			Course: STEM **Grade Level: 3** **Unit: 4Cs**
Course/Subject: STEM **Unit: 4Cs**	**Grade:** **3**	**Unit:** 4Cs	**Suggested Timeline:** **(cycle days)** 2 Cycle Days

Grade Level Summary	
Grade Level Units	Unit 1: 4Cs Unit 2: Design Engineering Process Unit 3: Coding Unit 4: Makerspace 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. Third 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:	**Key Understandings:**
1. How can I work with a team to solve a problem? 2. Why should I work with others to find a solution? 3. How can I help a friend achieve his or her goal?	1. Students will be able use effective interpersonal skills to build positive relationships. 2. Students will be able to use effective interpersonal skills to promote collaborative learning. 3. Students will be able to communicate ideas through the creation of authentic products.

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
Profile of a Graduate: Collaboration	The flexibility necessary to collaborate effectively

Important Standards Addressed in the Unit:	
CC.1.5.3.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.1.5.3.C	Ask and answer questions about information from a speaker, offering appropriate detail.
CC.1.5.3.E	Speak in complete sentences when appropriate to task and situation in order to provide requested detail or clarification.
CC.1.5.3.G	Demonstrate command of the conventions of standard English when speaking based on grade 3 level and content.

Misconceptions:	**Proper Conceptions:**
• Students do not see any importance in working together to solve a problem • Students only want to work with their friends.	• Students will communicate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and context. • Students will listen effectively to decipher meaning, including knowledge, values, attitudes and intentions. • Students will use communication for a range of purposes to inform, instruct, motivate and persuade.

Knowledge & Concepts	**Skills & Competencies**	**Dispositions & Practices**
• Participate in collaborative conversations • Use effective communication skills in a variety of ways. • Use effective listening skills in a variety of ways.	• Listen actively and build upon the ideas of others • Recognize when a friend needs assistance, offer help and take ownership • Demonstrate ability to work effectively and respectfully with diverse teams • Assume shared responsibility for collaborative work, and value the individual contributions made by each team member.	• Students will exercise flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal. • Students will engage in active listening, address ideas versus individuals, and respectfully disagree/question. • Students will demonstrate the ability to work effectively and respectfully with diverse teams.

Academic Vocabulary:

- STEM
- Communication
- Collaboration
- Critical thinking
- Ask
- Interpersonal communication
- Conflict resolution
- Task management
- Norms
- Compromise

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:

- 3rd Grade English Language Arts Standards
- 3rd Grade Guidance Standards
- 3rd Grade Math Standards
- 3rd Grade Science Standards
- 3rd Grade Social Studies Standards
- 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 **Grade Level: 3** **Unit: Engineering Design Process**
Course/Subject: STEM **Unit: Engineering Design Process**	**Grade:** **3**	**Unit:** Engineering Design Process	**Suggested Timeline:** **(cycle days)** 4 Cycle Days

Grade Level Summary	
Grade Level Units	Unit 1: 4Cs Unit 2: Engineering Design Process Unit 3: Coding Unit 4: Makerspace 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. Third grade students can use their knowledge to unleash the creative potential so that they can become makers, designers, artists and engineers. Third 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:**
4. What are the steps in the Engineering Design Process? 5. How can apply the Engineering Design Process to solve real-world problems? 6. What careers use the Engineering Design Process?	4. Students will use the design process to solve real-world design problems and develop prototypes.. 5. Students will be able to create sketches, with annotations, in an Engineering Design Journal. 6. Students will see the benefits of making modifications to improve their design. 7. 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
Profile of a Graduate: Collaboration	The flexibility necessary to collaborate effectively

Important Standards Addressed in the Unit:	
CC.1.5.3.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.1.5.3.C	Ask and answer questions about information from a speaker, offering appropriate detail.
CC.1.5.3.E	Speak in complete sentences when appropriate to task and situation in order to provide requested detail or clarification.
CC.1.5.3.G	Demonstrate command of the conventions of standard English when speaking based on grade 3 level and content.
Science and Technology and Engineering Education	3.4.3.C1. Recognize design is a creative process and everyone can design solutions to problems. 3.4.3.C2. Explain why the design process requires creativity and consideration of all ideas. 3.4.3.C3. Recognize that all products and systems are subject to failure; many products and systems can be fixed. 3.4.3.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 • Revisions are not necessary	• Students can use the Engineering Design Process to identify problems and develop and improve solutions.

