MP2-3-Dash & Dot (Coding)

Content Area: **G&T**
Course(s): **G&T 5**
Time Period: **MP2-3**
Length: **MP2-3**
Status: **Published**

Unit Objectives

Unit D - Events, Loops & Conditionals

- Students will:
  - Understand the definition of a nested loop.
  - Distinguish between when a nested loop should be used instead of a simple or regular loop.
  - Create a program that uses a nested loop in order to solve a puzzle.
  - Use loops to revise code and complete coding challenges in an iterative process.
- Students will:
  - Use event handlers and a combination of loops to develop a code in which Dot and Dash interact.
  - Use event handlers to revise code and complete coding challenges in an iterative process.
- Students will:
  - Define a conditional statement.
  - Locate an example of a conditional statement in their classroom or home.
  - Design a card game using conditionals.
- Students will:
  - Understand the definition of a conditional statement.
  - Create a conditional statement.
  - Use conditionals to revise code and complete coding challenges in an iterative process.
- Students will:
  - Understand how to use more than one conditional in a program.
  - Use a combination of loops and conditionals to enable Dash to make a variety of "choices."
- Students will:
  - Brainstorm solutions to a classroom problem.
  - Demonstrate and use the coding concepts introduced in Level D to program a set of instructions

for Dash to follow.

These concepts include: nested loops, event handlers, and conditionals.

- Determine and/or clarify the meaning of terminology related to coding and design.
- Apply the steps of the Design Thinking Process to construct a new accessory for Dash.
- Document the Design Thinking Process in their Design Thinking Group Workbook.
- Explain their ideas with peers and teachers.
- Create an engaging presentation about their design to share with the class.

Unit Objectives

Unit E - Loops, Conditionals & Functions

- Students will:
  - Identify the differences between Repeat, Repeat Forever, and Repeat Until blocks.
  - Differentiate between situations in which a Repeat, Repeat Forever, or Repeat Until block should be used.
  - Use Repeat Until blocks to revise code and complete coding challenges in an iterative process.
  - Construct an original program using a Repeat Until block.
- Students will:
  - Define If/Else blocks.
  - Use If/Else blocks to solve a problem.
  - Differentiate between situations when If/Else blocks should be used instead of If blocks.
- Students will:
  - Understand the definition and uses of a function.
  - Understand the correlation between a song's chorus and a function.
  - Write an original song/chant using a function.
- Students will:
  - Define a function.
  - Identify the differences between a function and a loop, and identify times when a function should

be used instead of a loop.

- Use functions to revise code and complete coding challenges in an iterative process.

- Students will:
  - Define a function.
  - Design a program that combines event handlers, loops, and functions.
  - Use functions to revise code and complete coding challenges in an iterative process.

- Students will:
  - Brainstorm solutions to a classroom problem.
  - Demonstrate and use the coding concepts introduced in Level E to program a set of instructions for Dash to follow. These concepts include: Repeat Until Loops,

    If/Else Conditionals and Functions.
  - Determine and/or clarify the meaning of terminology related to coding and design.
  - Apply the steps of the Design Thinking Process to construct a new accessory for Dash.
  - Document the Design Thinking Process in their Design Thinking Workbook.
  - Explain their ideas to peers and teachers.
  - Create an engaging presentation about their design to share with the class.

Unit Objectives

Unit F - Conditionals & Variables

- Students will:
  - Identify a nested conditional.
  - Use and manipulate a nested conditional effectively.
  - Use nested conditionals to revise code and complete coding challenges in an iterative process.

- Students will:
  - Define a variable.
  - Identify and use variables in real life.

- Students will:

- Define a variable.
- Understand the benefits of using variables.
- Use variables to revise code and complete coding challenges in an iterative process.

- Students will:
  - Define a variable.
  - Manipulate the variable using mathematical formulas.
  - Use variables to revise code and complete coding challenges in an iterative process.

- Students will:
  - Define a variable.
  - Manipulate multiple variables in a single program.
  - Use variables to revise code and complete coding challenges in an iterative process.

- Students will:
  - Brainstorm solutions to a classroom problem.
  - Demonstrate and use the coding concepts introduced in Level F to program a set of instructions for Dash to follow.

    This would include: Functions, Nested Conditionals and Variables.
  - Determine and/or clarify the meaning of terminology related to coding and design.
  - Apply the steps of the Design Thinking Process to construct a new accessory for Dash.
  - Document the Design Thinking Process in their Design Thinking Workbook.
  - Explain their ideas to peers and teachers.
  - Create an engaging presentation about their design to share with the class.

Activities

- After students work on lesson "Independent" work, they must demonstrate their work to the teacher/class and explain what they have done in the app to make Dash and/or Dot complete its objective.

- Once each of the lessons are completed in all the units, students will then complete Challenge Cards to expand on the lesson, demonstrate to the teacher they understand the coding and process and then write

reflections on each of the Challenge activities. Each reflection has to explain what they wanted their Dash and/or Dot to do, how they completed their objective, and if they made any mistake, what they were and how they fixed them.

Enduring Understandings

CSTA - The Computer Science Teachers Association

1B-AP-08: Compare and refine multiple algorithms for the same task and determine which is the most appropriate.

1B-AP-09: Create programs that use variables to store and modify data.

1B-AP-10: Create programs that include sequences, events, loops, and conditionals.

1B-AP-11: Decompose (break down) problems into smaller, manageable subproblems to facilitate the program development process.

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.

1B-AP-13: Use an iterative process to plan the development of a program by including other's perspectives and considering user preferences.

1B-AP-15: Test and debug (identify and fix errors) a program or algorithm to ensure it runs as intended

1B-AP-16: Take on varying roles, with teacher guidance, when collaborating with peers during the design, implementation, and review of program development.

1B-AP-17: Describe choices made during program development using code comments, presentations, and demonstrations.

1B-DA-06: Organize and present collected data visually to highlight relationships and support a claim.

1B-DA-07: Use data to highlight or propose cause-and-effect relationships, predict outcomes, or communicate an idea.

1B-IC-18: Discuss computing technologies that have changed the world and express how those technologies influence, and are influenced by, cultural practices.

1B-IC-19: Brainstorm ways to improve the accessibility and usability of technology products for the diverse needs and wants of users.

1B-IC-20: Seek diverse perspectives for the purpose of improving computational artifacts.

2-AP-12: Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals.

ISTE - The International Society for Technology in Education

1.a. Students use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways.

3.a. Students plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits.

3.d. Build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.

4.a. Students engage in a cyclical design process to develop prototypes and reflect on the role that trial and error plays.

4.c. Develop, test and refine prototypes as part of a cyclical design process.

4.d. Exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.

5.a. Formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.

5.c. Break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.

5.d. Students understand and explore basic concepts related to automation, patterns, and algorithmic thinking.

6.a. Choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.

6.b. Create original works or responsibly repurpose or remix digital resources into new creations.

6.c. Communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations.

6.d. Students publish or present content that customizes the message and medium for their intended audiences.

7.a. Use collaborative technologies to work with others, including peers, experts or community members, to examine issues and problems from multiple viewpoints.

7.b. Choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.

7.c. Contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.

7.d. Explore local and global issues and use collaborative technologies to work with others to investigate solutions.

NGSS - Next Generation Science Standards

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 solutions to a problem based on how well they meet the criteria and constraints of the design problem.

3-5-ETS1-3: Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved.

K-2-ETS1-2: Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

Resources

Apps

- Wonder Workshop
  - Go
  - Wonder
  - Blockly
  - Path