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Robotics Kits

< **BLUEBOT** >



How Does Blue Bot Work?

Blue Bot is a programmable robot that can follow your instructions by using the buttons on its back. Blue Bot can go forwards, backwards, or make right or left turns. Forward and backward movements are 15cm long and turns are 90° (or a half circle).



Let's learn what each of Blue Bots buttons do!

Orange Buttons

- These buttons make the robots go in different directions (right, left, forward, and backward).

Blue Buttons

- The X button will clear all of the coding that you have programmed into Blue Bot
- The || button will pause Blue Bot

Green Button

- The GO button tells Blue Bot to start performing the code entered
- Once you press the GO button, we do not touch Blue Bot again until it stops moving.

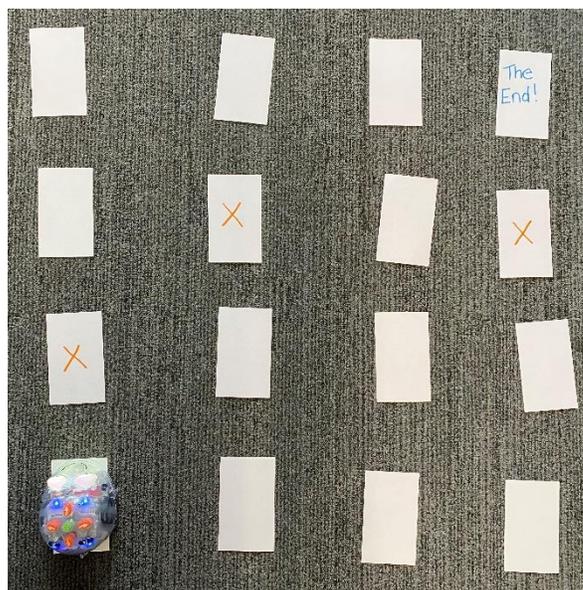
Blue Bot has an impressive memory. Until you hit the X button to clear your programming, Blue Bot will go through every block of code you have added to your sequence.

Activity 1: Deck Of Cards Coding and Map Making

This activity will illustrate how Blue Bot's code works and encourage children to develop sequential thinking and patterning skills. It will also introduce debugging. Your job will be to get Blue Bot to travel from a set starting point to a set end point. For this activity, you will need:

- 1 Blue Bot
- 1 Deck of Cards
- 1 Piece of Paper
- Writing Utensil
- Tape

You are going to use the deck of cards to create an obstacle course for Blue Bot! First, lay out a grid for Blue Bot using your deck of cards. Blue Bot travels 15cm every time we tap the forward or backwards button, so use a ruler to make sure that your cards are adequately spaced (each card will need approximately a 3cm border, or 6cm between each card). The grid could be any size you like, but if you are new to this, then a smaller grid may work better. Use your tape to secure your grid to the ground.



Next, decide where your starting and ending points will be and use your markers. With Blue Bot, you will always need to go back to the same starting point, so marking your starting point is necessary.

Now it's time to add some obstacles! Place "blocks" on different cards that Blue Bot must avoid. You'll still need a path to the end, and the more obstacles you add, the fewer routes there will be to get to your end point.

We're almost ready to code! But first, let's plan. Take a look at the maze you've created for Blue Bot. Using your paper and writing utensil, draw out the route that Blue Bot will need to take to get around all of the obstacles. Once you know your route, it's time to think about how Blue Bot will need to move. Draw arrows indicating which way Blue Bot will need to move and turn every step of the way. Remember, every card that Blue Bot moves to will require a forward or backwards movement and when Blue Bot turns, that changes which direction is forward and backward!

