Mathematics Instructional Plan – Grade 8

Independent and Dependent Variables

**Strand:** Patterns, Functions, and Algebra

**Topic:** Identifying independent and dependent variables

**Primary SOL:** 8.16 The student will

1. determine the independent and dependent variable, given a practical situation modeled by a linear function.

**Related SOL:** 8.15

# Materials

* Independent and Dependent Variables activity sheet (attached)
* Poster Directions (attached)
* Poster paper
* Markers

# Vocabulary

dependent variable, domain, function, independent variable, range (8.16)

# Student/Teacher Actions: What should students be doing? What should teachers be doing?

1. Discuss with students what they already know from science class about independent and dependent variables. Develop a definition for each term.
2. Distribute the Independent and Dependent Variables activity sheet. Have students work with partners to identify the independent and dependent variables for each situation presented on the chart.
3. When students have finished, have them present their solutions and defend their reasoning.
4. Distribute the Poster Directions, poster paper, and markers. Have students complete the poster project.
5. Display the posters, and have students present their variables to the class.

# Assessment

## Questions

* + - When finding the circumference of a circle, what is the independent variable? What is the dependent variable?
    - How do you explain the difference between independent and dependent variables?

## Journal/Writing Prompts

* + - Explain why it is important to know the difference between an independent variable and a dependent variable.
    - Explain how independent and dependent variables are related to domain and range.

# Extensions and Connections (for all students)

* Have students create a mnemonic device to remember the relationships between domain and independent variable and between range and dependent variable.

# Strategies for Differentiation

* Create a table to show the different vocabulary for input and output.
* Have students identify the domain and range of given graphs and tables.
* Highlight key words that can assist students with identifying whether a variable is dependent or independent.

**Note: The following pages are intended for classroom use for students as a visual aid to learning.**

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**Independent and Dependent Variables**

**Name Date**

Identify the independent and dependent variables for each situation described below.

|  |  |  |
| --- | --- | --- |
|  | **Independent Variable** | **Dependent Variable** |
| John measures the length of each side of a square. He uses that value to calculate the perimeter. |  |  |
| *y* = 4*x* + 1 |  |  |
| David measures how many inches his tomato plant grows every week. |  |  |
| Mark works full time as a busboy at a local café. He earns $6 per hour. |  |  |
| The number of gum balls, *g*, that can be packaged in a box with a volume of *V* cubic units is given by *g* = 40*V* + 15. |  |  |
| Jake works as a sales representative. He earns $1,275 per month plus an 8 percent commission on his total sales. |  |  |

**Poster Directions**

Make a poster that uses pictures to show the difference between a dependent variable and an independent variable. Find or devise an example of a dependent variable and an example of an independent variable, using the list below as a start. Your poster must have the following:

* A title
* Two pictures, one illustrating each variable (Pictures may be either drawn, cut out from newspapers or magazines, or printed from the internet.)
* Labels for “Dependent Variable” and “Independent Variable”
* A caption that says, “\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ depends on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.”

|  |  |
| --- | --- |
| **DEPENDENT** | **INDEPENDENT** |
| Cell phone bill | Minutes used |
| How far you can drive | The amount of gas you have |
| Your mathematics grade | The number of assignments you turned in |
| How much money you earn | The hours you work |
| Cost of a speeding ticket | How many miles you went over the speed limit |
| Time it takes to drive somewhere | How fast you drive |
| Result of a football game | Who scores more points |
| How much air conditioning you use | Temperature |
| Total calories and fat | Number of cookies |
| Opportunities for high-paying jobs | How much education you have |