Teacher Instructions: Hot Chocolate

Grade Level: K – 2

Task: Hot Chocolate

Standard: Number Sense and Operations

The pan has hot chocolate in it.
It takes 3 ladles full to fill each mug.
How many ladles will it take to fill mugs
for 5 children that are coming in from sliding?

Context – From the Task Author: Our first grade class has been investigating different kinds of problems for our winter theme. This task evolved from a class discussion of which tools would be quicker to fill a mug with hot chocolate. (A teaspoon, serving spoon, different measuring cups and ladle were brought in to build vocabulary and reasoning skills.

What the task accomplishes…

- This task has the children working with the number pattern of 3 and an introduction to grouping items by 5.
- The problem enables students to recognize and represent mathematical relationships.

What students will do…

- Most children realized they needed to start with the five mugs and then figure out how to represent the ladles.
- Some will draw ladles, use tally marks or represent with numbers.
- The children are encouraged to use lots of writing skills at their own level to communicate with the math task.
- It is also possible that children may not listen carefully to the word "each ", which will greatly effect the results.

Time Required: The time required to solve tasks is always flexible to meet the needs of individual learners. This task took one 60-minute period.

Interdisciplinary Links: This task was part of our winter theme which also included science exploration stations with ladles using water, snow and rice to pour into containers in a group of five. We examined the slowest and fastest way to fill the five containers. When using ladles of snow it can lead to more problem-solving to estimate the amount of snow scooped to the amount of water that melts from the snow. The opposite science discovery could examine what happens when you freeze a ladle of water. For language arts or social studies children could investigate the origin of the ladle, material it can be made out of and how different cultures have used ladles.

Teaching Tips…

- You may want to have your students explore using different size ladles and other scooping materials to be measured in a number of plastic cups or other kinds of containers before presenting this problem.

Suggested Materials: Mugs, ladles, water or manipulatives to represent these. Paper and pencil (crayons) for representing these.

Possible Solution…

- ✓ This problem is not open-ended like many of the other ones we have been doing.
- ✓ The number of ladles full is 15 to fill all 5 mugs.

Benchmark Descriptors:

- ❑ The benchmark descriptors and rubric are designed to help the teacher analyze student thinking and understanding at each of the four performance levels.
- ❑ The descriptors are generalizations of what student work could look like.
- ❑ It is not possible to anticipate every answer a student can give, so in scoring student work the teacher must use these generalizations to come to their own conclusions as to where a student is performing on the assessment.
- ❑ It is recommended that teachers create their own task specific rubric by listing the specific math skills that would make up each section of the four performance levels.

- ➢ These benchmark descriptors are based on the benchmark papers provided at the end.

Novice

- ✓ Often times the Novice will try to use manipulatives to get started with a problem, but this student didn't.
- ✓ The problem was not understood and a strategy was not employed that would help to lead to a solution.
- ✓ The student started with some mathematical representation, and came up with an answer of eight by adding 3 ladles and 5 mugs.

Apprentice

- ✓ The student started an appropriate strategy placing the number 3 under each mug, but did not complete the task, which would have led to the solution.
- ✓ The total of 5 reflects counting the mugs and not the ladles.

Practitioner

- ✓ The Practitioner has a broad understanding of the problem and uses effective strategies to solve the task.
- ✓ The student represented the ladles in groups of three and wrote an appropriate math sentence to show the solution.
- ✓ The representation and written explanation are very clear.

Expert

- ✓ This expert understood the problem clearly.
- ✓ The student changed the tallying strategy to a numerical representation, which indicates a very efficient and accurate way to reach the solution.
- ✓ It indicates a good reasoning in being able to change strategies independently.

APS Mathematical Standards…

❖ **The math standards stated for this task are aligned to the APS Draft Standards 2000.**

Strand - Number Sense and Operations:

Students will demonstrate number sense through experiences with meaningful mathematical problems while focusing on number meaning, number relationships, relative effects of operations, and multiple representations to communicate sound mathematical thinking.

Benchmark (K – 12): The student will understand place value of whole numbers, compose and decompose whole numbers, understand the operations and their effect on numbers and solve problems with fluency and a variety of methods.

Performance Standards:

Kindergarten:

- **Connects** numerals to the quantities they represent.
- **Combines and separates** sets of objects with quantities and **identifies** the parts and the whole.
- **Represents** numbers in a variety of equivalent ways (e.g. dots, pictures, and numerals).
- **Records** numerical information using pictures, words, and/or numbers.

