

Dash Joins a Dance Circle!

Dash wants to learn how to dance! Can you help it drive in and out and show its stuff in the middle? This activity is student directed and will teach the user about sequencing and loops.

1. To do this activity, you will need:

- a. the Dash robot from Wonder Workshop
- b. the free Blocks4All app available from the Apple App Store
- c. Some space for Dash to drive around! (a couple square feet)

2. *Driving Forward*

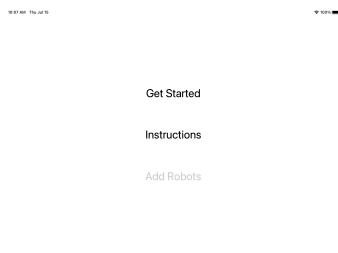
- a. First, turn on your robot by pressing the round power button on her side.



3. Next, open the Blocks4All app on your iPad.



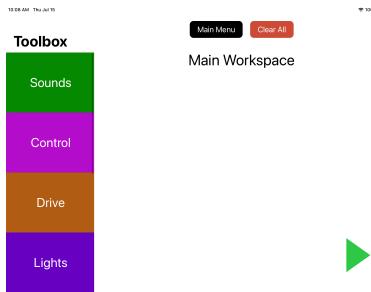
4. Select **Add Robots** (in the center, near the bottom of the screen).



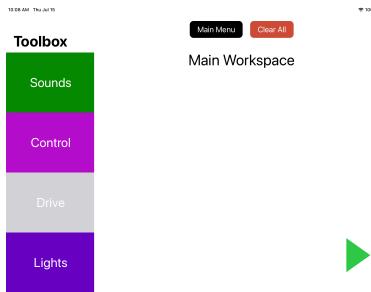
5. A new screen will open with a list of robots. Select your robot's name (it will appear near the top of the screen). Once she connects, her name will turn green. If you have VoiceOver on, it will say "connected."



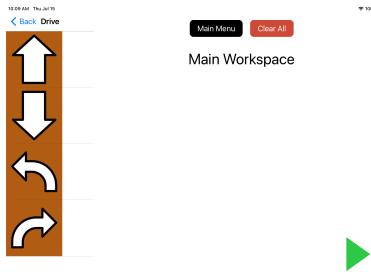
6. Press the **Workspace** button in the upper left corner of the screen. This will open up the **coding environment** where you can send commands to the robot. On the left side of the screen is the **toolbox**, which contains a menu of all the commands (called **blocks**) that you can send to the robot. In the center of the screen is the **main workspace**.



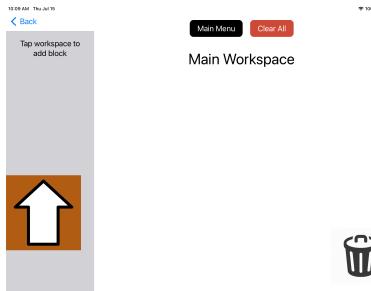
7. Find the **Drive** category in the toolbox and select it.



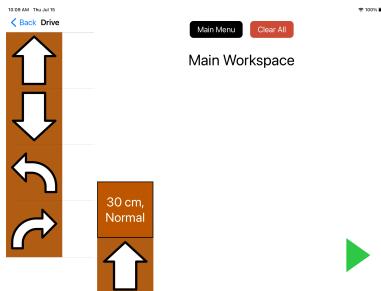
8. A new toolbox screen will open with your drive options! Select the first block in this screen (it is called **Drive Forward**).



9. Once selected, your choice will appear in the toolbox.



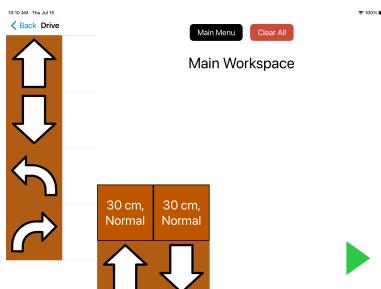
10. Select anywhere in the workspace and the **Drive Forward** block will be placed at the beginning of your code. You do not need to drag and drop!



