Essential Elements
Math Pacing Guide

April

Background

The Essential Elements Math Pacing Guide was inspired by realizing that there is a small amount of information found on the internet to help support educators who teach those who follow an alternate curriculum for our amazing 1% of the student population in education. I wanted to create something that could help serve as a guide, a support, an understanding of how to hold our students to high academic achievement, just like their regular education peers.

Regular education materials are abundant and come with pacing guides with how to implement the prescribed curriculum that the school decided to buy into. Within those curriculums, a good majority of publishers incorporated how to differentiate Instruction for struggling learners, for English Language Learners and/or English as a Second Language learners. However, there does not seem to be a supplementary curriculum that aligns to how to modify instruction and materials for those who follow the alternate curriculum so the 1% of students with disabilities aligned to the alternate curriculum could also learn a modified version of the same materials as their non-disabled peers in an inclusive setting.

Your partner in education,

Jeanette Nowak

Updated August 2022

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April Outline

Standards covered during February:

- M.EE.6.NS.2 - Apply the concept of fair share and equal shares to divide.
- M.EE.6.NS.3 - Solve two-factor multiplication problems with products up to 50 using concrete objects and/or a calculator.
- M.EE.8.F.1-3 - Given a function table containing at least 2 complete ordered pairs, identify a missing number that completes another ordered pair (limited to linear functions).

According to the Dynamic Learning Maps (DLM) website, these are the commonly tested standards that are used for the DLM assessment.

How to Access Math Instruction and Materials from Unique

1. https://www.n2y.com/unique-learning-system/
2. Log in using the provided username and password you received
3. Click on Unique Learning System
4. Click on the three lines 

5. Select Monthly Lessons/Unit Lessons
6. Select Math
    a. When selecting materials, select PDF icon to save and print

Understanding Differentiated Levels in Unique

- Level 3 Learners – can read text and can participate more independently in the lesson (Independent)
- Level 2 Learners- require pictorial support and require mild to moderate support to participate in the lesson (Supported)
- Level 1 Learners- require extensive supports to participate in the lesson (Participatory).

Measuring Success by the Essential Elements Standards

Students who take DLM assessments are instructed and assessed on *Essential Elements*. Essential Elements are grade-specific expectations about what students with the most significant cognitive disabilities should know and be able to do. The Essential Elements relate to college and career readiness standards for students in the general population.

April Math Pacing Guide
6th Grade

M.EE.6.NS.2 - Apply the concept of fair share and equal shares to divide.

Learning Goal:

- Level 2-3 – Divide to solve real-world problems with multi-digit numbers.
- Level 1 – Count a set of objects in a division real-world problem with multi-digit numbers through an active participation response.

Essential Questions:

- How can I make equal groups from this one large group?
- How do I know this is a fair share?
- How can I solve this division problem using objects?
- How can I solve this division problem using a calculator?

Vocabulary:

- **Fair share –** Splitting into equal parts or groups.
- **Division –**To split into equal parts or groups.

Mini-Map for M.EE.6.NS.2

Subject: Mathematics
The Number System (NS)
Grade: 6

Learning Outcome

DLM Essential Element	Grade-Level Standard
M.EE.6.NS.2 Apply the concept of fair share and equal shares to divide.	**M.6.NS.2** Fluently divide multi-digit numbers using the standard algorithm.

Linkage Level Descriptions

Initial Precursor	Distal Precursor	Proximal Precursor	Target	Successor
Communicate understanding of "separateness" by recognizing objects that are not joined together. Communicate understanding of set by recognizing a group of objects sharing an attribute. Communicate understanding of a subset by recognizing a subset as a set or group of objects within a larger set that share an attribute.	Divide a set containing 10 or fewer objects into equal subsets (e.g., divide a set consisting of 10 counters into two subsets with 5 counters each).	Communicate understanding that repeated subtraction is subtracting equal groups from a number (e.g., 15 - 5 - 5 - 5). Represent repeated subtraction using equations (e.g., 15 - 5 - 5 - 5 = 0), and model repeated subtraction using concrete manipulatives.	Demonstrate understanding of division by splitting a set into an equal number of subsets and communicating the quotient as the number of equal subsets (e.g., a set consisting of 15 objects has three subsets, each containing 5 objects).	Divide a number within 12 by a divisor from 1 to 5 to determine the quotient, using manipulatives as needed.

Initial Precursor and Distal Precursor Linkage Level Relationships to the Target

How is the Initial Precursor related to the Target?

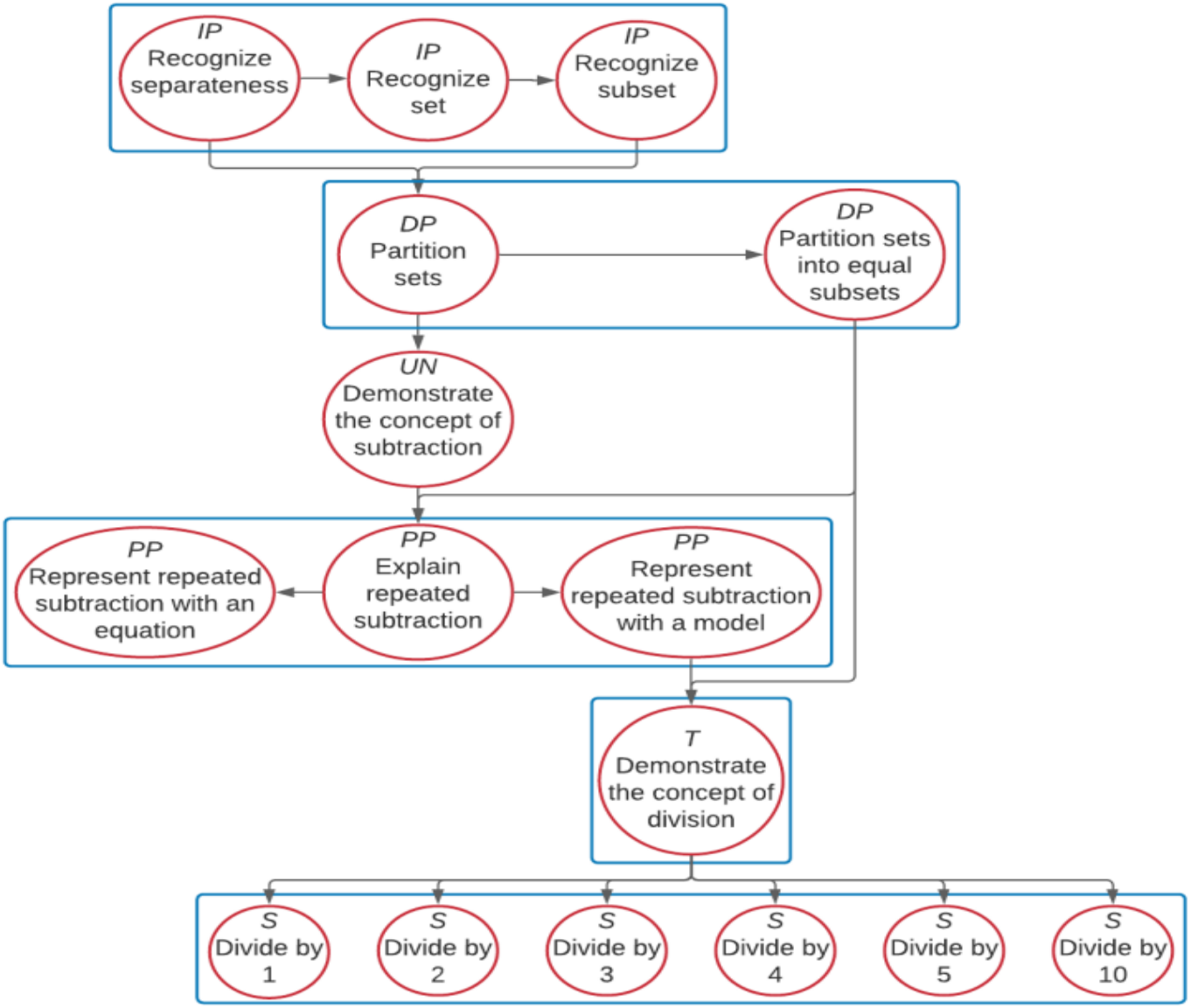
In order to understand division, students must learn to organize items into groups/sets based on a common characteristic such as size, color, shape, or texture. Students working at the Initial Precursor linkage level learn how to sort items by separating a group of items into two groups (e.g., music I like/music I don't like; red fidgets/black fidgets). As students gain comfort sorting items into sets, they are encouraged to communicate their thought process by identifying and naming the characteristic that determines the set (e.g., color, length). Activities that require students to engage actively with the items will foster understanding of set, subsets, and separateness.

How is the Distal Precursor related to the Target?

As students' understanding of labeling and counting sets develops, they will begin working on adding and taking away items from a set. Educators provide opportunities for students to work on developing an understanding of partitioning by actively participating in one-to-one distribution of objects to person, objects to objects, and objects to available space (e.g., giving each person in the group two pencils; given four counters they can line up, then four more counters in front of or on top of the first set; given three chairs at a table, the student would place a cup on the table for each available chair) and taking equal shares away (subtracting) from each person, object, or space. Educators will provide opportunities for students to connect their understanding of subtraction (starting with the whole and taking away a part) to repeated subtraction. For example, if the educator has 12 balls, and each team gets 4 balls, how many teams will there be? By subtracting 4 from the whole repeatedly, we made 3 equal sets so there are 3 teams.

12 - 4=8 8 - 4=4 4 - 4=0

M.EE.6.NS.2 Apply the concept of fair share and equal shares to divide.



Map Key	
IP	Initial Precursor
DP	Distal Precursor
PP	Proximal Precursor
T	Target
S	Successor
UN	Untested

Boxes indicate tested nodes

Rubric of Student Success

M.EE.6.NS.2 - Apply the concept of fair share and equal shares to divide.

Level 3 Students will…	Level 2 Students will…	Level 1 Students will…
Level 3 • Solve real world division problems with multi-digit numbers.	Level 2 • Divide to solve real-world problems with multi-digit numbers.	Level 1 • Count a set of objects in a division real-world problem with multi-digit numbers through an active participation response.
Successor and Target Students will… Successor • Divide by: 1, 2, 3, 4, 5, 10 Target • Demonstrate the concept of division	**Proximal Precursor and Distal Precursor Students will…** Proximal Precursor • Represent repeated subtraction with an equation • Explain repeated subtraction • Represent repeated subtraction with a model Distal Precursor • Partition sets • Partition sets into equal subsets	**Initial Precursor Students will…** Initial Precursor • Recognize separateness • Recognize set • Recognize subset

Instructional Ideas

M.EE.6.NS.2 - Apply the concept of fair share and equal shares to divide.

Problems can be solved using various operations.

The big idea is that some problems involving separating equal groups can be solved using division.

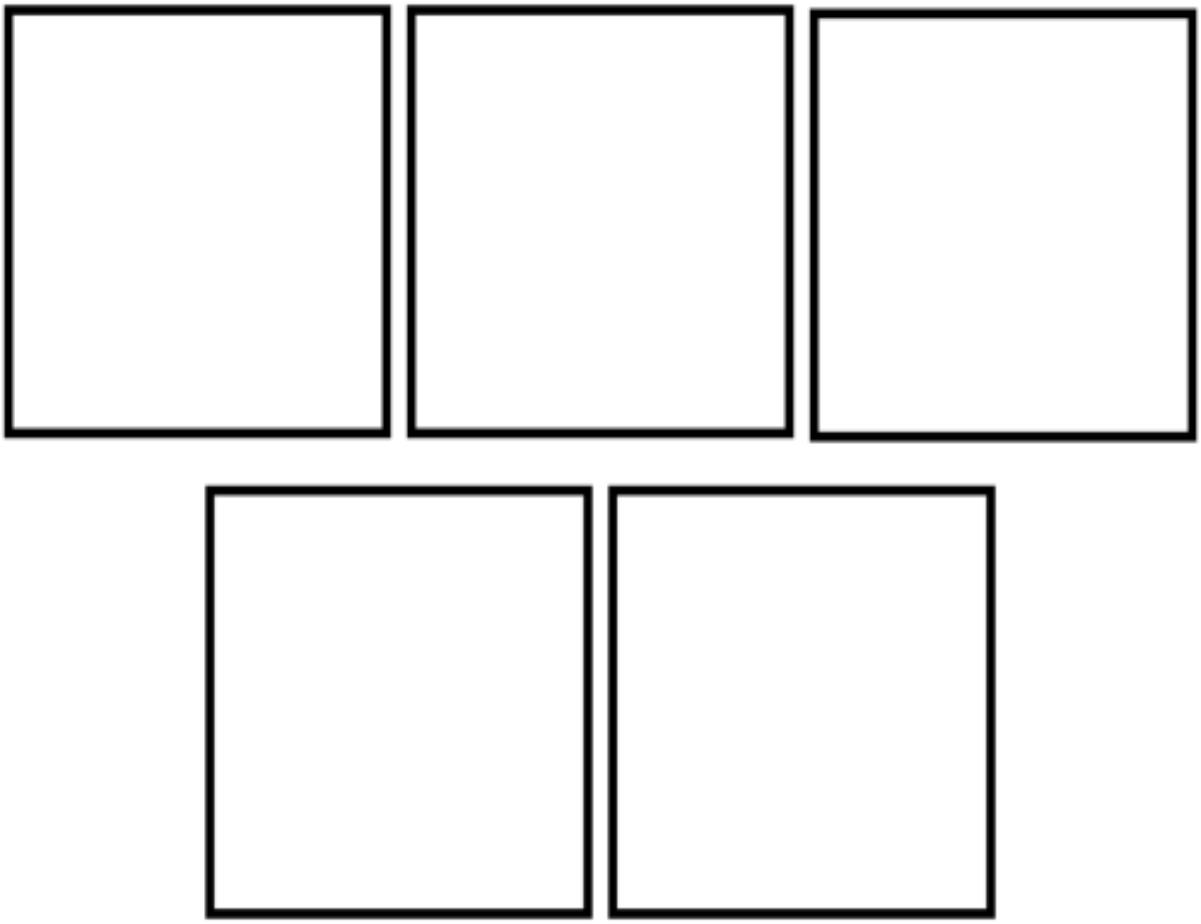
- Introduce by asking the essential questions.
- Use the values in a division equation to find the number of groups that can be made or the number of items in each group using the strategy of fair or equal shares.
- Display and review the division symbol including the equal sign.
- When students see a division sign, it means to subtract a number a certain amount of times.
- Review and go over repeated subtraction.
- Use concrete objects to prove the answer.
- Use a calculator to prove the answer.
- Use manipulatives as needed.
- Students may use a calculator if needed.
- Included worksheets are examples of what to look for when finding additional materials that best fits your student's needs.

