OP N **Multiply fractions using models and symbols**

The Painted Door

Description:
Students will use models and representations to determine the amount of time it takes to paint a portion of a door. Within this context, they will multiply two fractions with unlike numerators and denominators using representations (e.g., number lines and grids) to build a more conceptual understanding of multiplication of fractions beyond the standard algorithm.

Mathematics:

Multiplication of fractions is frequently introduced using an algorithm without sufficient opportunities for students to build understanding of the meaning of multiplication or why the algorithm works. When students engage in concrete tasks in which they are required to communicate and represent their thinking, they develop fractional number and operational sense and are better able to multiply fractions appropriately and reasonably without error. This problem solidifies the importance of using visual representations and appropriate labels to develop a conceptual understanding of operations with fractions.

Curriculum Connections

Students will:

- multiply fractions with unlike numerators and denominators; and
- solve problems involving multiplication of fractions using a variety of representations.

Instructional Sequence

1. Partner students. Distribute BLM 1. Provide an assortment of materials and manipulatives.
2. Provide students with time to complete the task. Allow students to explore, while encouraging the use of a variety of models. Circulate and ask the key questions as appropriate.
3. Consolidate by comparing the various strategies. Use the key questions as appropriate.

Highlights of Student Thinking

Students may:

- use repeated addition as an entry point into multiplication;
- misrepresent the answer as a proportion of the door rather than a proportion of time;
- use a circular clock representation to solve; and
- convert to minutes (50 minutes) and solve by dividing that number of minutes in half (25 minutes).

Key Questions

1. a) What does your model represent? (e.g., area of door, or time required to paint)
   b) How have your labels helped you communicate your understanding?
2. How many minutes does your fraction represent? Or: what fraction represents that amount of time (based on one hour)?
3. What operation does your model represent? How does your model help you obtain your answer?

Materials:

- BLM 1 (one copy per student)
- grid paper
- colored pencil crayons, washable chalk board markers
- other fraction manipulatives (fraction strips, stacked number lines etc.).