Digital Opportunities

Unplugged: What's Your Function And Crazy Conditionals

ACTIVITY

Computational thinking is a way to break down problems into pieces that can be solved by computers. It helps you know how to think about the information they encounter. It includes skills like looking for data patterns and processes, coding, and developing algorithms.

In computer programming, algorithms are sets of instructions.

Algorithms "tell" the computer how to process input and what, if any, output to produce.

An example of an algorithm you have seen in math class is the function machine.

A function machine takes an input, processes the input and then delivers an output.

The inputs and their outputs are usually recorded in an input output table, where the value of x represents the input and the value of y represents the output. **See example:**

Input (x)	Output (y)
1	2
2	4
3	6
4	8

A common math problem is to determine what process is happening to the input that results in the given output. In the example above, each input is being doubled (multiplied by 2) to produce the corresponding output.

Input (x)	Processing =>	Output (y)
1	* 2	2
2	* 2	4
3	* 2	6
4	* 2	8

MATERIALS:

- Pencils
- Paper

UNPLUGGED: WHAT'S YOUR FUNCTION?

For this activity, you will want to work with another person—a friend or family member will be great. Player A and Player B. You will take turns being the function machine for your partner, who will be providing input to be processed.

Use a pencil and paper or index cards to record your work. On paper, you can keep track of inputs and outputs in a table (see example above). With index cards, Player A can write each input on one side of an index card and hand the card to Player B, who then writes the corresponding output on the other side of the card.

TO BEGIN:

- Player B decides on a mathematical function or bit of processing that will be done on whatever input received from Player A.
- Player B should write down the function or bit of processing and set it aside, out of sight of Player A.
- Player A then gives Player B a number to process.
- Player B processes the number and returns an output to Player A.
- Player A can then guess what function or bit of processing Player B is using on the input to produce the given output. One try per round of input/output.
- If Player A states the correct function, Player B confirms that it is correct by showing the previously hidden function and the players switch roles and start the game over.
- If Player A does not guess correctly, Player A provides another input that Player B processes and provides an output for.
- The goal is for Player A to figure out what function or bit of processing Player B is using in the fewest number of input/output rounds possible.

SOURCE This is derived from full educator lessons at MicroBit: https://makecode.microbit.org/courses/csintro/algorithms/unplugged