11. Dash is ready to drive! Press the **Play** button (green triangle) in the bottom right corner of the screen.

Driving Backward

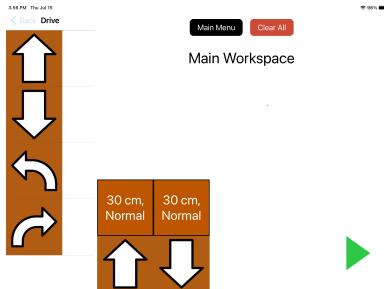
12. Now Dash can show her moves in the middle of the circle! Let's help her learn how to go back after she's done.
13. The **Drive** category in the toolbox should still be open. Find the second block (**Drive Backward**) and select it.
14. Where should we put the block in the workspace? Dash reads her instructions left to right, so we have to make sure to put the **Drive Backward** block *after* the **Drive Forward** block. Click anywhere in the workspace to the right of the **Drive Forward** block to do this.



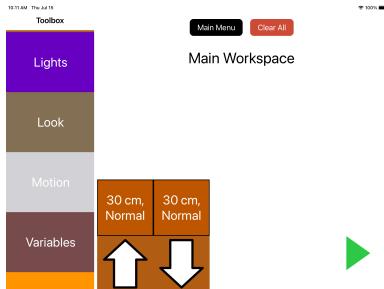
15. Select the **Play** button to make Dash go forward and backward!

Dash Does the Nod!

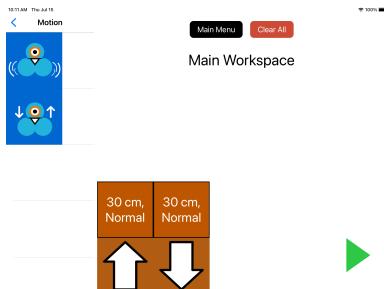
16. Now Dash can go in and out of the circle, but she wants to dance while she's in the middle. Let's teach her a basic move.
17. Select the **Back** button in the upper left corner of the screen. This will take you out of the **Drive** category.



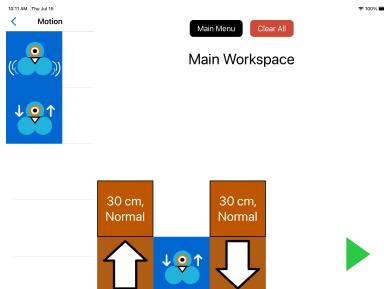
18. Select the **Motion** category in the toolbox (**Hint:** You will have to scroll down to find it).



19. The selection screen will open. Select the second block (**Nod**).



20. Now we have to place this block in the workspace. We want to put it *after* Dash **Drives Forward** into the circle and *before* she **Drives Backward** out of it. Select the **Drive Backward** block in the workspace to place **Nod** before it!

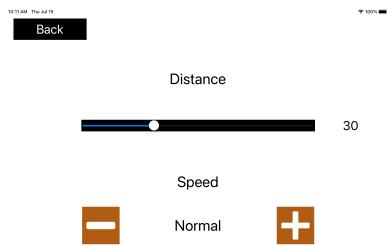


21. Select **Play** to make Dash do her dance!

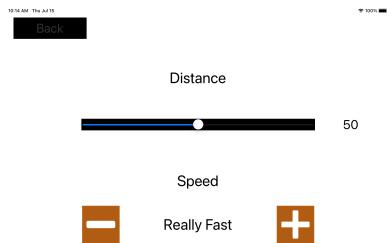
The Circle Gets Bigger

22. Now Dash can do her dance in the circle. But what if the circle gets bigger? She will need to drive a longer distance to get to the center.

