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|---|---|---|---|
| | | | **Course: STEM**<br>**Grade Level: 4**<br>**Unit: 4Cs** |
| **Course/Subject: STEM**<br>**Unit: 4Cs** | **Grade:**<br>**4** | **Unit:**<br>4Cs | **Suggested Timeline:**<br>**(cycle days)**<br>2 Cycle Days |

| | |
|---|---|
| **Grade Level Summary** | |
| **Grade Level Units** | Unit 1: 4Cs<br>Unit 2: Design Engineering Process<br>Unit 3: Coding<br>Unit 4: Makerspace<br>Unit 5: STEM Experience |

| | |
|---|---|
| **Unit Title** | 4C's |
| **Unit Summary** | This unit in STEM (Science, Technology, Engineering and Math) extends the 4C's (communication, collaboration, creativity and critical thinking) learning from the previous year. Fourth grade students will build upon and reinforce their understandings of communication, collaboration, critical thinking, and creativity with various challenges and group learning experiences. Students will be able to transfer their knowledge of the 4C's to help them by modeling effective representations of each throughout the school year. |

**Unit Essential Questions:**

1. How can I demonstrate effective listening by asking questions?
2. Why do I need to find meaningful connections for my opinion and how does this information affect my product/opinion?
3. How do failures help to improve my product/understanding? How does this new knowledge allow me to move forward in my learning experience?

**Key Understandings:**

1. An effective communication asks questions to clarify understandings or expand your own level of knowledge about a subject.
2. It is important to ask yourself where information is obtained and that the validity of sources should stand as sources should stand as the basis of opinion. It is also necessary to evaluate the importance of ideas and how they affect the outcome of a project.
3. Failure is an opportunity to learn, and an important aspect of learning real world limits as ideas are adapted and changed.

**Focus Standards Addressed in the Unit:**

| ***Standard Number*** | *Standard Description* |
|---|---|
| ISTE-1b | Build networks and customize their learning environments in ways that support the learning process |
| ISTE-6a | Choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication |

| | |
|---|---|
| Profile of a Graduate: Critical Thinking | Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation |
| Profile of a Graduate: Critical Thinking | Problem solve, by identifying a problem, brainstorming solutions for that problem, and selecting the best solution |
| Profile of a Graduate: Creativity | Innovation through problem-solving, taking risks, and exploring |
| Profile of a Graduate: Communication | Speaking, including appropriate dialogue and effective public speaking, listening with the goal of understanding another's point of view |
| Profile of a Graduate: Communication | Listening with the goal of understanding another's point of view |
| Profile of a Graduate: Communication | Ability to use inquiry to solve problems by taking risks and exploring |

| **Important Standards Addressed in the Unit:** | |
|---|---|
| CC.1.4.4.A | Write informative/ explanatory texts to examine a topic and convey ideas and information clearly. |
| CC.1.4.4.B | Identify and introduce the topic clearly. |
| CC.1.4.4.G | Write opinion pieces on topics or texts. |
| CC.1.4.4.K | Choose words and phrases to convey ideas precisely. |
| CC.1.5.4.A | Engage effectively in a range of collaborative discussions on grade-level topics and texts, building on others' ideas and expressing their own clearly. |
| CC.1.5.4.F | Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes. |
| CC.1.5.4.G | Demonstrate command of the conventions of standard English when speaking based on grade 4 level and content. |

| **Misconceptions:** | **Proper Conceptions:** |
|---|---|
| • Students do not see any importance in working together to solve a problem<br>• Students only want to work with their friends.<br>• Students think that if they fail in a task, they are done with the task. | • Students will communicate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and context.<br>• Students will listen effectively to decipher meaning, including knowledge, values, attitudes and intentions.<br>• Students will use communication for a range of purposes to inform, instruct, motivate and persuade.<br>• Reflecting on new knowledge acquired through experiments and trials in order to improve their final product. |

