A pullout program is offered for students in grades 3-5. These students are identified through a teacher rating scale, report cards and the scores from gifted assessment(s). The identified children in grades 3 and 5 meet twice weekly with the HEP teacher for a total of eighty minutes. Students identified in grade 4 meet three times per week, with the third meeting being a problem solving component. Additionally, grade 5 students who are identified specifically in math attend HEP 5 Math, which replaces their daily math class. Grade 6 is a replacement math class only.

## **HIGH ENRICHMENT PROGRAM GRADES 3 - 6 PROCESS**

A selection committee will be chaired by the building principal. The High Enrichment teachers will serve on the committee. Individual classroom teachers or teachers with special expertise in a subject may be invited to participate in deliberations.

**STEP 1: INFORMATION TO PARENTS ANNUALLY** Information about this program will be disseminated from the district office in the spring of 2nd grade. The selection committee will be assigned to receive all nominations and render a decision regarding identification and services.

**STEP 2: GIFTED AND TALENTED ASSESSMENT** All grade 2 students will be assessed using a computer-based gifted abilities test.

**STEP 3: LETTER OF RECOMMENDATION/RATING SCALE** Teachers or administrators may submit a letter of recommendation on behalf of a student. The letter of recommendation must specify the reasons for the recommendation. In addition, teachers of nominated students will be asked to complete a rating scale related to giftedness.

**STEP 4: PERMISSION FOR TESTING FOR STUDENTS CURRENTLY IN GRADES 3, 4, AND 5** Parents will receive a letter for a "Permission to Test" form. An assessment will be administered such as: Screening Assessment for Gifted Elementary Students (SAGES 2) will be administered to nominated students currently in grades 3 and 4 for identification for HEP classes in grades 4 and 4. TOMAGS is administered to mathematics nominees who are currently in grades 4 and 5 for HEP math classes in grades 5 and 6.

**STEP 5: REVIEW OF SUPPORTING MATERIALS** The committee will deliberate by reviewing all materials supporting the candidacy of individual children related to their area of giftedness. The committee seeks to select students within the top 3-5% of areas surveyed.

**STEP 6: WRITTEN NOTIFICATION TO PARENTS** The Gifted and Talented Selection Committee will forward written notification to parents regarding their recommendation. Gifted and talented services will be provided as per the New Jersey Administrative Code, that is, "to ensure that the exceptionally able student may achieve according to their ability".

**STEP 7: RIGHT TO APPEAL** If a parent wishes to appeal the decision of the Gifted and Talented Selection Committee, they may do so by submitting that appeal in writing to the Superintendent of Schools within ten (10) days of notification. The decision of the Superintendent will be the final level of appeal.

STEP 8: SIGNING OF CONTRACT Upon entrance into the program, the student will sign a contract. When any of the conditions of the contract have not been consistently met, a probationary plan will be implemented.

### **HIGH ENRICHMENT PROGRAM GRADES 3 - 6 PROGRAM**

#### **OBJECTIVES**

- Students will demonstrate the capacity to analyze, apply, synthesize, and evaluate printed materials to accomplish written exercises.
- Students will demonstrate improvement in their ability to use inquiry and problem solving skills.
- Students will develop their ability to be self-directed learners.
- Students will refine their skills and talents to be quality producers.
- Students will develop their ability to be cooperative workers.

**HIGH ENRICHMENT PROGRAM**  
**GRADES 4-5-6**  
**STUDENT CONTRACT**

As a participant in the High Enrichment Program, I will:

- Demonstrate cooperative behavior
- Be responsible for completion of daily, long-term, and make-up assignments (including absentee work), Demonstrate effort that shows pride in producing quality work.
- Be organized and prepared with the appropriate school materials.
- Maintain an "A" average, with the exception of one "B" per marking period, in all major subject areas.

I understand that a "B-" in a major subject area, in two consecutive marking periods, will warrant probationary intervention. A conference may be requested by parent(s) or teacher(s) to discuss any of the conditions of the contract. A Probationary Plan will be initiated when failure to maintain any of the above contract conditions is determined.

**I understand the above contract and will abide by its conditions:**

**Student's Signature** \_\_\_\_\_ **Date:** \_\_\_\_\_

**I have read the contract and reviewed it with my child.**

**Parent's Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Homeroom Teacher's Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**S.T.E.A.M. Curriculum for H.E.P. (High Enrichment Program)  
Fairfield Public Schools**

Grade: **Kindergarten**      Unit 1 Theme: Computer Science-Coding      Time Frame: April to June

Summary: Pupils will learn the basics of coding through a computer science program -Code.org  
Texts/Resources: Code.org (unplugged and plugged lessons).

**Assessments**

Formal:

- Focus on building a secure relationship with algorithms.
- Use a mouse and the block-based programming interface.
- Utilize “Blockly” and “Java Script” coding.

Informal:

- Teacher observation.
- Classroom observation.
- Ability to work independently.
- Ability to complete tasks and work cooperatively.

**Established Goals**

**Overarching Goals:** Learners will create computer programs using Blockly and JavaScript code, that will help them learn to collaborate with others, develop problem-solving skills, and persist through difficult tasks.