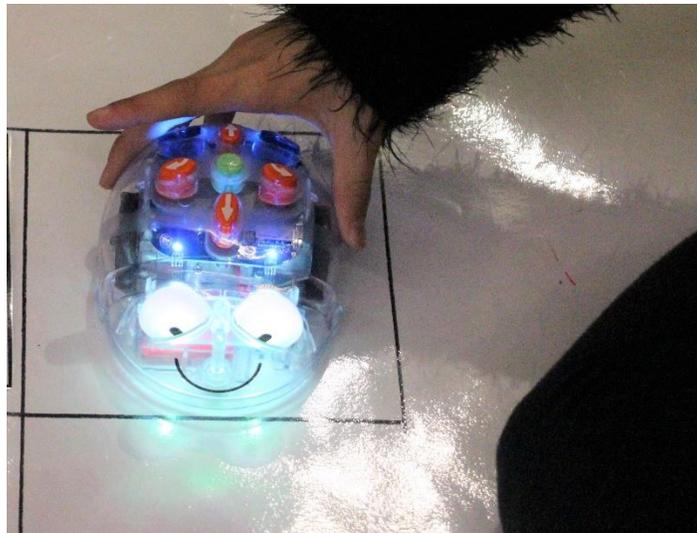
If you're having trouble, try moving Blue Bot yourself (without pressing buttons) to each card on the route. Which way will the Robot need to face? How many steps forward did you take?

With your plan written out, let's experiment with your code! But let's start small to make sure we get our code right. Press your first arrow and then hit the Go button. Did Blue Bot go where you expected? If so, add your next arrow, then return Blue Bot to the starting spot, and hit "Go!" If not, hit the X button to clear Blue Bot's code and try another button.

Repeat this process, adding one direction at a time and clearing your coding sequence when you make an error (debugging your code) until you successfully get to the ending point. Then, it's time to show off how smart Blue Bot is! Congratulations!

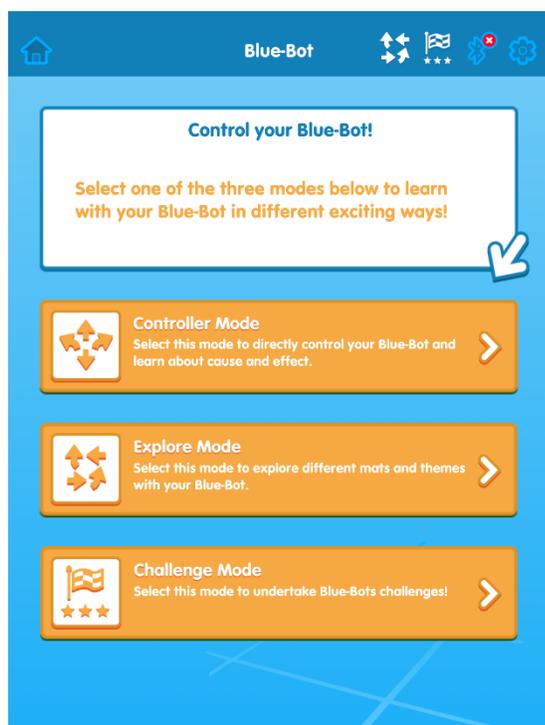
Variations:

- No Blue Bot? No problem! Use a stuffed animal or create a Lego Sprite for the maze! For an example, check out: <https://www.innisfilidealab.ca/coding-with-a-deck-of-cards/>
- Instead of a deck of cards, you can always draw out a grid of 15cm x15cm squares on a piece of bristol board, poster paper, or any other large roll of paper!



Activity 2: Coding with the Blue-Bot App

For this activity, you do not require a Blue Bot robot, but you will require a tablet with the app “Blue-Bot” downloaded. In the app, you can connect to a Blue Bot robot, via Bluetooth, but you can also control a version of the Robot right in the app to complete challenges and learn about block-based coding.



Before we get into our activity, let’s look at the different options in the app:

Controller Mode: If you are connected via Bluetooth to a Blue Bot robot, as you press buttons on the tablet, the Blue Bot robot will respond and move accordingly.

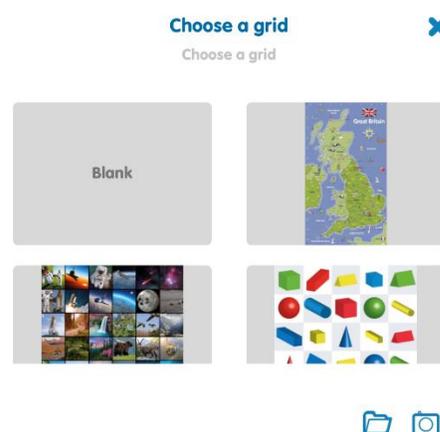
Explore Mode: Explore a variety of grids, including a neighbourhood map, an alphabet, the human body, and a snakes and ladders game, to build your knowledge of different elements of code.

