



CONSTRUCTING TASK: “MULTIPLES OF TEN”

Adapted from ETA Cuisenaire

STANDARDS FOR MATHEMATICAL CONTENT

MCC.3.NBT.3 Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9×80 , 5×60) using strategies based on place value and properties of operations.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
6. Attend to precision.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

(adapted from North Carolina’s DPI resources)

This task allows students to work in multiplication by having them apply their understanding of place value. In this task, students will go beyond tricks that hinder understanding such as “just adding zeros” and explain and reason about their products. For example, for the problem 50×4 , students should think of this as 4 groups of 5 tens or 20 tens.

ESSENTIAL QUESTIONS

- What happens to a number when it is multiplied by ten?
- How can I model multiplication by ten?
- How is place value related to multiples of ten?

MATERIALS

- Base Ten Blocks
- Multiples of Ten Slips (teacher created)
- Paper bag or container (to hold multiples of ten slips)
- Large Cards (10) each with a number 1-10 on it
- Blank index cards.

GROUPING

Students should work with a partner, or small group.

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

Students will build snap cube structures using multiples of 10 and order the structures according to the number of cubes from which they were built. In this learning task, students should have the opportunity to:

- Count out large and small quantities of objects
- Work with multiples of 10
- Develop number sense about the relative magnitude of a number
- Work with conservation of number

Part I

To begin, present 10 large cards displaying the decade numbers (10, 20, 30, 40, etc.). Place the 50 in the middle of a chalkboard tray, or in the middle of the floor if you are in a circle on the rug. Hand a large card to a student and ask them where it belongs on the chalkboard tray. Have them explain their reasoning. Repeat this process again. When the students have decided where to place the second card and have explained their reasoning, ask them to decide which numbers are missing and where they might go. Allow students to complete the number line. Discuss how many tens are in each number as they are placed on the number line, and the magnitude of each number.

Part II

Each pair of students will:

- Draw a number from a bag. This is a number that the teacher has written. It should be a decade number 10-90
- Provide students with Base Ten blocks. Ask them to make an array that will match their number. Ideally, one of the students will realize that they can use the 10 rods to make the arrays instead of the unit cubes.
- Have students create a T-Chart that looks similar to the one below. Students should record the number drawn and write an addition sentence to match their array. (Students have not been formally introduced to multiplication yet)

Number Chosen	Addition Sentence
40	$10+10+10+10$
30	$10+10+10$
50	$10+10+10+10+10$

- Students may pull several numbers to have a good comparison of their arrays.
- Once students have had many opportunities to draw from the bag and create arrays, bring them back to the carpet for a discussion.

- How did you form your arrays?
- Which blocks did you use?
- Look at your number sentences. What do you notice about them?
- How are the number chosen and the number sentence related?
- At this point you may introduce the multiplication symbol, and ask students if they know how to write a multiplication number sentence that means the same as the addition. Some students may know. If not, you should model this for them.

Part III

Once students complete their arrays, and have recognized the relationship between multiplying and addition, lead a discussion about the arrays using the following:

- Knowing what you know about tens, can you make an array for the number 120? Explain your thinking.
- Have each group choose one additional number from a separate bag of decade numbers over 100.
- They will add on to the previous T-Chart with the new number. Encourage them to make an addition sentence, then a multiplication sentence.
- Discuss the patterns that they notice.

FORMATIVE ASSESSMENT QUESTIONS:

- How are you forming your arrays?
- How can you write a number sentence to match your array?
- What do you notice about the number pulled and your addition sentence?
- What happens to a number when it is multiplied by ten?
- How can we model multiples of ten with objects and numbers?

DIFFERENTIATION

Extension

- Students should investigate multiplying numbers larger than 200 by building arrays using a variety of manipulatives (tiles, connecting cubes, base ten materials, and graph paper are some suggestions).

Intervention

- Students needing intervention should continue to build arrays, but with teacher support in a small group setting. These students should begin with decade numbers that match multiplication fact strategies that the student is comfortably using. For example, a student may know the $\times 2$ facts because he/she relates them to doubles facts for addition. The teacher structures problems for this student around $\times 20$, gradually allowing the student to make sense of the relationship between what he/she already knows ($\times 2$) and the new strategy ($\times 20$).