**Learners will . . .**

- Recognize situations where they can create programs to complete tasks.
- Predict moves necessary to get teammate from start to finish.
- Convert movements into symbolic instructions.
- Relate algorithms as programs to teammates.
- Use a mouse to input information into a computer.
- Recall and apply the rules of pair programming.
- Use pair programming to complete collaborative tasks with or without a computer.
- Identify situations when the rules of pair programming are not followed.
- Arrange puzzle pieces into the proper order.
- Order movement commands as sequential steps in a program.
- Represent an algorithm as a computer program.
- Count the number of times an action should be executed and represent it as instructions in a program.
- Decompose large activities into a series of smaller events.

**NAGC Gifted and Talented Programming Standards and Related Standards Covered:**

**NAGC Gifted and Talented Standards:**

**3.1. Curriculum Planning.** Students with gifts and talents demonstrate growth commensurate with aptitude during the school year.

3.1.4. Educators design differentiated curricula that incorporate advanced, conceptually challenging, in-depth, distinctive, and complex content for students with gifts and talents.

3.1.6. Educators use pre-assessments and pace instruction based on the learning rates of students with gifts and talents and accelerate and compact learning as appropriate.

**3.6. Resources.** Students with gifts and talents benefit from gifted education programming that provides a variety of high quality resources and materials.

3.6.1. Teachers and administrators demonstrate familiarity with sources for high quality resources and materials that are appropriate for learners with gifts and talents.

**NJ SLS: Mathematical Practices**

- Mathematical Practices



<ul style="list-style-type: none"> <li>● Arrange sequential events into their logical order.</li> <li>● Select an argument for a given command.</li> <li>● Choose the appropriate blocks to draw images with non-continuous lines.</li> </ul>	<ul style="list-style-type: none"> <li>● 1. Make sense of problems and persevere in solving them.</li> <li>● 2. Reason abstractly and quantitatively.</li> <li>● 3. Construct viable arguments and critique the reasoning of others.</li> <li>● 4. Model with mathematics.</li> <li>● 5. Use appropriate tools strategically.</li> <li>● 6. Attend to precision.</li> <li>● 7. Look for and make use of structure. 8</li> <li>● 8. Look for and express regularity in repeated reasoning</li> </ul> <p><b>NJ Student Learning Standards -Education Technology:</b></p> <ul style="list-style-type: none"> <li>● 8.1 Educational Technology and 8.2 Technology, Engineering, Design and Computational Thinking, which work symbiotically to provide students with the necessary skills for college and career readiness.</li> </ul>
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<b>Desired Results</b>	
<p>Enduring Understandings: Learners understand . . .</p> <ul style="list-style-type: none"> <li>● Be able to use coding independently and collaboratively to create games, app, etc. using the beginnings of Blockly and Java Script code.</li> </ul>	<p>Essential Questions:</p> <ol style="list-style-type: none"> <li>1. What does the word code mean?</li> <li>2. What is an algorithm? What is a program?</li> <li>3. How can the internet, computers or any technology help this world?</li> <li>4. What is Blockly and JavaScript?</li> </ol>

<b>Suggested Materials</b>
<p>Utilize “Code.org”, a web-based software to code using Blockly and Java Script.  <a href="http://www.code.org">www.code.org</a>  Or  <a href="https://scratch.mit.edu/">https://scratch.mit.edu/</a></p>

**S.T.E.A.M. Curriculum for H.E.P. (High Enrichment Program)  
Fairfield Public Schools**

Grade: **1st**                      Unit 1 Theme: Computer Science-Coding                      Time Frame: Jan. to March

Summary: Pupils will learn the basics of coding through a computer science program -Code.org

Texts/Resources: Code.org (unplugged and plugged lessons).

**Assessments**

Formal:

- Code in Selected Program.
- Apply algorithms to coding.
- Utilize “Blockly” and “Java Script” coding in a program of their choice (Minecraft, Frozen, etc.).

Informal:

- Teacher observation.
- Classroom observation
- Ability to code independently.
- Ability to complete tasks and work cooperatively.

**Established Goals**

**Overarching Goals:** Learners will create programs to solve problems and develop interactive games or stories they can share.

**Learners will . . .**

- Begin to understand what programming is really about.
- Will relate the concept of algorithms back to everyday real-life activities
- Students will build on the understanding of algorithms
- Create a program to complete an image using sequential steps
- Will practice converting sets of actions into a single loop.
- Identify the benefits of using a loop structure instead of manual repetition
- Write a program for a given task which loops a single command
- Practice communicating ideas through codes and symbols
- Predict where a program will fail
- Define circumstances when certain parts of programs should run and when they shouldn't
- Encode letters into binary & Understand that being safe when they visit websites is similar to staying safe in real life
- Learn to recognize websites that are alright for

**NAGC Gifted and Talented Programming Standards and Related Standards Covered:**

**NAGC Gifted and Talented Standards:**

**5.1. Variety of Programming.** Students with gifts and talents participate in a variety of evidence-based programming options that enhance performance in cognitive and affective areas.

5.1.1. Educators regularly use multiple alternative approaches to accelerate learning.

5.1.2. Educators regularly use enrichment options to extend and deepen learning opportunities within and outside of the school setting.

5.1.3. Educators regularly use multiple forms of grouping, including clusters, resource rooms, special classes, or special schools.

5.1.4. Educators regularly use individualized learning options such as mentorships, internships, online courses, and independent study.