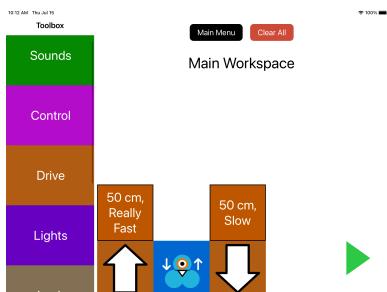
23. Did you notice that the **Drive Forward** and **Drive Backward** blocks have another block on top of them? These are called **modifier blocks** and we can use them to help Dash drive farther.
24. Select the modifier block on top of **Drive Forward** (it says **30 cm, Normal**).
25. A new screen will appear with your options. At the top of the screen is a **distance slider**. Let's use it to help Dash drive 50 centimeters.



26. Increment the distance slider until it reaches its halfway point and says "50".
27. **Optional:** You can also change how fast Dash drives! Select the **Faster** (plus) and **Slower** (minus) buttons to make her go the speed you want.
28. When you're happy with your choices, press the **Back** button in the upper left corner of the screen. Now Dash will drive forward 50 centimeters!



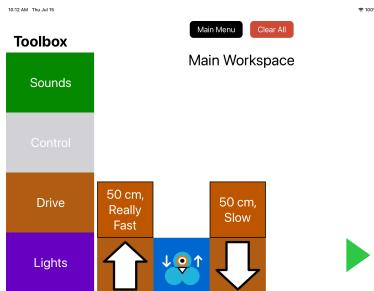
29. Adjust the **Drive Backward** distance to also be 50 centimeters (**Hint:** Use the modifier block).



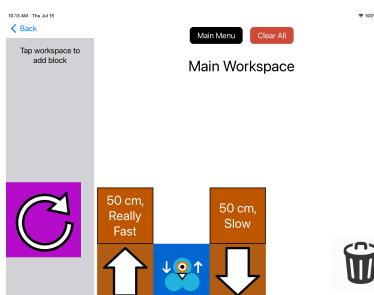
30. Press play to make Dash dance in the bigger circle!

Dash Repeats Her Dance

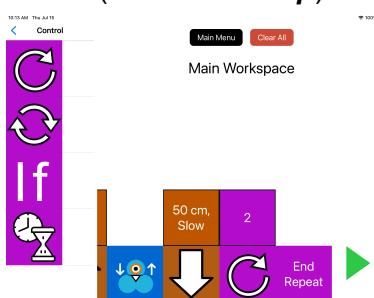
31. Dash wants to go into the circle again! Let's help her do her dance more than once.
32. We can help Dash repeat her dance by using a **loop**. We can create one by selecting the **Control** category in the toolbox.



33. Select the first block in this category (**Repeat**) and place it anywhere in the workspace.

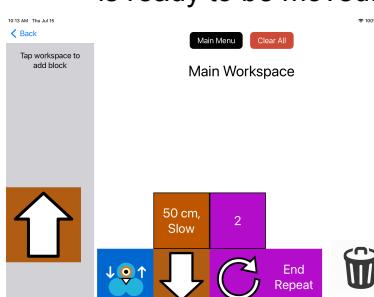


34. In the workspace, **Repeat** has two blocks that are next to each other (you may have to scroll left or right to find both). The one on the left is **Repeat** and the one on the right is **End Repeat**. We can put the commands we want to repeat in between these two blocks (*inside the loop*).

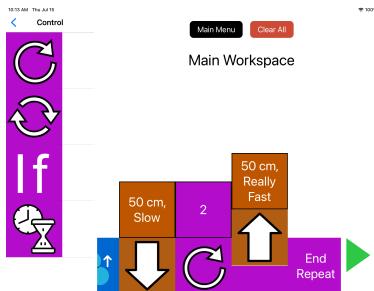


35. Since we want Dash to repeat her whole dance, we will have to move all three other blocks into the **Repeat** loop. We can start with **Drive Forward**.

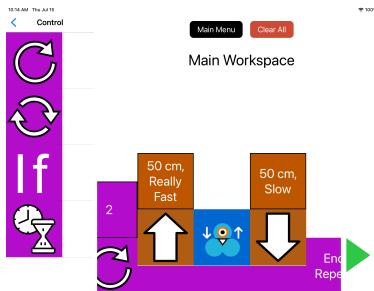
36. Select **Drive Forward** in the workspace (you may have to scroll left or right to find it). Make sure to select the bottom block and not the modifier. Once you select it, the block is ready to be moved.