First Grade:

- **Forms and counts** groups of objects (e.g. 2s, 5s, 10s).
- **Demonstrates** that the number of objects (up to 20) does not change when the objects are moved or rearranged.
- **Develops** strategies and estimation skills for solving addition and subtraction problems.
- **Records** strategies for solving, combining, and separating problems using pictures, numbers, equations, and words.

Second Grade:

- **Applies** patterns in skip counting; **compares** and **defends** the relationship between skip counting, grouping, and equal sets.
- **Uses** and **explains** strategies for recalling addition and subtraction facts to 18.
- **Identifies** number sequences (e.g., 12, 14, 16 ...).
- **Uses** and **explains** multiple strategies to solve addition and subtraction problems using 2-digit numbers with and without re-grouping.
- **Writes** addition and subtraction equations for problem situations with I- or 2-digit numbers, using vertical or horizontal formats.

Strand - Global Mathematical Processes:

Students will understand and use mathematical process.

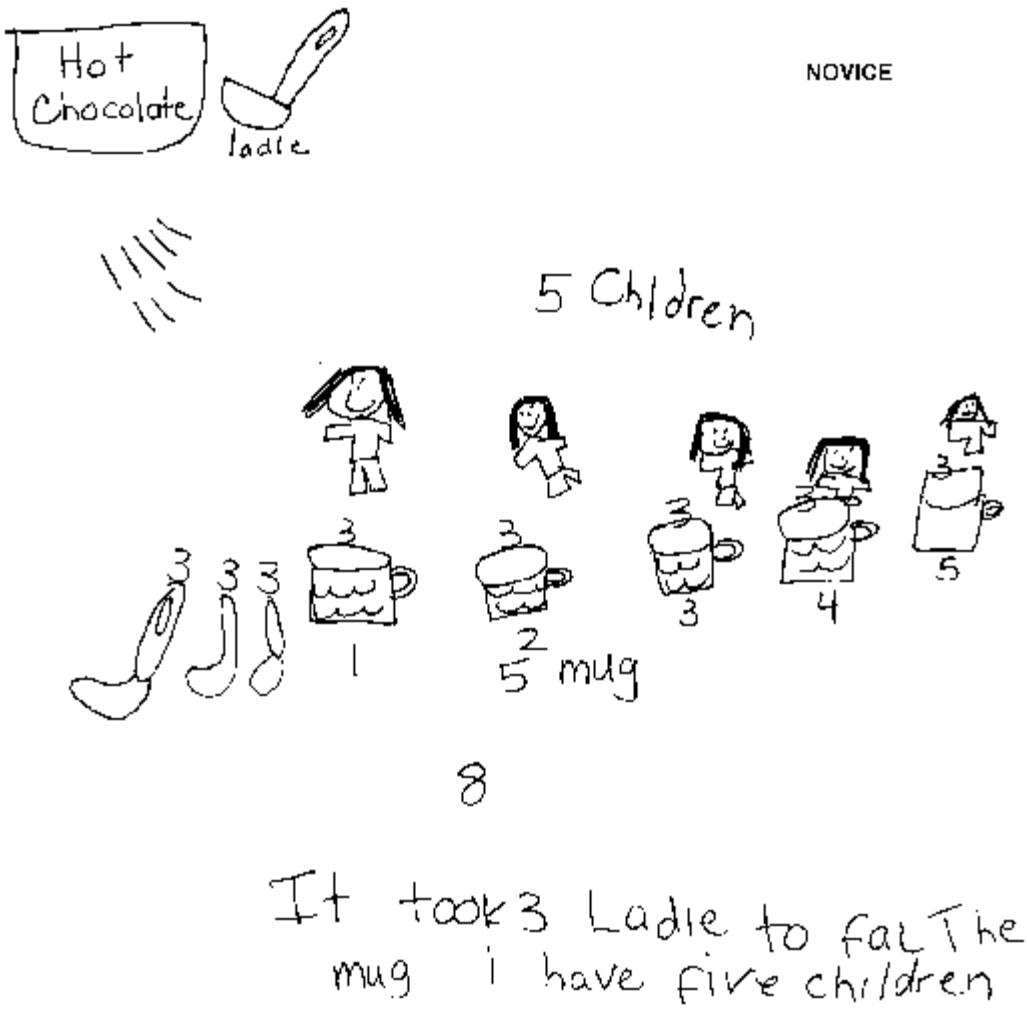
Benchmark (K - 12): The student will use problem solving, reasoning and proof, communication, connections, and representation as appropriate in all mathematical experiences.

