Grade 4 rich tasks mathematics

Instructional mathematics tasks are accessible to all learners because they invite students to wrestle with a problem. Students share their ideas, ask questions of one another, use and apply multiple representations, and collaborate to develop various solution pathways. Then, teachers use students' solutions to make the math visible, connect prior learning, and forecast new mathematical learning.

Directions: You can launch the tasks in a whole group to provide opportunities for students to discuss their understanding of the task and suggest strategies to solve. Then, organize the students in pairs or groups of four to encourage participation. Provide manipulatives, chart paper, and markers.

1

Topic

Operations and Algebraic Thinking: Gain familiarity with factors and multiples.

Task

Fermi Elementary will be holding a scavenger hunt at the school picnic. Mrs. Newton, the school principal, wants to make sure that the students are organized in equal groups. There are 36 fifth graders, 48 fourth graders, 60 third graders, 60 second graders, 72 first graders, and 24 kindergartners. Mrs. Newton wants to make sure that the students are grouped with children from the same grade level. What size group should Mrs. Newton use for the scavenger hunt? Prove your idea with words, math drawings, and numbers.

Facilitate

Reveal the first part of the problem before the class sizes are revealed and ask the students to talk about what they notice in the problem. Elicit from the students that they will need to find a common group size that will work for all grade levels. Ask students to show all the possible group sizes, construct an argument for the ideal group size, and make a recommendation to the principal.

Make the Math Visible

Ask the students to share solutions and list all the possible group sizes the students discovered. Use student work examples to introduce factors and multiples vocabulary. Emphasize the multiple representations students used (math drawings, patterns, hundreds chart).

Notes

2

Topic

Number and Operations in Base 10: Place value understanding.

Task

Juanita and Harold are playing a compare game with digit cards. Juanita makes the following number: 456,201, and Harold makes the following number: 365,609. Juanita says that the 5 in her number is 10 times more than the 5 in Harold's number. Harold says that the 5 in Juanita's number is 100 times more than the 5 in Harold's number. Is one of them right? Or, are they both wrong? How do you know? Prove your idea to Juanita and Harold!

Facilitate

Encourage the students to represent the place value amounts in several ways, including manipulatives, equations, expanded form, and place value charts. Ask students to notice patterns in whole number place value. Ask students if the pattern is true for all whole number adjacent place values.

Make the Math Visible

Ask the students to share solutions and highlight student work that reveals understanding about place value patterns. Encourage students to describe the pattern from left to right (ones, tens, hundreds, thousands, ten thousands . . .) and right to left (ten thousands, thousands, hundreds, tens, ones).

3

Topic

Number and Operation: Fraction equivalence.

Task

The twins were so excited about their birthday cake surprise! The twins' mother made a chocolate cake for Alanna and a strawberry cake for Andy. Each cake was the same size. She sliced Alanna's cake into 8 pieces and Andy's cake into 4 pieces. After the birthday celebration, 3 chocolate pieces and 2 strawberry pieces were left over. Which cake had the most left over? Use fraction models and drawings to prove your solution.

Facilitate

Encourage your students to compare the fractional amounts using equivalencies. Ask, "How can you compare the fractions to find out which cake had the most left over?" Ask, "Is there another fraction equal to $\frac{2}{4}$ that can help you solve this problem?"

Make the Math Visible

Ask the students to share solutions and highlight student work that reveals understanding about equivalence. Encourage the students to draw equal regions to show $\frac{3}{8}$ of the chocolate cake and $\frac{2}{4}$ of the strawberry cake. Highlight the concept that finding the equivalent fractions $\frac{2}{4}$ and $\frac{4}{8}$, allows students $\frac{3}{8}$ to compare $\frac{3}{8}$ to $\frac{4}{8}\left(\frac{2}{4}\right)$.

4

Topic

Measurement and Data: Solving problems involving conversion.

Task

Marta is in a rope climbing competition. To qualify for finals, she has to climb more than 50 feet in 4 days without making a mistake. On the first day, Marta climbed 11 feet 6 inches. On the second day, she climbed 12 feet 10 inches. On the third day, she climbed 108 inches. How many feet and inches does she have to climb on the fourth day to qualify for finals?

Facilitate

Encourage the students to use tools to solve. Make available number lines, strip diagrams, rulers, and string for students to solve. Ask, "How can you figure out the total number of feet? Inches?"

Make the Math Visible

Ask the students to share solutions and highlight student work that reveals understanding about measurement conversion. Ask the students to share strategies such as converting all measurements to inches and then determining the number of feet and inches.

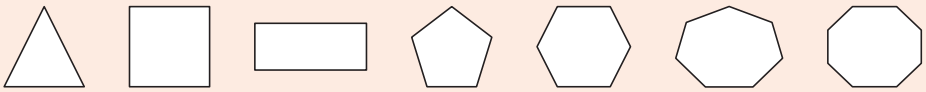
5

Topic

Geometric Measurement: Solving problems involving conversion.

Task

Ruth says that the shape with the most sides also has the most lines of symmetry. Lois disagrees. Who is correct? Prove your solution by finding all the lines of symmetry.



Facilitate

Make available multiple copies of all of the shapes. Encourage the students to fold and draw lines to prove their ideas. Ask, "How do you know you have found ALL the lines of symmetry?" "What patterns do you notice?" "How can you prove or disprove Lois's idea?"

Make the Math Visible

Ask the students to share solutions and focus on student work that reveals understanding about symmetry. Highlight the relationships of equal sides, equal angles, and lines of symmetry.

Adapt-a-Mathematical TASK Tool

Do you have a task that is not quite right? Use this guide to adapt the task to meet your needs!

How does the task meet your STUDENTS' needs?

ACCESS and EQUITY: Ensure that the task is "responsive to students' backgrounds, experiences, cultural perspectives, traditions, and knowledge" (NCTM, 2014, para. 1, https://www.nctm.org/uploadedFiles/Standards_and_Positions/Position_Statements/Access_and_Equity.pdf). Consider students' language readiness, including access to mathematical vocabulary.

- How can you differentiate the context of the task to support the students' backgrounds, experiences, and cultural needs?
- How can you group students to engage the students' socio-emotional and developmental needs?
- How can you "open up" the task to encourage access to the task for all learners?
- How can you connect the task to the mathematics the students have learned and students' interests?

Notes

How do you PLAN for students to learn from the task?

MATHEMATICAL GOAL: The task should provide students opportunities to access new mathematical knowledge and to solidify, consolidate, or extend knowledge. Tasks can be changed to highlight multiple learning needs and content standards. Ensure that you strategically connect the learning goal to the task.

- What do your students know how to do right now?
- What do you expect your students to understand as a result of this task?
- What do you anticipate students will do? What changes might you make as a result of your anticipation?

FACILITATE: Task facilitation is critical to student success. Consider how you will organize students and **design** purposeful questions to help them discover and connect mathematics concepts and procedures.

- What **questions** are you going to ask? What tools will you provide? How will students be grouped?
- How and when will you provide opportunities for student **discourse**?

Notes

How do you move learning FORWARD?

FORMATIVE ASSESSMENT: Collecting information about student understanding will help you adjust instruction as you conduct the task.

- How will you listen, observe, and identify students' strategies?
- How will you respond to students' understanding?
- How will you provide feedback to students?
- How will you provide opportunities for students to provide feedback to one another?
- How will you provide opportunities for students to persevere and productively struggle through problems?
- How will you make the mathematics visible for your students?

Notes