EQUAL GROUPS, REPEATED ADDITION, & ARRAYS TEACHER NOTES (PG. 1 OF 3)

SE: 3.4D

Solve Multiplication Problems

Purpose In this activity, students learn to represent multiplication using equal groups, repeated addition, and arrays.

☑ Teacher-facilitated w/ Small Student Groups	☑ Tutoring/Intervention	☑ Journal
☑ Small Group	☑ Centers	☑ Anchor chart

Setting Up For Instruction

- ☐ Prepare **Equal Groups, Repeated Addition, & Arrays Example** (PG. 43) so that it can be projected using your classroom technology.
- ☐ Make 1 copy of **Equal Groups, Repeated Addition, & Arrays Example** for each student.
- ☐ Choose problems from **A Problem for Every Multiplication Fact** (PG. 22–35) so that each pair of students has a different problem to practice. Do not use the 0 facts problems at this time.
- ☐ Make 6 copies of **Equal Groups, Repeated Addition, & Arrays Practice Template** (PG. 44) for each student.

  Option: Print 1 copy per student and laminate it or put it in a sheet protector for use with dry erase markers.
- ☐ Write the journal question on the board: How are equal groups, arrays, and repeated addition related?
- ☐ Other materials:
  - ☐ **Colored pencils**: 1 pack per pair of students
  - ☐ **Centimeter cubes**: approximately 100 per pair of students
  - ☐ **Sticky notes**: 1 per student
  - ☐ (Optional) **Sheet protectors**: 1 per student
  - ☐ (Optional) **Dry erase markers**: 1 per student

Differentiation is simple with over 100 problems to choose from! This book is also available in Spanish.

Thought Extenders

Equal Groups

- Can you make a model/draw a picture to show your thinking?
- How many are in each group?
- How many groups do you have?
- What is the total number?

Arrays

- How many are in each row?
- How many rows do you have?
- How many are in each column?
- How many columns do you have?
- What is the product?

Repeated Addition

- What number is being added?
- How many times should it be added?

Connecting Equal Groups and Arrays

- How are equal groups and arrays alike?
- How are equal groups and repeated addition alike?
- How are arrays and repeated addition alike?

Digital add-on with book purchase available.

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How-To Guide

CONNECT EQUAL GROUPS & REPEATED ADDITION

Goal: Model multiplication using equal groups and connect the model to repeated addition

1. Put students in pairs and hand out the **Equal Groups, Repeated Addition, & Arrays Example**, **colored pencils**, and **centimeter cubes**.
2. Project **Equal Groups, Repeated Addition, & Arrays Example**. Read the problem together.
   - What is the problem asking you to find? *The total number of turtles*
   - Work with students to fill in the blanks. What operation do you use to solve the problem? How do you know? *Multiplication; there are 4 groups with 3 in each group*
3. Have students model the problem using **centimeter cubes**. Then discuss and draw the models. How many turtles are there altogether? *12*
4. How can you write this using addition? *3 + 3 + 3 + 3 = 12*

CONNECT EQUAL GROUPS & ARRAYS

Goal: Organize equal groups into arrays to model multiplication

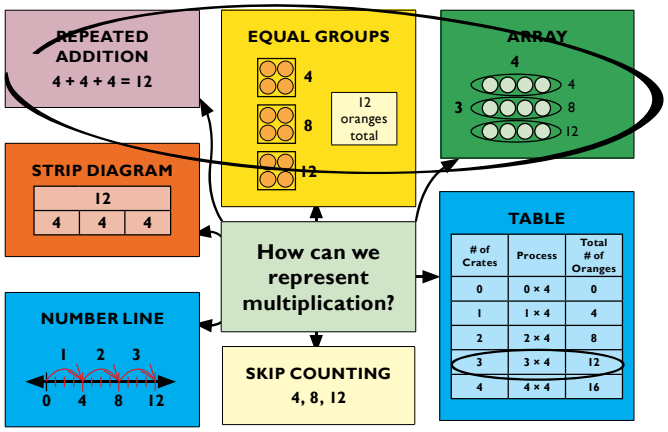
5. Look at your model.
   - How can you organize it into a rectangle so that it shows 4 groups with 3 in each group? *Make 4 rows with 3 in each row*
   - How many are in each row? What does this represent in the problem? 3*; the number of turtles on each log*
   - How many rows are there? What does this represent in the problem? *4; the number of logs*
6. How could you color the boxes in the array to show your model? *Color in 4 rows with 3 boxes in each row.* Have students color each row a different color so that the equal groups are visible. Then fill in the blanks.
7. Have students write the answer to the problem in a complete sentence.

