Dash’s World Adventure

by Terri Eichholz

Description

Dash criss-crosses the map in this fun lesson on geography, creative writing, and mathematics. Students will create or finish a creative story telling of Dot and Dash’s adventures in traveling the world. Students will measure distances and estimate angles in order to program the robots to move, flash, and make sounds to act out their story.

Objectives

Create a short piece of creative writing
Take measurements of angles and distances between points on a map.
Identify major physical components of the world (i.e. oceans, continents, and equator), locating them on the map visually and using longitude and latitude.
Present a piece of writing to the class.
Learn how programming can be an avenue for creative expression.
Use a map key to find the real distances between points on a map.

What You’ll Need

Robots & Accessories

- Dash
- Dot

Downloadable Materials

- Dash Action Recording Table.pdf
- World Map Labels.pdf

Other Supplies

- iPad
- Multiple Large World Maps (ideally one per group of students)
- Rulers
- Sticky putty or tape for labels

Lesson Procedure

This lesson could be split up across multiple classes of approximately 30 minutes.
Class 1: Writing challenge Class 2: Measuring and programming challenges Class 3: Presentations

Class 1

(40 minutes)

Issue a challenge to students: Write a story about Dash going on a world adventure. The story must include Dash or Dot travelling (or being on) each continent and crossing the equator.

- Extension for grade 4 - 5: challenge students to reference longitude and latitude and geographical features (such as rivers, forests, and mountains) in their stories.

Write the prompt on the board and conduct a review of the geographical content.

- Hang a copy of the world map on a wall or the whiteboard
• Hang a copy of the world map on a wall or the whiteboard.
• Have the world map labels cut out and folded inside a hat.
• Have students come up and draw a label from the hat. They then read the label out loud and place the label at the location/geographical feature on the map.
• Conduct a discussion with the class as labels are placed on the map:
  ○ What is a country they know in a placed continent?
  ○ What is special about the equator?
  ○ How do you find geographical features on a map?
• Once all labels are placed, quickly review the positions of each of the continents, different lines of longitude and latitude, and how to identify geographical features on the map.

Review of the capabilities of Dash and Dot that they can use in their story. Below is a list of capabilities and some example blockly code that can be used to demonstrate all of these.

• Moving: Dash can move forward and backward in jumps of 10 cm. Dash can also turn left and right at a variety of angles, including spinning.
• Dash’s head can look left, right, up, and down.
• Sounds: Dash can make a variety of sounds.
• Lights: Dash’s eye, chest, and side lights can be controlled.
• Wait: Dash can be made to wait for up to 10 seconds to pause between actions.

Students will begin the creative writing activity. Pass out the world maps to the groups to use as inspiration. You may want to leave the labeled world map up while students are writing.

• For students who struggle with creative writing or if time is limited, have students read the story prompt provided, and have them write a conclusion to the story. For younger students, read the story prompt out loud before asking students to write their conclusion, alone or as a class.
Dash's World Adventure

by Temi Eichholz

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Subjects

- Coding
- ELA
- Math
- Social Studies

Group Size

2 - 4 students

Target Grades

3 - 5

Time Required

2 hours

What You’ll Need

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Class 1

Students are challenged to write a program to act out their story.

(30 minutes)

Do a quick review of Blockly programming. Use the sample code above as a help, projecting it for students to see, if possible.

- Start with the When block, explaining that it is used to trigger the start of the story. The example code gives two different types of start triggers (button, clapping).
- Everything students want Dash to do is attached below the When block, in order. Dash will start at the top and read to the bottom, executing each instruction (and only those instructions).
- Drive blocks control how Dash moves. Look blocks control where Dash looks. Light blocks control the color of each light. Sound blocks control the sounds Dash makes. Control blocks can cause Dash to wait for a set time or for some event to happen. They can also make Dash repeat an action on a loop, or have it react if something specific happens. Loops and if statements won’t be necessary for this activity so only “wait” Control blocks need to be shown.

Students will read their stories or the story prompt to extract Dash actions from the story. Students will fill these actions into the Dash Action Recording Table to help them lay out a plan for programming. This stage will require students to measure distances between points on the graph and estimate the angles Dash will need to turn.

- Students may program as they fill out the table, to test their measurements and angle choices, sharing the robot between group members to do this.

- Below is an example of part of a partially completed table, using the story prompt, and an example of the code that could be used to program those actions (measurements of distances and angles would be map dependent).

<table>
<thead>
<tr>
<th>Story Action</th>
<th>Dash Commands</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Dash drives from North America to South America to see Dot. Greens Dot by making grass sound.</td>
<td>Move forward 30 cm. Make grass sound.</td>
</tr>
<tr>
<td>2 Dash goes to Africa (Zimbabwe) by boat, green the grass, dance the phone, and hears an elephant sound.</td>
<td>Turn left 90 degrees. Make boat sound. Move forward 10 cm. Make crocodile sound. Make crocodile sound. Make elephant sound.</td>
</tr>
<tr>
<td>3 Dash goes to Australia and green the elephant whisperer.</td>
<td>Turn right 90 degrees. Make piano sound. Move forward 50 cm. Make forward 25 cm. Make elephant sound.</td>
</tr>
</tbody>
</table>

Students will code the program from their story worksheet.

Math/Geography Extension: Challenge students to find the total distance that Dash will travel (in cm), and then use the map key to find the distance in kilometers (or miles, as appropriate) using multiplication.

- For example, say the students have calculated that Dash moved 100 cm in his journey. If the map has a scale of 1 cm = 400 m, then Dash moves 100 cm = 400 m/cm = 40,000 miles in its journey.