Additional Instructional Ideas

- Go to website for additional instructional resources, materials, and activities for lessons:

Keisha is putting an equal number of milk cartons into recycling bins. There are 15 milk cartons altogether. There are 5 recycling bins. How many milk cartons go into each recycling bin?

The squares represent the recycling bins.
Make Xs to represent the number of milk cartons.

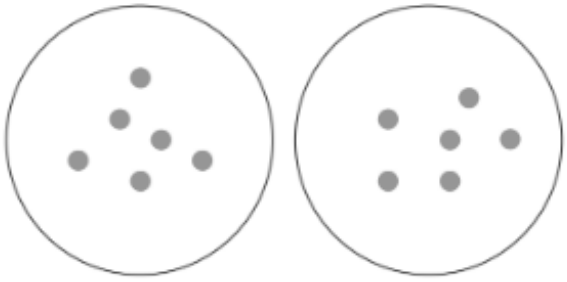


15	÷	5	=	
Number of milk cartons altogether		Number of recycling bins		Number of milk cartons in each recycling bin?

Division by Sharing (Word Problems 2)

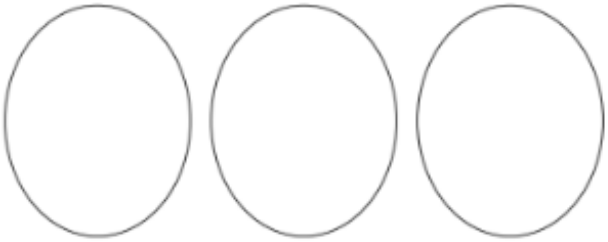
Name: **Date:**

At the supermarket, dad shares 12 tins equally into two bags. How many tins does he put in each bag?



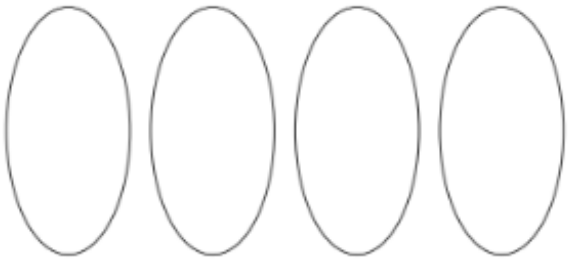
12 ÷ 2 = 6

Matthew, Emily and Harry share out 15 marbles. How many marbles do they get each?



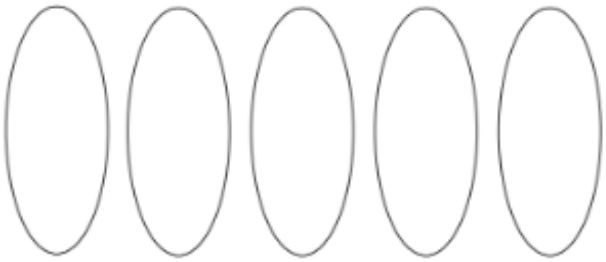
15 ÷ 3 =

Mandy has 28cm of sticky tape to wrap four small parcels. How much tape should she use on each one?



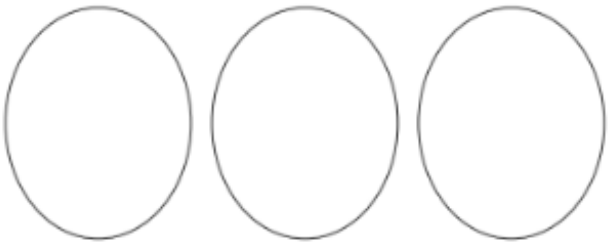
28 ÷ 4 =

15 scouts need to share five tents at their summer camp. How many scouts should stay in each tent?

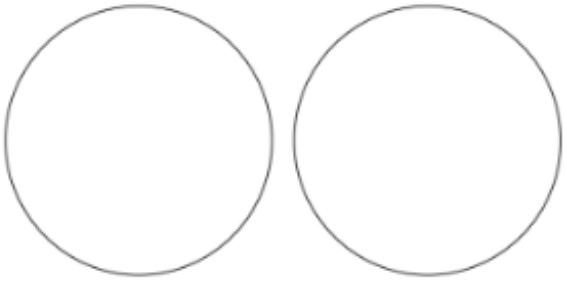


15 ÷ 5 =

George spent 12 days in Italy visiting three cities. How many days did he stay in each one if he shared his time equally?



Class 2G has an equal number of boys and girls. If there are 18 children altogether, how many girls are there?



Dividing into equal groups

Grade 3 Division Worksheet

Divide the food between the kids & write the division equation.


___ ÷ ___ = ___

How many bananas does each kid get? ___


___ ÷ ___ = ___

How many muffins does each kid get? ___


___ ÷ ___ = ___

How many pretzels does each kid get? ___


___ ÷ ___ = ___

How many cherries does each kid get? ___

Dividing into equal groups

Grade 3 Division Worksheet

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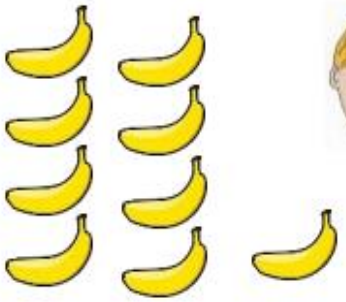

___ ÷ ___ = ___

How many bananas does each kid get? ____

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___ ÷ ___ = ___

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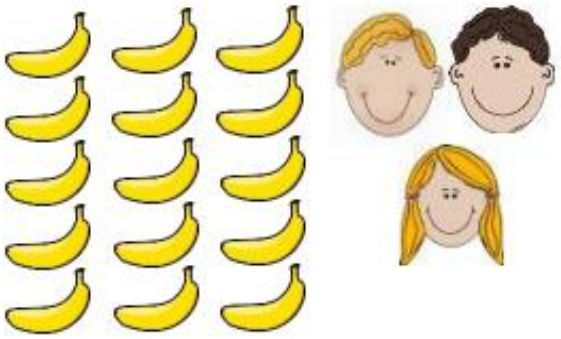

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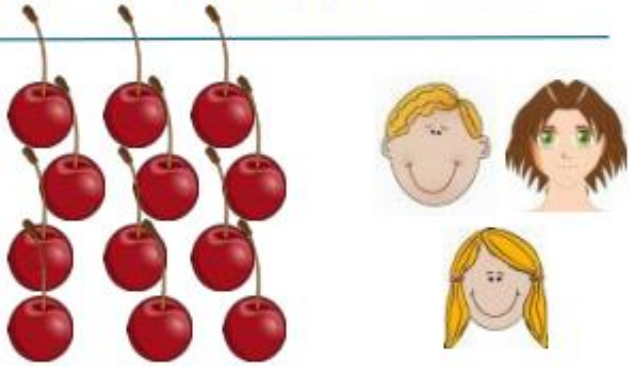


___ ÷ ___ = ___

How many cherries does each kid get? ____

Name _____ Date _____

Division with Repeated Subtraction

Repeated subtraction is a strategy for solving division problems.

Example: 12 ÷ 4 = 3

12 - 4 = 8

8 - 4 = 4

4 - 4 = 0

4 was subtracted **3** times. So 12 ÷ 4 = 3

Directions: Use repeated subtraction as seen in the example above to solve the following division problems.

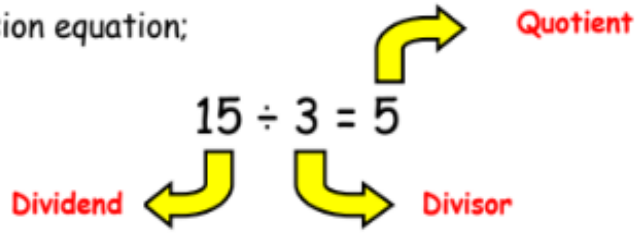
1	2	3	4	5
18 ÷ 2 = ____	12 ÷ 3 = ____	16 ÷ 4 = ____	24 ÷ 6 = ____	10 ÷ 2 = ____
6	**7**	**8**	**9**	**10**
21 ÷ 7 = ____	8 ÷ 4 = ____	15 ÷ 5 = ____	9 ÷ 3 = ____	32 ÷ 8 = ____

DIVISION

By repeated subtraction

Division can also be taken as a way of **repeated subtraction** i.e. subtracting a same number several times, since division and subtraction are interrelated concepts.

In a division equation;



For example; **15÷3** can also be solved by 'repeated subtraction'.

METHOD:

We keep on subtraction 3 from the dividend until we get 0. The number of times 3 is subtracted from the dividend to reach 0 is the quotient i.e. the answer!

So, 15 - 3 = 12 **12 - 3 = 9** **9 - 3 = 6**

6 - 3 = 3 **3 - 3 = 0**

→ **15 ÷ 3 = 5**

The repeated subtraction equation for **15÷3=5** is **15-3-3-3-3-3=0**

Similarly, the division equation for 15-3-3-3-3-3=0 is **15÷3=5**

Lets Share Knowledge

WORKSHEET#1

Solve the following division problems by using the method of repeated subtraction.

1. 12 ÷ 3 = 4

12-3 = 9
9-3 = 6
6-3 = 3
3-3 = 0
So, 12÷3=4
Since 3 is subtracted 4 times to reach 0.

2. 20 ÷ 10 =

3. 35 ÷ 5 =

4. 24 ÷ 8 =

5. 63 ÷ 9 =

6. 45 ÷ 15 =

7. 16 ÷ 2 =

8. 16 ÷ 4 =

9. 35 ÷ 7 =

Sharing vs. Repeated Subtraction

Grade 3

Activity #328

Relevant Chapter in the *Digi-Block Comprehensive Teacher's Guide:*
Book III, Unit4-1: Developing Two Meanings for Division, pages 103 - 106

Lesson Overview

This activity compares two models of division - "sharing" division and "repeated subtraction" division. Students discover and explain why both models of division yield the same answer. Students decide which model of division a problem reflects, then model and solve the problem with blocks.

Objectives

Thinking Skills: Students explore two meanings for division by modeling different situations with blocks. They first examine a problem and decide which model or meaning of division is most appropriate and then use that model to solve the problem.

Mastery Skills: Students learn to model, solve, and write number sentences to represent division story problems.

Materials

Each pair of students needs:

- 9 small paper plates
- 50 single blocks, packed or unpacked

- Activity Sheets #1 and #2

Class Introduction **(25 minutes)**

Provide small paper plates to pairs of students. Suggest that students use them to help organize blocks as they are solving problems.

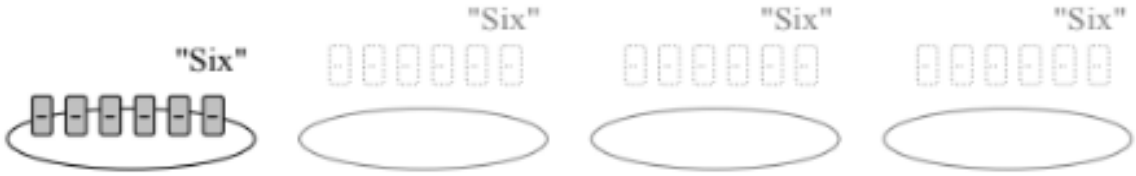
Problem 1:

Display a repeated subtraction problem, such as:

Emma has 24 stickers for her sticker book. She puts 6 stickers on a page. How many pages does she fill?

Have students work together to model the problem with blocks. Students will likely do the following:

- Put six blocks on a plate at a time until they run out of blocks.