Note: You may want to do a second example prior to students working in small groups.

WRAP IT UP

Goal: Solidify the difference between multiplication and division

8. Work with students to create an anchor chart as shown with equal groups, repeated addition, and arrays. The next 3 activities will add information to the same anchor chart.



9. Hand out **Equal Groups, Repeated Addition, & Arrays Practice Template** and one problem to each pair of students. Have students work together to fill out the template. When a pair is finished, have them trade problems with another pair until they have solved 6 different problems.
10. Hand out **sticky notes**. Ask students to discuss the journal question and then write their own thoughts on the sticky note.

Modeling Multiplication Using Equal Groups, Repeated Addition, & Arrays

Take the following problem:

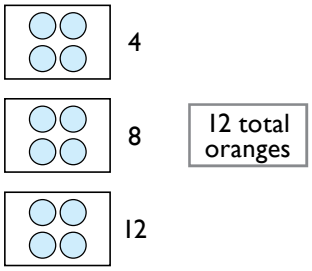
Je'Von has 3 crates of oranges, and each crate holds 4 oranges. How many oranges does Je'Von have?

To the experienced math teacher, this is clearly a multiplication situation: 3 groups of 4 oranges equals 12 total oranges. But the state standards emphasize that students must be able to represent this problem in a variety of ways. Let's look at how this problem could be modeled using equal groups, repeated addition, and arrays, as well has how these representations are connected.

<table>
<tr>
<td>WORD PROBLEM/EQUATION

Je'Von has 3 crates of oranges, and each crate holds 4 oranges. How many oranges does Je'Von have?

3 × 4 = 12</td>
<td>EQUAL GROUPS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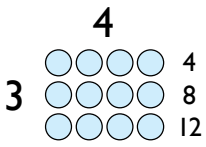
<tr>
<td>REPEATED ADDITION

4 + 4 + 4 = 12</td>
<td>ARRAY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When exploring these three models, encourage students to look at how they are similar and how they are different. A few things you might lead students to notice if they don't identify them on their own:

- Each model shows 3 equal groups of 4.
- Each model equals 12 total objects.
- Equal groups and arrays both show 3 equal groups of 4 using objects, but the array model uses rows and columns.
- Even though it's not introduced in this activity, students may make the connection between these models and skip counting by 4.
- Repeated addition uses only numbers and no pictures or objects.

EQUAL GROUPS, REPEATED ADDITION, & ARRAYS EXAMPLE

ANSWER KEY

Directions: Make a model to solve the problem. Draw your model and an array. Then fill in the table below.

There were 4 logs laying by the pond. 3 turtles crawled onto each log to sun themselves. How many turtles were on the logs?

