MONSTER FROG FUNCTION MACHINE

Math Topic: Algebra

Subtopic: Functions

Grades: 3-5

Help! In the *Cyberchase* clip, Hacker releases a mechanical hopping frog and the kids need to stop it before it destroys Motherboard! How does it work? Input “1” and the frog hops once, but input “2” and the frog hops three times! In this version of “Guess My Rule,” one student inputs a number into the monster frog function machine. Another student makes up the frog’s rule and outputs how many hops it will take.

**Learning Objective:** Students use a function machine to explore the relationship between input and output and determine the rule for the change.

**NCTM Standard:** Algebra

**DIRECTIONS**

**Materials Needed:**

- Cardboard box
- Scissors
- Index cards or slips of paper
- Markers

**Class Periods: 1-2**

**Directions for Building Function Machine**

1. Put a box on its side, and cut out two slots in the bottom.

2. Label top slot “Input” and the bottom slot “Output.” Be sure to label the slots on the inside of the box, too.
Directions for Using the Function Machine

1. Place slips of paper or index cards and pencils next to the box.

2. Decide which student will be a Cyberchase kid and do input and which will be the frog and do output.

3. Have the input student write a number on a slip of paper (example: 2) and put it through the input (top) slot.

4. Have the output student determine a rule (example: plus 6). The output student applies the rule, writes the output on the card, and slides the correct number (8) through the output (bottom) slot.

5. Have input students use a table as shown below to help them see the patterns.

6. After students have filled in several columns in their table, they can figure out the rule. The output student verifies whether the rule is the one they applied.

Tips

· Demonstrate to the class how the machine works.

· For multiplication and division, you may want to limit input numbers to those that are easily factored or divided.

<table>
<thead>
<tr>
<th>INPUT (Numbers you put in)</th>
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<tbody>
<tr>
<td>OUTPUT (Numbers you get out)</td>
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The Big Idea:
When changing one quantity determines the value of another, they are connected by a rule you may not see. Find the rule and you can predict any outcome.