Inquiry: Makerspaces or Innovation Stations

Content Area: **English Language Arts**
Course(s):
Time Period: **Trimester 1**
Length: **2-3 Weeks and throughout the school year**
Status: **Published**

Brief Summary of Unit

Students will have the opportunity to interact in a fixed makerspace or portable innovation stations which allows for collaboration and creativity while fostering necessary twenty-first century skills. Teaching collaboration, design-thinking, problem-solving, and prototyping will be a priority.

Fifth grade students will review makerspace or innovation stations at the beginning of the year. Procedures and behavioral expectations for the students while participating at a makerspace station will be introduced, modeled, and practiced. After the initial orientation, students will have time to do makerspace or innovation stations throughout the school year. Depending on the library lesson, the students may be able to go to a makerspace or innovation station after the library lesson. Usually once a month, the students have the opportunity to do a makerspace or innovation stations or engage in a choice board on Google Classroom that has multiple activities from which to choose for the whole library class. The students' ability to create and make more advanced creations in each makerspace change with the grade level and ability of the students.

This unit is designed to be part of a developmental progression across grade levels and make interdisciplinary connections across content areas including physical and social sciences, technology, career readiness, cultural awareness, and global citizenship. During this course, students are provided with opportunities to develop skills that pertain to a variety of careers.

Revision Date: July 2023

Standards

This unit challenges students to locate, evaluate, and use information effectively. Information literacy includes, but is not limited to, digital, visual, media, and technological literacy.

The identified standards reflect a developmental progression across grades/ levels and make interdisciplinary connections across content areas including social sciences, technology, career readiness, cultural awareness and global citizenship. The standards that follow are relevant to this course in addition to the associated content-based standards listed below.

LA.RI.5.4	Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area.
LA.RI.5.7	Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.
LA.RI.5.10	By the end of year, read and comprehend literary nonfiction at grade level text-complexity or above, with scaffolding as needed.

LA.RF.5.4.A	Read grade-level text with purpose and understanding.
LA.SL.5.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly.
LA.SL.5.1.A	Explicitly draw on previously read text or material and other information known about the topic to explore ideas under discussion.
LA.SL.5.1.B	Follow agreed-upon rules for discussions and carry out assigned roles.
LA.SL.5.1.C	Pose and respond to specific questions by making comments that contribute to the discussion and elaborate on the remarks of others.
LA.SL.5.1.D	Review the key ideas expressed and draw conclusions in light of information and knowledge gained from the discussions.
LA.SL.5.2	Summarize a written text read aloud or information presented in diverse media and formats (e.g., visually, quantitatively, and orally).
LA.SL.5.4	Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.
LA.SL.5.6	Adapt speech to a variety of contexts and tasks, using formal English when appropriate to task and situation.
I.A	Learners display curiosity and initiative by:
I.A.2	Recalling prior and background knowledge as context for new meaning.
I.B.1	Using evidence to investigate questions.
I.B.2	Devising and implementing a plan to fill knowledge gaps.
I.B.3	Generating products that illustrate learning
I.C.1	Interacting with content presented by others.
I.C.2	Providing constructive feedback.
I.C.3	Acting on feedback to improve.
I.C.4	Sharing products with an authentic audience
I.D.1	Continually seeking knowledge.
I.D.2	Engaging in sustained inquiry.
I.D.3	Enacting new understanding through real-world connections.
I.D.4	Using reflection to guide informed decisions.
V.A.1	Reading widely and deeply in multiple formats and write and create for a variety of purposes
V.A.2	Reflecting and questioning assumptions and possible misconceptions
V.A.3	Engaging in inquiry-based processes for personal growth.
V.B.1	Problem solving through cycles of design, implementation, and reflection.
V.B.2	Persisting through self-directed pursuits by tinkering and making.
V.C.1	Expressing curiosity about a topic of personal interest or curricular relevance
V.C.2	Co-constructing innovative means of investigation.
V.C.3	Collaboratively identifying innovative solutions to a challenge or problem
V.D.1	Iteratively responding to challenges.
V.D.2	Recognizing capabilities and skills that can be developed, improved, and expanded.
V.D.3	Open-mindedly accepting feedback for positive and constructive growth.