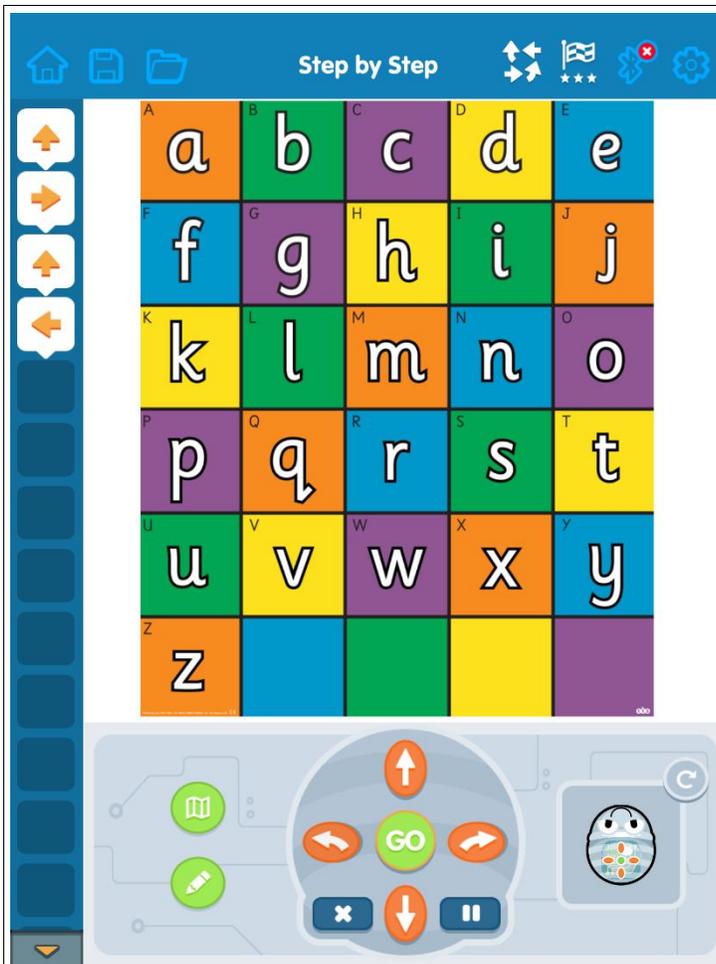
Challenge Mode: Put your coding knowledge to the test with one of 4 challenge options: Getting from A to B, moving around Obstacles, using Fewer Buttons, or Random Instruction challenges.

Part 1: Can Blue Bot Spell Your Name?

The goal of this activity is to practice letter familiarity, spelling, and introduce coding. For this activity, we will begin in “Explore Mode” on the app and use the “Basic Programming” option, to give us access to all the same buttons that are available on Blue Bot. Select the colourful Alphabet Grid option for Blue Bot.

For this activity, we will begin in Explore Mode and use the “Basic Programming” option. Select the Alphabet Grid option.





On the left side of the screen there are squares where the selected code will appear. In the middle of the screen is the alphabet grid that we'll use. At the bottom of the screen, you'll see a virtual Blue Bot, along with the same arrow buttons that are seen on the back of a physical Blue Bot.

Find the first letter of your name on the grid and drag and drop Blue Bot onto that square on the grid. Remember, forward and backward are determined by which way Blue Bot is facing, so keep that in mind as you prepare to code the robot.

If you realize that Blue Bot is not facing the right direction after you place the robot on the map, tap the X button to reset your code. Blue Bot will return to the starting square and then you can use the rotate button beside Blue Bot to change which way the bot is facing before placing the bot on the map.

Once you are happy with the way Blue Bot is facing, find the next letter in your name. How many letters will Blue Bot need to move to get to the next letter in your name? Will Blue Bot need to move to another row? Press the orange arrow buttons at the bottom of the screen to direct Blue Bot.

Tip: Test your code as you go, pressing "GO" after you add each arrow. If Blue Bot doesn't move the way you want, you can drag away the arrows from the left side bar and replace them with a different direction.

If you'd like to see the path Blue Bot has followed, tap the green pencil button beside the arrows at the bottom of the screen. This will allow you to see the path the robot will follow each time you hit "GO."

Continue adding arrow blocks until you have a path that leads Blue Bot to every letter in your name. Debug your code by removing blocks that are not needed and testing every time you add more blocks.

Part 2: Can you navigate Blue Bot's neighbourhood?