• Students struggle with failure.	• Revisions allows students to learn to challenge their own ideas, thus deepening and strengthening their argument. • Students will attain goals through perseverance.

Knowledge & Concepts	Skills & Competencies	Dispositions & Practices
• Engineering Design Process • Engineering • Prototype • Fail • Perseverance • Trial and Error • Innovation	• Explore and practice how a design process works to generate ideas, consider solutions, plan to solve a problem or create innovative products that are shared with each other. • Use the Engineering Design Process to develop ideas or creations/prototypes. • Test creations and redesign.	• Students will use the Engineering Design Process to solve real-world problems • Students will use perseverance while working on a task. • Students will share with the class, a group or a partner their ideas and their reasoning or strategy for solving a problem.

Academic Vocabulary:

• Structure • Perseverance • Ask • Imagine • Plan • Revise	• Trial and error • Innovation • Criteria • Real world problem • Word problems • 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:

- 3rd Grade English Language Arts Standards
- 3rd Grade Guidance Standards
- 3rd Grade Math Standards
- 3rd Grade Science Standards
- 3rd Grade Social Studies Standards
- 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 **Grade Level: 3** **Unit: Coding**
Course/Subject: STEM **Unit: Coding**	**Grade:** **3**	**Unit:** Engineering Design Process	**Suggested Timeline:** **(cycle days)** 7 Cycle Days

Grade Level Summary	
Grade Level Units	Unit 1: 4Cs Unit 2: Engineering Design Process Unit 3: Coding Unit 4: Makerspace Unit 5: STEM Experience

Unit Title	Coding
Unit Summary	This unit of STEM allows third 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:**
7. What is the difference between private and public information? 8. How do digital citizens take responsibility for themselves, their communities, and their world? 9. How does what I post online affect my identity? 10. How has computer programming made my everyday life experiences easier? 11. How do changes in an algorithm affect the computer program?	8. Understand that being safe when they visit websites is similar to staying safe in real life. 9. Learn to recognize websites that are safe and recognize if they should ask an adult before visiting a website. 10. Computer algorithms are directions computers follow in order to complete a task. 11. Altering an algorithm to make a program run a specific way.

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-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.1.5.3.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.1.5.3.C	Ask and answer questions about information from a speaker, offering appropriate detail.
CC.1.5.3.E	Speak in complete sentences when appropriate to task and situation in order to provide requested detail or clarification.
CC.1.5.3.G	Demonstrate command of the conventions of standard English when speaking based on grade 3 level and content.
Science and Technology and Engineering Education	3.4.3.E1 Identify the technologies that support and improve quality of life. 3.4.3.E4 Recognize that information and communication technology is the transfer of messages among people and/or machines over distances through the use of technology. 3.4.3.E7. Recognize that people live, work, and go to school in buildings representing different types of structures.
Computer Science	1B.AP.08 Compare and refine multiple algorithms for the same task and determine which is the most appropriate. 1B.AP.15 Test and debug (identify and fix errors) a program or algorithm to ensure it runs as intended.

	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. • Most websites are safe • The information on a website is true and factual. • Computer programming/coding doesn't integrate with my interests and passions.	• Computer programming/coding benefits individual areas of interests, passions, and well-being. • Students will understand that information is being collected based on their online activity. • Students will learn how to check to see if a website is safe or not. • Student will learn how to communicate properly online.

Knowledge & Concepts	**Skills & Competencies**	**Dispositions & Practices**
• Algorithm • Problem-solving • Patterns • Sequencing • Computer Programming • Decoding/Debugging • Cyberbully • Online • Digital Footprint • Private • Public • Digital Citizen	• Identify and solve problems using appropriate technology. • Translate an algorithm into a program • Students will understand that being safe when they visit websites is similar to staying safe in real life. • Students will learn to recognize websites that are safe and recognize if they should ask an adult before visiting a particular website.	• Students will learn how to select appropriate technology to solve problems. • Students will arrange events into sequential order. • Students will create algorithms to solve problems and create new code. • Students will debug code, when necessary. • Students will know how to deal with a cyberbully situation.