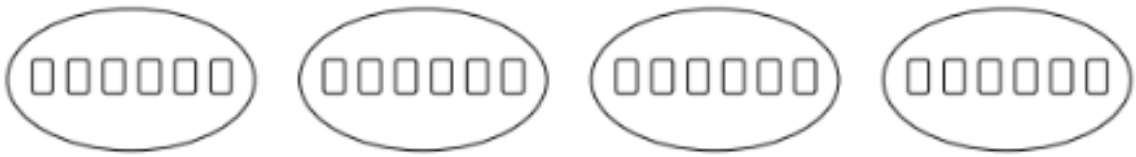
- Count the number of plates they used. The answer is: 4 plates/4 pages of stickers.

While students are modeling the problem, ask questions such as:

- **What do your blocks represent?**
- **What did you do first? Then what?**
- **Why did you put 6 blocks together?**
- **How many groups of 6 can you make, or how many "pages" can you fill?**

Have students record how they organized the blocks by drawing a picture.

Picture 1



Ask, **How can we show what we did with numbers?**

- Students may suggest using subtraction to show removing 6 at a time:

$$24 - 6 - 6 - 6 - 6 = 0$$

- Help students understand that what they have really done is *separate* the stamps and that this process can be expressed with the division sign.
- Introduce/review the meaning of the numbers and symbols in the division equation:

$$24 \div 6 = 4$$

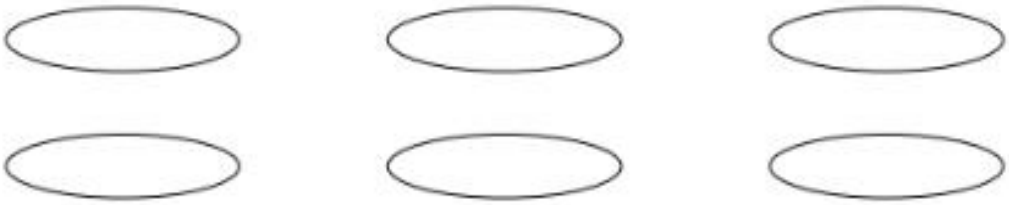
Problem 2:

Next, display a sharing problem, such as:

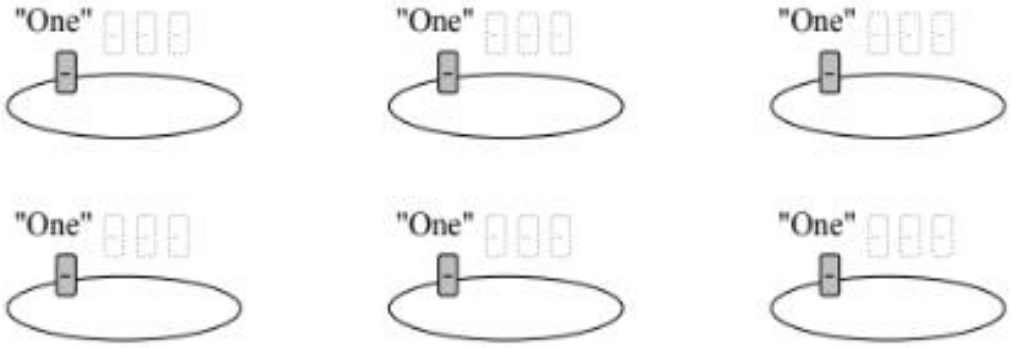
Eddie has a box of 24 mints. He wants to distribute them evenly to 6 of his friends. How many should each of the 6 friends get?

Again, have students model the problem with blocks. This time, however, they will likely be "dealing out" mints, one to four blocks at a time to each of six piles or paper plates.

- Set up 6 plates (one plate for each friend).

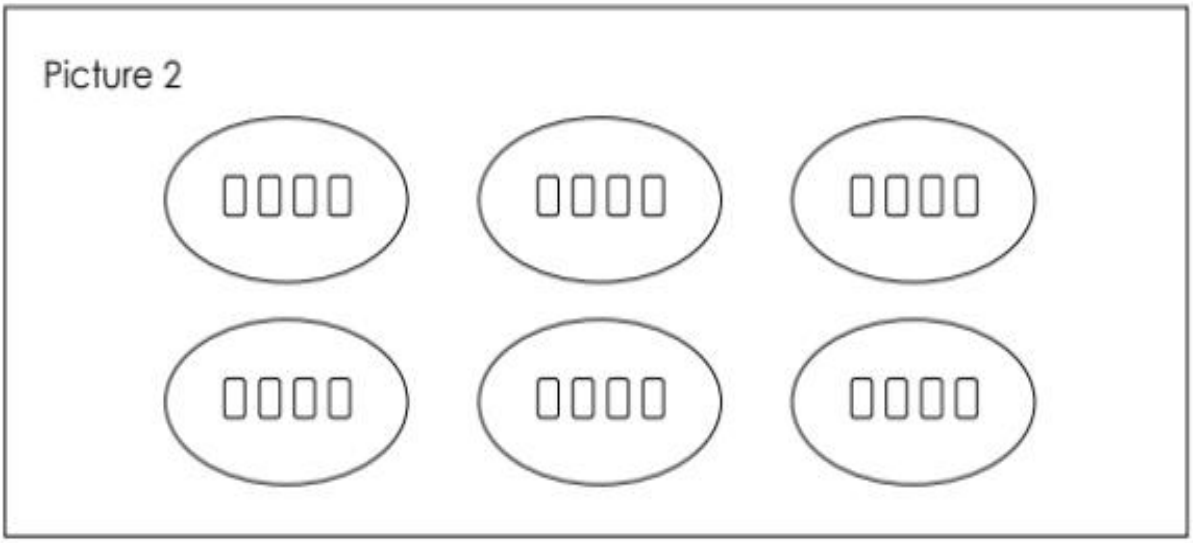


- Deal out one to four blocks/mints at a time to each plate until there are no more blocks.



- Count the number of blocks/mints on each plate. The answer is: 4 mints for each friend.

Have students explain what they did and draw a picture to show how they arranged their blocks.



Again, help children express what they did with numbers. They will notice that, once again, the problem can be written as:

24 ÷ 6 = 4

Comparing Problem 1 and Problem 2:

Have students compare the pictures they drew for the 2 problems. Ask, **How can it be that we solved two different problems and our pictures look very different, yet the number sentences and answers are the *same*?**

- Some students may be completely baffled; others may be convinced that it is coincidental.
- Challenge students to explain the similarities and differences between the problems.

Help students articulate the following:

- The first problem specifies the group *size* (6) whereas the second specifies the *number of groups* (6 again).

- To solve the first problem, students need to figure out *how many groups they can make,* but in the second, they need to know *how many in each group.*
- It may be helpful to relate each drawing to a multiplication sentence (4 x 6 and 6 x 4) and remind students that although 4 groups of 6 and 6 groups of 4 "look" different, they both have the same product. (See Pack-It #316: "Let's Explore 6 x 4.")

Explain to students that they will continue to explore the meaning of division by modeling and solving additional problems.

Activity **(25 minutes)**

Copy and distribute Activity Sheets #1 and #2, "Sharing Vs. Repeated Subtraction" to pairs of students sitting side by side. Explain the following:

- The student on the left reads and models the problem on the left side of the page, and the student on the right does the same for the problem on the right. Each student records his/her block arrangement.
- Students take turns explaining how they solved their problem to their partners.
- Both students agree on one division number sentence that represents both problems and write it in the space.
- They continue on the back.

As students are working, help them clarify whether they are finding the *number of groups* or the *number in each group* as they model their problems with blocks.

Challenge early finishers with a pair of problems using larger numbers.

Closure **(10 - 15 minutes)**

After students have completed their work, collect papers and select several to share and discuss.

- Have the "authors" of each paper describe how they solved each problem and invite classmates to respond.

- Again, help students distinguish between the two models of division. Ask, **What did you know and what did you need to find out?** for each problem.
- Discuss the number sentence for both problems. Ask, **What does the 9 in problem A mean? What does the 9 in problem B mean?**

While students are discussing their solutions, ask questions such as:

- **Is one model easier/harder for you to understand?**
- **Which model is easier/harder to show with blocks? Why?**
- **Which model do you use more in your everyday lives? Give examples.**
- **Is it a *coincidence* that both problems have the same answer? Explain why or why not.**

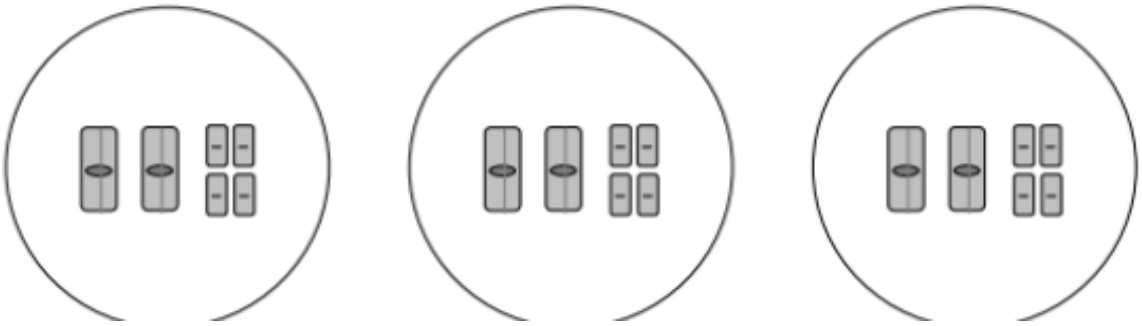
Assessment

As students are working, observe and note:
Do they -

- Model the story problem situation with blocks?
- Answer the question correctly?
- Know how to write the division number sentence that relates to the problem?
- Describe the meaning of the numbers and symbols in a division number sentence?

Extensions

- Have students model 72 ÷ 3 *both* ways! Make sure they start with packed blocks. Students will find that even though they get the same answer with both models, making 24 groups of 3 can be cumbersome, whereas 3 groups of 24 is much easier to count.



SplashLearn

Subtract to Divide

Divide the numbers by subtracting the same number till you reach zero.
(Show your work.)

$9 \div 3 =$ ☐

$8 \div 2 =$ ☐

$12 \div 6 =$ ☐

$16 \div 4 =$ ☐

$15 \div 3 =$ ☐

$24 \div 4 =$ ☐

April Math Pacing Guide
6th Grade

M.EE.6.NS.3 - Solve two-factor multiplication problems with products up to 50 using concrete objects and/or a calculator.

Learning Goal:

- Level 2-3 – I will multiply to solve a math problem.
- Level 1 – I will count objects.

Essential Questions:

- How can I make equal groups from this one large group?
- How do I know this is a fair share?
- What is the product?
- How can I solve this multiplication problem using objects?
- How can I solve this multiplication problem using a calculator?

Vocabulary:

- Multiply – to add equal groups using repeated addition.

Mini-Map for M.EE.6.NS.3

Subject: Mathematics
The Number System (NS)
Grade: 6

Learning Outcome

DLM Essential Element	Grade-Level Standard
M.EE.6.NS.3 Solve two-factor multiplication problems with products up to 50 using concrete objects and/or a calculator.	**M.6.NS.3** Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

Linkage Level Descriptions

Initial Precursor	Distal Precursor	Proximal Precursor	Target	Successor
Communicate understanding of "separateness" by recognizing objects that are not joined together. Communicate understanding of set by recognizing a group of objects sharing an attribute. Communicate understanding of a subset by recognizing a subset as a set or group of objects within a larger set that share an attribute.	Represent repeated addition problems in the form of an equation, including displaying the addition of the same numeral more than twice (e.g., 3 + 3 + 3 + 3) and finding the sum by adding the same number a certain number of times (e.g., 3 + 3 + 3 + 3 = 12). Communicate understanding of repeated addition as adding the same addend a given number of times (e.g., in the repeated addition equation 3 + 3 + 3 + 3 =	Demonstrate multiplication by combining multiple sets containing the same number of objects. Communicate understanding that the number of sets times the number of objects in each set equals the total number of objects.	Multiply numbers up to 12 by factors 1 to 5, using manipulatives or repeated addition (e.g., multiply 3 x 5 by adding 5 + 5 + 5 = 15).	Divide a number (up to 12) by one, two, three, four, or five, and determine the quotient using diagrams or manipulatives. Communicate understanding that the number of groups times the number of objects in each group equals the total number of objects (multiplication) and that the total number of objects divided by the number of groups equals the number of objects in each group (division).

Initial Precursor	Distal Precursor	Proximal Precursor	Target	Successor
	12, the addend 3 is added four times).			

