

Progression of Multiplication

What growth of multiplication looks like in 2nd and 3rd grade
using CGI with Florida standards

What is CGI

- Cognitively Guided Instruction (**CGI**) is a student-centered approach to teaching **math**. ... Rather than a **math** program or curriculum, **CGI** is a way of listening to students, asking smart questions, and engaging with their thinking—all with the goal of uncovering and expanding every student's mathematical understanding.

Intentions

- Relationship between 2nd and 3rd grade multiplicative thinking
- Integrating K-2 Knowledge for enhancement of 3rd grade multiplication skills
- Parallel progression of state standards using CGI

Students Objectives

- Model equal groups with manipulatives and drawings.
- Identify and create equal groups using arrays with manipulatives and drawings.
- Solve single-step word problems involving multiplication by using arrays.
- Prior knowledge used to comprehend relationships between multiplication and repeated addition
 - Model repeated addition with arrays
 - Model multiplication with equal groups
 - Understand multiplication key words

Standards

2 Grade



3rd Grade

- MAFS.2.OA.3.4

Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.

- MAFS.3.OA.1.3

Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. Cognitive Complexity: Level 2: Basic Application of Skills & Concepts

Activating Prior Knowledge

2nd Grade

- Counting skills to complete word problem
- Creating groups
- Doubles facts
- Fact Families

3rd Grade

- Repeated addition to solve word problems
- Organization of given groups into arrays
- Repeated addition
- Communitive property within an array

Give the problem

Orlando would like to bring cupcakes to school for her birthday. Her mom made **12** cupcakes and then made **8** more. She will need to put all the cupcakes into a box. Draw a picture to show how the cupcakes can be arranged in the box.



**READING COMPREHENSION
FAILURE ON THE DEFENSE**

**PLAYER ATTACKED THE POSITION
WHILE COMPLETELY MISUNDERSTANDING
THE ACTUAL MEANING**

Give the problem

_____ would like to bring cupcakes to school for her birthday. Her mom made ____cupcakes and then made ____ more. She will need to put all the cupcakes into a box. Draw a picture to show how the cupcakes can be arranged in the box.

- Relate the problem to students
- Leave out names and numbers to comprehend the question
- Allow them to work
- Multiple reads



2nd grade
Repeated Addition

$$4+4+4= \underline{\quad}$$


$$3+3+3+3= \underline{\quad}$$

3rd Grade
Multiplication


$$3 \times 4 = \underline{\quad}$$

$$4 \times 3 = \underline{\quad}$$

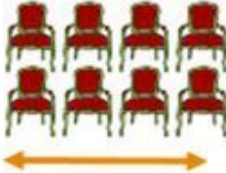
Arrays Arrays are things put into rows and columns



Columns go up and down



Rows go side to side



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Using your beans make an array.

_____ rows _____ columns

Number equations:





Multi standard lesson

1st grade: Apply properties of operations as strategies to add and subtract. Examples: If $8 + 3 = 11$ is known, then $3 + 8 = 11$ is also known. (Commutative property of addition.) To add $2 + 6 + 4$, the second two numbers can be added to make a ten, so $2 + 6 + 4 = 2 + 10 = 12$. (Associative property of addition.) Cognitive

2nd grade: MAFS.2.OA.3.3 Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.

2nd grade: MAFS.2.OA.3.4 Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.

2nd grade: MAFS.2.NBT.1.2 Count within 1000; skip-count by 5s, 10s, and 100s

Terms

Columns

Rows

re 3 parts
Each part had



3

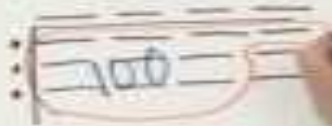
We use and
STRUCTURE!

40

0

$$12 \times 10 = 120$$

$$100 + 20$$



T- can you count these for me?

S- Counts in her head nods head up/down

T- Can I hear your thinking?