| **Knowledge & Concepts** | **Skills & Competencies** | **Dispositions & Practices** |
|---|---|---|
| • Participate in collaborative conversations<br>• Use effective communication skills in a variety of ways. | • Listen actively and build upon the ideas of others<br>• Recognize when a friend needs assistance, offer help and take ownership | • Students will exercise flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal.<br>• Students will engage in active listening, address ideas versus |

| | | |
|---|---|---|
| • Use effective listening skills in a variety of ways.<br>• Using perseverance while completing a task. | • Demonstrate ability to work effectively and respectfully with diverse teams<br>• Assume shared responsibility for collaborative work, and value the individual contributions made by each team member.<br>• Using reflection so that improvements can be made to a product. | individuals, and respectfully disagree/question.<br>• Students will demonstrate the ability to work effectively and respectfully with diverse teams.<br>• Apply knowledge of STEM in discussion on relevant issues in a changing world |

**Academic Vocabulary:**

| | | |
|---|---|---|
| • STEM<br>• Communication<br>• Collaboration<br>• Critical thinking<br>• Ask<br>• Persuade | • Interpersonal communication<br>• Conflict resolution<br>• Task management<br>• Norms<br>• Compromise | • Relevant<br>• Compare |

**Evidence: Assessments and Performance Task(s)**

- STEM Journal
- Reflections in Student Journal focusing on making improvements, and to know that it is okay to fail
- Collaborative Learning

**Interdisciplinary Connections:**

- 4th Grade English Language Arts Standards
- 4th Grade Guidance Standards
- 4th Grade Math Standards
- 4th Grade Science Standards
- 4th Grade Social Studies
- ISTE Standards for Students
- Next Generation Science Standards
- Profile of a Graduate

**Additional Resources:**

- LAUNCH, John Spencer and A.J. Juliani

**Created By:**

Teresa Lowery and Stephanie Flowers

| | | | |
|---|---|---|---|
| | | | **Course: STEM**<br>**Grade Level: 4**<br>**Unit: Engineering Design Process** |
| **Course/Subject: STEM**<br>**Unit: Engineering Design Process** | **Grade:**<br>**4** | **Unit:**<br>Engineering Design Process | **Suggested Timeline:**<br>**(cycle days)**<br>4 Cycle Days |

| | |
|---|---|
| **Grade Level Summary** | |
| **Grade Level Units** | Unit 1: 4Cs<br>Unit 2: Engineering Design Process<br>Unit 3: Coding<br>Unit 4: Makerspace<br>Unit 5: STEM Experience |

| | |
|---|---|
| **Unit Title** | Engineering Design Process |
| **Unit Summary** | This unit in STEM extends the Engineering Design Process learning from the previous year. Fourth grade students can use their knowledge to unleash the creative potential so that they can become makers, designers, artists and engineers. Fourth grade students will build upon their learning to help them solve new problems and new ideas. Students will also be able to transfer their knowledge of the 4C's and the Engineering Design Process by modeling effective representations of each throughout the school year. |

| **Unit Essential Questions:** | **Key Understandings:** |
|---|---|
| 1. How does the Engineering Design Process give structure to creativity?<br>2. Why follow a process?<br>3. How do engineers understand real world problems and persevere?<br>4. Why is no design perfect? | 1. Students will engage in cyclical design process to develop prototypes.<br>2. Students will be able to create sketches, with annotations, in an Engineering Design Journal.<br>3. Students will see the benefits of making modifications to improve their design.<br>4. The Engineering and Design Process consists of multiple stages/steps to implement their innovation. |