II.B.2	Evaluating a variety of perspectives during learning activities.
II.C.2	Contributing to discussions in which multiple viewpoints on a topic are expressed.
IV.A.1	Determining the need to gather information.
IV.A.2	Identifying possible sources of information.
IV.A.3	Making critical choices about information sources to use.
VI.A.1	Responsibly applying information, technology, and media to learning.
VI.C.2	Disseminating new knowledge through means appropriate for the intended audience.
VI.D.1	Personalizing their use of information and information technologies.
VI.D.2	Reflecting on the process of ethical generation of knowledge.
III.A.1	Demonstrating their desire to broaden and deepen understandings.
III.A.2	Developing new understandings through engagement in a learning group.
III.A.3	Deciding to solve problems informed by group interaction.
III.B.1	Using a variety of communication tools and resources.
III.B.2	Establishing connections with other learners to build on their own prior knowledge and create new knowledge
III.C.1	Soliciting and responding to feedback from others.
III.C.2	Involving diverse perspectives in their own inquiry processes.
III.D.1	Actively contributing to group discussions.
III.D.2	Recognizing learning as a social responsibility.
SEL.PK-12.1.1	Recognize one’s feelings and thoughts
SEL.PK-12.1.2	Recognize the impact of one’s feelings and thoughts on one’s own behavior
SEL.PK-12.1.3	Recognize one’s personal traits, strengths, and limitations
SEL.PK-12.1.4	Recognize the importance of self-confidence in handling daily tasks and challenges
SEL.PK-12.2.1	Understand and practice strategies for managing one’s own emotions, thoughts, and behaviors
SEL.PK-12.2.2	Recognize the skills needed to establish and achieve personal and educational goals
SEL.PK-12.2.3	Identify and apply ways to persevere or overcome barriers through alternative methods to achieve one’s goals
SEL.PK-12.3.4	Demonstrate an awareness of the expectations for social interactions in a variety of settings
SEL.PK-12.4.1	Develop, implement and model effective problem-solving, and critical thinking skills
SEL.PK-12.4.2	Identify the consequences associated with one’s actions in order to make constructive choices
SEL.PK-12.4.3	Evaluate personal, ethical, safety, and civic impact of decisions
SEL.PK-12.5.1	Establish and maintain healthy relationships
SEL.PK-12.5.2	Utilize positive communication and social skills to interact effectively with others
SEL.PK-12.5.4	Demonstrate the ability to prevent and resolve interpersonal conflicts in constructive ways
WRK.K-12.P.1	Act as a responsible and contributing community members and employee.
WRK.K-12.P.4	Demonstrate creativity and innovation.
WRK.K-12.P.5	Utilize critical thinking to make sense of problems and persevere in solving them.
WRK.K-12.P.6	Model integrity, ethical leadership and effective management.

WRK.K-12.P.8	Use technology to enhance productivity increase collaboration and communicate effectively.
WRK.K-12.P.9	Work productively in teams while using cultural/global competence.
TECH.9.4.5.CI	Creativity and Innovation
TECH.9.4.5.CI.1	Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions (e.g., W.4.6, 3.MD.B.3,7.1.NM.IPERS.6).
TECH.9.4.5.CI.3	Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity (e.g., 8.2.5.ED.2, 1.5.5.CR1a).
TECH.9.4.5.CT	Critical Thinking and Problem-solving
TECH.9.4.5.CT.2	Identify a problem and list the types of individuals and resources (e.g., school, community agencies, governmental, online) that can aid in solving the problem (e.g., 2.1.5.CHSS.1, 4-ESS3-1).
TECH.9.4.5.CT.3	Describe how digital tools and technology may be used to solve problems.
TECH.9.4.5.CT.4	Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (e.g., 6.1.5.CivicsCM.3).
TECH.9.4.5.DC.1	Explain the need for and use of copyrights.
TECH.9.4.5.DC.2	Provide attribution according to intellectual property rights guidelines using public domain or creative commons media.
TECH.9.4.5.DC.3	Distinguish between digital images that can be reused freely and those that have copyright restrictions.
TECH.9.4.5.DC.4	Model safe, legal, and ethical behavior when using online or offline technology (e.g., 8.1.5.NI.2).
TECH.9.4.5.DC.7	Explain how posting and commenting in social spaces can have positive or negative consequences.
TECH.9.4.5.TL.1	Compare the common uses of at least two different digital tools and identify the advantages and disadvantages of using each.
TECH.9.4.5.IML.2	Create a visual representation to organize information about a problem or issue (e.g., 4.MD.B.4, 8.1.5.DA.3).
TECH.9.4.5.IML.3	Represent the same data in multiple visual formats in order to tell a story about the data.
TECH.9.4.5.IML.5	Distinguish how media are used by individuals, groups, and organizations for varying purposes. (e.g., 1.3A.5.R1a).

