Lesson Objective: EE.9 SWBAT translate between equations and tables.

Essential Question: How can you translate between equations and tables?

**Activate Knowledge:**



**Review previous skills:**

**VOCABULARY--WHAT ARE INDEPENDENT AND DEPENDENT VARIABLES?**

**Question:** What's a variable?

**Answer:** A variable is an object, event, idea, feeling, time period, or any other type of category you are trying to measure. There are two types of variables-independent and dependent.

**Question:** What's an independent variable?

**Answer:** An independent variable is exactly what it sounds like. It is a variable that stands alone and isn't changed by the other variables you are trying to measure. For example, someone's age might be an independent variable. Other factors (such as what they eat, how much they go to school, how much television they watch) aren't going to change a person's age. In fact, when you are looking for some kind of relationship between variables you are trying to see if the independent variable causes some kind of change in the other variables, or dependent variables.

**Question:** What's a dependent variable?

**Answer:** Just like an independent variable, a dependent variable is exactly what it sounds like. It is something that depends on other factors. For example, a test score could be a dependent variable because it could change depending on several factors such as how much you studied, how much sleep you got the night before you took the test, or even how hungry you were when you took it. Usually when you are looking for a relationship between two things you are trying to find out what makes the dependent variable change the way it does.

Many people have trouble remembering which is the independent variable and which is the dependent variable. An easy way to remember is to insert the names of the two variables you are using in this sentence in they way that makes the most sense. Then you can figure out which is the independent variable and which is the dependent variable:

(Independent variable) causes a change in (Dependent Variable) and it isn't possible that (Dependent Variable) could cause a change in (Independent Variable).

**For example:**

(Time Spent Studying) causes a change in (Test Score) and it isn't possible that (Test Score) could cause a change in (Time Spent Studying).

We see that "Time Spent Studying" must be the independent variable and "Test Score" must be the dependent variable because the sentence doesn't make sense the other way around.

An independent variable is an "input" variable. It's usually something you can control.

A dependent variable is an "output" variable. It's usually something that you measure.

Engage: Read the book *Two of Everything*

1. Complete the T-chart to keep track of what goes into and comes out of the pot.

|  |  |
| --- | --- |
| IN | OUT |
|  |  |
|  |  |
|  |  |
| 5 | 10 |
|  |  |
|  |  |
|  |  |
|  |  |

In the story things that fell into the pot doubled. Suppose we put in five coins, what would come out? (10)

How do you know?

Suppose we put in 4 coins….?

Suppose we put in 3 coins…. What is the output value if input value is 3?

What if 4 coins came out of the pot? How many would have to be put in?

1. Discuss patterns in the T-chart.
2. Predict what would happen if you put 10 coins into the pot. 100? 200?
3. Determine the inverse—Suppose 100 coins came out of the pot. How many went in?
4. Make generalizations from the T-chart.
	1. Use questioning strategies to help the students see patterns.
		1. Output number equals input number added to itself

 +

= +

* + 1. input plus input equal output

+ =

* + 1. output number equals input number times two

= x **2**

*The symbols are called variables because the numbers they represent can vary.*

1. Write the rule in words and algebraically.
	1. The rule for the magic pot in the story is *times 2*. To describe it in words—*the input value is multiplied by 2 to find the output value.* Algebraically it is y= 2x—for younger grades this can be described as y = X x 2
2. Choose a new rule for the “magic pot.”
3. Have students complete a T-chart for the new rule, write an equation for the rule; and describe the rule in words.

**Extensions:** Have students choose a rule for the pot and switch with a partner to determine input and output values; describe the rule in words and algebraically. Students can use “doubling” to think about an exponential pattern as opposed to a linear pattern. This can be extended to graphing using a coordinate grid and a discussion of proportional relationships—ratios—and unit rates in the upper grades. Students can also begin to explore two-step equations and functions.

**Assessment:** Students will fill out the T-chart during the book.

 Students will complete the worksheet writing the rule in words and algebraically

Students will complete an exit card with a completed T-chart showing at least 4 additional in and out values, the rule written in words and algebraically for the following pattern.

EXE

 Exit Card:

|  |  |
| --- | --- |
| IN | OUT |
| 0 | 0 |
| 1 | 3 |
| 2 | 6 |
|  | 15 |
| 7 | 21 |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

Write the rule in words:

Express the rule using an algebraic equation:





















