Balance or Tilt?

Summary

The activities in this lesson will give students opportunities to explore the algebra concepts of variable, constant, expressions and equations.

Main Core Tie

Mathematics Grade 6

Strand: EXPRESSIONS AND EQUATIONS (6.EE) Standard 6.EE.2

Materials

- *Balance or Tilt?* worksheet
  Math journals
  Balance scale
  Small wooden blocks

Additional Resources

Book

- *Navigating Through Algebra in Grades 3-5*
  , by Gilbert J. Cuevas and Karol Yeatts; ISBN 0-87353-500-7

Background for Teachers

Variables, expressions
, and *equations* are important concepts in the study of algebra. For this activity, students should know and use the correct terms. A *constant* is a quantity that stays the same. A *variable* is a quantity that can change. An *expression* is like a phrase, it has no equal sign. An *equation* is a mathematical statement that says two expressions are equal to each other. A *solution* to an equation is the value that makes the equation true or "equal" as illustrated by the balance.

Intended Learning Outcomes

2. Become mathematical problem solvers.
3. Reason mathematically.

Instructional Procedures

Invitation to Learn

Use a balance scale and small wooden blocks to demonstrate if the scale is balanced or if it is not. Model several different situations so the students know what happens to the side that weighs more, the side that weighs less, and when the amounts are equal. Have students write what happened in their math journals.

Instructional Procedures

Explain to students that like the balance scale, equations need to be balanced, or equal.
Draw a scale on the overhead using an expression on each side. Ask the students if the scale shows the correct balance. If not, how should we fix it? Should one side be lower than the other?
Give a few more examples to the class. You can also use the interactive from Math is Fun along with the following worksheet
Have students write the definitions of *variable*, *constant*, *expression*, *solution* and *equation* in their journals. Tell them to make up their own equation and represent it on a balance scale picture. Under the picture have them describe each of the vocab words using their example.

Have students complete the *Balance or Tilt?* worksheet.
Discuss the worksheet as a class.
Have students write a paragraph in their journal explaining how they know that their solution is correct.

Extensions

Add the words constant, variable, expression, equation and solution to your spelling and vocabulary units.
Students brainstorm a list of variables and constants found in space:
Variables: age of stars, distance between stars
Constants: speed of light, distance light travels in one year, the size of each planet.
Create word problems that represent given equations using variables. From given word problems, students write equations using variables.

Family Connections

Students make up three different equations to take home and have a family member solve. Explain to the family member how to solve the equation, if needed.
Students make a list of five variables and five constants that they find in or around their home. *Example:* Number of people in family is a constant, number of hours they do chores each day is a variable.

Assessment Plan

Class discussion.
- *Balance or Tilt?*
worksheet and the paragraph and definitions in their math journal.

Bibliography

Research Basis

Schifter, D. (1997) Developing operation sense as a foundation for algebra. http://eric.ed.gov ERIC # ED408152
This paper points out the importance of operation sense in the preparation for algebra. Implications of this work include the idea that diagrams, graphs, and tables are important for students to understand.
Swafford, J.O., & Langral, C.W. (2000). Grade 6 students' preinstructional use of equations to describe and represent problem situations. *Journal for Research in Mathematics Education*, 31(1), 89-112.
This study investigates sixth grade students' use of equations to describe and represent problem situations. The students showed a remarkable ability to generalize problem situations and to write equations using variables.

Authors

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