Unit 4b-Tech: Solve a Problem

Content Area: **Technology**
Course(s): **Technology 4**
Time Period: **Marking Period 4**
Length: **MP4; once a week**
Status: **Published**

Essential Questions

- How do I choose which technological tools to use and when is it appropriate to use them?
- How can I transfer what I know to new technological situations/experiences?

Big Ideas

- Selection of technology should be based on personal and/or career needs assessment.
- A tool is only as good as the person using it.
- Identify and define authentic problems and significant questions for investigation.
- Plan and manage activities to develop a solution or complete a project.
- Collect and analyze data to identify solutions and/or make informed decisions.
- Use multiple processes and diverse perspectives to explore alternative solutions.
- Engineering design requirements include desired features and limitations that need to be considered.
- 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

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.

English Language Arts

- RI.4.3. Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.
- RI.4.4. Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area.
- RI.4.7. Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.
- RI.4.10. By the end of year, read and comprehend literary nonfiction at grade level text-complexity or above, with scaffolding as needed.

- W.4.10. Write routinely over extended time frames (time for research, reflection, metacognition/self-correction and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.
- SL.4.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly.
- L.4.6. Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases, including those that signal precise actions, emotions, or states of being (e.g., quizzed, whined, stammered) and that are basic to a particular topic (e.g., wildlife, conservation, and endangered when discussing animal preservation).

Career Readiness, Life Literacies and Key Skills Integration

Performance Expectations

- 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).
- 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).
- 9.4.5.CI.4: Research the development process of a product and identify the role of failure as a part of the creative process (e.g., W.4.7, 8.2.5.ED.6).
- 9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2).
- 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).
- 9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems.
- 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).
- 9.4.5.DC.2: Provide attribution according to intellectual property rights guidelines using public domain or creative commons media.
- 9.4.5.DC.3: Distinguish between digital images that can be reused freely and those that have copyright restrictions.
- 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.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 (e.g., 2.2.5. PF.5)

Practices

- Act as a responsible and contributing community members and employee.
- Demonstrate creativity and innovation.
- Utilize critical thinking to make sense of problems and persevere in solving them.
- Use technology to enhance productivity increase collaboration and communicate effectively.
- Work productively in teams while using cultural/global competence.

Enduring Understandings

- 8.2.5.ED.5: Describe how specifications and limitations impact the engineering design process.
- 8.2.5.ED.6: Evaluate and test alternative solutions to a problem using the constraints and tradeoffs identified in the design process.
- 8.2.5.NT.3: Redesign an existing product for a different purpose in a collaborative team.

Activities and Assessments

- Thinking Critically [The 21st Century COACH C13]
- Making Good Decisions [The 21st Century COACH C23]
- Small groups of students will be presented with a problem. They will analyze the problem, research it, come up with potential solutions, and present it to the class using a digital tool (their choice).
- Use technology to collect, organize, and analyze data that supports scientific findings.

Climate Change

8.2.5.ED.5: Describe how specifications and limitations impact the engineering design process.

- Activity: Students will work in small groups where each group will be given a different engineering problem with clear specifications and limitations. Students will discuss how the specifications and limitations will impact their design decisions. Then, groups will sketch initial designs that address both the specifications and limitations.

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.

- Activity: Students will work in a group to research a specific local or global climate change issue and use communication technologies (e.g., online forums, social media, email) to reach out to individuals or organizations with diverse perspectives on the issue. Students will use collaborative tools (e.g., Google Docs, Google Meet) to discuss their findings then create a presentation.

9.4.5.CI.2: Investigate a persistent local or global issue, such as climate change, and collaborate with individuals with diverse perspectives to improve upon current actions designed to address the issue.

- Activity: Students will research a specific aspect of climate change and find current actions taken to help climate change and their effectiveness. Students will then propose improvements into a coherent plan and create a presentation outlining their proposed improvements, supported by evidence and reasoning.

9.4.5.DC.8: Propose ways local and global communities can engage digitally to participate in and promote

climate action.

- Activity: Students will brainstorm ideas for how local and global communities can use digital platforms and technologies to participate in and promote climate action then select the most promising ones. Next, students will discuss how each proposed idea leverages digital tools (e.g., social media, websites, apps) to engage people in climate action. Last, students will create a presentation outlining their proposed digital engagement strategies for climate action.

Additional Resources

- Bullying and Problem Solving Video, PBSLearning: https://ny.pbslearningmedia.org/resource/bullying-problem-solving-video/teamology/ **(SEL)**
- Computer Clubhouse, PBSLearning Media: https://ny.pbslearningmedia.org/resource/9612f76a-8569-4a28-b6c7-6b816b13a077/9612f76a-8569-4a28-b6c7-6b816b13a077/