Initial Precursor and Distal Precursor Linkage Level Relationships to the Target

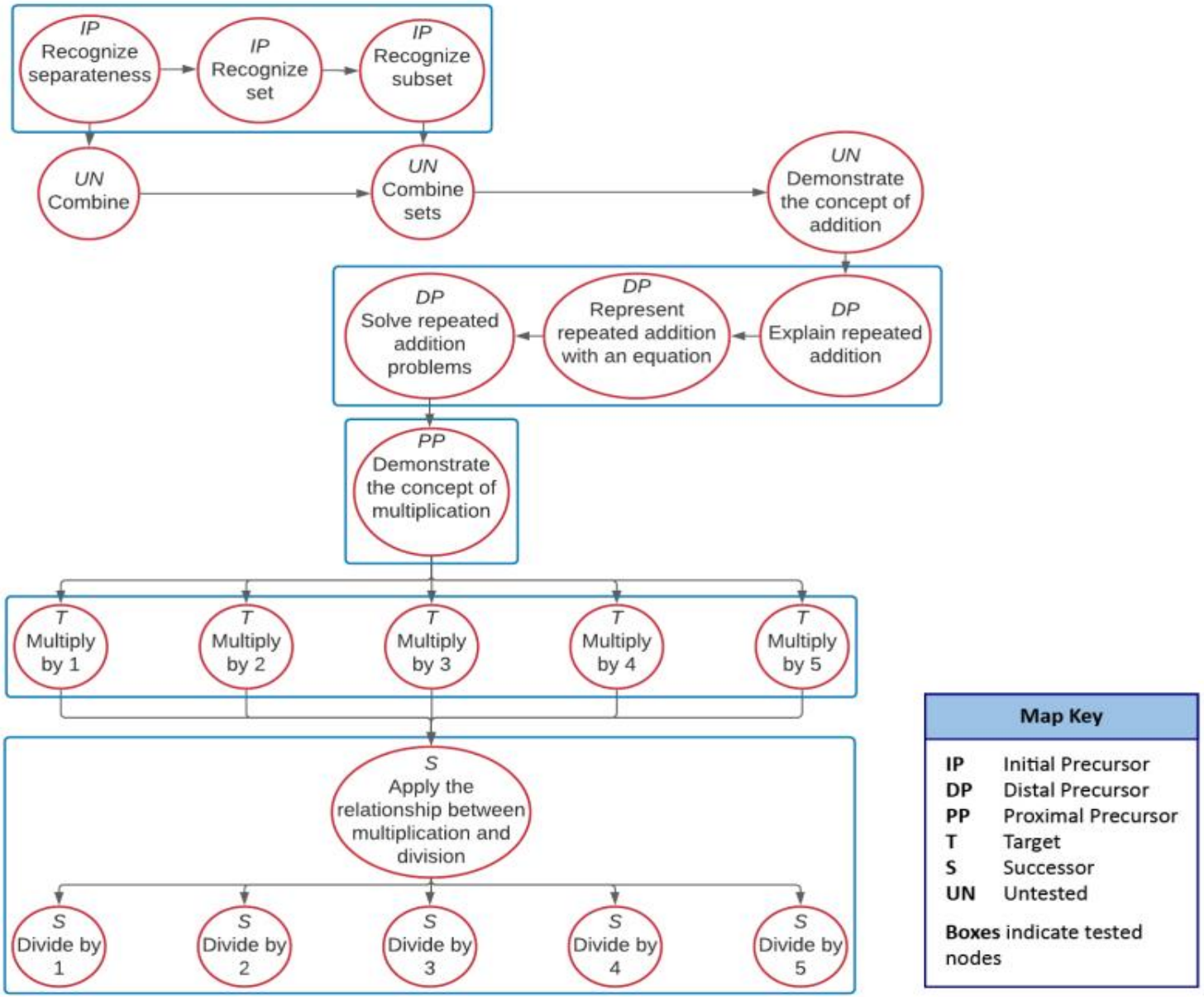
How is the Initial Precursor related to the Target?

In order to solve multiplication problems, students must learn to organize items into groups/sets based on a common characteristic such as size, color, shape, or texture. Students learn how to sort items by separating a group of items into two groups (e.g., music I like/music I don't like; red fidgets/black fidgets). As students gain comfort sorting items into sets, they are encouraged to communicate their thought process by identifying and naming the characteristic that determines the set (e.g., color, length). Activities that require students to engage actively with the items will foster understanding of set, subsets, and separateness.

How is the Distal Precursor related to the Target?

As students' understanding of labeling and counting sets develops, they will begin working on adding items to a set and combining sets to create a new set. Additionally, students will work on developing an understanding of equal shares by actively participating in one-to-one distribution of objects to person, objects to objects, and objects to available space (e.g., giving each person in the group two pencils; given four counters, they would line up four more counters in front of or on top of the first set; given three chairs at a table, the student would place a cup on the table for each available chair). As students learn to work with sets and connect their understanding of equal shares to sets, educators will provide students experience with combining multiple sets (e.g., 3 sets with 4 counters each) and represent the problem (e.g., 4 + 4 + 4 = ?). Students will also learn to represent the problem in writing (e.g., the student is shown 4 equal sets each with 2 counters. The student counts the first set and writes a 2 or indicates 2, then writes or indicates the plus sign. The student repeats for all 4 sets and then indicates the equal sign and solves the problem.).

M.EE.6.NS.3 Solve two-factor multiplication problems with products up to 50 using concrete objects and/or a calculator.



Rubric of Student Success

M.EE.6.NS.3 - Solve two-factor multiplication problems with products up to 50 using concrete objects and/or a calculator.

Level 3 Students will… **Level 3** • I will multiply to solve a math problem.	**Level 2 Students will…** **Level 2** • I will multiply to solve a math problem.	**Level 1 Students will…** **Level 1** • I will count objects.
Successor and Target Students will… **Successor** • Apply the relationship between multiplication and division • Divide by 1, 2, 3, 4, and 5 **Target** • Multiply by 1, 2, 3, 4, and 5	**Proximal Precursor and Distal Precursor Students will…** **Proximal Precursor** • Demonstrate the concept of multiplicate **Distal Precursor** • Solve repeated addition problems • Represent repeated addition with an equation • Explain repeated addition • Demonstrate the concept of multiplication	**Initial Precursor Students will…** **Initial Precursor** • Recognize separateness • Recognize set • Recognize subset

Instructional Ideas

M.EE.6.NS.3 - Solve two-factor multiplication problems with products up to 50 using concrete objects and/or a calculator.

Problems can be solved using various operations.

The big idea is that some problems involving joining equal groups can be solved using multiplication.

- Introduce by asking the essential questions.
- Solve multiplication problems using 2 values whose product is less than or equal to 50.
- Multiply by 1, 2, 3, 4, and 5.
- Teach repeated addition.
- Display the multiplication sign and ask, “When we see this sign what should we do?”
- Introduce and discuss symbols used in multiplication including the equal sign.
- Tell students that when they see a multiplication sign it means to add a certain number a certain about of times.
- Use concrete objects to prove the answer.
- Use a calculator to prove the answer.
- Use manipulatives as needed.
- Use graphic organizers as needed.
- Students may use a calculator if needed.
- Included worksheets are examples of what to look for when finding additional materials that best fits your student’s needs.

Additional Instructional Ideas

- Go to website for additional instructional resources, materials, and activities for lessons:

Math Story 1
Multiplication

Name: _____

Raj is putting pine cones he finds on his hike into boxes.
There are 6 boxes. He puts 4 pine cones into each box.
How many pine cones are there altogether?

6 boxes

4 pine cones

Number of boxes: 6

Number of pine cones in each box: x 4

How many pine cones are there altogether? ____

Keisha is putting rocks she finds on her hike into rows.
There are 5 rows. She puts 9 rocks in each row.
How many rocks are there altogether?

5 rows

9 rocks

Number of rows: 5

Number of rocks in each row: x 9

How many rocks are there altogether? ____

Multiplication Strategies

Repeated Addition

$5+5+5=15$

$3 \times 5 = 15$

	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

Name _____ Date _____

Introduction to Multiplication:

Repeated Groups

Directions: Solve each equation.

Example: 2 + 2 + 2 + 2 = 8
4 + 4 = 8
2 × 4 = 8
4 × 2 = 8

Question What do you notice about the connection between multiplication and addition?

_____

3 + 3 + 3 + 3 + 3 = _____ 5 + 5 + 5 = _____ 5 × 3 = _____ 3 × 5 = _____	3 + 3 + 3 + 3 = _____ 4 + 4 + 4 = _____ 3 × 4 = _____ 4 × 3 = _____	2 + 2 + 2 + 2 + 2 + 2 = _____ 6 + 6 = _____ 2 × 6 = _____ 6 × 2 = _____
4 + 4 + 4 + 4 + 4 = _____ 5 + 5 + 5 + 5 = _____ 5 × 4 = _____ 4 × 5 = _____	2 + 2 + 2 + 2 + 2 + 2 + 2 = _____ 7 + 7 = _____ 2 × 7 = _____ 7 × 2 = _____	3 + 3 + 3 + 3 + 3 + 3 = _____ 6 + 6 + 6 = _____ 3 × 6 = _____ 6 × 3 = _____
5 + 5 + 5 + 5 + 5 = _____ 5 × 5 = _____	2 + 2 + 2 = _____ 3 + 3 = _____ 2 × 3 = _____ 3 × 2 = _____	2 + 2 + 2 + 2 + 2 = _____ 5 + 5 = _____ 2 × 5 = _____ 5 × 2 = _____
2 + 2 = _____ 2 × 2 = _____	3 + 3 + 3 = _____ 3 × 3 = _____	6 + 6 + 6 + 6 + 6 + 6 = _____ 6 × 6 = _____

Name _____ Date _____

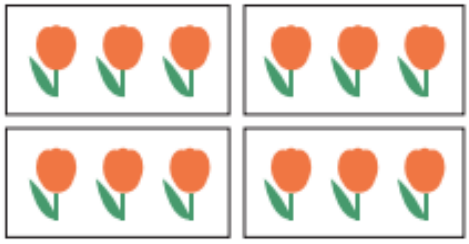
Introduction to Multiplication

Adding Groups

Learn how to multiply by thinking of numbers as groups.
Use the groups of tulips to help you answer each multiplication problem.

EXAMPLE:

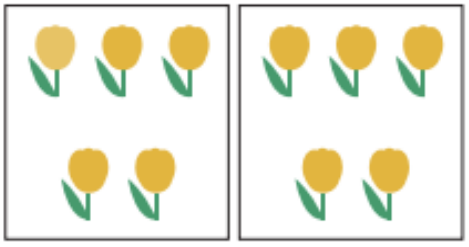
2 groups with 3 tulips each.
There are 6 tulips in total.
2 × 3 = 6



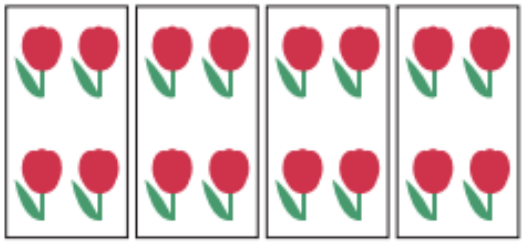
_____ groups with _____ tulips each.
There are _____ tulips in total.
_____ × _____ = _____

_____ groups with _____ tulips each.
There are _____ tulips in total.
_____ × _____ = _____

_____ groups with _____ tulips each.
There are _____ tulips in total.
_____ × _____ = _____



_____ groups with _____ tulips each.
There are _____ tulips in total.
_____ × _____ = _____



_____ groups with _____ tulips each.
There are _____ tulips in total.
_____ × _____ = _____

Name _____ Date _____

Multiplication Word Problems

Use the picture above to answer the questions.
Write the answer in the form of a number sentence.

Example: 2 x 5 = 10

1. **The Ferris wheel costs 5 tickets to ride. How many tickets does it cost for 5 people to ride?**

   _____

2. **The roller coaster cars hold 2 people each. How many can 10 roller coaster cars hold?**

   _____

3. **There are 5 children who bought balloons. Each child bought 2 balloons. How many balloons in all did they buy?**

   _____

4. **An ice cream cone costs $3. How much will 5 children spend buying ice cream cones?**

   _____

5. **There are 4 people who play the ball toss. Each game costs 5 tickets. How many tickets are used?**

   _____

6. **There are 6 people who sell balloons in the park. If they each have 5 balloons, how many balloons are there in all?**

   _____

Mammal Mystery

Multiply. Then fill in the boxes with the letters that go with the numbers to find the answer to the question!

