MP2-3-Dash & Dot (Coding)

Content Area: **G&T**
Course(s): **G&T 4**
Time Period: **MP2-3**
Length: **MP2-3**
Status: **Published**

Unit Objectives

Unit A - Sequences & Loops

- Students will:
  - Define sequences and algorithms.
  - Relate coding to their lives at home and school.
  - Design an algorithm navigating Dash through a maze to find Dot.
- Students will:
  - Understand what problems are best solved with sequencing.
  - Use sequencing to revise code and complete coding challenges in an iterative process.
- Students will:
  - Review using lights, sounds, and animations in sequences.
  - Understand what problems are best solved with sequences.
  - Use sequences to revise code and complete coding challenges in an iterative process.
- Students will:
  - Understand what problems are best solved with sequencing.
  - Use sequencing to revise code and complete coding challenges in an iterative process.
- Students will:
  - Understand what problems are best solved with loops.
  - Use loops to revise code and complete coding challenges in an iterative process.
- Students will:
  - Demonstrate understanding of basic programming functions introduced in Level A curriculum: lights, sounds, animations, movements.
  - Learn about the beginning steps of the Design Thinking Process: Ask, Imagine, Plan.
  - Discuss a sequenced set of instructions for Dash to follow.

- Design an accessory for Dash to solve a problem at home.
- Use a combination of drawing and speaking to narrate their thinking processes.
- Explain ideas to peers and teacher audibly and clearly, with guidance and support from teacher, to improve their initial designs.

Unit Objectives

Unit B - Sequences, Loops & Events

- Students will:
  - Understand what problems are best solved with sequencing.
  - Change the parameters in a program.
  - Use sequencing to revise code and complete coding challenges in an iterative process.
- Students will:
  - Define a loop.
  - Identify examples of how they use loops in their lives.
  - Design a dance for Dash that uses loops.
- Students will:
  - Understand the purpose of using the Repeat block.
  - Use the Repeat block to revise code and complete coding challenges in an iterative process.
- Students will:
  - Understand the difference between Repeat Forever and Repeat blocks.
  - Understand what problems are best solved with infinite loops (Repeat Forever blocks) and specified loops (Repeat blocks).
  - Use loops to revise code and complete coding challenges in an iterative process.
- Students will:
  - Define how events are used to create code.

- Define the Wait For block and how it might be used.
- Locate the Wait For block.
- Design a program that uses Wait For and Repeat blocks.
- Use the Wait For and Repeat blocks to revise code and complete coding challenges in an iterative process.

- Students will:

- Demonstrate and use the coding concepts introduced in Level B to program a set of instructions for Dash to follow. These concepts would include: sequences, loops, and events.
- Assign specific parameters to different coding blocks such as drive and repeat blocks.
- Learn about the beginning steps of the Design Thinking Process: Ask, Imagine, Plan, Build, and Improve.
- Confirm understanding of discussion by asking and answering questions.
- Draw an attachment for Dash.
- Use a combination of drawing, dictating, and writing to narrate a single event.
- Follow agreed-upon rules during group discussions.
- Explain ideas to peers and teacher audibly and clearly with guidance and support from teacher to improve their initial designs.

Unit Objectives

Unit C - Sequences, Events & Loops

- Students will:

- Experiment with more complex programming by changing the direction that Dash looks and turns.
- Use complex parameters to revise code and complete coding challenges in an iterative process.

- Students will:

- Define an event handler.
- Locate examples of how they use event handlers in their lives.
- Use event handlers to “program” their classmates using Dot’s buttons.

- Students will:

- Understand what problems are best solved with event handlers via the When block in Blockly.
- Use event handlers to revise code and complete coding challenges in an iterative process.

- Students will:
  - Understand what problems are best solved with event handlers via the When block in Blockly.
  - Use event handlers to revise code and complete coding challenges in an iterative process.

- Students will:
  - Understand how and when to use multiple loops.
  - Use multiple loops to revise code and complete coding challenges in an iterative process.

- Students will:
  - Demonstrate and use the coding concepts introduced in Level C to program a set of instructions for Dash to follow. These concepts include **sequences with complex parameters**, **multiple loops**, and **event handlers**.
  - 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 with 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

1A-AP-08: Model daily processes by creating and following algorithms (sets of step-by-step instructions) to complete tasks.

1A-AP-10: Develop programs with sequences and simple loops, to express ideas or address a problem.

1A-AP-11: Take on varying roles, with teacher guidance, when collaborating with peers during the design implementation and review stages of program development.

1A-AP-12: Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions.

1A-AP-13: Give attribution when using the ideas and creations of others while developing programs.

1A-AP-14: Develop a plan that describes a program's sequence of events, goals, and expected outcomes.

1A-AP-15: Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.

1A-IC-16: Compare how computing technology has changed the way people live and work.

1A-IC-17: Work respectfully and responsibly with others online.

1B-AP-16: Using correct terminology, describe steps taken and choices made during the iterative process of program development.

ISTE - The International Society for Technology in Education

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.d. Students demonstrate perseverance when working with open-ended problems.

5.a. With guidance from an educator, students identify a problem and select appropriate technology tools to explore and find 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.b. Students use digital tools to create original works.

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.c. Students perform a variety of roles within a team using age-appropriate technology to complete a project or solve a problem.

NGSS - Next Generation Science Standards

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-ETS1-1: Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

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.

K-2-ETS1-3: Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

New Jersey Student Learning Standards

NJSLA.W4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

W.4.6.NJSLSA.W6. Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.

W.4.7. Conduct short research projects that build knowledge through investigation of different aspects of a topic.

W.4.8. Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.

NJSLA.SL1: Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

NJSLA.SL.2: Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.

NJSLSA.SL4: Present information, findings, and supporting evidence such that listeners can follow the line

of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.

Resources

Apps

- Wonder Workshop
  - Go
  - Wonder
  - Blockly
  - Path