5.1.5. Educators regularly use current technologies, including online learning options and assistive

<p>them to visit</p> <ul style="list-style-type: none"> <li>● Recognize if they should ask an adult they trust before they visit a particular website</li> <li>● Explore what information is appropriate to be put online</li> <li>● Practice differentiating pre-defined actions and event-driven ones</li> <li>● Match blocks with the appropriate event handler</li> <li>● Create an animated, interactive story using sequence, loops, and event-handlers</li> <li>● Use the Artist environment to write programs that have looped statements inside another loop.</li> </ul>	<p>technologies to enhance access to high-level programming.</p> <p><b>NJ SLS: Mathematical Practices</b></p> <ul style="list-style-type: none"> <li>● Mathematical Practices</li> <li>● 1. Make sense of problems and persevere in solving them.</li> <li>● 2. Reason abstractly and quantitatively.</li> <li>● 3. Construct viable arguments and critique the reasoning of others.</li> <li>● 4. Model with mathematics.</li> <li>● 5. Use appropriate tools strategically.</li> <li>● 6. Attend to precision.</li> <li>● 7. Look for and make use of structure. 8</li> <li>● 8. Look for and express regularity in repeated reasoning</li> </ul> <p><b>NJ Student Learning Standards -Education Technology:</b></p> <ul style="list-style-type: none"> <li>● 8.1 Educational Technology and 8.2 Technology, Engineering, Design and Computational Thinking, which work symbiotically to provide students with the necessary skills for college and career readiness.</li> </ul>
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<b>Desired Results</b>	
<p>Enduring Understandings: Learners understand . . .</p> <ul style="list-style-type: none"> <li>● Be able to use coding to create a program, game, app, etc. using Blockly and Java Script coding.</li> </ul>	<p>Essential Questions:</p> <ol style="list-style-type: none"> <li>1. What is coding?</li> <li>2. How will coding help you create something?</li> <li>3. How can coding change the world?</li> <li>4. How can one use technology in a creative and innovative way?</li> </ol>

<b>Suggested Materials</b>
<p>Utilize “Code.org”, a webbased software to code using Blockly and Java Script.  <a href="http://www.code.org">www.code.org</a>  Or  <a href="https://scratch.mit.edu/">https://scratch.mit.edu/</a></p>

**S.T.E.A.M. Curriculum for H.E.P. (High Enrichment Program)  
Fairfield Public Schools**

Grade: **2nd Grade**

Unit 1 Theme: Computer Science-Coding

Time Frame: Sept. to Dec.

Summary: Pupils will learn the basics of coding through a computer science program -Code.org

Texts/Resources: Code.org (unplugged and plugged lessons)

**Assessments**

Formal:

- Program using various topics (i.e.debugging, conditionals, functions,etc.)
- Create solutions for digital dilemmas.
- Create interactive games and stories that can be shared.
- Utilize Blockly and Java Script Coding.

Informal:

- Teacher observation.
- Classroom observation.
- Ability to program independently.
- Ability to complete solutions for digital dilemmas cooperatively.

**Established Goals**

Overarching Goals: Students will delve deeper into programming topics introduced in previous courses to create flexible solutions to more complex problems.

**Learners will . . .**

- Create interactive stories and games
- Practice the four arts of computational thinking (decomposition, pattern, matching, abstraction, and algorithms).
- Create a program for a given task using sequential steps.
- Count the number of times an action should be repeated and represent it as a loop.
- Calculate the angles in equilateral and 30, 60, and 90 triangles.
- Calculate the perimeter and one side of a rectangle.
- Identify symmetrical shapes & decompose a shape into its smallest repeatable sequence.
- Use functions to draw shapes on the screen and modify those functions to fit different purposes.
- Write programs with conditional statements.
- Translate real-world situations to online

Related Standards Covered:

**NAGC Gifted and Talented Programming Standards and Related Standards Covered:**

**NAGC Gifted and Talented Standards:**

**5.1. Variety of Programming.** Students with gifts and talents participate in a variety of evidence-based programming options that enhance performance in cognitive and affective areas.

5.1.1. Educators regularly use multiple alternative approaches to accelerate learning.

5.1.2. Educators regularly use enrichment options to extend and deepen learning opportunities within and outside of the school setting.

5.1.3. Educators regularly use multiple forms of grouping, including clusters, resource rooms, special classes, or special schools.

**5.7. Career Pathways.** Students with gifts and talents identify future career goals and the talent development

<p>scenarios and vice-versa.</p> <ul style="list-style-type: none"> <li>• Learn about the complexity of sending messages over the Internet.</li> <li>• Translate URLs into IP Addresses.</li> <li>• Practice creative problem solving.</li> <li>• Rearrange a large task into several smaller tasks.</li> <li>• Build a complete solution from several smaller solutions.</li> <li>• Compare and contrast their responsibilities to their online and offline communities.</li> <li>• Understand what type of information can put them at risk for identify theft and other scams.</li> <li>• Reflect on the characteristics that make someone an upstanding citizen.</li> <li>• Devise resolutions to digital dilemmas.</li> </ul>	<p>pathways to reach those goals.</p> <p>5.7.1. Educators provide professional guidance and counseling for individual student strengths, interests, and values.</p> <p>5.7.2. Educators facilitate mentorships, internships, and vocational programming experiences that match student interests and aptitudes.</p> <p><b>NJ SLS: Mathematical Practices</b></p> <ul style="list-style-type: none"> <li>• Mathematical Practices</li> <li>• 1. Make sense of problems and persevere in solving them.</li> <li>• 2. Reason abstractly and quantitatively.</li> <li>• 3. Construct viable arguments and critique the reasoning of others.</li> <li>• 4. Model with mathematics.</li> <li>• 5. Use appropriate tools strategically.</li> <li>• 6. Attend to precision.</li> <li>• 7. Look for and make use of structure. 8</li> <li>• 8. Look for and express regularity in repeated reasoning</li> </ul> <p><b>NJ Student Learning Standards -Education Technology:</b></p> <ul style="list-style-type: none"> <li>• 8.1 Educational Technology and 8.2 Technology, Engineering, Design and Computational Thinking, which work symbiotically to provide students with the necessary skills for college and career readiness.</li> </ul>
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Desired Results	
<p>Enduring Understandings: Learners understand . . .</p> <ul style="list-style-type: none"> <li>• Will be able to apply different topics (debugging, looping, functions, conditionals, etc.) while programming using Blockly and Javascripte.</li> <li>• Will be able to program different types of games that can be shared.</li> </ul>	<p>Essential Questions:</p> <ol style="list-style-type: none"> <li>1. What is a program?</li> <li>2. What are programming topics?</li> <li>3. How are programming topics used to help society?</li> <li>4. Why is programming important?</li> <li>5. What are digital dilemmas in computer science?</li> </ol>

