

Discipline: Mathematics

Standard Category: Computation and Estimation

Lesson Focus: Multiplication as repeated addition and arrays

PA Standard(s):	Related TESOL Standard(s):
2.2.3C: Demonstrate the concept of multiplication as repeated addition and arrays.	Goal 2: To use English to achieve academically in all content areas. Standard 2: Students will use English to obtain, process, construct, and provide subject matter information in spoken and written form.

Key Objectives in Accordance with TESOL Level:

Pre-Conversational/ Beginning	Intermediate	Advanced
Students will be able to: <ul style="list-style-type: none">• Write an array to express a single digit multiplication problem.• Write an addition problem to express a single digit multiplication problem.	Students will be able to: <ul style="list-style-type: none">• Write an array to express a single digit multiplication problem.• Write an addition problem to express a single digit multiplication problem.• Explain to a partner how to create an array that expresses an assigned multiplication problem.• Explain to a partner how to write an addition problem to represent a displayed array.• Orally tell how he/she did the problem in simplified language.	Students will be able to: <ul style="list-style-type: none">• Write an array to express a single digit multiplication problem.• Write an addition problem to express a single digit multiplication problem.• Explain to a partner how to make an array to express a multiplication problem.• Explain to a partner how to write an addition problem that expresses a displayed array.• Explain orally how he/she solved the given problem.• Explain in writing how he/she solved the given problem.

Materials:

1. Chalkboard or write-on/wipe-off board
2. Individual chalkboards or write-on/wipe-off boards
3. Chalk or markers
4. Mini-Chips Ahoy cookies in individual baggies

Suggested

Level:

Primary

Lesson Focus:

Multiplication as repeated addition and arrays

Teaching

Strategies:

Application of concepts

Cooperative learning

Modeling

Use of manipulatives

Writing to display thinking

Whole group instruction

Assessment

Strategies:

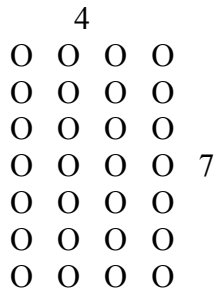
Multiple-choice response

Open-ended response

Procedures: (ELL Suggestions are in italics)

Beginner, Intermediate and Advanced:

1. Explain to students they will be working on special math problems using cookies. It is important to save the cookies so we can count how many there are to eat at the end of the lesson.
2. Pose this question to students, “Suppose you are going to have a sleep over party. You invite 6 friends and wish every person to receive 4 cookies. Cookies are needed for 7 people. How can we create a way to display how many cookies are needed altogether?”
3. Discuss ways to complete the problem.
4. Demonstrate a picture array with 7 rows with 4 cookies in each row.



5. Show students how to label the sides of the array with the appropriate numbers by identifying the important information in a problem. (See example above.)
6. Students practice making other arrays with cookies (ex. a party with 5 children each receiving 6 cookies.)
7. Students draw the arrays on write-on/wipe off boards and label the numbers on the side.
8. Repeat #7 again with different equations.
9. Ask students how they can find out how many cookies are in the array altogether. Demonstrate how they can do this by addition. $4 + 4 + 4 + 4 + 4 + 4 + 4 = 28$ or $7 + 7 + 7 + 7 = 28$
10. Demonstrate the process as a multiplication problem:
 $4 \times 7 = 28$ means (4 seven times) or an equivalent is $7 \times 4 = 28$, although the array is different.
11. Provide ample practice with multiple examples.
12. Pair students. *Combine beginner with advanced or English speaking student.*

Assessment:

Beginner

Given an equation, the beginner displays the correct array to show understanding. An oral explanation is given by the intermediate or advanced student.

Intermediate

The intermediate student writes a multiplication equation in response to a verbal problem posed by the advanced speaker. The students work together to check for accuracy.

The intermediate speaker explains how he/she solved the problem.

Advanced

Advanced students will create an addition problem from a single digit multiplication problem, create an array and write an explanation of the process used in solving the equation.

Assessment: (All Levels)

Multiple-Choice Option:

Choose the correct array and addition problem to show 3×5 :

A. $3 + 5 = 15$

x x x x x x x x

x x x x x x x x

x x x x x x x x

B. $5 + 5 + 5 = 15$

x x x x x

x x x x x

x x x x x

C. $3 + 3 + 3 = 9$

x x x

x x x

x x x

D. $5 + 5 + 5 + 5 + 5 = 25$

x x x x x

x x x x x

x x x x x

Open-Ended Option:

Using write-on/wipe-off board, write the array and the addition problem to show 3×5 . Explain orally how this was done. Using a Math journal, explain the process in writing.

For the open-ended assessment, assess the student based on his/her language level:

Beginning: *Display the problem using an array to demonstrate understanding of the concept.*

Intermediate: *Complete the problem and orally explain the process.*

Advanced: *Complete all phases of the open-ended assessment.*

Extension: Extend this activity by having the student present the activity to another student.