2 × 6 = U ☐	3 × 5 = D ☐	7 × 7 = M ☐	4 × 1 = S ☐	5 × 8 = C ☐
2 × 7 = J ☐	6 × 4 = A ☐	5 × 6 = L ☐	7 × 3 = K ☐	3 × 2 = T ☐
9 × 4 = E ☐	2 × 1 = Y ☐	8 × 6 = B ☐	4 × 4 = I ☐	9 × 6 = P ☐

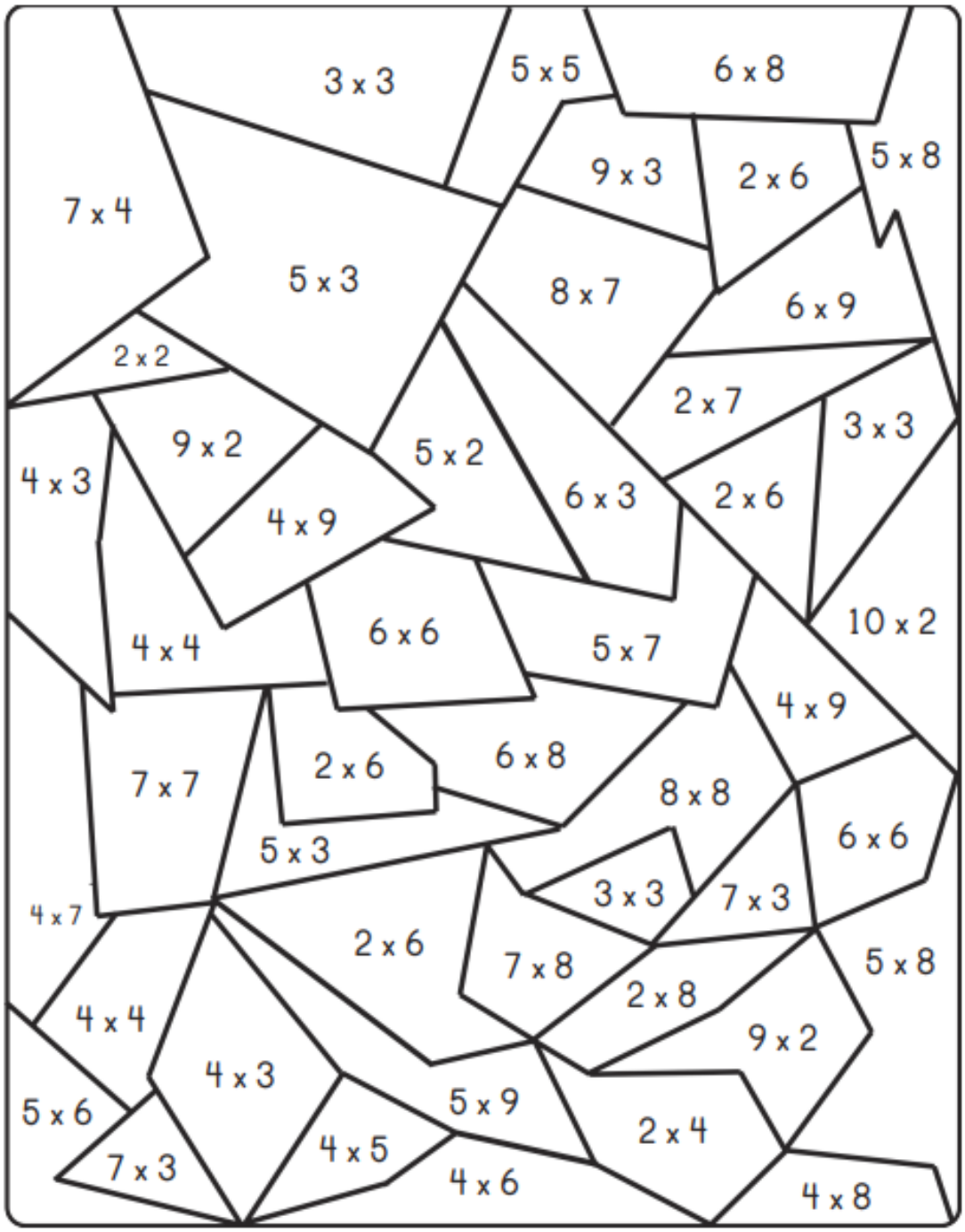
What unusual mammal lays eggs instead of giving birth to live young?

☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
15	12	40	21	–	48	16	30	30	36	15	54	30	24	6	2	54	12	4	

Color by Multiplication

Do the multiplication calculation and color the shape in the correct color.

0-10	11-20	21-30	31-40	41-50	51-60	61-70
light blue	purple	pink	yellow	green	orange	dark blue



April Math Pacing Guide
7th Grade

*** Follow the 6th Grade standards listed above with the 7th graders during this month.

April Math Pacing Guide
8th Grade

M.EE.8.F.1-3 - Given a function table containing at least 2 complete ordered pairs, identify a missing number that completes another ordered pair (limited to linear functions).

Learning Goal:

- Level 2-3 – I will solve a problem using a function table.
- Level 1 – I will count objects and select points of a function.

Essential Questions:

- What is the constant change?
- What rule can express this change?
- How can I use a rule to find additional ordered pairs (values)?
- What is the next set of ordered pairs?

Vocabulary:

- **Function –** A special relationship where each input has a single output.
- **Ordered Pair -** Two numbers written in a certain order. Usually written in parentheses like this: **(12,5)**
- **X-Axis -** The line on a graph that runs horizontally (left-right) through zero.
- **Y-Axis –** The line on a graph that runs vertically (up-down) through zero.
- **X Coordinate -** The horizontal value in a pair of coordinates: how far **along** the point is. The X Coordinate is always written first in an *ordered pair* of coordinates (x,y), such as (12,5).
- **Y Coordinate -** The vertical value in a pair of coordinates. How far **up or down** the point is. The Y Coordinate is always written second in an *ordered pair* of coordinates (x,y) such as (12,5).

Mini-Map for M.EE.8.F.1-3

Subject: Mathematics
Functions (F)
Grade: 8

Learning Outcome

DLM Essential Element	Grade-Level Standard
M.EE.8.F.1-3 Given a function table containing at least 2 complete ordered pairs, identify a missing number that completes another ordered pair (limited to linear functions).	**M.8.F.1** Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output. **M.8.F.2** Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). **M.8.F.3** Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.

Linkage Level Descriptions

Initial Precursor	Distal Precursor	Proximal Precursor	Target	Successor
Form a pair of objects by arranging two objects in a specific order (e.g., form a pair by first placing a pencil and then placing a ruler). Arrange objects by a specified rule (e.g., arrange pencils in order by length).	Recognize a growing pattern as a pattern that increases (e.g., 3, 6, 9, 12...) and a shrinking pattern as a pattern that decreases (e.g., 12, 10, 8...).	Communicate understanding that the numbers in the coordinate pair (x, y) represent x units left or right on the x-axis and y units up or down on the y-axis. Communicate the next term in a growing or shrinking pattern, consisting of numerals or letters, by recognizing the core	Generate ordered pairs by recognizing the pattern rules for each coordinate and applying these rules to the x- and y-values [e.g., given (1, 3), (2, 5), (3, 7)..., the next ordered pair would be (4, 9)].	Recognize covariation as the pattern in which two variables or quantities change together. Recognize correspondence as the relationship between each x- and y-value.

Initial Precursor	Distal Precursor	Proximal Precursor	Target	Successor
		unit or the pattern rule and applying it to the pattern (e.g., the pattern rule in the pattern: 3, 6, 9, 12 is "add 3," so the next term in the pattern is 12 + 3 equals 15).		

Initial Precursor and Distal Precursor Linkage Level Relationships to the Target

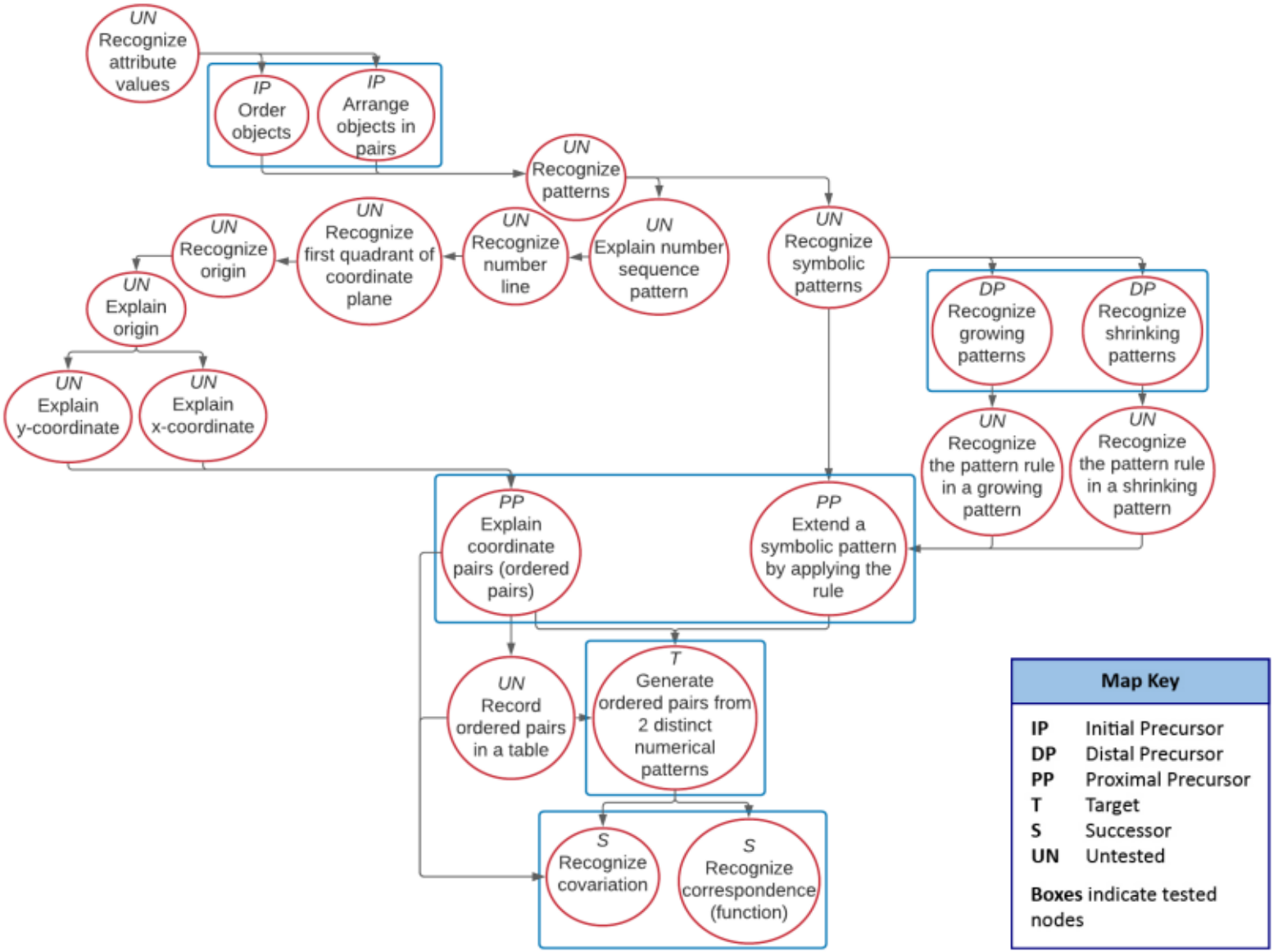
How is the Initial Precursor related to the Target?

In order to understand and work with function tables, students begin by learning to notice what is new. The educator draws the students' attention to new objects or stimuli, labels them (e.g., "this set has all red objects; this set has all blue," "these fidgets are big; these fidgets are small") and the student observes, feels, or otherwise interacts with them. Educators encourage students to begin placing like objects together, drawing attention to the characteristics that make an item the same or different.

How is the Distal Precursor related to the Target?

Building on arranging and ordering objects, educators can use some of the other mathematical concepts like working with sets or recognizing a whole and parts to help students identify "same" and "different." For instance, students may create a set and then create a second set that has the same amount. Then, they can change one of the sets to make it different. As students are learning to create and identify sets that are same and different, educators can draw student attention to the various attributes of a set to teach students to order, classify, and contrast the sets. These understandings will then lead to students having the attentional skills to recognize growing and shrinking patterns.

M.EE.8.F.1-3 Given a function table containing at least 2 complete ordered pairs, identify a missing number that completes another ordered pair (limited to linear functions).



Rubric of Student Success

M.EE.8.F.1-3 - Given a function table containing at least 2 complete ordered pairs, identify a missing number that completes another ordered pair (limited to linear functions).

Level 3 Students will… **Level 3** • Solve a function using a function table independently.	**Level 2 Students will…** **Level 2** • Solve a problem using a function table with guided support.	**Level 1 Students will…** **Level 1** • Will count objects and select points of a function.
Successor and Target Students will… **Successor** • Recognize covariation • Recognize correspondence (function) **Target** • Generate ordered pairs from 2 distinct numerical patterns	**Proximal Precursor and Distal Precursor Students will…** **Proximal Precursor** • Explain coordinate pairs (ordered pairs) • Extend a symbolic pattern by applying the rule **Distal Precursor** • Recognize growing patterns • Recognize shrinking patterns	**Initial Precursor Students will…** **Initial Precursor** • Order objects • Arrange objects in pairs

Instructional Ideas

M.EE.8.F.1-3 - Given a function table containing at least 2 complete ordered pairs, identify a missing number that completes another ordered pair (limited to linear functions).

A function is a mathematical rule that describes how two or more quantities vary in relationship to each other.

The big idea is that in mathematical relationships, the value for one quantity depends on the value of the other quantity. Known values in a function table (pattern) can be used to predict other values.

- Introduce by asking the essential questions.
- Identify the relationship between the input and output (the pattern).
- Identify the change (function or rule).
- Use mathematical strategies to "find" the missing number.
- Identify the missing number.
- Ask, "How many numbers do you need to graph a point on a coordinate graph – 1 or 2?"
- Discuss that a number is needed on each axes.
- One number tells how many spaces to move either left or right, and the other tells how many to move up or down.
- These are called coordinate pairs.
- Unknown numbers can be represented with many different letters.
- Explain that x and y are for functions. X represents the horizontal line and the y represents the vertical line.
- Teach how to fill in a table that will give them several coordinate pairs to graph and form a line.
- Emphasize the pattern that is forming, "Each time, the number increases by _____." Model how to fill in the blank spaces.
- Students may use a calculator if needed.
- Included worksheets are examples of what to look for when finding additional materials that best fits your student's needs.