Suggested Materials	
<p><a href="http://www.code.org">www.code.org</a></p>	<p><a href="https://scratch.mit.edu/">https://scratch.mit.edu/</a></p>
<p>Utilize web-based software to code using Blockly and Java Script.</p>	

**S.T.E.A.M. Curriculum for H.E.P. (High Enrichment Program)  
Fairfield Public Schools**

Grade: 3rd Grade      Unit 1 Theme: Problem Based Learning/Coding/Digital Designs      Time Frame: Sept. to June

Summary: Pupils will learn how to think independently through problem-based learning, coding and digital design.

Texts/Resources: Code.org, TinkerCAD.com, <https://www.aurasma.com>

**Assessments**

Formal:

- Create solutions for real-world problems.
- Invent something to help an existing problem.
- Solve multiple challenges utilizing coding.
- Utilize problem solving in a different and very unconventional way.

Informal:

- Independently use digital design programs.
- Collaboratively and independently solve problems by creating inventions.
- Develop programs using Blockly and JavaScript code collaboratively and independently.
- Teacher and classroom observation.

**Established Goals**

**Overarching Goals:**

Students will actively explore real-world problems and challenges and acquire a deeper knowledge.

Learners will . . .

**PBL:**

- Tackle realistic problems as they would be solved in the real world.
- Be able to increase control over his or her learning.
- Work in pairs or groups.

**Code:**

- Learn how to tackle puzzles with increased complexity as they learn how to combine several concepts when solving each challenge.

**Digital Designs:**

- Provides students the foundation of computer design using graphics software.
- Capture images and learn to manipulate them to

Related Standards Covered:

**NAGC Gifted and Talented Programming Standards and Related Standards Covered:**

**NAGC Gifted and Talented Standards:**

**1.1. Self-Understanding.** Students with gifts and talents demonstrate self-knowledge with respect to their interests, strengths, identities, and needs in socio-emotional development and in intellectual, academic, creative, leadership, and artistic domains.

**1.1. Self-Understanding.** Students with gifts and talents demonstrate self-knowledge with respect to their interests, strengths, identities, and needs in socio-emotional development and in intellectual, academic, creative, leadership, and artistic domains.

**1.8. Cognitive and Affective Growth.** Students with gifts and talents identify future career goals that match their talents and abilities and resources needed to meet those goals (e.g., higher education opportunities,

<p>create dynamic designs.</p> <ul style="list-style-type: none"> <li>Discover, compare and contrast emerging technologies.</li> </ul>	<p>mentors, financial support).</p> <p><b>4.5. Communication Competence.</b> Students with gifts and talents develop competence in interpersonal and technical communication skills. They demonstrate advanced oral and written skills, balanced biliteracy or multiliteracy, and creative expression. They display fluency with technologies that support effective communication.</p> <p><b>5.7. Career Pathways.</b> Students with gifts and talents identify future career goals and the talent development pathways to reach those goals.</p> <p>5.7.1. Educators provide professional guidance and counseling for individual student strengths, interests, and values.</p> <p><b>NJ SLS: Mathematical Practices</b></p> <ul style="list-style-type: none"> <li>Mathematical Practices</li> <li>1. Make sense of problems and persevere in solving them.</li> <li>2. Reason abstractly and quantitatively.</li> <li>3. Construct viable arguments and critique the reasoning of others.</li> <li>4. Model with mathematics.</li> <li>5. Use appropriate tools strategically.</li> <li>6. Attend to precision.</li> <li>7. Look for and make use of structure. 8</li> <li>8. Look for and express regularity in repeated reasoning</li> </ul> <p><b>NJ Student Learning Standards -Education Technology:</b></p> <ul style="list-style-type: none"> <li>8.1 Educational Technology and 8.2 Technology, Engineering, Design and Computational Thinking, which work symbiotically to provide students with the necessary skills for college and career readiness.</li> </ul>
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<b>Desired Results</b>	
<p>Enduring Understandings: Learners understand . . .</p> <p><b>PBL</b></p> <ul style="list-style-type: none"> <li>Deeper learning, higher-level thinking skills, and intra/interpersonal skills</li> </ul> <p><b>Digital Design</b></p> <ul style="list-style-type: none"> <li>Demonstrate an understanding of terminology, software, principles and equipment necessary in graphic design.</li> <li>Identify careers in the graphic design field and digital communications industry.</li> </ul> <p><b>Coding:</b></p>	<p><b>Essential Questions:</b></p> <p><b>PBL:</b></p> <ul style="list-style-type: none"> <li>What is problem-based learning?</li> <li>Why do we work collaboratively in this world?</li> <li>Why do we problem-solve?</li> </ul> <p><b>Digital Design</b></p> <ul style="list-style-type: none"> <li>What is digital design?</li> <li>How do we use graphic design to improve our lives?</li> <li>How do we use digital design to help the world?</li> </ul>