S- 1, 2, 3, 4.

wait

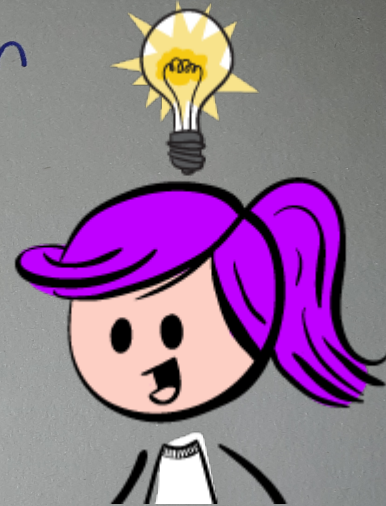
S- I don't

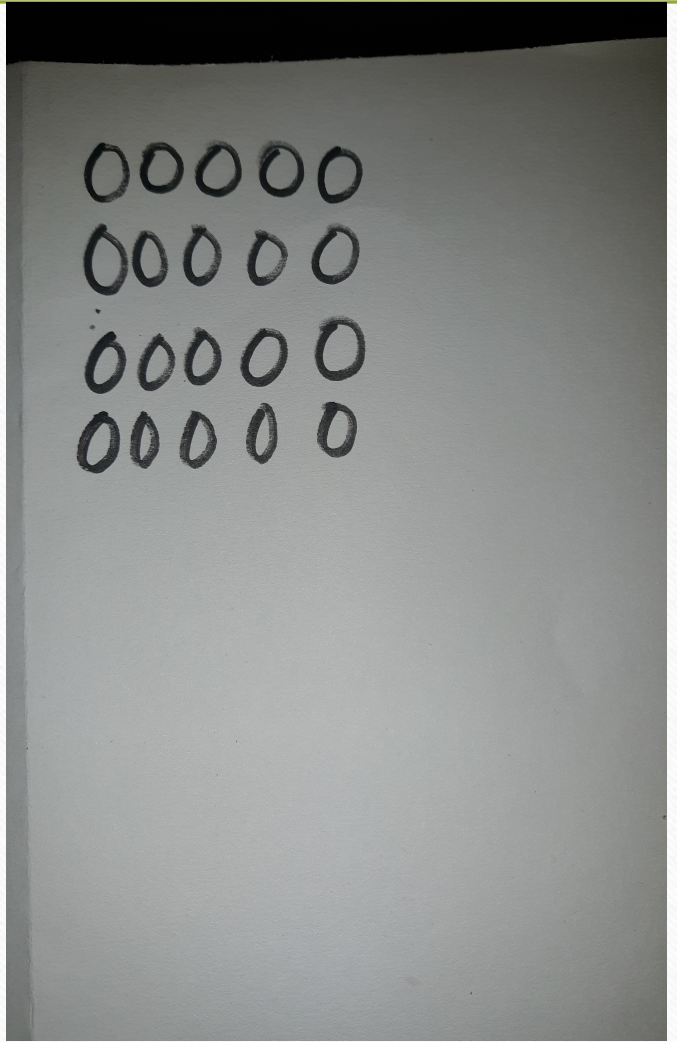