**Focus Standards Addressed in the Unit:**

| ***Standard Number*** | *Standard Description* |
|---|---|
| ISTE-1c | Students use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways. |

| | |
|---|---|
| ISTE-3d | Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions. |
| ISTE-4a | Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems. |
| ISTE-4c | Students develop, test and refine prototypes as part of a cyclical design process. |
| ISTE-4d | Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems. |
| ISTE-5c | Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving. |
| ISTE-6a | Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication. |
| ISTE-7c | Students contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal. |
| Profile of a Graduate: Critical Thinking | Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation |
| Profile of a Graduate: Critical Thinking | Problem solve, by identifying a problem, brainstorming solutions for that problem, and selecting the best solution |
| Profile of a Graduate: Creativity | Innovation through problem-solving, taking risks, and exploring |
| Profile of a Graduate: Communication | Speaking, including appropriate dialogue and effective public speaking, listening with the goal of understanding another's point of view |
| Profile of a Graduate: Communication | Listening with the goal of understanding another's point of view |
| Profile of a Graduate: Communication | Ability to use inquiry to solve problems by taking risks and exploring |

| **Important Standards Addressed in the Unit:** | |
|---|---|
| CC.1.4.4.A | Write informative/ explanatory texts to examine a topic and convey ideas and information clearly. |
| CC.1.4.4.B | Identify and introduce the topic clearly. |
| CC.1.4.4.G | Write opinion pieces on topics or texts. |
| CC.1.4.4.K | Choose words and phrases to convey ideas precisely. |
| CC.1.5.4.A | Engage effectively in a range of collaborative discussions on grade-level topics and texts, building on others' ideas and expressing their own clearly. |
| CC.1.5.4.F | Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes. |
| CC.1.5.4.G | Demonstrate command of the conventions of standard English when speaking based on grade 4 level and content. |
| Science and Technology and Engineering Education | 3.4.4.A1 Understand that tools, materials, and skills are used to make things and carry out tasks.<br>3.4.4.A2 Understand that systems have parts and components that work together.<br>3.4.4.A3 Describe how various relationships exist between technology and other fields.<br>3.4.4.C1 Understand that there is no perfect design. |

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|---|---|
| | 3.4.4.C2 Describe the engineering design process: Define a problem. Generate ideas. Select a solution and test it. Make the item. Evaluate the item. Communicate the solution with others. Present the results<br>3.4.4.C3 Explain how asking questions and making observations help a person understand how things work and can be repaired.<br>3.4.4.D1 Investigate how things are made and how they can be improved. |

| **Misconceptions:** | **Proper Conceptions:** |
|---|---|
| • There is no need for the design process, you should just be able to create.<br>• Students feel only one revision is necessary.<br>• Students struggle with failure.<br>• | • Students can use the Engineering Design Process to identify problems and develop and improve solutions.<br>• Revisions allows students to learn to challenge their own ideas, thus deepening and strengthening their argument.<br>• Students will attain goals through perseverance. |

| **Knowledge & Concepts** | **Skills & Competencies** | **Dispositions & Practices** |
|---|---|---|
| • Engineering Design Process<br>• Engineering<br>• Prototype<br>• Fail<br>• Perseverance<br>• Trial and Error<br>• Innovation | • Students will ask questions and make observations to create and improve a project.<br>• Use the Engineering Design Process to develop ideas or creations/prototypes.<br>• Test creations and redesign. | • Students will use the Engineering Design Process to solve real-world problems<br>• Students will use perseverance while working on a task.<br>• Students will share with the class, a group or a partner their ideas and their reasoning or strategy for solving a problem.<br>• |

**Academic Vocabulary:**

| | | |
|---|---|---|
| • Structure<br>• Perseverance<br>• Ask<br>• Imagine<br>• Plan<br>• Revise | • Trial and error<br>• Innovation<br>• Criteria<br>• Real world problem<br>• Word problems<br>• Strategy | |

**Evidence: Assessments and Performance Task(s)**

- STEM Journal
- Reflections in Student Journal focusing on making improvements, and to know that it is okay to fail
- Collaborative Learning and Creation

**Interdisciplinary Connections:**

- 4th Grade English Language Arts Standards
- 4th Grade Guidance Standards
- 4th Grade Math Standards
- 4th Grade Science Standards
- 4th Grade Social Studies
- ISTE Standards for Students
- Next Generation Science Standards
- Profile of a Graduate