From the Home Screen, select "Explore Mode" and then select "45 Degree Turns." By selecting "45 Degree Turns", we have enabled all of the code features of Blue-Bot in the app. Now we will select a grid, either from the list or by selecting the Green Map icon at the bottom of the screen, beside the arrows. Select a grid that has a Town's street view on it (either the rectangle or the square version of the Town. The rectangle grid is shown below).



Today, our task will be to get Blue Bot to drive into the Town on one of the roads, visit **the bank**, then **the grocery store**, and then meet a friend at a place where you can play together (**Park, Leisure Centre**, etc.). Take a look at the map and find these different locations. You



want to meet your friend as fast as possible, so you want the most direct routes possible!

Now it's time to place Blue Bot on the map. Remember, Blue Bot will drive into town on the road and can't drive through walls of buildings in the neighbourhood!

Using all of the available arrows (including the 45° turn options), move Blue Bot on the fastest path possible to meet your friend! You don't want to be late!

What is the fewest number of code blocks you can use? Are there any other paths

you could use?

Variation: Instead of using one of the neighbourhood maps in the app, you can also use a picture of your own! Create a grid on a piece of paper and then decorate each of the buildings in your neighbourhood. Make sure you have a road for Blue Bot to follow!

Once you are finished your map, in the Blue-Bot app, select the green "Map" button and instead of choosing one of the available grids, select the camera icon. Then, using the tablet's camera, take a picture of your map. You can then code Blue Bot in the app to travel around your map!

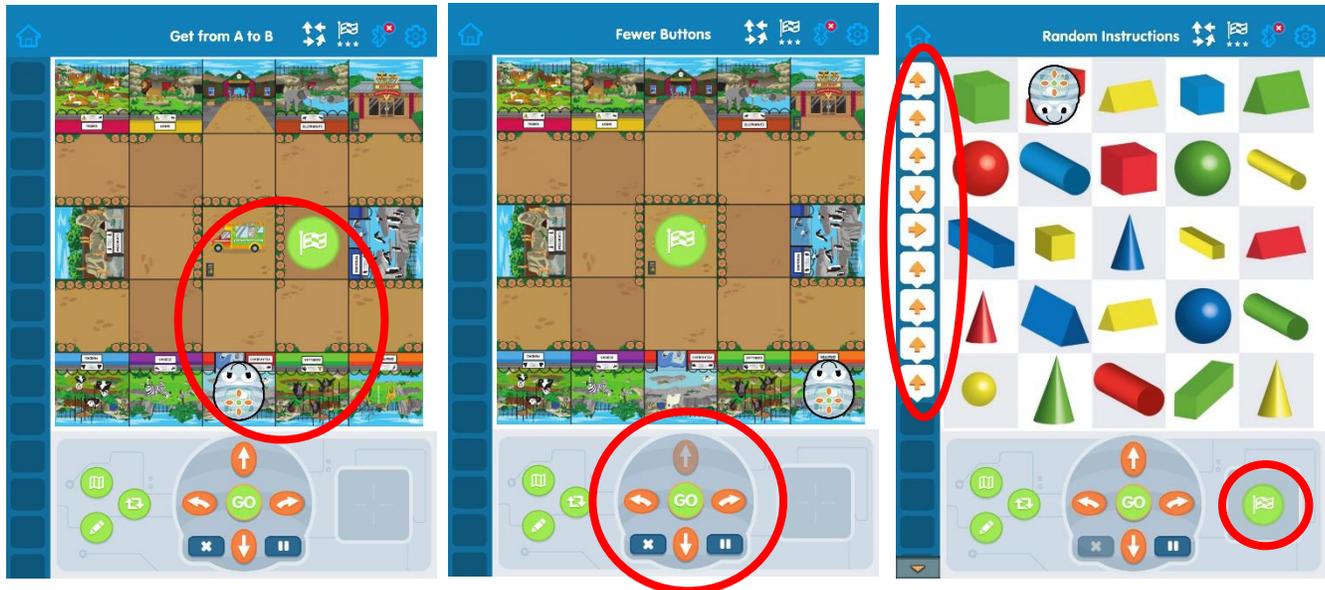
Make up different challenges, design different neighbourhoods, and have fun!