- For an extra challenge, have students measure the exact distances between city markers on the map (to the ¼ in., instead of 10 cm chunks) and add them together by hand before using the map key to find the total distance. This will challenge students to add mixed numbers and multiply fractions by a whole number.
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Lesson Procedure

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Class 1: Writing challenge
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Discussion questions:

1. What problems did you have getting Dash to follow your story? How did you solve them?
1. When using the ruler to follow the dashed line, what problems might you encounter and how can you mitigate them? Problems could include not turning the right amount, or falling off the edge of the map. Measurement inaccuracy could cause problems, so it is good to have a classmate double-check.

2. How did you measure the distances that Dash should move? Did other students in the class use different methods? Which method worked best?
   Students could use a ruler to measure the total distance, and then figure out how many multiples of 10 cm that distance makes. Or they could use a string, piece of paper, or other object that is 10 cm long, and count how many copies of that object make up the distance. Point out that as long as the result works, there are no wrong methods, but some might take less time than others.

3. How did you measure the angles that Dash should turn? Did other students in the class use different methods? Which method worked best?
   Most students will use estimation to decide how much Dash turns. Older students should use a protractor.
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Dash the Treasure Hunter Story Prompt
Dash, the world-renowned treasure hunter, is seeking the famous Shoe of Honesty, which has the power to make anyone who wears it tell the truth. While in North America, Dash gets a secret message. He only knows one person who can help him decode it: Dot the Decoder. Dot is currently in South America. Dash drives to South America to get Dot's advice. When Dash sees Dot he gives her the secret turkey goat greeting.

Dot decodes the message and tells Dash that it is a phone number. He must now take a boat to Africa to find the Nile Crocodile, who is in Zimbabwe. The crocodile swallowed a phone, and its ringtone will reveal the location of the Shoe of Honesty on the map.

Dash finds the Exiled Crocodile in Zimbabwe, greets him with a proper crocodile hello, and then diels the phone number. Dash hears an elephant sound from the crocodile's stomach, and he realizes that this sound tells him that he must now visit the Rocking Sheep in India.
Elephant Whisperer who is currently taking a vacation in Antarctica.

Dash easily finds the Elephant Whisperer in Antarctica because he is the only man who answers when Dash yells out an elephant greeting. The Elephant Whisperer informs Dash that he must go to the Syney Opera House in Australia, to see the greatest opera singer of all time.

Dash heads to Australia, but his plane crashes in the Indian Ocean. An emergency boat sounds the alarm and rescues Dash, taking him the rest of the way to Australia. He speaks to the great opera singer in goat language, so she knows that Dash can be trusted with the map.

Dash receives the map from the opera singer, and learns that he must now climb Mount Everest in Asia to find the key that is at the top of the mountain. Dash goes to Asia, and after being the first treasure hunter ever to climb Mount Everest in one day, he sighs with relief when he discovers the key right where he expected.

With the key is a set of coordinates. Using his smartphone, Dash realizes that the key is for a locker in the Underground in London, England. Dash goes straight to London. He opens the locker and says, “Ta Da” because he has finally found the Shoe of Honesty. But there is something wrong! Dash says, “Uh Oh!”

What did Dash find? Finish the story of Dash’s treasure hunt across the world!
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Geography:

- Identify the major physical components of the world (e.g. oceans, equator, continents, and hemispheres).
- Find a specific location on a school or community map.
- Identify and use key geographical features on maps (e.g. mountains, rivers, plains, valleys, and forests).
- Use latitude and longitude to identify major North American cities on a map (e.g. Boston, Mexico City, Toronto, Charleston, Savannah, Washington, DC, Philadelphia, Santa Fe, and Los Angeles).

English:

- RL.3.10, 4.10, 5.10: By the end of the year, read and comprehend literature, including stories, dramas, and poetry, at
- RI 3.3: Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.
- W.3.3, 4.3, 5.3: Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.
- SL.3.4, 4.4, 5.4: Report on a topic or text, tell a story, or recount an experience in an organized manner, using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.

Mathematics:
- 3.NBT.A.2: Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationships between addition and subtraction.
- 4.NBT.B.4: Fluently add and subtract multi-digit whole numbers using the standard algorithm.
- 5.NBT.B.5: Fluently multiply multi-digit whole numbers using the standard algorithm.
- 3.MD.B.4: Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters (in extension).
- 4.NF.B.3.C: Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction in extension.
- 4.NF.B.4.C: Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem (in extension).
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<tbody>
<tr>
<td>1</td>
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<td>10</td>
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</tbody>
</table>
World Map Labels
Cut these labels out and have students attach them to their location(s) on a world map using tape, tacks, or putty.

There are 27 labels included here. If you have more than 27 students, or you want each student to place two labels, print out extra copies of Desert, Plain, Forest, Mountain, or Lines of Longitude/Latitude.

<table>
<thead>
<tr>
<th>North America</th>
<th>Southern Hemisphere</th>
<th>Ocean</th>
</tr>
</thead>
<tbody>
<tr>
<td>South America</td>
<td>Line of Longitude</td>
<td>Ocean</td>
</tr>
<tr>
<td>Europe</td>
<td>Line of Longitude</td>
<td>Desert</td>
</tr>
<tr>
<td>Asia</td>
<td>Line of Latitude</td>
<td>Plain</td>
</tr>
<tr>
<td>Africa</td>
<td>Line of Latitude</td>
<td>Forest</td>
</tr>
<tr>
<td>Australia</td>
<td>River</td>
<td>Forest</td>
</tr>
<tr>
<td>Antarctica</td>
<td>River</td>
<td>Mountain</td>
</tr>
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