POST FIELD TRIP ACTIVITY

Cracking the Code

Grade: 5

THE Discovery
Terry Lee Wells Nevada Discovery Museum

Engagement:

Activate student's prior knowledge about coding by asking them if they can think of examples of coding and algorithm use in everyday life? (Example brushing your teeth, making a peanut butter and jelly sandwich). Discuss what they learned in the Discovery lab.

What You Will Need:

- Cups or other small objects that can represent your "robot"
- When applicable worksheets or prepared floor mats
- When applicable butcher paper.

Note about device free coding: *Many of the activities that we do here at The Discovery, involving the blue bots, can be done without the devices. Instead have one student act out the program (code) that another student has written by moving an object, like a cup, in the way that the robot bug would move.*

Exploration:

The following are some example of ways that you could address some of the fifth grade academic content standards using Blue Bots or the device free method described above.

ELA:

- **5.RL.5** Reading comprehension - Draw and code a plot map
- **5.RL.2** reading – theme – Code to move your "robot" or object from one side of your board to the right theme after reading or listening to a text.
- **5.W.3** Creative writing – Using a map of random words, word in partners to generate a list of words that must be used in a short story.

MATH:

- **5.NBT.3.B** Compare two decimals to thousandths based on meanings of the digits in each place, coding the "robot" to move to the >, =, and < symbols to record the results of the comparisons.
- **5.G.1** On a coordinate grid, give students a pair set and have them code their "robot" to move to that location (-3, 6) or (5, -2).
- **5.NBT.3.A** Create boards/worksheets with alternating rows of number 1-9 and empty rows. See example pictured below. Give student different multiple digit numbers and have them code for the equivalent place number values.
  e.g., 347.392 = 3 × 100 + 4 × 10 +7 × 1 + 3 × (1/10) + 9 × (1/100) + 2 × (1/1000).

1 x .01	2 x .01	3 x .01	4 x .01	5 x .01	6 x .01	7 x .01	8 x .01	9 x .01
1 x .1	2 x .1	3 x .1	4 x .1	5 x .1	6 x .1	7 x .1	8 x .1	9 x .1
1 x 1	2 x 1	3 x 1	4 x 1	5 x 1	6 x 1	7 x 1	8 x 1	9 x 1
1 x 10	2 x 10	3 x 10	4 x 10	5 x 10	6 x 10	7 x 10	8 x 10	9 x 10
1 x 100	2 x 100	3 x 100	4 x 100	5 x 100	6 x 100	7 x 100	8 x 100	9 x 100

Other device free coding lessons::

The following device free coding lessons were featured on code.org website (https://code.org/learn) and therefor have been rigorously reviewed and tested.

The Emotion Machine Activity

The class program a card robot face to show different emotions one after another. This is a very simple way to introduce the idea of programs and sequences of instructions as well as computational thinking ideas like algorithmic thinking and decomposition.
https://teachinglondoncomputing.org/resources/inspiring-uplugged-classroom-activities/the-emotion-machine-activity/

Design a Robot

In this lesson, students will build their literacy skills while diving into the field of robotics. They'll watch Flocabulary's educational hip-hop video to find out what a robot is and see examples of robots in daily life. They'll close-read short passages about robots, discuss tasks that robots are well suited for and finish the lesson by designing their own robot to solve a specific problem.
https://www.flocabulary.com/lesson/Robots/

Move It, Move It!

This lesson will help students realize that in order to give clear instructions, they need a common language. Students will practice controlling one another using a simple combination of hand gestures. Once they understand the language, they will begin to "program" one another by giving multiple instructions in advance.
https://studio.code.org/s/course1/stage/2/puzzle/1

Standards: K-12 Computer Science Standards Framework:

Algorithms 5th: Different algorithms can achieve the same result. Some algorithms are more appropriate for a specific context than others.