

Trail Breaker Coding with Dash & Dots

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Discipline / Subject: Technology/STEM

Topic: Coding with Dash and Dots

Grade Level: 2-8

Resources / References / Materials Teacher Needs:

- cotton balls/small paper balls etc...
- Dash & Dots
- iPads - or similar device
- “Blockly” App
- “Bulldozer bar” accessory
- meter/yard sticks
- Pre-designed courses to follow (optional)

Lesson Summary:

- Class watches and discusses the video provided by Spencer Pape - lead trail breaker with Iditarod, to build background and understanding
- Students are placed into groups and asked to code a bot to clear a predetermined course without touching the sides
- Students use the “Blockly” app on iPads to create a code for the bot to carry out on the corresponding route

Standards Addressed: (Local, State, or National)

Ohio Technology Standards:

- a) Information and Communications Technology The understanding and application of digital learning tools for accessing, creating, evaluating, applying and communicating ideas and information.
 - i) Topic 1: Identify and use appropriate digital learning tools and resources to accomplish a defined task.
 - (1) With guidance, identify and use digital learning tools or resources to support planning, implementing and reflecting upon a defined task.
 - ii) Topic 3: Use digital learning tools and resources to construct knowledge.
 - (1) Interpret images, diagrams, maps, graphs, infographics, videos, animations, interactives, etc. in digital learning tools and resources to clarify and add to knowledge.

- (2) Create artifacts using digital learning tools and resources to demonstrate knowledge.
- iii) Topic 4: Use digital learning tools and resources to communicate and disseminate information to multiple audiences.
 - (1) Produce and publish information appropriate for a target audience using digital learning tools and resources.
- b) Design and Technology Addresses the nature of technology to develop and improve products and systems over time to meet human/societal needs and wants through design processes.
 - i) Topic 1: Define and describe technology, including its core concepts of systems, resources, requirements, processes, controls, optimization and trade-offs.
 - (1) Describe a process as a series of actions and how it is used to produce a result.
 - ii) Topic 2: Identify a problem and use an engineering design process to solve the problem
 - (1) Generate, develop, and communicate design ideas and decisions using appropriate terms and graphical representations.

Learning objectives:

1. Students use Dash & Dot bots to mimic the jobs/duties of the Iditarod trail breakers
2. Students will code a bot to clear a predetermined course without touching the sides

Assessment:

- Observation of groups to assess understanding of content and technology
- completion of objectives for this lesson

Procedural Activities

1. begin by sharing some information and background about the jobs of the trail breakers through the video provided here:
<https://drive.google.com/file/d/1z1zcnDBisZwdEUmGoaKlgYw358dk0dki/view?usp=sharing>
2. discuss with the class the different jobs including:
 - a. clear fallen trees
 - b. pack down the trail to create a firmer base for the teams to follow
 - c. build bridges over creeks and streams
 - d. choose the safest paths for the mushers to follow a couple weeks later
3. place students into groups of (no more than 4)
4. explain that they will have to clear cotton balls (that make up the snowdrifts) along the “trail”, and that the bot cannot touch a barrier along the path
5. working collaboratively, the groups measure the different distances, take turns entering the codes and checking the path of the bot
6. students use the meter sticks to measure and estimate the distances needed
7. using the “Blockly” app to pair the devices to the bot, students instruct the bot to move through the course
8. once the bot completely clears a path, without touching the sides, they have completed the task

Materials Students Need:

- cotton balls/small paper balls etc...
- Dash & Dots
- iPads - or similar device
- “Blockly” App
- “Bulldozer bar” accessory
- meter/yard sticks
- Pre-designed courses to follow (optional)

Technology Utilized to Enhance Learning:

- “Blockly” app
- Dash & Dot bots

Other Information

- The trail breaker video might need to be viewed ahead of time to get an understanding of what is happening in the video, so that it can be explained later to the class as they are watching.

Modifications for special learners/ Enrichment Opportunities

- Differentiating this activity can be done by adjusting the number of turns/obstacles and difficulty of course selected by each group
 - Higher ability groups can be challenged to include more turns and obstacles and lower ability groups can be asked to include fewer