<ul style="list-style-type: none"> <li>• Create programs that let them showcase multiple skills, including for loops and functions with parameters.</li> </ul>	<p><b>Coding:</b></p> <ul style="list-style-type: none"> <li>• What are functions?</li> <li>• What are parameters?</li> <li>• Who will functions and parameters help the world with coding?</li> </ul>
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Suggested Materials/Resources		
Problem Based Learning	Digital Design	Coding
<ul style="list-style-type: none"> <li>• Stevenson Garden-(Growing crops, preparing of garden, Maintaining the garden, etc)</li> <li>• <a href="http://www.projectparadigm.org/">http://www.projectparadigm.org/</a></li> <li>• <a href="http://wveis.k12.wv.us/teach21/public/project/Mainmenu.cfm">http://wveis.k12.wv.us/teach21/public/project/Mainmenu.cfm</a></li> <li>• <a href="http://edibleschoolyard.org/">http://edibleschoolyard.org/</a></li> <li>• <a href="http://www.schoolgardenwizard.org/">http://www.schoolgardenwizard.org/</a></li> </ul>	<ul style="list-style-type: none"> <li>• TinkerCAD</li> <li>• <a href="https://www.thingiverse.com/jumpstart/tinkercad">https://www.thingiverse.com/jumpstart/tinkercad</a></li> <li>• <a href="https://www.aurasma.com">https://www.aurasma.com</a></li> <li>• <a href="http://www.diigo.com">www.diigo.com</a></li> <li>• <a href="http://www.signupgenius.com">www.signupgenius.com</a></li> <li>• <a href="http://www.dropbox.com">www.dropbox.com</a></li> <li>• <a href="http://www.picmonkey.com">www.picmonkey.com</a></li> <li>• <a href="http://www.gimp.org">www.gimp.org</a></li> <li>• <a href="http://www.photobucket.com">www.photobucket.com</a></li> <li>• <a href="http://www.shutterfly.com">www.shutterfly.com</a></li> <li>• <a href="http://www.snapfish.com">www.snapfish.com</a></li> <li>• <a href="https://storybird.com/">https://storybird.com/</a></li> </ul>	<ul style="list-style-type: none"> <li>• <a href="http://www.code.org">www.code.org</a></li> <li>• <a href="https://scratch.mit.edu/">https://scratch.mit.edu/</a></li> <li>• <a href="https://cybraryman.com/qrcode_s.html">https://cybraryman.com/qrcode_s.html</a></li> </ul>



**S.T.E.A.M. Curriculum for H.E.P. (High Enrichment Program)**  
**Fairfield Public Schools**

**Grade:** 4th Grade      **Unit 1 Theme:** Inventions in Engineering/Coding/Robotics      **Time Frame:** Sept. to June  
**Summary:** Pupils will learn how to think independently through problem-based learning  
**Texts/Resources:** Code.org, robotics websites, engineering websites and forums.

**Established Goals**

Overarching Goals:  
Learners will . . .

**Engineering:**

- Research and understand the concepts of engineering and inventions.
- Demonstrate an understanding of the scientific process and fundamentals of engineering.
- Use online forums to discuss their projects and learn how other students use the same materials to achieve different results.

**Robotics:**

- Create robots from legos.
- Program robots from various kits.
- Run robots that are programmed.

**Coding:**

- Learn the difference between programming, computer science, and computational thinking
- Understand that a computer is a tool and not an excuse to turn off your brain.
- Learn to be responsible computer users.
- Discover that computer science can change the world.

Related Standards Covered:

**NAGC Gifted and Talented Programming Standards and Related Standards Covered:**

**NAGC Gifted and Talented Standards:**

**1.1. Self-Understanding.** Students with gifts and talents demonstrate self-knowledge with respect to their interests, strengths, identities, and needs in socio-emotional development and in intellectual, academic, creative, leadership, and artistic domains.

**1.1. Self-Understanding.** Students with gifts and talents demonstrate self-knowledge with respect to their interests, strengths, identities, and needs in socio-emotional development and in intellectual, academic, creative, leadership, and artistic domains.

**1.8. Cognitive and Affective Growth.** Students with gifts and talents identify future career goals that match their talents and abilities and resources needed to meet those goals (e.g., higher education opportunities, mentors, financial support).

**4.5. Communication Competence.** Students with gifts and talents develop competence in interpersonal and technical communication skills. They demonstrate advanced oral and written skills, balanced biliteracy or multiliteracy, and creative expression. They display fluency with technologies that support effective communication.

**5.7. Career Pathways.** Students with gifts and talents identify future career goals and the talent development pathways to reach those goals.

