Pencils for the Year

Summary

This is a culminating task for Numbers and Base Ten - rounding and multiples of ten. Students will work together to figure out how many pencils the teacher needs to buy for the year. This lesson will incorporate rounding and multiples of ten.

Main Core Tie

Mathematics Grade 3

Strand: OPERATIONS AND ALGEBRAIC THINKING (3.OA) Standard 3.OA.1

Time Frame

1 class periods of 60 minutes each

Group Size

Pairs

Life Skills

Thinking & Reasoning

Materials

Pencil, paper, graph paper, manipulatives; (beans, counters, cubes, base ten blocks)

Background for Teachers

Rounding - Utah State Curriculum Guides for 3NBT1:
http://www.schools.utah.gov/CURR/mathelem/Core/Base-Ten/Standard1G3.aspx
Multiples of ten - Utah State Curriculum Guides fore 3NBT3:
http://www.schools.utah.gov/CURR/mathelem/Core/Base-Ten/Standard3G3.aspx

Student Prior Knowledge

This is an application task for the Domain Numbers and Base Ten. It will incorporate rounding AND multiplying by multiples of ten.

Intended Learning Outcomes

The Mathematical Practices used for this task are as follows: MP1: Students will make sense of problems and persevere in solving them. MP2: Reason abstractly and quantitatively. MP7: Look for and make use of structure. Students will incorporate multiplication by ten and rounding to determine the number of pencils a teacher will need for the school year.

Instructional Procedures

Introduce Task:

Pencils are on sale. Your teacher wants to buy all of the pencils her class will need for the year. Each student will receive 5 pencils in August and one extra pencil for each month September through May. How many pencils should your teacher buy?

The focus for this lesson is for students to discover why multiplication is easier than addition for some problems. They will explore how rounding can aid in complex multiplication problems.

There are multiple ways to solve this problem. Students should do the problem solving and the

teacher should NOT give the students the solution. (The problem will end up being 9 pencils per student times the number of students in the class. The class number should be rounded up to the nearest ten.)

Facilitating the Task:

The teacher should ask such questions like:
- What do you need to know?
- How can this problem be solved?
- How do you know your answer is correct?
- How can rounding help you get started?
- How can rounding simplify your computations?
- What do you know about (# of students, in class, addition, multiplication)?
- Can you solve this another way?
- Is this a reasonable answer? How do you know?
- Prove your answer to your group. Did you notice any patterns?
- Is there another way to solve the problem?

Look for the following:
- repeated addition
- drawing a picture or model
- Groups of numbers or multiplication
- Colored examples
- Manipulative use
- Labeling
- Patterns

Monitor students and order from simplest to more complex to share and make connections with the class.

Have the students write at least one Ah Ha they learned from doing this task.

Strategies for Diverse Learners

For Frustrated students
- ask them to draw a picture - using graph paper could help. Ask how many pencils for 1 student, then how many for 10 students, etc.

For the Advanced student - ask - If 10 pencils cost 50 cents, how many packages will your teacher need to buy and how much will it cost?

How much for entire third grade class?

Extensions

Different number of pencils could be presented for the class, or for the entire grade level. This could be applied also for the entire school

Assessment Plan

As the students perform the task, look for strategies they should use for real life application - rounding, multiplication by multiples of 10. Some students may know and use rounding. Students can realize that when they round it is easier to multiply by multiples of ten.

Bibliography

Core Academy Tasks 2013
Wikispaces - 2012 Core Academy Task site:
https://ccak52012.wikispaces.com/Third+Grade+Teacher+Created+Tasks
Mathematics Teaching in the Middle School (October 2008): 132-138

Adapted from Margaret Schwan Smith, Victoria Bill, and Elizabeth K Hughes. "Thinking Through a Lesson Protocol: Successfully Implementing High level Tasks"

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