Essential Questions

- How can a makerspace change our learning experience?
- How are students empowered as design thinkers and creators?
- How can a Makerspace be used for collaboration, exploration, and creation?
- How can design thinking change how I view success?
- How do I develop perseverance through tinkering and play?
- Why are exploration and creation an important part of learning?

Students Will Know/Students Will Be Skilled At

- Communicating (listening, speaking with clarity) while collaborating with others.
- Design-thinking and prototyping.
- Makerspaces are locations for students to create, tinker, make, and explore their own thoughts and interests; the learning is personalized.
- To seek help, as needed.
- Tolerating frustration and building a growth mindset.
- Using tools and resources while interacting in a Makerspace.

Evidence/Performance Tasks

Students demonstrate differentiated proficiency through both formative and summative assessments in the classroom. Based on individual student readiness and performance, assessments can be implemented as formative and/or summative.

Developmental progression across years in media is evidenced through benchmark assessments as part of the media specialist's Student Growth Objective (SGO). Student proficiency allows for additional or alternative assessment based on demonstration or absence of skill.

The performance tasks listed below are examples of the types of assessments teachers may use in the classroom and the data collected by the district to track student progress.

- Formative-Students demonstrate acceptable behavior in a makerspace station.
- Formative-Students will present both formally and informally prototypes and plans.
- Formative-Students worked collaboratively with others in the group.
- Summative-Students will present both formally and informally products and creations in teams and individually.

Learning Plan

Media Specialists may personalize instruction during this unit and address the distinct learning needs, interests, aspirations, or cultural backgrounds of individual students.

Media Specialists at the elementary level design their own unique lesson plans in order to incorporate the essential questions provided in this unit. The order in which this information is presented is dependent upon the variables specific to each elementary school community. For example, students may be called to the carpet for a lesson followed by guided practice, then independent practice. After the lesson, students will check out books. Library Media time ends with an electronic story or students going to a makerspace station.

During makerspace time, students are given tasks or challenges using the available materials rather than use the time to free play.

While there is intrinsic value in play, a makerspace is intended to explicitly teach valuable life skills. According to Laura Fleming, A makerspace is "a metaphor for a unique learning environment that encourages tinkering, play, and open-ended exploration for all." Following the concept of a future-ready school, it "encourages and facilitates students to become increasingly self-directed as they create products of their learning that engage them in critical thinking, collaboration, and authentic problem solving." This unit is intended to teach design thinking, prototyping, and critical thinking. It fosters play, creativity, and team building. Most importantly, it bolsters social and emotional learning among students.

Fifth grade students will review makerspace or innovation stations at the beginning of the year. Procedures and behavioral expectations for students. Depending on the library lesson, the students may be able to go to a makerspace or innovation station after the library lesson. Usually once a month, the students have the opportunity to do a makerspace or innovation stations or choiceboard from Google Classroom that have multiple activities to choose from for the whole library class. The makerspace stations for the week are usually the same for all grade levels. The students' ability to create and make more advanced creations in each makerspace change with the grade level and ability of the students. participating at a makerspace station will be introduced, modeled, and practiced. They will have the opportunity to interact in a fixed makerspace or portable innovation stations which allows for collaboration and creativity while fostering necessary twenty-first century skills. After the initial orientation, students will be able to go to a makerspace or innovation station after the library lesson. The library class usually starts with a lesson and students take turns checking out books and creating at a makerspace at the end of the library period throughout the school year. The makerspace stations for the week are usually the same for all grade levels. The students' ability to create and make more advanced creations in each makerspace change with the grade level and ability of the students.