	<p>5.7.1. Educators provide professional guidance and counseling for individual student strengths, interests, and values.</p> <p><b>NJ SLS: Mathematical Practices</b></p> <ul style="list-style-type: none"> <li>● Mathematical Practices</li> <li>● 1. Make sense of problems and persevere in solving them.</li> <li>● 2. Reason abstractly and quantitatively.</li> <li>● 3. Construct viable arguments and critique the reasoning of others.</li> <li>● 4. Model with mathematics.</li> <li>● 5. Use appropriate tools strategically.</li> <li>● 6. Attend to precision.</li> <li>● 7. Look for and make use of structure. 8</li> <li>● 8. Look for and express regularity in repeated reasoning</li> </ul> <p><b>NJ Student Learning Standards -Education Technology:</b></p> <ul style="list-style-type: none"> <li>● 8.1 Educational Technology and 8.2 Technology, Engineering, Design and Computational Thinking, which work symbiotically to provide students with the necessary skills for college and career readiness.</li> </ul>
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<b>Desired Results</b>
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<p>Enduring Understandings: Learners understand . . .</p> <p><b>Engineering:</b></p> <ul style="list-style-type: none"> <li>● Create a project using the scientific process and the fundamentals of engineering prepare.</li> <li>● Use Google Classroom as discussion board and on-line forum to debrief the engineering process and creations.</li> </ul> <p><b>Robotics:</b></p> <ul style="list-style-type: none"> <li>● Create a tangible robot from abstract ideas.</li> <li>● Collaborate with peers to create their robot.</li> <li>● Use coding to program robots.</li> </ul> <p><b>Coding:</b></p> <ul style="list-style-type: none"> <li>● Create binary decoder key</li> <li>● Use computational thinking model to prepare real world problems for digital representation.</li> </ul>	<p>Essential Questions:</p> <p><b>Engineering Questions</b></p> <ul style="list-style-type: none"> <li>● What is engineering?</li> <li>● How can engineering and the scientific process help create inventions?</li> <li>● What is an on-line forum? Purpose?</li> </ul> <p><b>Robotics:</b></p> <ul style="list-style-type: none"> <li>● What can robotics do to help improve the world?</li> <li>● How can robotics help people?</li> <li>● What are robotics?</li> </ul> <p><b>Coding:</b></p> <ul style="list-style-type: none"> <li>● What is the role of a computer scientist?</li> <li>● How can computer scientists improve the world? Technology?</li> </ul>
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<b>Suggested Activities</b>
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Engineering	Robotics	Coding
<ul style="list-style-type: none"> <li>● Introduction to Inventions</li> </ul>	<ul style="list-style-type: none"> <li>● Lego MindStorms</li> </ul>	<ul style="list-style-type: none"> <li>● <a href="http://www.code.org">www.code.org</a></li> <li>● <a href="https://scratch.mit.edu/">https://scratch.mit.edu/</a></li> </ul>

<ul style="list-style-type: none"> <li>• Characteristics of Inventors</li> <li>• the Scientific Process</li> <li>• Naming an Invention</li> <li>• Simple Machines</li> <li>• Aeronautics</li> <li>• Patents and Trademarks</li> <li>• Electrical Engineering</li> <li>• Vehicles</li> </ul>	<ul style="list-style-type: none"> <li>• OzBots</li> </ul>	<ul style="list-style-type: none"> <li>• <a href="https://cybraryman.com/qrcode/s.html">https://cybraryman.com/qrcode/s.html</a></li> </ul>
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**S.T.E.A.M. Curriculum for H.E.P. (High Enrichment Program)  
Fairfield Public Schools**

Grade: 5th Grade      Unit 1 Theme: Coding/Finance/Engineering with Origami      Time Frame: Sept. to June

Summary:  
Texts/Resources: Code.org, financial websites, engineering with origami

**Assessments**

<p><u>Formal:</u> <b>Computer Science In Algebra:</b></p> <ul style="list-style-type: none"> <li>• Learn Functional Programming through Algebra.</li> <li>• Utilize evaluation blocks to explore the concept of math as a language, more specifically, a programming language.</li> </ul> <p><b>Finance: The Stock Market:</b></p> <ul style="list-style-type: none"> <li>• Students work together to create and manage a virtual investment portfolio of real world stocks, bonds, and mutual funds.</li> <li>• Research and evaluate potential investments.</li> <li>• Buy, sell, or hold the stocks, funds, and bonds in a created portfolio.</li> </ul> <p><b>Engineering with Origami:</b></p> <ul style="list-style-type: none"> <li>• Introduce subject of origami help students think like mechanical engineers.</li> <li>• To encourage future-based origami design and applications.</li> </ul>	<p><u>Informal:</u> <b>Computer Science In Algebra</b></p> <ul style="list-style-type: none"> <li>• Independently and Collaboratively use computer science concepts.</li> <li>• Construct viable arguments to justify solution methods. Use order of operations when coding.</li> </ul> <p><b>Finance: The Stock Market:</b></p> <ul style="list-style-type: none"> <li>• Independently create a portfolio.</li> <li>• Trade stocks/bonds/funds using The Stock Market Game.</li> <li>• Collaboratively sell, buy or hold funds for portfolios.</li> </ul> <p><b>Engineering with Origami:</b></p> <ul style="list-style-type: none"> <li>• Independently create and use origami.</li> <li>• Collaboratively invent origami that can be used by engineers.</li> </ul>
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**Established Goals**

<p>Overarching Goals: Learners will . . .</p> <p><b>Coding in Computer Science:</b></p> <ul style="list-style-type: none"> <li>• Understand and visualize how expressions follow the order of operations.</li> <li>• Visually represent mathematical functions through coding.</li> </ul> <p><b>Finance: The Stock Market:</b></p> <ul style="list-style-type: none"> <li>• Create a virtual investment portfolio.</li> </ul>	<p>Related Standards Covered: <b>NAGC Gifted and Talented Programming Standards and Related Standards Covered:</b></p> <p><b>NAGC Gifted and Talented Standards:</b></p> <p><b>1.1. Self-Understanding.</b> Students with gifts and talents demonstrate self-knowledge with respect to their interests, strengths, identities, and needs in</p>
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- Understand money management in a global economy.