**Additional Resources:**

- LAUNCH, John Spencer and A.J. Juliani

**Created By:**

Teresa Lowery and Stephanie Flowers

| | | | |
|---|---|---|---|
| | | | **Course: STEM**<br>**Grade Level: 4**<br>**Unit: Coding** |
| **Course/Subject: STEM**<br>**Unit: Coding** | **Grade:**<br>**4** | **Unit:**<br>Coding | **Suggested Timeline:**<br>**(cycle days)**<br>7 Cycle Days |

| | |
|---|---|
| **Grade Level Summary** | |
| **Grade Level Units** | Unit 1: 4Cs<br>Unit 2: Engineering Design Process<br>Unit 3: Coding<br>Unit 4: Makerspace<br>Unit 5: STEM Experience |

| | |
|---|---|
| **Unit Title** | Coding |
| **Unit Summary** | This unit of STEM allows fourth grade students to extend basic computer programming concepts and tools. They will also build upon their knowledge of valuable problem-solving strategies from the previous year to help be successful not only in programming but in life. Unplugged programming and online tools are resources that the students utilize to learn about the digital world. Students learn how to write and interpret algorithms. The beginning concepts of debugging and sequencing are presented to students. These skills present a strong foundation for beginner computer programmers. |

| **Unit Essential Questions:** | **Key Understandings:** |
|---|---|
| 1. What information about you is okay to share online?<br>2. How do I practice positive, safe, and kind behavior when using technology?<br>3. Why is pair programming, working together, beneficial when solving intricate algorithms?<br>4. How can programmers think critically and collaboratively to create an effective program before publishing it? | 1. Understand why people share information about themselves online.<br>2. Understand how to effectively communicate with other online and understand what cyberbullying is.<br>3. Modeling Pair Programming with effective communication and collaboration skills as well as identifying problems and fixing them within a written program<br>4. Brainstorming with others make a program better. |

**Focus Standards Addressed in the Unit:**

| ***Standard Number*** | *Standard Description* |
|---|---|
| ISTE-1c | Students use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways. |

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|---|---|
| ISTE-1d | Students understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies. |
| ISTE-2a | Students cultivate and manage their digital identity and reputation and are aware of the permanence of their actions in the digital world |
| ISTE-2b | Students engage in positive, safe, legal and ethical behavior when using technology, including social interactions online or when using networked devices. |
| ISTE-5d | Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions. |
| ISTE-6a | Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication. |
| ISTE-7c | Students contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal. |
| Profile of a Graduate: Critical Thinking | Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation |
| Profile of a Graduate: Critical Thinking | Problem solve, by identifying a problem, brainstorming solutions for that problem, and selecting the best solution |
| Profile of a Graduate: Creativity | Innovation through problem-solving, taking risks, and exploring |
| Profile of a Graduate: Communication | Speaking, including appropriate dialogue and effective public speaking, listening with the goal of understanding another's point of view |
| Profile of a Graduate: Communication | Listening with the goal of understanding another's point of view |
| Profile of a Graduate: Communication | Ability to use inquiry to solve problems by taking risks and exploring |

| **Important Standards Addressed in the Unit:** | |
|---|---|
| CC.1.4.4.A | Write informative/ explanatory texts to examine a topic and convey ideas and information clearly. |
| CC.1.4.4.B | Identify and introduce the topic clearly. |
| CC.1.4.4.G | Write opinion pieces on topics or texts. |
| CC.1.4.4.K | Choose words and phrases to convey ideas precisely. |
| CC.1.5.4.A | Engage effectively in a range of collaborative discussions on grade-level topics and texts, building on others' ideas and expressing their own clearly. |
| CC.1.5.4.F | Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes. |
| CC.1.5.4.G | Demonstrate command of the conventions of standard English when speaking based on grade 4 level and content. |
| Science and Technology and Engineering Education | 3.4.4.E1 Identify tools and devices that have been designed to provide information about a healthy lifestyle.<br>3.4.4.E4 Explain how information and communication systems allow information to be transferred from human to human.<br>3.4.5.C2 Describe how design, as a dynamic process of steps, can be performed in different sequences and repeated. |
| Computer Science | 1A.AP.08 Model daily processes by creating and following algorithms (sets of step-by-step instructions) to complete tasks. |

