Objective:
Students will be introduced to coding functions as they try to “crack the code” to predetermined puzzles using Google Forms.

Background information:
At the most basic level, coding involves giving instructions to a computer to make something happen. Coding is what makes it possible for us to create computer software, apps and websites.

An Example of Computer Code in Action: The Microwave Oven
Most of your interactions with code can be thought of as inputs and outputs.

Input: When you use a microwave, you trigger a series of actions. You might punch in a cooking duration, then press ‘Start’. Immediately after that, the code running the microwave kicks in and uses your inputs (button presses) to complete the task of cooking.

Output: A motor begins to turn the plate inside the microwave. The microwaves are turned on (only if the door is closed!). The timer ticks down and displays that time on the little digital screen. When the time is up, the motor rotating the plate inside the microwave stops. The microwaves turn off. The alarm ‘dings’ to let you know the process is complete.

Materials:
Download each PDF file by clicking on the title below.

- Playing Board (7x7 table)
- Obstacle Puzzle Pieces
- Puzzle Blueprints (7 puzzles)
- Master Puzzle Answer Key
- Worksheet (optional)
- Pencil

For more activities, please visit us at www.alcosan.org/educational-activities
**Getting Started:**
If printing is available, Print out the following:

1. Playing Board/Obstacle “Puzzle Pieces”
2. Puzzle Blueprints (7 total)
3. Coding Conundrum “Worksheet”
4. Puzzle Answer Key

**If printing is unavailable:**
For your playing board, you can use index cards, post-its, cut out your own pieces from paper/cardboard, etc. The only requirement is that it is a 7x7 playing board.

You will also need to create your own puzzle pieces. You will need 8, “X’s” and 1 piece as your “start” and 1 piece as your “finish”. (You can also use coins, pop tabs, bottle caps, etc.)

If you have multiple students participating, each should have a role during each puzzle and the roles should rotate:

1. Setting up the “Playing board”
2. Ipad/computer controller
3. Moving of “Start” pieces

All members should collaborate when deciding the codes for every puzzle.

For more activities, please visit us at www.alcosan.org/educational-activities
Directions:

1. Lay out your playing board.

2. Students will start with Puzzle 1. Whoever is in charge of setting up the playing board should use the “Puzzle 1” Blueprint to set the board.
   a. The “water drop” will be in its starting position and your goal is to get it into the “wet well” by avoiding all of the obstacles.
   b. You may move the water drop as you go, but that is the only thing that you should be moving. Do not move the X’s or the wet well after the initial setup.

3. To “Crack the code” you will need to enter each move correctly into a Google Form.

   - The answer for each move will have three things: **Move** will always be the first word, the second word will be **Up, Down, Left or Right**, and the third will be the **number** of spaces you want the waterdrop to move.
     
     - There is a space in between each word/number and the first letter of each word needs to be capitalized.
     
     - Example: If you think the water drop should move up 2 spaces you will enter: **Move Up 2**

   - Click “submit”. If you have the correct code, you will be prompted to move on to the next move. If you do not have the correct code, you will get an error message that states, “Try Again!” and you will try a different code.

   - When you have cracked the code (the water drop makes its way to the wet well), you will receive a message telling you that you have successfully cracked the code to that puzzle.

There are 7 different puzzles that you will be challenged with. You will need to reorganize the Playing board between puzzles in accordance to each puzzle’s “blueprint”.

Each puzzle has a different Google Form, so make sure that the Puzzle number of the Google Form matches the Puzzle you are trying to solve.

The “Worksheet” can be used to record what moves you have made, but it is not required.

Links for Google Forms:

Puzzle #1: https://docs.google.com/forms/d/e/1FAIpQLSdZ2IGLXFiBKF7J6ypmkpunOxBmhYFy-ee0UK-1GU6bkJXzDsg/viewform?vc=0&c=0&w=1

Puzzle #2: https://docs.google.com/forms/d/e/1FAIpQLSfbTmuAru3-X_11yEwVZCzoSBV3klSb9Q-3xt-Jhb6tXgNqFRA/viewform?vc=0&c=0&w=1

Puzzle #3: https://docs.google.com/forms/d/e/1FAIpQLSekWZZ7Ap9z7HrlDmzYcuAzsqq49-qUHwB-Pqri-4Eom7HEEwQ/viewform?vc=0&c=0&w=1

Puzzle #4: https://docs.google.com/forms/d/e/1FAIpQLSe-MV1P7EAh5ex2BDj3nvjt3pJvbEeAWhwd-QMz2NAEPQSiJg/viewform?vc=0&c=0&w=1

For more activities, please visit us at www.alcosan.org/educational-activities
*Extension:
If you have finished all 7 puzzles and would like to continue playing:

Now that you have experience, and success, in cracking the codes of 7 puzzles, you can try to create your own!

One person in the group will use the back of the Worksheet to create the Puzzle Blueprint and movements of the waterdrop from start to finish. That same person will then set up the playing board according to their puzzle blueprint.

Once the playing board is set, the other two group members will try to crack the code.

Since “Google Forms” will not be used in this extension, you will say the commands to the puzzle blueprint creator and he or she will respond with “correct” or “incorrect” until the code is cracked.

Each group member can have a turn creating the puzzle blueprint if they would like!

For more activities, please visit us at www.alcosan.org/educational-activities