Suggested activities are listed below for this unit:

- Participate in creative and innovative tasks in a Makerspace

Materials

The materials used in this course allow for integration of a variety of instructional, enrichment, and intervention materials that support student learners at all levels in the school and home environments. Associated web content and media sources are infused into the unit as applicable and available. Library media spaces are housed with a rich collection of core materials to use in the Makerspace area or at innovation stations.

Instructional Materials

Choice Boards

- Virtual Makerspace Board
- September Choice Board
- October Choice Board
- November Choice Board
- January Choice Board

Legos

Lego bases- 4 pk, 10X10 $16.95 amazon (need 2 packs)

Marble Runs

Keva Planks

Power Clix

Magna tiles/Picasso tiles/Plagmags- Amazon, $66.99, 100 piece set

Dot and Dash Robots

Ozobots

Samsung Tablets

- Samsung Tablets necessary for Dash & Dots
- access online resources using QR code
- stop motion animation
- coding apps

Botley the Coding Robot

Sphero Robots

Cubelets

Snap Circuits

Quibits

K'nex

Popsicle Sticks

Straws

Origami paper

Pipe cleaners

Craft sticks

Pom-poms

Stress-free coloring books

Colored Pencils

Crayons

Markers

Gear Stencils (Roylco Brand in School Specialty catalog)

Rainbow loom

Stick Together (Letsticktogether.com)

Cricut Explore Air Wireless Cutting Machine- Amazon, $199; Michaels, in store, $179

Duct tape creation station

5 Boogie Boards (doodling) https://www.myboogieboard.com/

Crossword puzzles

Games/Puzzles

Magnetic Poetry- Amazon, $19.95

Puzzles

Checkers/Chess

Brain puzzles

Materials

Cardboard

Toilet paper rolls

Duct tape

Hot Glue guns

Cups

Hand Magnifiers - Set of 12 Lakeshore Catalog: item# LA444 $39.99

Real Bugs Discovery Kit Lakeshore Catalog: tem# DD646 $24.99

Survive the Quake Engineering Kit Lakeshore Catalog: item#DD121 $29.99

Dot and Dash Robots

Ozobots

10 Ipads Mini 1,2,3,4 (8.1 +)

- Ipads necessary for Dash & Dots
- access online resources using QR code
- stop motion video
- coding apps

Snap Circuits

Legos

Lego bases- 4 pk, 10X10 $16.95 amazon (need 2 packs)

Quibits

K’nex

Keva structures 200 Plank Set- Amazon, $49.95

Magna tiles/Picasso tiles/Plagmags- Amazon, $66.99, 100 piece set

Popsicle Sticks

Straws

Bloxels

Origami paper

Pipe cleaners

Craft sticks

Pom-poms

Stress-free coloring books

Colored Pencils

Gear Stencils (Roylco Brand in School Specialty catalog)

Rainbow loom

Stick Together (letsticktogether.com), $30 each; $100 for set of 4

Cricut Explore Air Wireless Cutting Machine- Amazon, $199; Michaels, in store, $179

Duct tape creation station

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Cups

Teacher Resources

Suggested Supplemental Resources:

Makerspace Center Signs (Google Doc)

Makerspace Presentation (Google Slides)

Presentation link: https://docs.google.com/presentation/d/1DAiWKOdsQ-1erD8Quywsdal-YIvmMGcB83GTS7-tiaY/edit#slide=id.geb509dba2_0_37

Suggested Strategies for Accommodations and Modifications

Content specific accommodations and modifications as well as Career Ready Practices are listed here for all students, including: Special Education, English Language Learners, At Risk of School Failure, Gifted and Talented, Students with 504.