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|---|---|
| | 1A.AP.09 Model the way programs store and manipulate data by using numbers or other symbols to represent information.<br><br>1A.AP.10 Develop programs with sequences and simple loops, to express ideas or address a problem.<br><br>1A.AP.11 Decompose (down) the steps needed to solve a problem into a precise sequence of instructions.<br><br>1B.AP.12 Modify, remix, or incorporate portions of an existing program into one's own work, to develop something new or add more advanced features.<br><br>1B.AP.13 Use an iterative process to plan the development of a program by including others' perspectives and considering user preferences.<br><br>1B.AP.15 Test and debug (identify and fix errors) a program or algorithm to ensure it runs as intended.<br><br>1B.NI.05 Discuss real-world cybersecurity problems and how personal information can be protected. |

| **Misconceptions:** | **Proper Conceptions:** |
|---|---|
| • Saying it online like with cyberbullying is okay because they are not saying it in person.<br>• Most websites are safe<br>• The information on a website is true and factual.<br>• Computer programming/coding doesn't integrate with my interests and passions. | • Computer programming/coding benefits individual areas of interests, passions, and well-being.<br>• Students will understand that information is being collected based on their online activity.<br>• Students will learn how to check to see if a website is safe or not.<br>• Student will learn how to communicate properly online. |

| **Knowledge & Concepts** | **Skills & Competencies** | **Dispositions & Practices** |
|---|---|---|
| • Algorithm<br>• Problem-solving<br>• Computer Programming<br>• Decoding/Debugging<br>• Cyberbully<br>• Digital Footprint<br>• Private<br>• Public<br>• Digital Citizen<br>• Digital media | • Identify and solve problems using appropriate technology.<br>• Translate an algorithm into a program<br>• Students will understand that there are risks when sharing personal information online.<br>• Students understand how their digital footprint can affect their online reputation for a *long time*.<br>• Students will recognize what cyberbullying is. | • Students will learn how to select appropriate technology to solve problems.<br>• Students will work with others to create algorithms to solve problems and create new code.<br>• Students will debug code, when necessary.<br>• Students will be empowered to understand that being online comes with big responsibilities.<br>• Students will know how to deal with a cyberbully situation. |

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**Academic Vocabulary:**

| | | |
|---|---|---|
| • Empathy<br>• Programming<br>• Algorithm<br>• Cyberbully | • Computer languages<br>• Digital footprint<br>• Digital citizen<br>• Online | • Decode<br>• Encode<br>• |

**Evidence: Assessments and Performance Task(s)**

- STEM Journal
- Reflections in Student Journal focusing on making improvements, and to know that it is okay to fail
- Collaborative Learning
- Coding online resources (ex. Code.org)
- FBI Safe Online Surfing - https://sos.fbi.gov/en/
- Common Sense Media Digital Citizenship - https://www.commonsense.org/education/digital-citizenship/curriculum?grades=4%2C4%2C5

**Interdisciplinary Connections:**

- 4th Grade English Language Arts Standards
- 4th Grade Guidance Standards
- 4th Grade Math Standards
- 4th Grade Science Standards
- 4th Grade Social Studies
- ISTE Standards for Students
- Next Generation Science Standards
- Profile of a Graduate