Additional Instructional Ideas

- Go to website for additional instructional resources, materials, and activities for lessons:

Linear Functions With an Origin of 0

Mary Beth is handing out fishing poles. For every group of people who come to the boathouse, Mary Beth hands out 2 fishing poles. If 2 groups come to the boathouse today, how many fishing poles does Mary Beth hand out?

x The number of groups coming to the boathouse.

y Total number of fishing poles handed out.

Complete the function table. Use it to answer the following questions.

x	Rule					y	Point						
	2	x	x	=	y		(	x	,	y	)		
0	2	x		=	0	0	(	0	,	0	)		
	2	x	1	=			(	1	,	2	)		
2	2	x	2	=			(	2	,		)		
3	2	x	3	=	6	6	(		,	6	)		
	2	x	4	=	8	8	(	4	,	8	)		
5	2	x	5	=			(	5	,		)		
6	2	x		=	12	12	(	6	,	12	)		

1. If 2 groups come to the boathouse, Mary Beth will hand out _____ fishing poles.

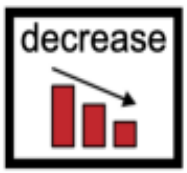
2. If 5 groups come to the boathouse, Mary Beth will hand out _____ fishing poles.

Use the table to graph the function. The first 2 sets of coordinate points have been graphed. Graph the remaining coordinate points. Put a line to connect the points.

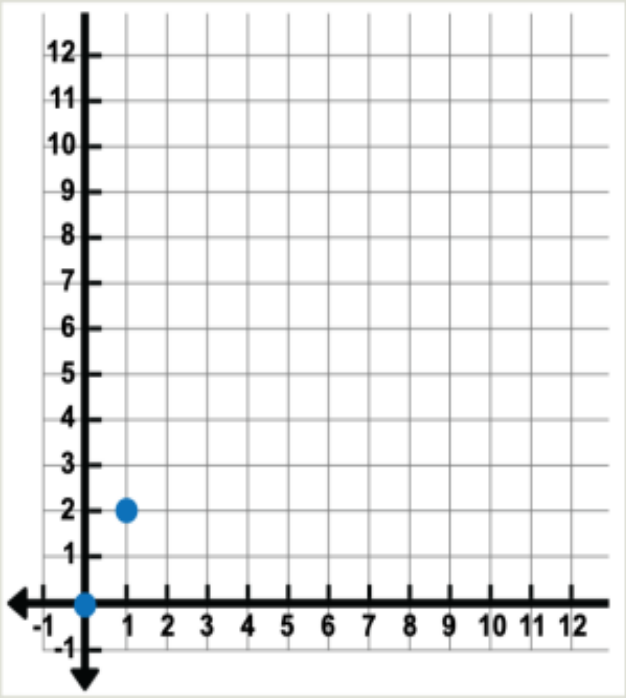
Use the graph to answer the following question.

3. What will happen to the amount of fishing poles as more groups come to the boathouse?

For each group that comes to the boathouse, the number of fishing poles Mary Beth hands out will



by _____



Linear Functions With an Origin of 0

Mario is ordering canoes. For every canoe he orders, he gets 3 free canoe paddles. If Mario orders 4 canoes, how many free canoe paddles will he get?

x Each canoe he orders.

y Number of free canoe paddles he gets.

Complete the function table. Use it to answer the following questions.

x	Rule					y	Point						
	3	x	x	=	y		(	x	,	y	)		
0	3	x	0	=	0	0	(		,	0	)		
1	3	x	1	=			(	1	,	3	)		
	3	x	2	=	6	6	(	2	,	6	)		
3	3	x		=	9	9	(	3	,	9	)		
4	3	x	4	=			(	4	,		)		
	3	x	5	=	15	15	(	5	,	15	)		
6	3	x	6	=			(	6	,		)		

1. If Mario orders 4 canoes, he will get _____ free canoe paddles.

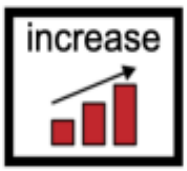
2. If Mario orders 6 canoes, he will get _____ free canoe paddles.

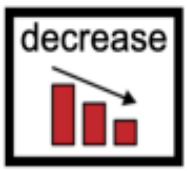
Use the table to graph the function. The first 2 sets of coordinate points have been graphed. Graph the remaining coordinate points. Put a line to connect the points.

Use the graph to answer the following question.

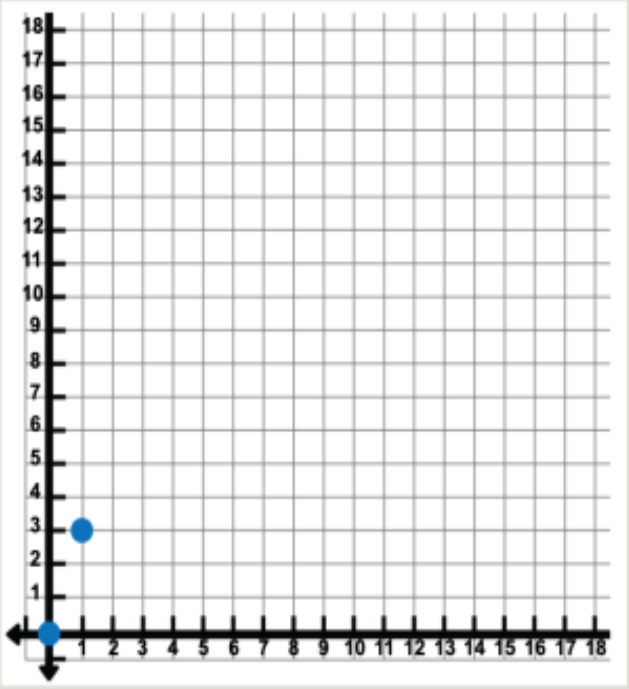
3. What will happen to the amount of free canoe paddles Mario gets as he orders more canoes?

For each canoe he orders, the number of canoe paddles will





by _____



Linear Functions With Starting Value and Increasing Slope

Keisha is handing out lanterns to campers. She has handed out 8 lanterns already. If she hands out 1 more lantern each minute, how many total lanterns will be handed out in 2 minutes?

x Each minute that passes.

y Total number of lanterns handed out.

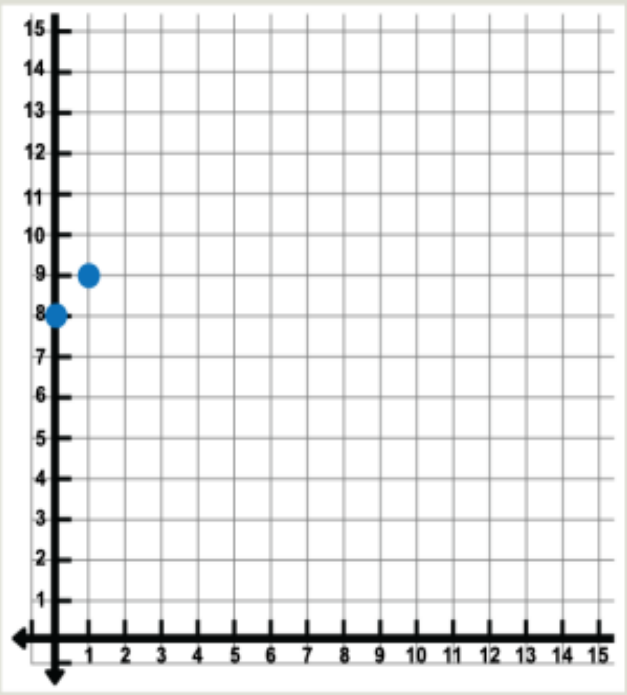
Complete the function table. Use it to answer the following questions.

x	Rule					y	Point						
	8	+	x	=	y		(	x	,	y	)		
	8	+	0	=	8	8	(	0	,	8	)		
1	8	+		=	9	9	(	1	,	9	)		
2	8	+	2	=			(	2	,		)		
3	8	+	3	=	11	11	(		,	11	)		
	8	+	4	=	12	12	(	4	,	12	)		
5	8	+	5	=			(	5	,		)		
6	8	+	6	=			(	6	,	14	)		

1. After 2 minutes, there will be _____ lanterns handed out to campers.

2. After 5 minutes, there will be _____ lanterns handed out to campers.

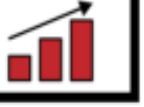
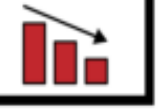
Use the table to graph the function. The first 2 sets of coordinate points have been graphed. Graph the remaining coordinate points. Put a line to connect the points.



Use the graph to answer the following question.

3. What will happen to the total number of lanterns handed out as each minute passes?

For each minute that passes, the total number of lanterns handed out will

increase  decrease  by _____

Linear Functions With Starting Value and Increasing Slope

Raj is gathering canoe paddles at the campground for a race. He already has 2 canoe paddles. If he gathers 1 more paddle each minute for the race, how many canoe paddles will he have gathered after 6 minutes?

x Each minute that passes.

y Total number of canoe paddles gathered.

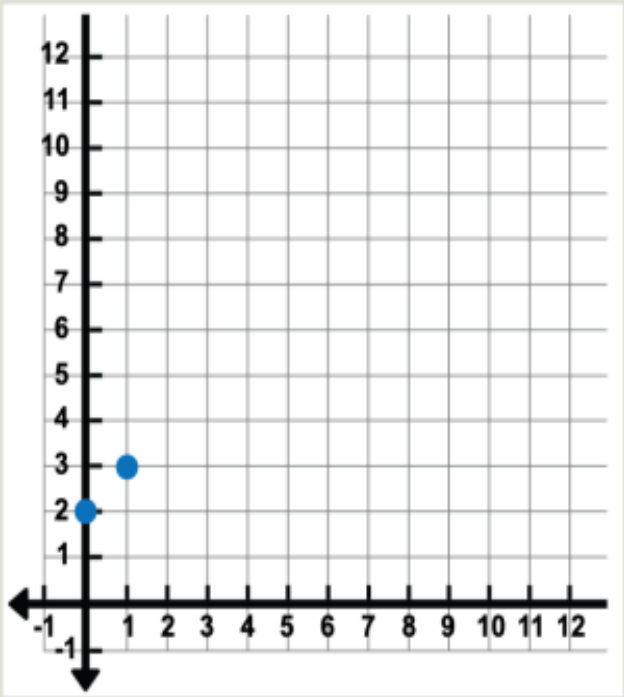
Complete the function table. Use it to answer the following questions.

x	Rule					y	Point						
	2	+	x	=	y			(	x	,	y	)	
0	2	+	0	=	2	2		(		,	2	)	
	2	+	1	=	3	3		(	1	,	3	)	
2	2	+		=	4	4		(	2	,	4	)	
	2	+	3	=	5	5		(	3	,	5	)	
4	2	+	4	=				(	4	,	6	)	
5	2	+	5	=				(	5	,		)	
6	2	+	6	=				(	6	,		)	

1. After 6 minutes, Raj will have gathered _____ canoe paddles.

2. After 5 minutes, Raj will have gathered _____ canoe paddles.

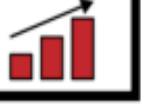
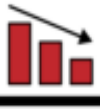
Use the table to graph the function. The first 2 sets of coordinate points have been graphed. Graph the remaining coordinate points. Put a line to connect the points.



Use the graph to answer the following question.

3. What will happen to the number of canoe paddles Raj gathers for the race as each minute passes?

For each minute that passes, the number of canoe paddles Raj gathers will

increase  decrease  by _____

Linear Functions With Starting Value and Decreasing Slope

Mario is filling water bottles at camp. There are 15 water bottles to fill. He fills one water bottle each minute. If he continues to fill water bottles at this rate, how many water bottles will be left to fill after 4 minutes?

x Each minute that passes.

y Number of water bottles left after each minute.

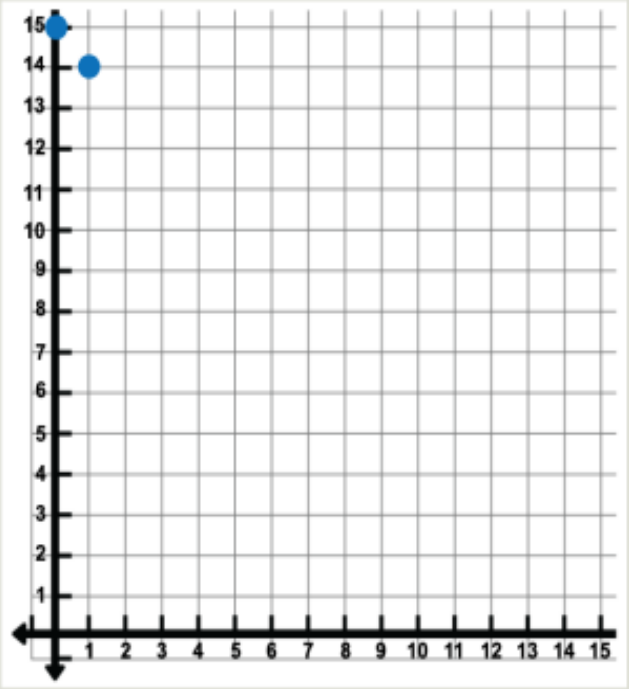
Complete the function table. Use it to answer the following questions.

x	Rule					y	Point						
	15	-	x	=	y		(	x	,	y	)		
0	15	-	0	=			(	0	,	15	)		
1	15	-	1	=			(	1	,		)		
2	15	-		=	13	13	(	2	,	13	)		
3	15	-	3	=	12	12	(		,	12	)		
4	15	-	4	=			(	4	,		)		
	15	-	5	=	10	10	(	5	,	10	)		
	15	-	6	=	9	9	(	6	,	9	)		

1. After 4 minutes, there will be _____ water bottles left to fill.

2. After 1 minute, there will be _____ water bottles left to fill.

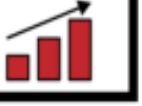
Use the table to graph the function. The first 2 sets of coordinate points have been graphed. Graph the remaining coordinate points. Put a line to connect the points.