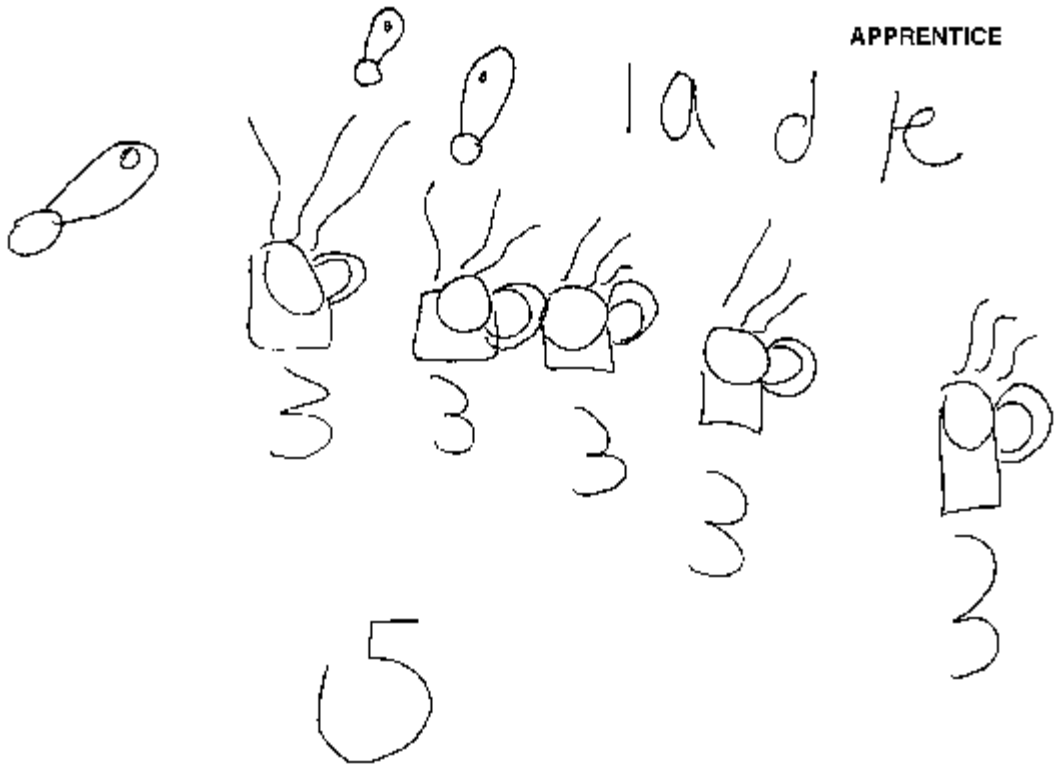
Performance Standards:

Grades Kindergarten through twelve:

- **Develops** resourcefulness and perseverance in problem solving in mathematics and other disciplines.
- **Recognizes** when to use previously learned strategies to solve new problems.
- **Develops and uses** strategies for solving given problems.
- **Monitors and reflects** on the process of mathematical problem solving.
- **Makes and investigates** mathematical conjectures and use them successfully in developing and evaluating mathematical arguments and proofs.
- **Uses** the concept of counterexample to test the legitimacy of an argument.
- **Develops** a logical sequence of arguments leading to a valid conclusion or solution to a problem (statement/reasons, proof, informal proof, and algebraic steps).
- **Works** in teams to share ideas, to develop and coordinate group approaches to problems, and to share from each other in communicating findings.
- **Relates** applications to mathematical language in various modalities.
- **Communicates** mathematical thinking coherently and clearly to others.
- **Analyzes and evaluates** mathematical thinking and strategies of others.

Benchmark Papers




APPRENTICE
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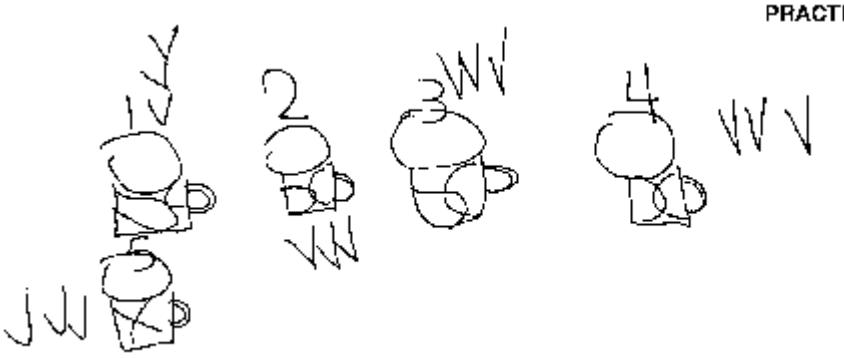
PRACTITIONER



It took 15 to fill the mugs

3+3+3+3+3+=15

EXPERT