Part 3: Blue-Bot Challenges

Once you are comfortable with the controls in the Blue-Bot app, it's time to take things to the next level! In the Blue-Bot app, you can switch to "Challenge Mode" either from the Home page or by selecting the Flag with the stars from the top of the screen.



There are 4 different types of challenges: "Get From A to B," "Obstacles," "Fewer Buttons," and "Random Instructions."



"Get from A to B" and "Obstacles" are similar: a Green Flag will be placed on the grid in a random spot, and Blue Bot will also be placed on the grid in a starting position. If you've selected "Obstacles" there will also be obstacles on the grid that you will have to move around in order to get Blue Bot to the Green Flag. What's the shortest route? Can you do it backwards?

"Fewer Buttons" is a great challenge for more advanced coders! Some of the Arrow buttons will be greyed out and unavailable to use, so you will have to move Blue Bot from the start point to the Green Flag without using those buttons!

"Random Instructions" is the hardest challenge! A series of instructions will appear on the left side of the screen and you will need to figure out where they lead and place the Green Flag in the appropriate spot! If you get it wrong, Blue Bot will move to a new starting point and you'll have to try again.

With all of these challenges, you can decide your difficulty level: 1 star is great when you're getting started, and 3 stars means you're an expert!



Activity 3: Book Walks with Blue Bot

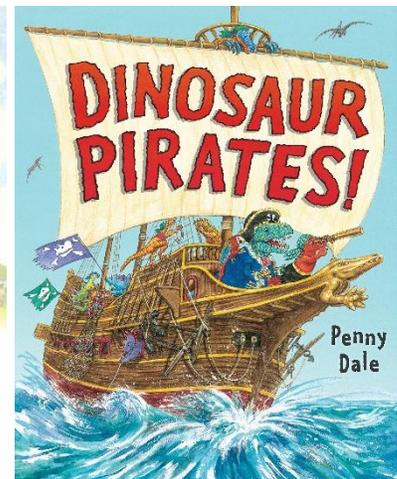
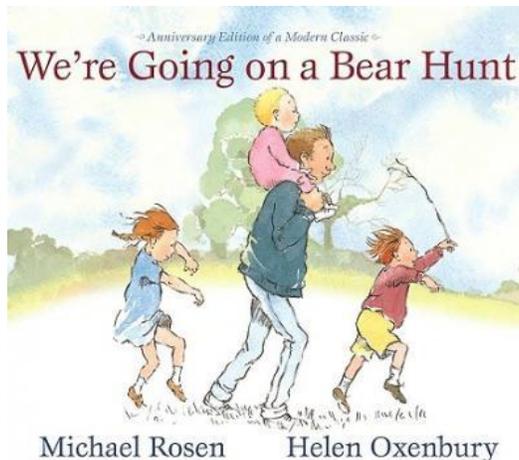
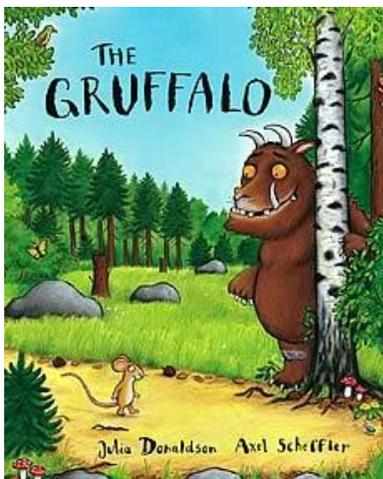
This activity is a great way to combine literacy skills and coding! Retell stories by going for a book walk with Blue Bot! For this activity, you will require:

- An adventure story of your choice
- 1 Blue Bot
- 1 piece of bristol board
- Markers (or toys are optional!)
- Pencil
- Ruler

Before you begin this activity, grown ups (or big kids) should first create a story map grid on the bristol board. Using the ruler and marker, draw out a grid of 15cm x15 cm squares on the bristol board (the bristol board should fit a grid that is 3x4 squares).

Part 1: Storytime

Begin by reading one of your favourite adventure stories (ex. Pirate Dinosaurs by Penny Dale or Going On A Bear Hunt by Michael Rosen or The Gruffalo by Julia Donaldson). Before the story, make predictions about the story and what it may be about (or, if you've read it before, see what you remember about the story!). During the story, emphasize key plot points and make predictions about what will happen next. After the story, review: who were the main characters? Where did the story take place (setting)? What was the resolution in the story (the ending)?