Use the graph to answer the following question.

3. What will happen to the number of water bottles Mario has left to fill after each minute?

For each minute that passes, the number of water bottles left to fill will

increase  decrease  by _____

Linear Functions With Starting Value and Decreasing Slope

Randy is handing out canoes. There are 14 canoes to hand out. He hands out 1 canoe each minute. If he continues to hand out canoes at this rate, how many canoes will be left to hand out after 4 minutes?

x Each minute that passes.

y Number of canoes left to hand out after each minute.

Complete the function table. Use it to answer the following questions.

x	Rule					y	Point						
	14	-	x	=	y		(	x	,	y	)		
0	14	-	0	=			(	0	,	14	)		
	14	-	1	=	13	13	(	1	,	13	)		
2	14	-	2	=	12	12	(		,	12	)		
3	14	-	3	=			(	3	,		)		
4	14	-	4	=			(	4	,		)		
5	14	-		=	9	9	(	5	,	9	)		
	14	-	6	=	8	8	(	6	,	8	)		

1. After 4 minutes, there will be _____ canoes left to hand out.

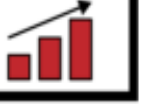
2. After 3 minutes, there will be _____ canoes left to hand out.

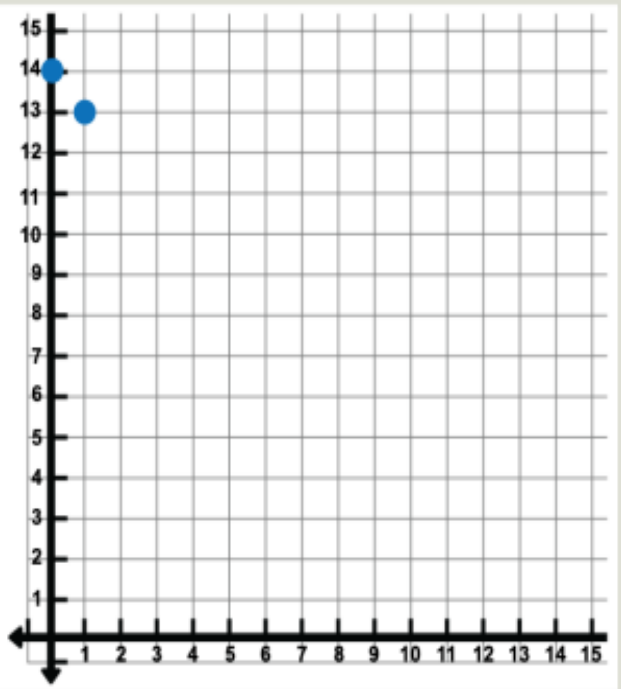
Use the table to graph the function. The first 2 sets of coordinate points have been graphed. Graph the remaining coordinate points. Put a line to connect the points.

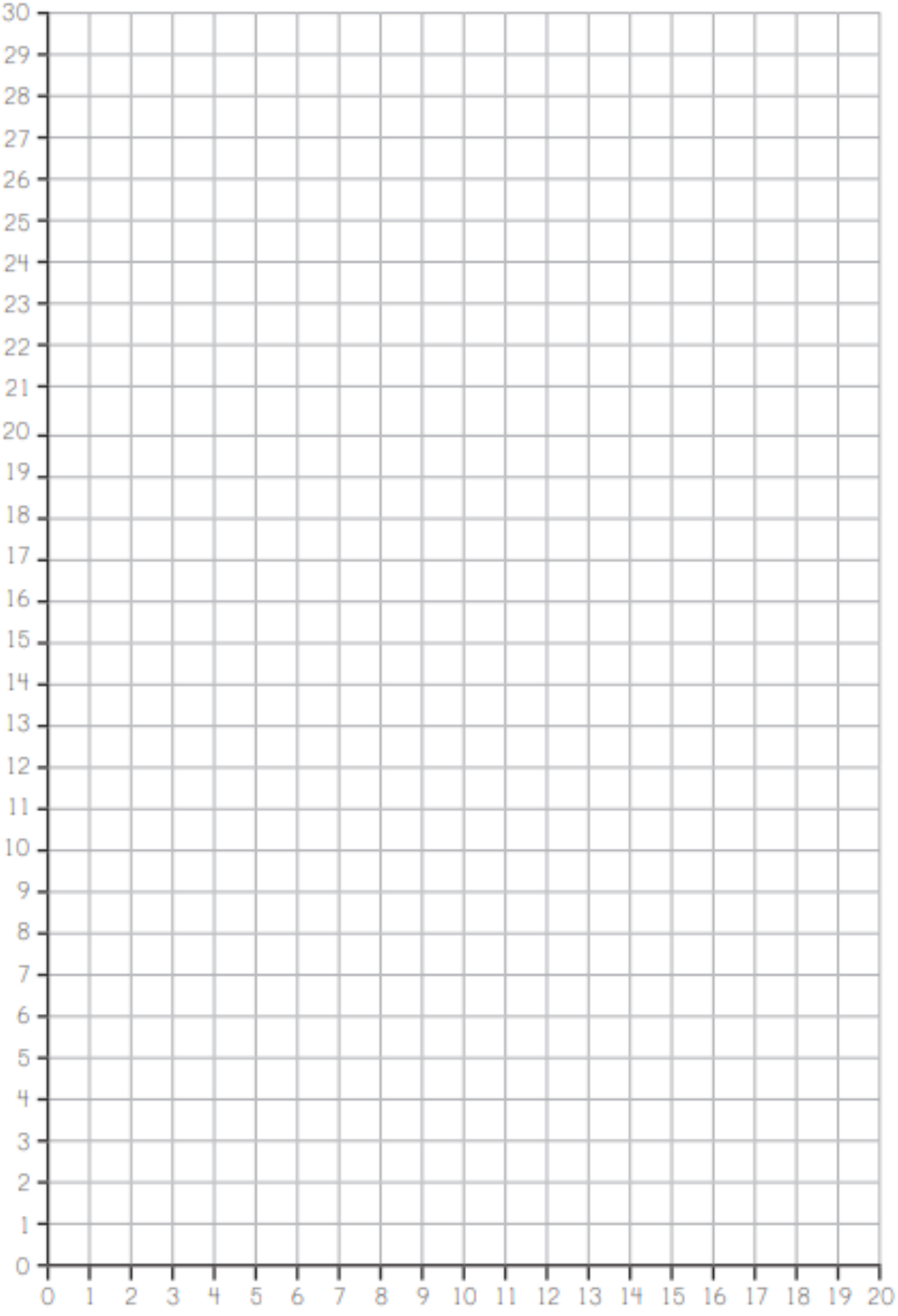
Use the graph to answer the following question.

3. What will happen to the number of canoes Randy has left after each minute passes?

For each minute that passes, the number of canoes he has left will

increase  decrease  by _____





1. **To find the x-coordinates:**
Begin with 15. Subtract 3 each time to find the next numbers in the pattern.

15 , _____ , _____ , _____

2. **To find the y-coordinates:**
Begin with 1. Multiply by 3 each time to find the next numbers in the pattern.

1 , _____ , _____ , _____

3. What are your coordinate points?

(15 , 1) ; (_____ , _____) ; (_____ , _____) ; (_____ , _____)

4. What would the next 2 sets of coordinate points be?

(_____ , _____) ; (_____ , _____)

Identifying Number Pattern Rules

Work out what the number pattern rule is for each of these patterns. The pattern might be increasing (addition +) or decreasing (subtraction −).

Use the rule to help you complete the number patterns.

14	18	22	___	___	___	**Rule:** _____
28	26	24	___	___	___	**Rule:** _____
65	___	75	80	___	___	**Rule:** _____
150	145	___	135	___	___	**Rule:** _____
36	30	24	___	___	___	**Rule:** _____
90	___	96	99	___	___	**Rule:** _____
201	211	221	___	___	___	**Rule:** _____
77	66	55	___	___	___	**Rule:** _____

Can you create your own tricky addition and subtraction number patterns?

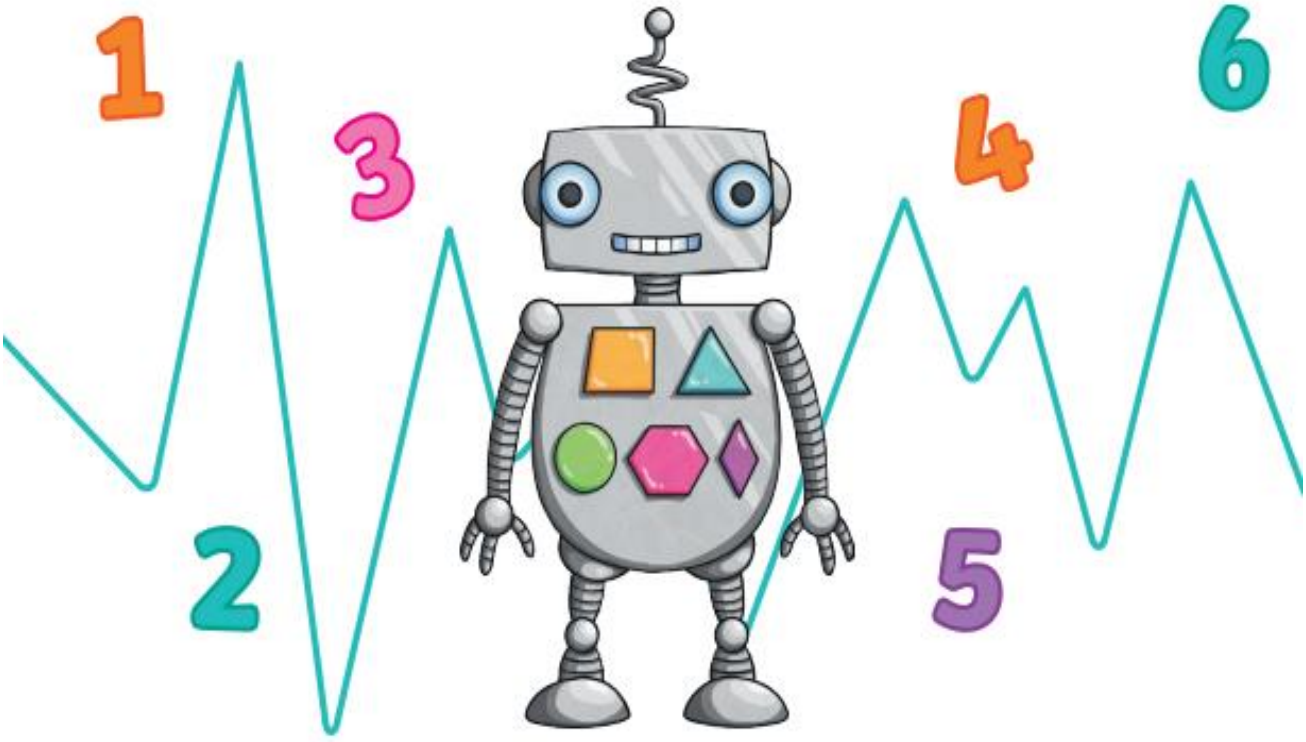
Don't forget to write down the rule!