**Additional Resources:**

- LAUNCH, John Spencer and A.J. Juliani

**Created By:**

Teresa Lowery and Stephanie Flowers

| | | | |
|---|---|---|---|
| | | | **Course: STEM**<br>**Grade Level: 4**<br>**Unit: Makerspace** |
| **Course/Subject: STEM**<br>**Unit: Makerspace** | **Grade:**<br>**4** | **Unit:**<br>Makerspace | **Suggested Timeline:**<br>**(cycle days)**<br>7 Cycle Days |

| | |
|---|---|
| **Grade Level Summary** | |
| **Grade Level Units** | Unit 1: 4Cs<br>Unit 2: Engineering Design Process<br>Unit 3: Coding<br>Unit 4: Makerspace<br>Unit 5: STEM Experience |

| | |
|---|---|
| **Unit Title** | Makerspace |
| **Unit Summary** | This unit of STEM allows fourth grade students to extend their creativity using design thinking. Students will continue investigate their passions and create various projects. Students will be provided with the necessary tools and materials for the project, but their creativity is limitless. This unit is a culmination of the 4Cs and the Design Engineering Process and gives students an opportunity to showcase the learning they experienced throughout the year. Projects will be displayed at the school Discovery Open House. |

| **Unit Essential Questions:** | **Key Understandings:** |
|---|---|
| 1. How can a makerspace change our learning experience?<br>2. Why are exploration and creation an important part of learning? | 1. Makerspace gives students the opportunity to explore different projects to find their passion which can drive their learning experiences and help them gain a deeper understanding.<br>2. Exploring and creating are important parts of learning, because it give students ownership of their learning experience. |

**Focus Standards Addressed in the Unit:**

| ***Standard Number*** | *Standard Description* |
|---|---|
| ISTE-1a | Articulate and set personal learning goals, develop strategies leveraging technology to achieve them and reflect on the learning process itself to improve learning outcomes. |
| ISTE-3d | Build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions. |

| | |
|---|---|
| ISTE-4a | Know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems. |
| ISTE-4d | Exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems. |
| ISTE-6a | Choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication. |
| ISTE-6b | Create original works or responsibly repurpose or remix digital resources into new creations. |
| Profile of a Graduate: Critical Thinking | Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation |
| Profile of a Graduate: Critical Thinking | Problem solve, by identifying a problem, brainstorming solutions for that problem, and selecting the best solution |
| Profile of a Graduate: Creativity | Innovation through problem-solving, taking risks, and exploring |
| Profile of a Graduate: Communication | Speaking, including appropriate dialogue and effective public speaking, listening with the goal of understanding another's point of view |
| Profile of a Graduate: Communication | Listening with the goal of understanding another's point of view |
| Profile of a Graduate: Communication | Ability to use inquiry to solve problems by taking risks and exploring |

| **Important Standards Addressed in the Unit:** | |
|---|---|
| CC.1.4.4.A | Write informative/ explanatory texts to examine a topic and convey ideas and information clearly. |
| CC.1.4.4.B | Identify and introduce the topic clearly. |
| CC.1.4.4.G | Write opinion pieces on topics or texts. |
| CC.1.4.4.K | Choose words and phrases to convey ideas precisely. |
| CC.1.5.4.A | Engage effectively in a range of collaborative discussions on grade-level topics and texts, building on others' ideas and expressing their own clearly. |
| CC.1.5.4.F | Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes. |
| CC.1.5.4.G | Demonstrate command of the conventions of standard English when speaking based on grade 4 level and content. |
| Science and Technology and Engineering Education | 3.4.4.A1 Understand that tools, materials, and skills are used to make things and carry out tasks.<br>3.4.4.A2 Understand that systems have parts and components that work together.<br>3.4.4.A3 Describe how various relationships exist between technology and other fields.<br>3.4.4.C1 Understand that there is no perfect design.<br>3.4.4.C2 Describe the engineering design process: Define a problem. Generate ideas. Select a solution and test it. Make the item. Evaluate the item. Communicate the solution with others. Present the results<br>3.4.4.C3 Explain how asking questions and making observations help a person understand how things work and can be repaired.<br>3.4.4.D1 Investigate how things are made and how they can be improved. |