Part 2: Story Mapping

Right after reading the story, it's time to do a Book Walk! On the grid paper, use your pencil to mark down the different parts of the story. This could mean writing down a word to represent a plot point or drawing a sketch of a character. Ask prompting questions as you go. The examples below work best with Dinosaur Pirates:

Ask the child "Where did the dinosaurs go to find the treasure?"

A: The secret island

On the Book Map Grid, pick a square to be where the Secret Island will be! Any square will work!

Ask the child "What were the obstacles the dinosaurs had to battle to get to the treasure?"

A: The Robber Raptors

On the Book Map Grid, pick a square to be where the Robber Raptors will block the path. This will be an "Obstacle" in your path that you will need to go around!

Ask the child "What other characters or important events do you remember in the story?"

On the Book Map Grid, pick different squares to represent other parts in the story – this could include water, other islands, sharks, different materials that the Pirates need to grab (such as rope).

Once you have notes about what the different squares might be, it's time to make your illustrations! Use markers (or toys!) on each square in the grid. Take your time to retell the story and remember what each part will be.

After you're done decorating, it's time to take Blue Bot on a Book Walk! Remember:

- 1) Blue Bot should always start at the same spot (the start of the book!)
- 2) Blue Bot always wants to reach the end of the story
- 3) Blue Bot wants to avoid obstacles (like the Robber Raptors!).

Start small to make sure you move through your story in the right order. Place Blue Bot at the start of the story and press your first arrow to give Blue Bot the first instruction. Then, hit the Go button. Did Blue Bot go where you expected? If so, press your next arrow, then return Blue Bot to the starting spot, and hit "Go!" If Blue Bot didn't do what you needed, hit the X button to clear Blue Bot's code and try another button.



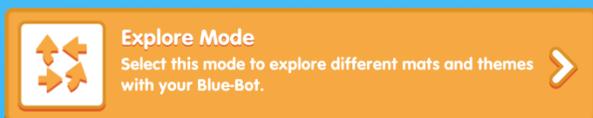
Repeat this process, adding one direction at a time and clearing your coding sequence when you make an error (debugging your code) until you successfully get to the ending of the story.

Part 3: Coding with Blue Bot Using the App “Blue-Bot”



Controller Mode
Select this mode to directly control your Blue-Bot and learn about cause and effect.

In the “Blue-Bot” app, both “Controller Mode” and “Explore Mode” will work with the Book Walk.



Explore Mode
Select this mode to explore different mats and themes with your Blue-Bot.

In “Controller Mode”, you can use your tablet like a remote control, telling Blue Bot how to move through the Story without pressing



the buttons on Blue Bot’s back. You will need to connect Blue Bot to the tablet via Bluetooth. This can be done anytime by clicking the Bluetooth symbol at the top of the screen or when you first open up the app.

In “Explore Mode,” select the level of complexity you’d like to use for your coding.

Explore Mode ✕

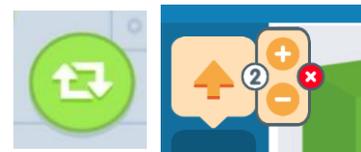


- Step by Step**
- Basic Programming**
- Repeats**
- 45 Degree Turns**

“Step by Step” gives the same options found on Blue Bot’s back but they are acted out immediately by Blue Bot on the screen.

“Basic Programming” also gives the same options found on Blue Bot’s back, but you can program a sequence of steps before telling Blue Bot when to move.

“Repeats” add a new green “Repeat” block that can be attached to a directional block. When in use, an orange circle will appear on the block being repeated, and when you press on



the orange circle, you can adjust how many times that block will be repeated in the sequence.

“45 Degree Turns” adds two more, yellow arrows to the directional buttons (plus the “repeat” block!). They will let Blue Bot do slighter turns.



Depending on your familiarity with coding, select the level that's right for you. Then, you will need to select a grid! Instead of choosing one of the "premade" grids, select the camera icon in the lower right corner. Next, using the tablet's camera, take a picture of your story map! Adjust the grid size to match what you had drawn and now you can code Blue Bot in the app! If you are connected to Blue Bot via Bluetooth, what you do on the map on the tablet, your physical Blue Bot will also do!

You can create digital maps and save them as an image on the tablet as well and upload those images into the app for even more Story Walk fun!