37. Select **End Repeat** to put it inside the loop.



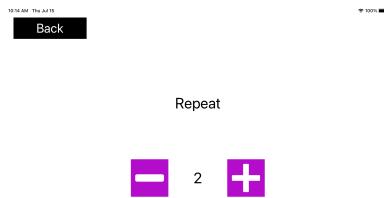
38. Repeat this move for **Nod** and **Drive Backward**. Now Dash's whole dance should be inside **Repeat**.



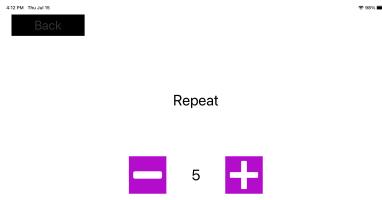
39. Select **Play**. Dash now does her dance twice!

Dash Dances More Than Twice

40. Dash loves dancing in the circle! Let's help her repeat her dance as many times as she wants.
41. The **Repeat** block in the workspace has a modifier block, just like **Drive Forward** and **Drive Backward**! We can use this block to change the number of times to repeat.
42. Select the modifier block (the block on top of **Repeat** that says **2**). A new screen will open with your options.



43. In the center of this screen there are two buttons. You can select the **Increase** (plus) button to make Dash dance more times.
44. You can also select the **Decrease** (minus) button to make Dash dance fewer times. She has to do at least two repeats though!
45. Use the two buttons to make Dash dance as many times as you want. When you're happy with your choices, press the **Back** button in the upper left corner to return to the workspace.



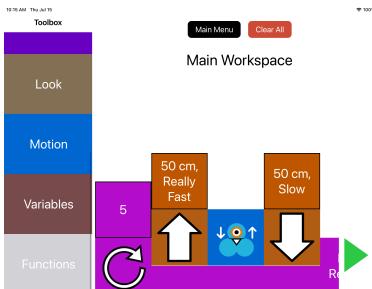
46. Select **Play** to have Dash dance as many times as you told her to!

Dash Gets Fancy

47. Dash wants to learn some other moves to show off in the circle. Can you help her out?
48. Give Dash some cool dance moves to do inside the circle (besides **Nod**)! Here are some ideas to get you started:
 - a. Dash changes her lights! (**Hint:** Check out the **Lights** category in the toolbox. You can select different colors/options with the modifier block.)
 - b. Dash moves her head in different directions! (**Hint:** Check out the **Look** category)
 - c. Dash sings! (**Hint:** Check out the **Sounds** category. You can change the noises with the modifier block.)
49. Place your new moves in the workspace before **Drive Backward**.
50. Select **Play** so that Dash shows off her new dance!

Functions

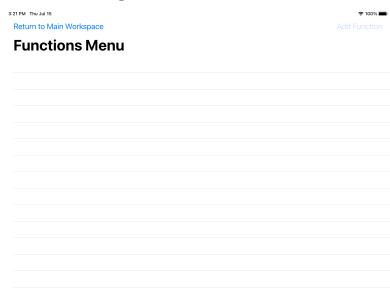
51. Take a look at the new dance you created. It probably takes several blocks to get Dash to do everything you want. Wouldn't it be nice if you could tell her how to dance with just one block? We can do this using **functions**! A function is one block that is filled with a bunch of other instructions. By using functions, you can make your instructions to Dash much clearer and more efficient.
52. Let's build a dance function! Select the **Functions** category in the toolbox (you will have to scroll to the bottom).



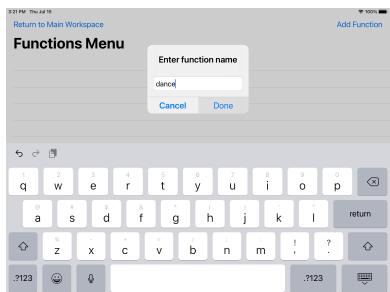
53. Select the block that appears in this category. It is called **Create/Edit Functions**.