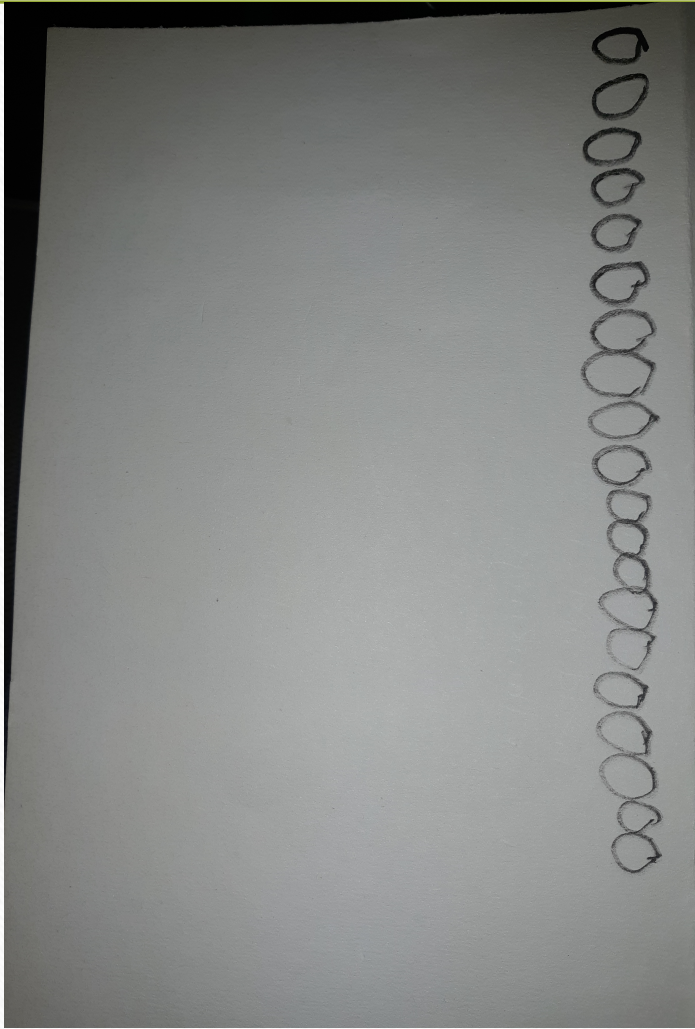
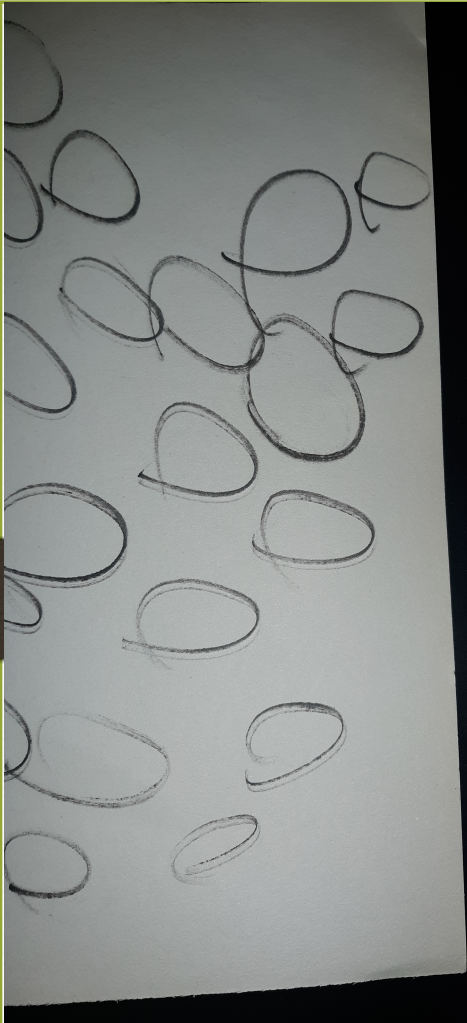
know which one
I counted.