| **Misconceptions:** | **Proper Conceptions:** |
|---|---|

| | |
|---|---|
| • Students believe that only big companies can make innovations that impact the world.<br>• Students feels that they can only be consumers of technology, not inventors. | • A makerspace is a place where students can create using a variety of tools and materials.<br>• Students will use critical thinking skills to create.<br>• Students will present their ideas and creations to their peers. |

| Knowledge & Concepts | Skills & Competencies | Dispositions & Practices |
|---|---|---|
| • Problem-solving<br>• Perseverance<br>• Fail<br>• Creativity<br>• Critical Thinking<br>• Listening<br>• Communication<br>• Collaboration | • Taking ownership of their learning experiences.<br>• Gaining knowledge and skills to investigate or respond to authentic challenges or problems. | • Students will use creativity to solve real-world problems.<br>• Taking ownership of their learning experiences.<br>• Students will communicate effectively with the teacher and their peers. |

**Academic Vocabulary:**

| | | |
|---|---|---|
| • Makerspace<br>• Makers<br>• Creation Station<br>• Empathy<br>• Perseverance | • Improve<br>• Imagine<br>• Inspiration<br>• Ownership | |

**Evidence: Assessments and Performance Task(s)**

- STEM Journal
- Reflections in Student Journal focusing on making improvements, and to know that it is okay to fail
- Collaborative Learning
- Use creation station items appropriately

**Interdisciplinary Connections:**

- 4th Grade English Language Arts Standards
- 4th Grade Guidance Standards
- 4th Grade Math Standards
- 4th Grade Science Standards
- 4th Grade Social Studies
- ISTE Standards for Students
- Next Generation Science Standards
- Profile of a Graduate

**Additional Resources:**

- LAUNCH, John Spencer and A.J. Juliani

**Created By:**

Teresa Lowery and Stephanie Flowers

| | | | |
|---|---|---|---|
| | | | **Course: STEM**<br>**Grade Level: 4**<br>**Unit: STEM Experience** |
| **Course/Subject: STEM**<br>**Unit: STEM Experience** | **Grade:**<br>**4** | **Unit:**<br>STEM Experience | **Suggested Timeline:**<br>**(cycle days)**<br>10 Cycle Days |

| | |
|---|---|
| **Grade Level Summary** | |
| **Grade Level Units** | Unit 1: 4Cs<br>Unit 2: Engineering Design Process<br>Unit 3: Coding<br>Unit 4: Makerspace<br>Unit 5: STEM Experience |

| | |
|---|---|
| **Unit Title** | STEM Experience |
| **Unit Summary** | Collaboration is the act of working together for a common goal. This unit allows students to work together and problem-solve to accomplish a goal. Students will work together and contribute constructively to produce products they can share with classmates and learners from other backgrounds. |

| **Unit Essential Questions:** | **Key Understandings:** |
|---|---|
| 1. How can I collaborate with a team to solve a problem?<br>2. What necessary compromises did I make to accomplish a goal?<br>3. How am I responsible for my contributions to a group?<br>4. How can I resolve conflicts respectfully? | 1. Students will be able to demonstrate the ability to work effectively and respectfully with diverse teams.<br>2. Students will be integrating the 4C's and the Engineering Design Process using the Makerspace tools to complete a project or accomplish a goal.<br>3. Students will share responsibility for collaborative work along with valuing each individual contributions made by each member of the group.<br>4. Students will work together to solve problems. |

**Focus Standards Addressed in the Unit:**

| ***Standard Number*** | *Standard Description* |
|---|---|
| ISTE-7a | With guidance from an educator, students use technology tools to work with friends and with people outside their neighborhood, city and beyond. |
| ISTE-7b | With guidance from an educator, students use technology to communicate with others and to look at problems from different perspectives. |
| ISTE-7c | With guidance from an educator, students take on different team roles and use age-appropriate technologies to complete projects. |