**Engineering with Origami:**

- Explore crimps, creases and folds in origami to understand how it will be used in engineering.

socio-emotional development and in intellectual, academic, creative, leadership, and artistic domains.

**1.1. Self-Understanding.** Students with gifts and talents demonstrate self-knowledge with respect to their interests, strengths, identities, and needs in socio-emotional development and in intellectual, academic, creative, leadership, and artistic domains.

**1.8. Cognitive and Affective Growth.** Students with gifts and talents identify future career goals that match their talents and abilities and resources needed to meet those goals (e.g., higher education opportunities, mentors, financial support).

**4.5. Communication Competence.** Students with gifts and talents develop competence in interpersonal and technical communication skills. They demonstrate advanced oral and written skills, balanced biliteracy or multiliteracy, and creative expression. They display fluency with technologies that support effective communication.

**5.7. Career Pathways.** Students with gifts and talents identify future career goals and the talent development pathways to reach those goals.

5.7.1. Educators provide professional guidance and counseling for individual student strengths, interests, and values.

**NJ SLS: Mathematical Practices**

- Mathematical Practices
- 1. Make sense of problems and persevere in solving them.
- 2. Reason abstractly and quantitatively.
- 3. Construct viable arguments and critique the reasoning of others.
- 4. Model with mathematics.
- 5. Use appropriate tools strategically.
- 6. Attend to precision.
- 7. Look for and make use of structure. 8
- 8. Look for and express regularity in repeated reasoning

**NJ Student Learning Standards -Education**

**Technology:**

- 8.1 Educational Technology and 8.2 Technology, Engineering, Design and Computational Thinking, which work symbiotically to provide students with the necessary skills for college and career readiness.

<p>Enduring Understandings: Learners will understand...</p> <p><b><u>Coding in Computer Science:</u></b></p> <ul style="list-style-type: none"> <li>• Convert arithmetic expressions to and from code.</li> <li>• Use Evaluation Blocks to reflect the proper order of operations for an expression.</li> </ul> <p><b><u>Finance: The Stock Market:</u></b></p> <ul style="list-style-type: none"> <li>• Create an individual financial 401K portfolio.</li> <li>• Trade Stocks/bonds/fund in a “Mock” portfolio on a web-based, “The Stock Market Game”.</li> </ul> <p><b><u>Engineering with Origami:</u></b></p> <ul style="list-style-type: none"> <li>• Create origami inspired robots or transformers.</li> <li>• Create geometric folding algorithms</li> </ul>	<p>Essential Questions:</p> <p><b><u>Coding in Computer Science:</u></b></p> <ul style="list-style-type: none"> <li>• What is computer science in algebra?</li> <li>• How is computer science tied to math?</li> </ul> <p><b><u>Finance: The Stock Market:</u></b></p> <ul style="list-style-type: none"> <li>• What is the stock market?</li> <li>• How will the stock market help me in life?</li> <li>• What is the purpose of the stock market?</li> </ul> <p><b><u>Engineering with Origami:</u></b></p> <ul style="list-style-type: none"> <li>• What is origami?</li> <li>• How is math and origami related?</li> <li>• How can engineers use origami to help the world?</li> </ul>
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Suggested Activities		
Coding in Computer Science	Finance: The Stock Market	Engineering with Origami
<ul style="list-style-type: none"> <li>• <a href="http://www.code.org">www.code.org</a></li> <li>• CS-First -Google</li> </ul>	<ul style="list-style-type: none"> <li>• <a href="http://www.thestockmarketgame.org">www.thestockmarketgame.org</a></li> </ul>	<ul style="list-style-type: none"> <li>• <a href="http://www.paper-art-gallery.com/images/site/exhibitions/Origami_Prospectus_folding_paper-exhibition.pdf">http://www.paper-art-gallery.com/images/site/exhibitions/Origami_Prospectus_folding_paper-exhibition.pdf</a></li> <li>• <a href="http://web.mit.edu/">http://web.mit.edu/</a></li> </ul>

**S.T.E.A.M. Curriculum for H.E.P. (High Enrichment Program)**  
**Fairfield Public Schools**

Grade: 6th Grade      Unit 1 Theme: **Coding/Personal Finance/PBL**      Time Frame: Sept to June

Summary: Pupils will learn how to think independently through problem-based learning

Texts/Resources: Code.org, personal finance websites, futurecity.com

**Assessments**

Formal:

**Personal Finance (Mortgages/Loans):**

- Small business management.
- Prepare financial documents to run a business.
- Loans (Personal and Business)
- Mortgages Principles 101

**Coding: Accelerated Course into CS Intro:**

- Introduction of the concept for Computer Science and role of a Computer Scientist.
- Learn the difference between programming, computer science, and computational thinking
- Understand that a computer is a tool and not an excuse to turn off your brain.

**PBL:**

- Tackle realistic problems as they would be solved in the real world.
- Be able to increase control over his or her learning.
- Work in pairs or groups.

