

About Cluster Problems

Cluster problems are a set of problems that encourage students to think about what they know in order to use that knowledge to solve harder problems. The cluster problems in this unit are designed to help students become familiar with different strategies for multiplying and dividing. Through these cluster problems, students learn how they can pull apart problems into more manageable components. They learn to use multiplication combinations they know and the relationship between multiplication and division to solve problems. They focus on understanding multiplying and dividing by multiples of 10 and 100, a critical skill in solving multidigit problems.

Different clusters suggest different strategies. For example, here is a cluster of problems that includes 2 different ways to think about solving 59×92 .

$$50 \times 90 =$$

$$60 \times 90 =$$

$$9 \times 90 =$$

$$59 \times 90 =$$

$$59 \times 2 =$$

The problems in this cluster include the possibility of breaking 59×92 apart to create partial products (50×90 , 9×90 , 59×2), or to make an easier problem by changing 59 to 60 (60×90) and then compensating by subtracting one group of 92. Cluster problems often include more than one strategy for students to consider.

Students solve all of the problems in the cluster and then think about what strategy makes the most sense and is the most efficient to solve the final problem.

Cluster problems are intended to help students learn how to look at a problem and build a strategy to solve it that is based on the number relationships they know. Students work on clusters of problems that are provided for them. They also create their own clusters of multiplication problems. Throughout their work on cluster problems in this unit, encourage students to add to the clusters any other problems they use to solve the final problem in the cluster. (Students will encounter division cluster problems in Grade 5.)

As students solve multiplication problems in this unit, observe their strategies and ways of thinking about multiplication. Encourage them to use what they already know to create their own clusters and to find solutions. Ask them to explain what parts of the problem they have solved and what parts are still remaining. As they build on what they already understand well (such as the basic multiplication combinations, multiplying by multiples of 10, and other multiplication problems that they can solve easily), they deepen their understanding of multiplication and become increasingly efficient and flexible in solving problems.