| | |
|---|---|
| ISTE-7d | With guidance from an educator, students use age-appropriate technologies to work together to understand problems and suggest solutions. |
| Profile of a Graduate: Critical Thinking | Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation |
| Profile of a Graduate: Critical Thinking | Problem solve, by identifying a problem, brainstorming solutions for that problem, and selecting the best solution |
| Profile of a Graduate: Creativity | Innovation through problem-solving, taking risks, and exploring |
| Profile of a Graduate: Communication | Speaking, including appropriate dialogue and effective public speaking, listening with the goal of understanding another's point of view |
| Profile of a Graduate: Communication | Listening with the goal of understanding another's point of view |
| Profile of a Graduate: Communication | Ability to use inquiry to solve problems by taking risks and exploring |

| **Important Standards Addressed in the Unit:** | |
|---|---|
| CC.1.4.4.A | Write informative/ explanatory texts to examine a topic and convey ideas and information clearly. |
| CC.1.4.4.B | Identify and introduce the topic clearly. |
| CC.1.4.4.G | Write opinion pieces on topics or texts. |
| CC.1.4.4.K | Choose words and phrases to convey ideas precisely. |
| CC.1.5.4.A | Engage effectively in a range of collaborative discussions on grade-level topics and texts, building on others' ideas and expressing their own clearly. |
| CC.1.5.4.F | Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes. |
| CC.1.5.4.G | Demonstrate command of the conventions of standard English when speaking based on grade 4 level and content. |
| Science and Technology and Engineering Education | 3.4.4.A1 Understand that tools, materials, and skills are used to make things and carry out tasks.<br>3.4.4.A2 Understand that systems have parts and components that work together.<br>3.4.4.A3 Describe how various relationships exist between technology and other fields.<br>3.4.4.C1 Understand that there is no perfect design.<br>3.4.4.C2 Describe the engineering design process: Define a problem. Generate ideas. Select a solution and test it. Make the item. Evaluate the item. Communicate the solution with others. Present the results<br>3.4.4.C3 Explain how asking questions and making observations help a person understand how things work and can be repaired.<br>3.4.4.D1 Investigate how things are made and how they can be improved. |

| **Misconceptions:** | **Proper Conceptions:** |
|---|---|
| • Students want to work by themselves and do not want to work in a group.<br>• Students feel that they can start making without using the Design Engineering Process steps.<br>• | • Students will use the Design Engineer Process steps for creation.<br>• Students will understand the basics of design decisions.<br>• Students will use critical thinking skills to create. |

| | |
|---|---|
| | • Students will demonstrate the ability to work effectively and respectfully with their peers. |

| Knowledge & Concepts | Skills & Competencies | Dispositions & Practices |
|---|---|---|
| • Problem-solving<br>• Perseverance<br>• Fail<br>• Creativity<br>• Critical Thinking<br>• Listening<br>• Communication<br>• Collaboration | • Exercise flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal<br>• Assume shared responsibility for collaborative work, and value the individual contributions made by each team member<br>• Participate in collaborative conversation with diverse partners | • Students will use creativity to solve real-world problems.<br>• Taking ownership of their learning experiences.<br>• Students will communicate effectively with the teacher and their peers. |

**Academic Vocabulary:**

| | | |
|---|---|---|
| • Empathy<br>• Perseverance<br>• Conflict<br>• Compromise<br>• Brainstorming<br>• Model<br>• Strategy | • Improve<br>• Imagine<br>• Inspiration<br>• Predict<br>• Analysis<br>• Risk | |

**Evidence: Assessments and Performance Task(s)**

- STEM Journal
- Reflections in Student Journal focusing on making improvements, and to know that it is okay to fail
- Collaborative Learning
- Use creation station items appropriately

**Interdisciplinary Connections:**

- 4th Grade English Language Arts Standards
- 4th Grade Guidance Standards
- 4th Grade Math Standards
- 4th Grade Science Standards
- 4th Grade Social Studies
- ISTE Standards for Students
- Next Generation Science Standards
- Profile of a Graduate

**Additional Resources:**

- LAUNCH, John Spencer and A.J. Juliani

**Created By:**

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