Informal:

**Personal Finance (Mortgages/Loans):**

- Apply and understand the concepts of cash flow for running a business, as well as a P & L statements (profit and loss).
- Complete the process for loans (personal and business).
- Learn the process and application of a mortgage.
- Work independently and collaboratively to understand the functions of mortgages.

**Coding: Accelerated Course in CS Intro:**

- Collaboratively and independently take on the role of a computer scientist
- Learn to be responsible computer users.
- Discover that computer science can change the world.

**PBL:**

- Collaboratively and independently solve problems by creating inventions.

**Established Goals**

Overarching Goals:

Learners will . . .

**Personal Finance (Mortgages/Loans):**

- Create financial records for running a business.
- Complete applications for mortgages.
- Understand the process of credit scores and how they affect personal/business finance.

**Coding: Accelerated Course in CS:**

- Learn the four steps of computational thinking
- Use teamwork to solve complex problems.

**PBL:**

- Deeper learning, higher-level thinking skills, and intra/interpersonal skills

Related Standards Covered:

**NAGC Gifted and Talented Programming Standards and Related Standards Covered:**

**NAGC Gifted and Talented Standards:**

**1.1. Self-Understanding.** Students with gifts and talents demonstrate self-knowledge with respect to their interests, strengths, identities, and needs in socio-emotional development and in intellectual, academic, creative, leadership, and artistic domains.

**1.1. Self-Understanding.** Students with gifts and talents demonstrate self-knowledge with respect to their interests, strengths, identities, and needs in socio-emotional development and in intellectual,

	<p>academic, creative, leadership, and artistic domains.</p> <p><b>1.8. Cognitive and Affective Growth.</b> Students with gifts and talents identify future career goals that match their talents and abilities and resources needed to meet those goals (e.g., higher education opportunities, mentors, financial support).</p> <p><b>4.5. Communication Competence.</b> Students with gifts and talents develop competence in interpersonal and technical communication skills. They demonstrate advanced oral and written skills, balanced biliteracy or multiliteracy, and creative expression. They display fluency with technologies that support effective communication.</p> <p><b>5.7. Career Pathways.</b> Students with gifts and talents identify future career goals and the talent development pathways to reach those goals.</p> <p>5.7.1. Educators provide professional guidance and counseling for individual student strengths, interests, and values.</p> <p><b>NJ SLS: Mathematical Practices</b></p> <ul style="list-style-type: none"> <li>● Mathematical Practices</li> <li>● 1. Make sense of problems and persevere in solving them.</li> <li>● 2. Reason abstractly and quantitatively.</li> <li>● 3. Construct viable arguments and critique the reasoning of others.</li> <li>● 4. Model with mathematics.</li> <li>● 5. Use appropriate tools strategically.</li> <li>● 6. Attend to precision.</li> <li>● 7. Look for and make use of structure. 8</li> <li>● 8. Look for and express regularity in repeated reasoning</li> </ul> <p><b>NJ Student Learning Standards -Education Technology:</b></p> <ul style="list-style-type: none"> <li>● 8.1 Educational Technology and 8.2 Technology, Engineering, Design and Computational Thinking, which work symbiotically to provide students with the necessary skills for college and career readiness.</li> </ul>
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**Desired Results**

<p>Enduring Understandings: Learners understand . . .</p> <p><b>Personal Finance:</b> Apply and understand how to use financing in their personal lives and in the business world.</p> <p><b>Coding: Accelerated Course in CS</b></p> <ul style="list-style-type: none"> <li>● Use the computational thinking model as a way</li> </ul>	<p>Essential Questions:</p> <p><b>Personal Finance:</b></p> <ul style="list-style-type: none"> <li>● What is finance?</li> <li>● Why is it important to learn about money in the world?</li> <li>● What are loans?</li> <li>● What is a business?</li> </ul>
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<p>of representing real-world problems for digital representation.</p> <p><b><u>PBL:</u></b></p> <ul style="list-style-type: none"> <li>• Tackle realistic problems as they would be solved in the real world.</li> <li>• Be able to increase control over his or her learning.</li> <li>• Work in pairs or groups.</li> </ul>	<p><b><u>Coding:</u></b></p> <ul style="list-style-type: none"> <li>• What is computational thinking?</li> <li>• What is a model?</li> <li>• What is digital representation?</li> </ul> <p><b><u>PBL</u></b></p> <ul style="list-style-type: none"> <li>• What is problem-based learning?</li> <li>• Why do we work collaboratively in this world?</li> <li>• Why do we problem-solve?</li> </ul>
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**Suggested Activities**

Personal Finance	Coding	PBL
<ul style="list-style-type: none"> <li>• <a href="http://www.bankrate.com">www.bankrate.com</a></li> <li>• <a href="http://www.kearnysavingsbank.com">www.kearnysavingsbank.com</a></li> <li>• <a href="http://www.yahoo.com/finance">www.yahoo.com/finance</a></li> </ul>	<ul style="list-style-type: none"> <li>• <a href="http://www.code.org">www.code.org</a></li> <li>• <a href="http://web.mit.edu/">http://web.mit.edu/</a></li> <li>• </li> </ul>	<ul style="list-style-type: none"> <li>• <a href="http://www.futurecity.com">www.futurecity.com</a></li> <li>• <a href="http://www.weebly.com">www.weebly.com</a></li> <li>• <a href="http://www.matholympiad.com">www.matholympiad.com</a></li> <li>• <a href="http://www.edisoninventionchallenge.com">www.edisoninventionchallenge.com</a></li> </ul>