

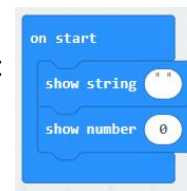
MAGIC 8 MICRO:BIT LESSON PLAN

DAY 1:

- Ask the students if they've ever used a Magic 8 Ball and explain that they will be using the Micro:bits to code their own Magic 8 Ball.
- Play the video *Uncovering the Mystery of the Magic 8 Ball* (1:49) to give some history of the toy
 - <https://www.youtube.com/watch?v=vZRrg6NI-1E>
- Hand out page 1 of the worksheet and have them work together with their table to complete the first section, "What is the purpose of the Magic 8 Ball?" [it's fortune telling toy]
- Hand out a Magic 8 Ball to each table. Remind them what Decomposition is (breaking something down into smaller parts) and ask them to work together to examine the Magic 8 Ball and decompose it into the parts it has that make it work. [ball/casing, window, die with responses, liquid]
- Remind them what an Algorithm is (step by step instructions for accomplishing a task) and have them work together to generate some ideas for their 8 Ball algorithm-- give them about 5 minutes for this
- Ask if any group would like to share their instructions, then follow them LITERALLY (for example, if they tell you to shake the 8 ball but never tell you to STOP shaking the 8 ball, do not stop).
- Play the video *Exact Instructions Challenge-- THIS is why my kids hate me | Josh Darnit* (6:45) to show the importance of specificity in algorithmic instructions (you don't have to watch the whole video)
 - https://www.youtube.com/watch?v=cDA3_5982h8
- Direct the students to revise their algorithms and continue on to complete the next sections:
 - "How does it know what answer to give you?" [it's random, whatever side of the die comes to the top]
 - "How many sides does the die have?" [20, it's an icosahedron-- also known as a D-20]
- Play the video *What's Inside a Magic 8 Ball?* (4:18) to show how it's all put together
 - <https://www.youtube.com/watch?v=0-FYc-eEDa0>
- With any remaining time students can use the Magic 8 Ball and ask each other questions.

DAY 2:

- Return papers to students, ask them to navigate to <https://makecode.microbit.org/#editor> and start a New Project named Magic Micro:bit
- Guide them in dragging the appropriate code blocks onto the workspace:
- Help them to answer the first two questions on page 1 of the worksheet:
 - "What string should we show on start?" [Ask a yes or no question]
 - "What number should be our place holder?" [8]
 - ***encourage them to use CapsLock bc the lowercase letters are difficult to read on the LED screen***
- Show them the Wikipedia page about the Magic 8 Ball and share the breakdown of the types of responses
 - https://en.wikipedia.org/wiki/Magic_8_Ball
 - 10 positive responses, 5 negative responses, and 5 noncommittal responses
- Ask them to work in pairs to generate 20 possible responses that are not existing 8 Ball responses
 - I required my kids to have one of each category, the other 17 could be anything school appropriate



DAY 3:

- Complete response array
- Guide them in setting up the random number generator with the code blocks
- Complete program, download to Micro:bits, and share with the class!

MAGIC 8 MICRO:BIT

EXAMPLE CODE

```
on start
  show string "ASK A YES OR NO QUESTION"
  show number 8
```

```
on shake
  clear screen
  set RandomNumber to pick random 1 to 20
  if RandomNumber = 1 then
    show string "YESSSSSSSS!"
  else if RandomNumber = 2 then
    show string "MAYBE SO"
  else if RandomNumber = 3 then
    show string "NOPE. NEVER."
  else if RandomNumber = 4 then
    show string "UH... NO"
  else if RandomNumber = 5 then
    show string "CERTAINLY"
  else if RandomNumber = 6 then
    show string "HOW SHOULD I KNOW?!"
  else if RandomNumber = 7 then
    show string "IN YOUR DREAMS, LOL"
  else if RandomNumber = 8 then
    show string "ABSOLUTELY!"
  else if RandomNumber = 9 then
    show string "EVEN YESSER"
  else if RandomNumber = 10 then
    show string "NO SIRREE BOB"
  else if RandomNumber = 11 then
    show string "YA THINK?!"
  else if RandomNumber = 12 then
    show string "DUDE... JUST... NO"
  else if RandomNumber = 13 then
    show string "KEEP WORKING TOWARD YOUR GOALS"
  else if RandomNumber = 14 then
    show string "SUCH HOW! SO MUCH YES!"
  else if RandomNumber = 15 then
    show string "WELL YES, BUT ACTUALLY NO."
  else if RandomNumber = 16 then
    show string "MAYBE MEANS NO"
  else if RandomNumber = 17 then
    show string "THAT'S A HARD PASS"
  else if RandomNumber = 18 then
    show string "ONE DOES NOT SIMPLY ASK THE MICRO:BIT"
  else if RandomNumber = 19 then
    show string "THAT'D BE COOL, WOULDN'T IT?"
  else
    show string "YES, CHEF"
```



NAMES: _____

MAGIC



MICRO:BIT

WHAT IS THE PURPOSE OF A MAGIC 8 BALL? _____

HOW IT WORKS:

WHAT PARTS DOES IT HAVE?

1. _____
2. _____
3. _____
4. _____



DESCRIBE THE ALGORITHM FOR USING IT (WHAT ARE THE STEPS YOU TAKE, IN ORDER)

1. _____
2. _____
3. _____
4. _____
5. _____

HOW DOES IT KNOW WHICH ANSWER TO GIVE YOU? _____

LIST SOME OF THE POSSIBLE MAGIC 8 BALL RESPONSES:

1. _____
2. _____
3. _____
4. _____
5. _____

HOW MANY ANSWERS ARE THERE?

NAMES: _____

MAGIC



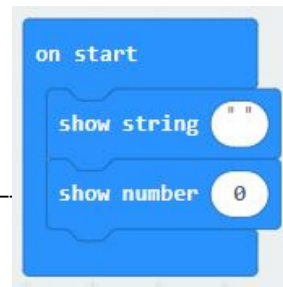
MICRO:BIT

PREPARING TO CODE:

The Magic 8 Ball comes in a box with directions and the ball itself shows an 8 at the start.

* What direction statement (string) should we show "on start"? _____

* What number should we program as a visual place holder? _____



The Magic 8 Ball contains an icosohedron (a D-20, or 20-sided die) with 20 different responses. All our responses should be school appropriate, and contain at least 1 response in each category (positive, negative, noncommittal) but should differ from the Magic 8 Ball responses.

Brainstorm some of your responses here:

POSITIVE

NONCOMMITTAL

NEGATIVE

1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			

How will the Magic Micro:bit decide which of these answers to display? (How did the Magic 8 Ball "decide"?)