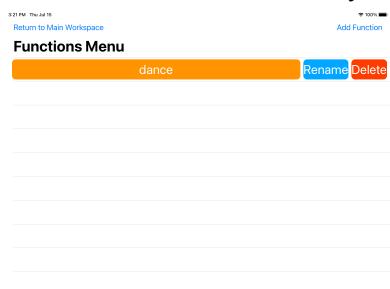
54. A new screen will open. This is the **functions menu**. Select **Add Function** in the upper right corner of the screen.



55. A pop-up will appear that asks you to type in your function's name. You can call it "dance" or another creative name that you choose! When you're done naming your function, press the **Done** button in the center of the screen.



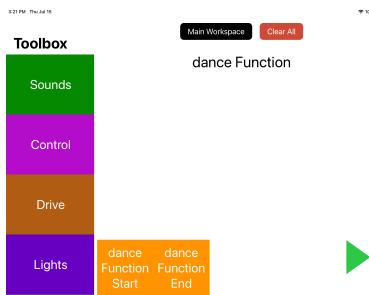
56. A new row of buttons will appear near the top of your screen. Select the button that has the same name as your function.



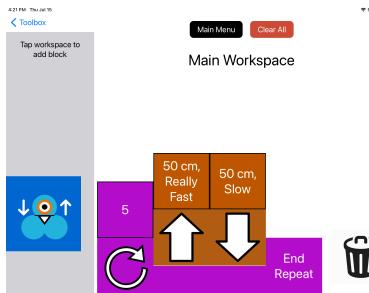
57. A new screen will appear. This is called the **function workspace** and it works almost the same way as the main workspace.

58. The one different thing about the function workspace is that it already has two blocks in it. Check out the **Function Start** and **Function End** blocks in the workspace. You will

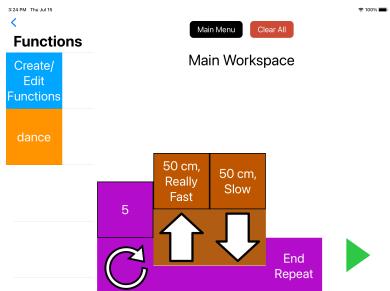
have to place all your dance blocks between these two blocks so that Dash knows that they are part of the function.



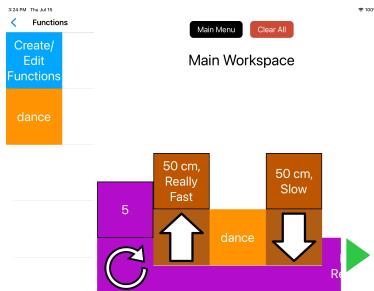
59. Select the first block for Dash's dance in the center of the circle. Don't include **Drive Forward** or **Drive Backward** (they're not part of her dance). **Hint:** You can select blocks from the toolbox on the left, just like in the main workspace.
60. Place the block in the workspace between the two **Function** blocks (**Hint:** You can do this by selecting the **Function End** block).
61. Repeat until you have all of Dash's dance blocks inside the function.
62. You can run your function using the **Play** button in the lower right corner of the screen to make sure it works correctly.
63. When you're happy with your function, select the **Main Workspace** button at the top of the screen in the center. This will take you back to the main workspace.
64. We're almost ready to use your function! First we have to delete the old dance blocks between **Drive Forward** and **Drive Backward** in the workspace. To delete a block, first select it in the workspace.
65. A **Trash** button will appear in the lower right corner of the screen, where the **Play** button used to be. Select this button.



66. Now your block is deleted! Do this for all the other blocks between **Drive Forward** and **Drive Backward**.
67. Now you're ready to put in your function! Select the **Functions** category in the toolbox.
68. Below the **Create/Edit Functions** block is a **block** with your function's name on it! Select this block.



69. Place your function in the workspace where Dash's dance should go (**Hint:** Put it between the **Drive** blocks).



70. Select **Play**. Dash can now read all the instructions for her dance from your one **Function** block!

