

Lesson Topic: Algorithm Neighborhoods

Grade Level: *Second*

Subject Area(s): *Computer Science, Language Arts, Social Studies*

Lesson Description (Abstract): *Students learn about maps, coordinates and directions, then create a map. They will then challenge friends to write algorithms to help Dash navigate the neighborhood.*

Learning goals/outcomes: *Students will:*

- *Write algorithms in a correct sequence to navigate around the neighborhood.*
- *Use algorithms and debug issues to solve the computational problems addressed.*

Wyoming Standards:

Computer Science: 2.NI.NCO.01, 2.AP.A.01, 2.AP.V.01, 2.AP.C.01, 2.AP.M.01, 2.AP.PD.01, 2.AP.PD.03

Social Studies: SS2.5.1, SS2.5.2, SS2.5.3

Language Arts: RL2.1, RL2.2, RL2.07, RL2.10, W2.2, SL2.2

Mathematics: 2.MD.F.1, 2.MD.F.3,

Technology

Materials: *Dash, Blockly App*

Vocabulary

Decompose: break a problem down into smaller pieces

Sequence: a set of instructions that follow one another in order

Algorithm: detailed, step-by-step process followed in order to accomplish a specific task or to solve a specific problem.


Program: an algorithm that has been coded into something that can be run by a machine.

Event: an action that causes something to happen

Activity: Three Little Pig Sequencing

- Discuss the story of the Three Little Pigs. Ask students if they can re-tell the sequence of events from the Wolf's perspective. Images are provided on the last page.

[Handout](#)

<ul style="list-style-type: none"> Using a grid set up (tape a grid on the floor or use a BeeBot mat) to randomly place the pig storyline cards. Starting at the Mother Pig's house, discuss the sequence of steps needed to get to the Straw House. Discuss the importance of sequencing while coding. Code the first part of the algorithm to tell the story. 	
<ul style="list-style-type: none"> Students pair up to work on the algorithm that will re-tell the story from the wolf's perspective. They should include code that will enhance the story (ie. individual sound that tells the story at each stage --blow the house down, or sneeze or huff and puff) Add lights to emphasize. Encourage student creativity. 	<p>Use the Blockly App to code the algorithm.</p>
<ul style="list-style-type: none"> If time permits, have students share their algorithms and discuss the sequence of events that they used to create the algorithm. 	

Activity: Mapping the Neighborhood

Students work to create a neighborhood map using the Mapping our Neighborhood sheet ([attached criteria](#)) on large pieces of craft/butcher paper.

Then students will determine how they want viewers to navigate their neighborhood. Teams will compile the sequence ([navigation directions](#)) for visitors to utilize as they write their algorithms in Blockly for Dash to navigate the neighborhood (see next activity).

Activity: Dashing Through the Neighborhood

Students share their maps and navigation directions with another group or class (visitors). Visitors work to document the algorithm that must be used to have Dash visit the town in the correct sequence outlined by the creator using the [coding block manipulatives](#). Students should use rulers to measure the distance that Dash will need to travel between locations. Remind students of the angles that Dash can turn--they don't have to be just 90 degree angles.

*Note--initial blocks shared are simplified to just utilize basic navigation and help speed up the planning. Additional blocks of code can be used in the extension.

When the "visitors" have the correct algorithm, they use it to program Dash using the Blockly App and test it out.

Extension: Students can add sound, lights and actions at each location to enhance the storyline.



Mapping our Neighborhood

Follow the directions below. Put a check mark in each box as your group completes each task.

First, draw with a pencil
Next, outline with a marker (if you wish)
Last, color with crayons.

- 1. Write the title of your map. Cut it out and glue to the top of your paper.
- 2. Draw a compass rose at the North-East corner of your paper. (top right corner)
- 3. Decide on what symbols to use on your map key. Fill out the map key page. Then glue the map key to the South-East corner of your paper. (bottom right corner)
- 4. Draw your **school** in the **middle** of the page.
- 5. Point to the **school**. Go **north**. Draw the **fire station**.
- 6. Point to the **school**. Go **east**. Draw the **playground**.
- 7. Point to the **playground**. Go **south**. Draw the **pond**.
- 8. Point to the **fire station**. Go **west**. Draw the **library**.
- 9. Point to the **pond**. Go **west**. Draw the **grocery store**.
- 10. Point to the **library**. Go **south**. Draw **McDonald's**.
- 11. Now color your map neatly!

Navigating Our Neighborhood



Dash needs directions to navigate the neighborhood.
Can you write the algorithm to help get Dash around
the neighborhood?

Starting Location: _____

First Stop: _____

Second Stop: _____

Third Stop: _____

Fourth Stop: _____

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