Understanding Variables
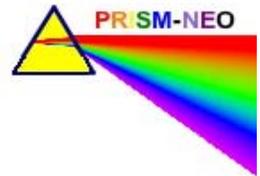
<---Sketch Title

Sketch Filename: Understanding Variables.gsp

Movie Filename: variable.mov

Math Concept(s)

Equations

Suggested Grades

☒ 7
☒ 8
☐ 9 Applied

Sketchpad Level

Easy
- drag points and click buttons

Beginner
Intermediate
Experienced

Learning Goals:

- to develop an understanding of a variable and how a change in a variable will effect numbers or objects which depend on its value

"Sketchy" Description:

This 6 page sketch includes
- an activity to help students visualize a variable, students can change the value of a variable and observe the impact this has on 3 shapes which depend on its value
- an activity to look at variables in expressions; students can change the value of a variable and observe the impact this has on the value of several algebraic expressions involving the variable
- an activity which tracks variables in context; students can observe the impact the change of a variable has on the outcome of 3 real-life situations

Lesson Plan Suggestions

- description of how the sketch might be used in each of the three lesson parts - Minds On, Action!, Consolidate.
- includes student groupings, instructional strategies, and connections to manipulatives or other technologies.

Minds On
Arrange students in small groups. Use the action button on the home page to change the value of the variable. Have groups discuss the impact this has on the numbers and objects. Have them predict what they think the next change will do to each number or object.

Action
Students work in pairs to explore i) visualizing variables, ii) variables in expressions and iii) variables in context

Consolidate
Students can work in pairs to match the english statements to mathematical expressions

Extensions:

Have students evaluate a mathematical expression for a given value

Given students a table of inputs (original given value) and outputs (value after it has been substituted in the expression) and have them try to determine the mathematical expressions which represents the relationship.

Questions or activities for students/parents to explore together:

1. Given a mathematical expression what effect would the following have...
   i) increasing the given input value?
   ii) decreasing the given input value? e.g. $2x - 4$, what happens if x increases? decreases?

2. Given a mathematical expression for what values of x would the expression be positive? negative? zero?
   e.g. for what values of x will $3x - 2$ be positive