T- Why do think you had this problem

S- The group is too small, they're too
close together.

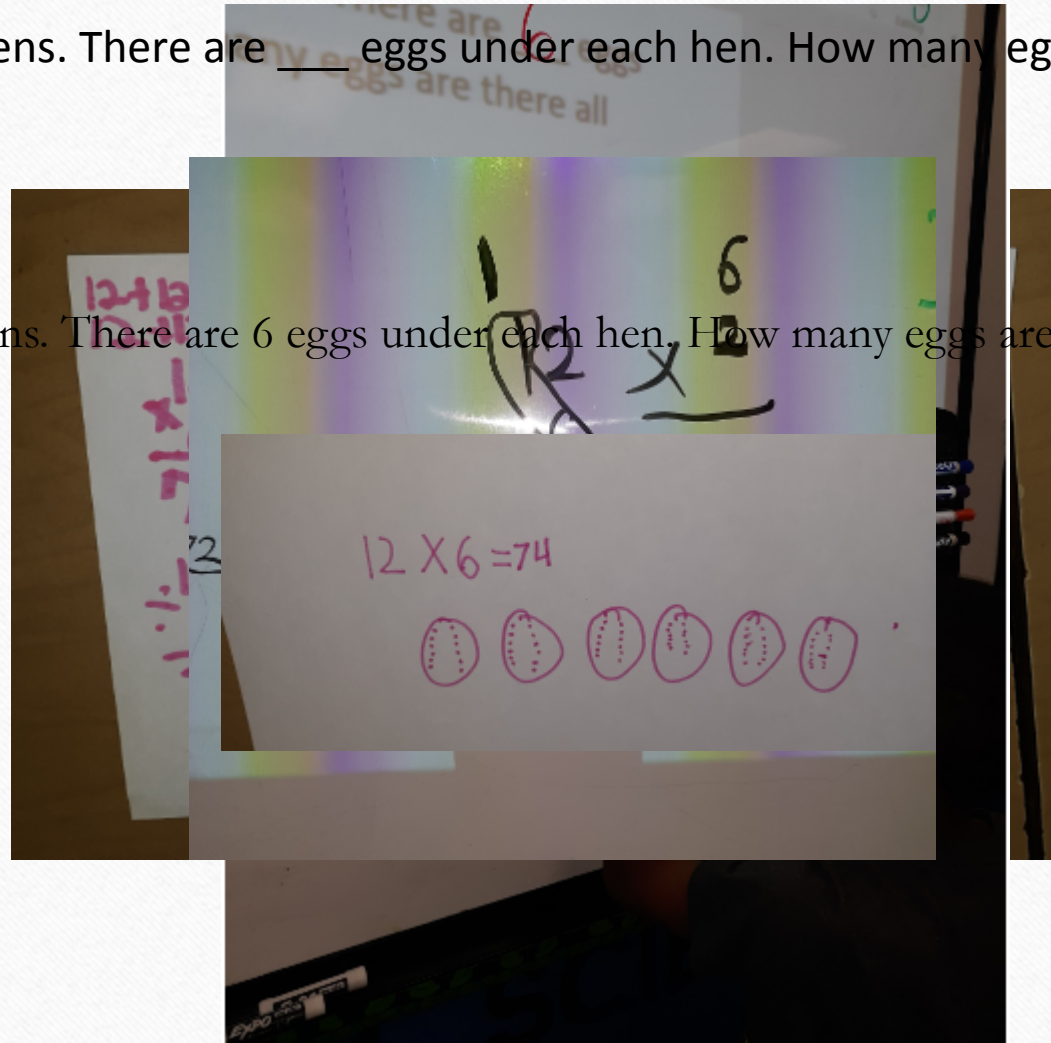
T- Would you like to draw your cupcakes again?





Farmer Ted has _____ hens. There are _____ eggs under each hen. How many eggs are there all together?

Farmer Ted has twelve hens. There are 6 eggs under each hen. How many eggs are there all together?



Multi standard lesson

3rd grade: MAFS.3.OA.1.1 Interpret products of whole numbers, e.g., interpret 5×7 as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as 5×7 .

3rd grade: MAFS.3.OA.1.3 Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

2nd grade: MAFS.3.OA.2.5 Apply properties of operations as strategies to multiply and divide. Examples: If $6 \times 4 = 24$ is known, then $4 \times 6 = 24$ is also known. (Commutative property of multiplication.) $3 \times 5 \times 2$ can be found by $3 \times 5 = 15$, then $15 \times 2 = 30$, or by $5 \times 2 = 10$, then $3 \times 10 = 30$. (Associative property of multiplication.) Knowing that $8 \times 5 = 40$ and $8 \times 2 = 16$, one can find

Terms

Groups of

Communicative property

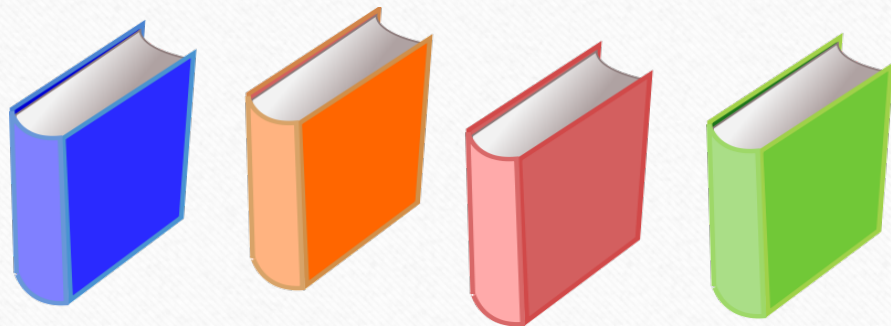
Rows

Columns

The library has _____ bookshelves. There are _____ books on each shelf. How many books does the library have?

Number choices

(2, 4) (12, 2) (9, 10) (8, 8)



<https://www.cgimath-tlc.org>

<https://www.heinemann.com>