Academic Vocabulary:

• Empathy • Programming • Algorithm • Cyberbully	• Computer languages • Digital footprint • Digital citizen • Online	

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=3%2C4%2C5

Interdisciplinary Connections:

- 3rd Grade English Language Arts Standards
- 3rd Grade Guidance Standards
- 3rd Grade Math Standards
- 3rd Grade Science Standards
- 3rd Grade Social Studies Standards
- 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 **Grade Level:** **Unit: Makerspace**
Course/Subject: STEM **Unit: Makerspace**	**Grade:** **3**	**Unit:** Makerspace	**Suggested Timeline:** **(cycle days)** 7 Cycle Days

Grade Level Summary	
Grade Level Units	Unit 1: 4Cs Unit 2: Engineering Design Process Unit 3: Coding Unit 4: Makerspace Unit 5: STEM Experience

Unit Title	Makerspace
Unit Summary	This unit of STEM allows third 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:**
12. How can a makerspace change our learning experience? 13. Why are exploration and creation an important part of learning?	12. 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. 13. 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
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Profile of a Graduate: Communication	Ability to use inquiry to solve problems by taking risks and exploring
Profile of a Graduate: Collaboration	The flexibility necessary to collaborate effectively

Important Standards Addressed in the Unit:	
CC.1.5.3.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.1.5.3.C	Ask and answer questions about information from a speaker, offering appropriate detail.
CC.1.5.3.E	Speak in complete sentences when appropriate to task and situation in order to provide requested detail or clarification.
CC.1.5.3.G	Demonstrate command of the conventions of standard English when speaking based on grade 3 level and content.
Science and Technology and Engineering Education	3.4.3.C1. Recognize design is a creative process and everyone can design solutions to problems. 3.4.3.C2. Explain why the design process requires creativity and consideration of all ideas. 3.4.3.C3. Recognize that all products and systems are subject to failure; many products and systems can be fixed. 3.4.3.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. • 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. • Students will use critical thinking skills to create. • Students will present their ideas and creations to their peers.

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

Academic Vocabulary:

• Makerspace • Makers • Creation Station • Empathy • Perseverance	• Improve • Imagine • Inspiration • 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:

- 3rd Grade English Language Arts Standards
- 3rd Grade Guidance Standards
- 3rd Grade Math Standards
- 3rd Grade Science Standards
- 3rd Grade Social Studies Standards
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- 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 **Grade Level:** **Unit: Makerspace**
Course/Subject: STEM **Unit: Makerspace**	**Grade:** **3**	**Unit:** Makerspace	**Suggested Timeline:** **(cycle days)** 7 Cycle Days

Grade Level Summary	
Grade Level Units	Unit 1: 4Cs Unit 2: Engineering Design Process Unit 3: Coding Unit 4: Makerspace Unit 5: STEM Experience

Unit Title	Makerspace
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Unit Essential Questions:	**Key Understandings:**
14. How can a makerspace change our learning experience? 15. Why are exploration and creation an important part of learning?	14. 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. 15. 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.
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ISTE-4a	Know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.
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Misconceptions:	**Proper Conceptions:**
• Students believe that only big companies can make innovations that impact the world. • 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. • Students will use critical thinking skills to create. • Students will present their ideas and creations to their peers.

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

Academic Vocabulary:

• Makerspace • Makers • Creation Station • Empathy • Perseverance	• Improve • Imagine • Inspiration • 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:

- 3rd Grade English Language Arts Standards
- 3rd Grade Guidance Standards
- 3rd Grade Math Standards
- 3rd Grade Science Standards
- 3rd Grade Social Studies Standards
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- Next Generation Science Standards
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Additional Resources:

- LAUNCH, John Spencer and A.J. Juliani

Created By:

Teresa Lowery and Stephanie Flowers