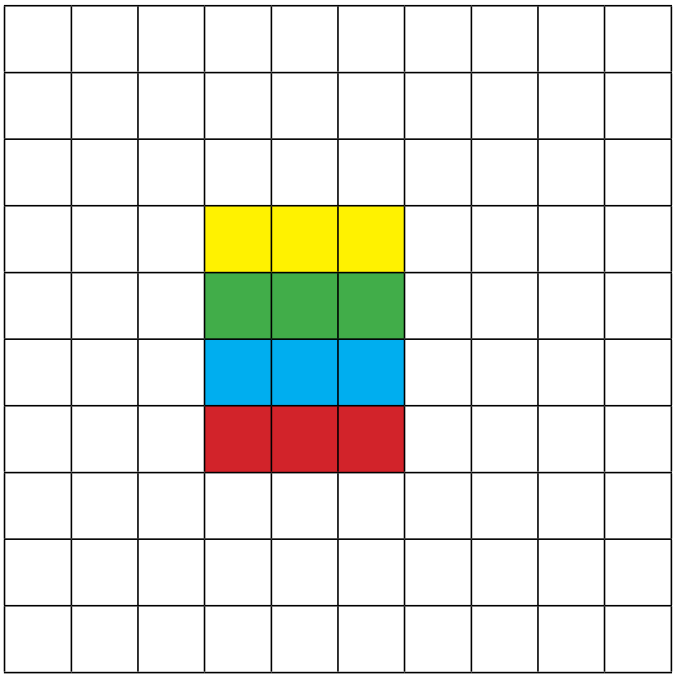
Write the multiplication sentence.

4 × 3 = 12

Fill in the blanks. Then draw a model showing equal groups.

4 groups of 3 turtles = Total

Make an array to match your model.



4 rows of 3 = 12

4 × 3 = 12

Solve using repeated addition.

3 + 3 + 3 + 3 = 12

Write your answer in a complete sentence.

There were 12 turtles on the logs.

EQUAL GROUPS, REPEATED ADDITION, & ARRAYS EXAMPLE

Name: _____

Directions: Make a model to solve the problem. Draw your model and an array. Then fill in the table below.

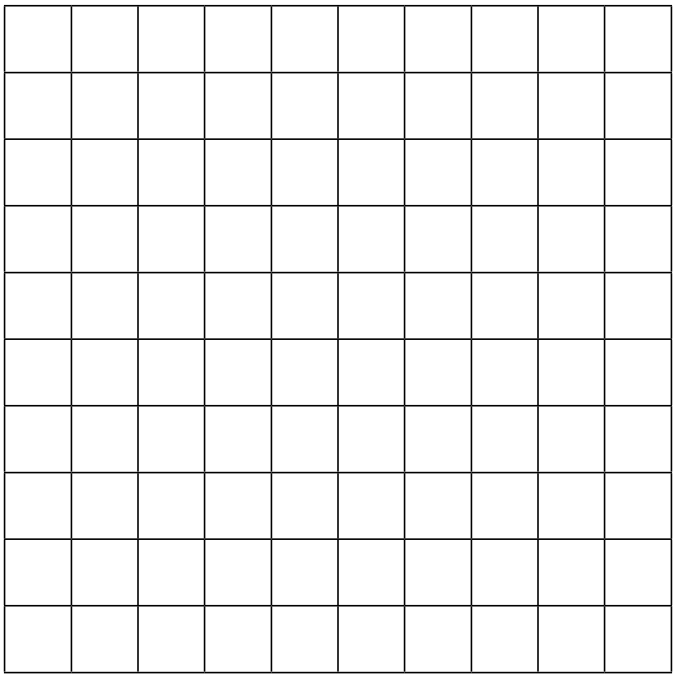
There were 4 logs laying by the pond. 3 turtles crawled onto each log to sun themselves. How many turtles were on the logs?

Write the multiplication sentence.

Fill in the blanks. Then draw a model showing equal groups.

_____ groups of _____ = Total

Make an array to match your model.



_____ rows of _____ = _____

_____ × _____ = _____

Solve using repeated addition.

Write your answer in a complete sentence.

Name: _____

Write the problem.

Write the multiplication sentence.

Fill in the blanks. Then draw a model showing equal groups.

_____ groups of _____ = Total

Make an array to match your model.

_____ rows of _____ = _____

_____ × _____ = _____

Solve using repeated addition.

Write your answer in a complete sentence.