Math 6 - Act. 04: Dishes for a Penny

Summary

Students will complete actvities to determine if they would like to do the dishes on this pay schedule: first night 1 penny, and each night after the amount will double.

Main Core Tie

Mathematics Grade 6
Strand: EXPRESSIONS AND EQUATIONS (6.EE) Standard 6.EE.1

Materials

    Calculators
    Dishes chart worksheet for each student

Background for Teachers

To evaluate exponents, most calculators use a caret key (^) or an x y. To evaluate 5 6, press 5 (^ or x y) 6 and (= or enter).

This is a good time to explain the meaning of the dimensions used in geometry. Have the students draw a person in the first dimension. The person would just be lines. In geometry, we say lines and measure them in inches, miles, centimeters, etc.
Next have them draw a person in the second dimension. This would be a person that has both width and length, but no depth. Have the students describe what they think it would feel like. Many have read stories about *Flat Stanley*. He was a two-dimensional person. In geometry, we describe two-dimensional figures as being squares, triangles, quadrilaterals, etc. We label them in 2, cm 2, mm 2, etc.
Then have them draw a person in the third dimension. This drawing should have width, length, and depth or height. In geometry, we describe these dimensional figures as being cubes, spheres, pyramids, etc. We label them in 3, cm 3, mm 3, etc. *Wrinkle in Time* has examples of the dimensions. The children travel in the fourth dimension to a two dimensional planet.

Intended Learning Outcomes

Make mathematical connections.

Instructional Procedures

Invitation to Learn

:
Ask the students if they would be willing to do the dishes at their home for the following pay schedule: The first night their parents will give them one penny. For each night after, if they continuously do the dishes, their parents will double the amount.

Instructional Procedures:

    Begin the lesson by asking the students to predict how much they think they would earn in the two-week period. Have the students explain how they would calculate the amount. Explain to the students that rather than writing out repeated multiplication of one factor, there is a more efficient way to write it. Explain to them the meaning of the terms base and exponent. Be sure to model for them the correct wording (2 raised to the 10th power or 2 to the tenth power).
    Using the Dishes Chart, have the students calculate how much money they would receive at the end of the second week. The students are usually comfortable doing up to 2 5 using mental

math. After they have calculated 2^5 students will be ready to learn how to use their calculators to evaluate the expressions. The students will be amazed how quickly the values increase.

Additional Resource
:

- *A Wrinkle in Time*
  by Madeleine L'Engle

Extensions

Possible Extension/Adaptations
:

Reading the story *King's Checkerboard* is an excellent follow up. Bring a bag of rice and have the students count how many grains of rice the man will receive during the first week. Another follow up activity is to give each student a sheet of smallsquared graph paper. The students color in the number of squares to represent 5^1, 5^2, 5^3, etc. Challenge them to get 5 to the highest power possible on just one sheet.

Homework & Family Connections:
The students enjoying going home and trying to make the deal for doing dishes with their parents.

Assessment Plan
Ask the students to determine the value of 4^4.

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