Unit 1-4 Design It [STEM Level 2]

Content Area: **Technology**
Course(s): **Technology 5**
Time Period: **MP1-4**
Length: **2nd half of MP**
Status: **Published**

Essential Questions

- What are the resources necessary to identify, describe and explain technological products or systems?

Big Ideas

- Apply the design process.
- Use and maintain technological products and systems.
- Assess the impact of products and systems.
- Certain resources are necessary to create a product.
- Computing devices may be connected to other devices to form a system as a way to extend their capabilities.
- Software and hardware work together as a system to accomplish tasks (e.g., sending, receiving, processing, and storing units of information).
- The type of data being stored affects the storage requirements.
- Technology innovation and improvement may be influenced by a variety of factors. Engineers create and modify technologies to meet people's needs and wants; scientists ask questions about the natural world.

Cross-Curricular Integration

English Language Arts

- RI.5.1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.
- RI.5.2 Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text.
- RI.5.3 Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.
- 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.
- 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.

- RI.5.10 By the end of the year, read and comprehend informational texts, including history/social studies, science, and technical texts, at the high end of the grades 4-5 text complexity band independently and proficiently.

- 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

Science

- 3-5-ETS1-1 Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
- 3-5-ETS1-2 Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
- 3-5-ETS1-3 Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Career Readiness, Life Literacies and Key Skills Integration

Performance Expectations

- 9.4.5.DC.4: Model safe, legal, and ethical behavior when using online or offline technology (e.g., 8.1.5.NI.2)

- 9.4.5.IML.1: Evaluate digital sources for accuracy, perspective, credibility and relevance (e.g., Social Studies Practice - Gathering and Evaluating Sources).

- 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).

- 9.4.5.IML.3: Represent the same data in multiple visual formats in order to tell a story about the data.

- 9.4.5.IML.6: Use appropriate sources of information from diverse sources, contexts, disciplines, and cultures to answer questions (e.g., RI.5.7, 6.1.5.HistoryCC.7, 7.1.NM. IPRET.5).

- 9.4.5.IML.7: Evaluate the degree to which information meets a need including social emotional learning, academic, and social

- 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.

- 9.4.5.TL.2: Sort and filter data in a spreadsheet to analyze findings.

- 9.4.5.TL.3: Format a document using a word processing application to enhance text, change page formatting, and include appropriate images, graphics, or symbols.

- 9.4.5.TL.4: Compare and contrast artifacts produced individually to those developed collaboratively (e.g., 1.5.5.CR3a).

- 9.4.5.TL.5: Collaborate digitally to produce an artifact

Practices

- Act as a responsible and contributing community member and employee.
- Consider the environment, social and economic impacts of decision.
- Demonstrate creativity and innovation.
- Utilize critical thinking to make sense of problems and persevere in solving them.
- Model integrity, ethical leadership and effective management.
- Use technology to enhance productivity, increase collaboration and communicate effectively.
- Work productively in teams while using cultural/global competence.

Enduring Understandings

- 8.1.5.CS.1: Model how computing devices connect to other components to form a system. **[R]**
- 8.1.5.CS.2: Model how computer software and hardware work together as a system to accomplish tasks. **[R]**
- 8.1.5.DA.2: Compare the amount of storage space required for different types of data.
- 8.2.5.NT.2: Identify new technologies resulting from the demands, values, and interests of individuals, businesses, industries, and societies.
- 8.2.5.NT.4: Identify how improvement in the understanding of materials science impacts technologies.

Activities and Assessments

- Discuss the positive and negative impacts of technology on society.
- Activity Resource: http://wvde.state.wv.us/learn21/3/5/stem
    - ROVER Robotic – What is it like to be part of a team that designs and tests robots? Find out and test your programming skills with ROVER
    - Perim-Bots - Make an awesome robot by answering questions about perimeter correctly and bringing your special creation to life
    - The Databank Research Company – Help the Jelly Fish Fruit Snack Company gather, organize, and display data to determine the best packaging of their fruit snacks

Additional Resources

- Programming a Robot: https://ny.pbslearningmedia.org/resource/wnet08.sci.engin.systems.wnetrobot1/programming-a-robot/
- Fifth grade "cyber ninja" wants to help make kids' toys safe from hackers, NewsELA: https://newsela.com/read/cyber-kid-teddy-bear-hacking/id/30919/ (also available in Spanish) **(Diversity, Equity and Inclusion)**
- Seventh Graders Create Virtual Holocaust Museum: https://www.5280.com/dont-miss-seventh-graders-create-virtual-holocaust-museum/ **(Holocaust Law)**