My addition number pattern rule: _____

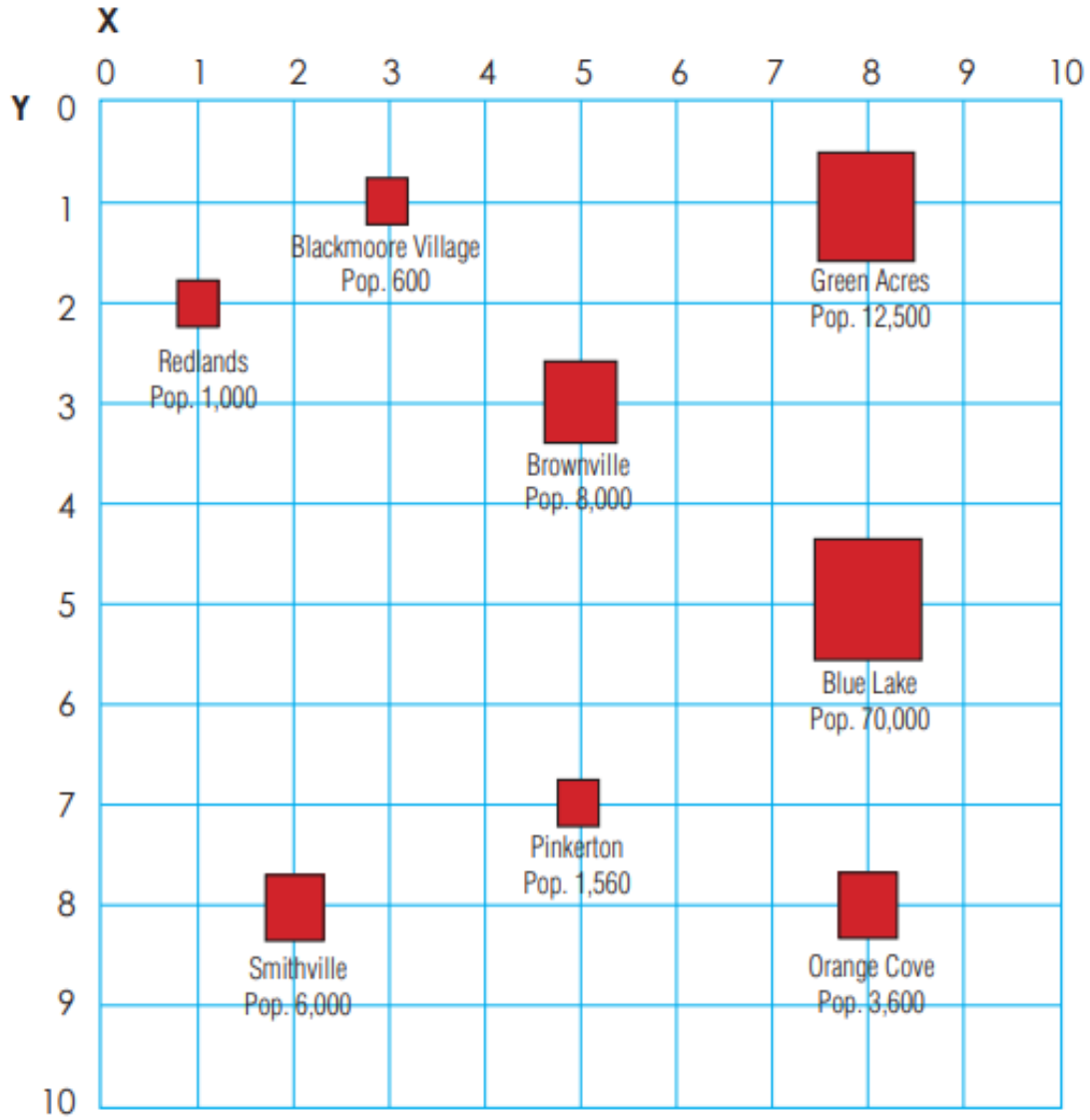
My number pattern is: ___ ___ ___ ___ ___ ___

My subtraction number pattern rule: _____

My number pattern is: ___ ___ ___ ___ ___ ___



X and Y Coordinates



Using the X and Y coordinates, list the towns by population from largest to smallest and also give their X,Y location.

	Town	X,Y		Town	X,Y
1.			5.		
2.			6.		
3.			7.		
4.			8.		

Name:_____ Date:_____

Funky Function Tables

Directions: Find the rule for each function table below.

Example

input	⟶	output
1	x2	=2
2	x2	=4
3	x2	=6
4	x2	=8

A **function table** is sometimes called an input-output table. It shows a pattern that follows a rule. In this example, the *input* is being multiplied by 2 to get the *output*. So, the **rule** is *times 2*.

In this table, the rule is given to you. But in the problems below, you will have to figure out the rule by looking at the pattern in each table.

1. Find the rule.

input	output
1	6
2	7
3	8
4	9

What is the rule?
a) x 6 b) + 6 c) + 5

2. Find the rule.

input	output
3	0
4	1
5	2
6	3

What is the rule?
a) x 0 b) - 3 c) + 3

3. Complete the table. Then find the rule.

Cookies	Chocolate Chips
1	10
2	
	30
4	40
5	

What is the rule? _____

4. Complete the table. Then find the rule.

Number of Math Problems	Minutes to Solve
	5
2	
3	15
	20
5	

What is the rule? _____

Input Output Math Tables

Determine the pattern to calculate the missing numbers.

IN	OUT
3	5
4	6
5	
7	9
9	11
10	

IN	OUT
3	3
5	
6	9
9	15
11	
15	27

IN	OUT
2	
3	6
5	10
7	
8	16
10	

IN	OUT
12	9
10	7
7	
6	
4	1
3	

IN	OUT
4	
5	
8	6
11	9
14	12
15	

IN	OUT
1	3
	6
3	9
5	15
7	
8	24

IN	OUT
1	3
3	
5	15
	18
8	
9	27

IN	OUT
0	3
2	11
3	
4	19
6	27
7	

GLOSSARY FOR EL SUPPORT LESSON PLAN:

FIGURING OUT FUNCTION TABLES

Word	Definition	Visual	
input	the number that is put into the first column of the function table	↓ input | output |	
output	the number that you get after applying the rule to the input	↓ input | output |	
number pattern	a series of numbers that relate to each other with a set rule	3, 6, 9,12,15	
rule	the math operation that needs to be applied to the input to get the output	+ 2 or x 4	
operation	math processes such as add, subtract, multiply, and divide	+ × − ÷	
function table	a chart that shows the relationship between input and output numbers		

Name: _____ Date: _____

Blank Function Tables and Coordinate Planes

Rule: _____

x	y

Ordered Pairs

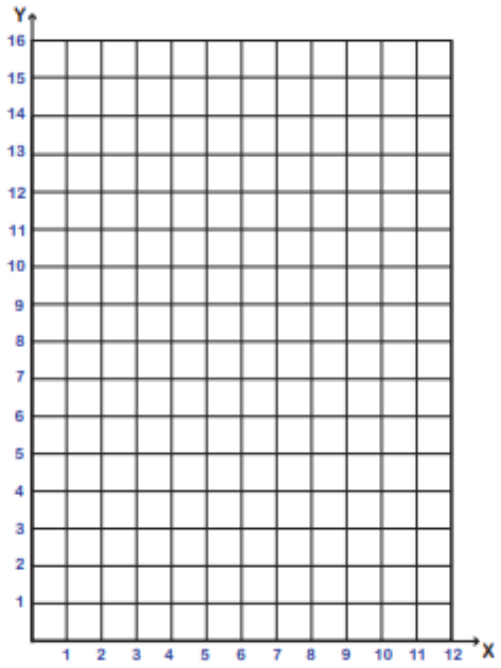
_____

_____

_____

_____

_____



Rule: _____

x	y

Ordered Pairs

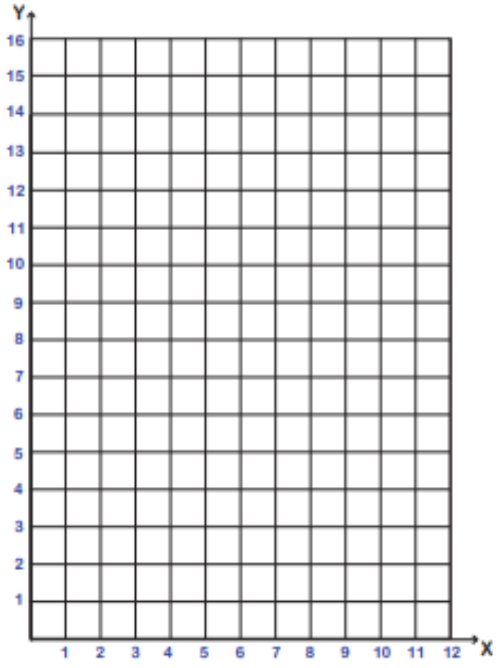
_____

_____

_____

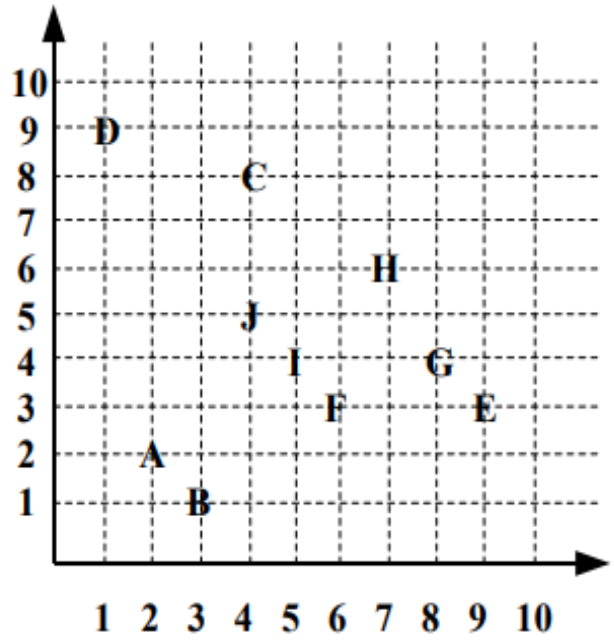
_____

_____



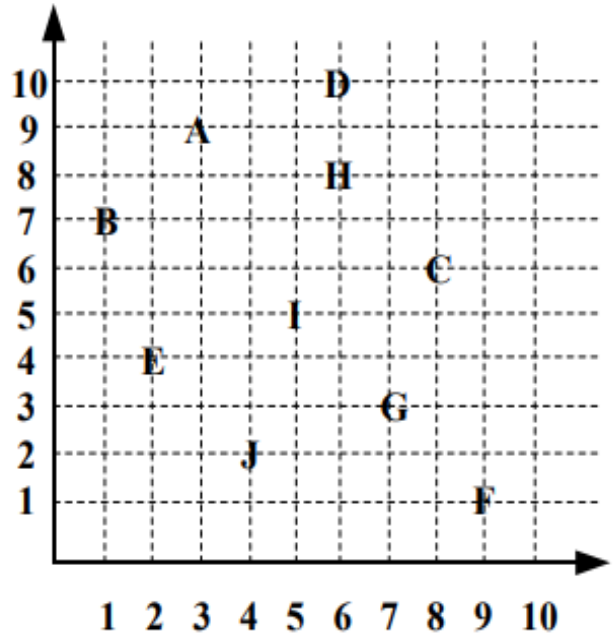
Positive Ordered Pairs

For each ordered pair, write the corresponding letter.



1. (2 , 2) =
2. (8 , 4) =
3. (1 , 9) =
4. (5 , 4) =
5. (6 , 3) =
6. (4 , 8) =
7. (4 , 5) =
8. (9 , 3) =
9. (7 , 6) =
10. (3 , 1) =

For each letter, write the corresponding ordered pair.



A =
B =
C =
D =
E =
F =
G =
H =
I =
J =

Name:_____ Date:_____

Graph it! Ordered Pairs

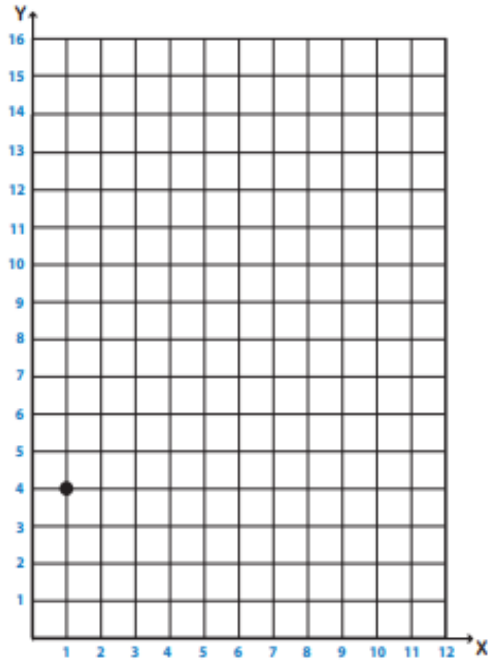
Use the function tables to find the ordered pairs. Then plot each ordered pair on the coordinate plane.

Rule: **y = x + 3**

x	y
1	4
2	5
3	6
4	7
5	8

Ordered Pairs

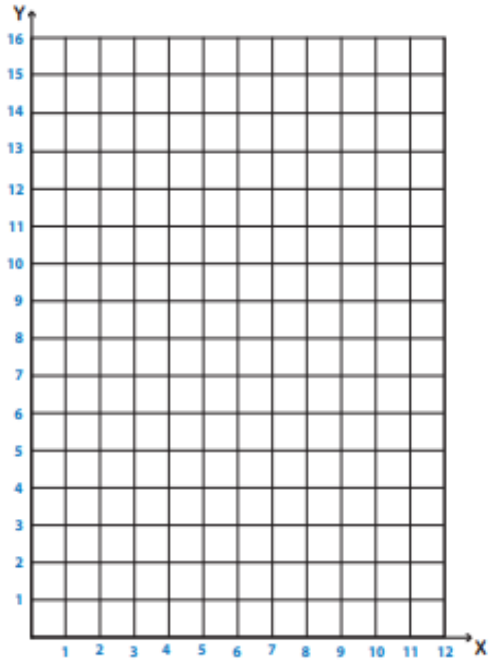
(1, 4)



Rule: **y = 3x**

x	y
1	3
2	6
3	9
4	12
5	15

Ordered Pairs



Compare the two graphs above. What differences do you notice?_____

_____

Credits

Websites Used for Worksheets and Lesson Ideas:

- https://www.education.com
- https://www.twinkl.com
- https://www.superteacherworksheets.com
- https://www.easyteacherworksheets.com
- https://www.mathworksheets4kids.com
- https://www.math-salamanders.com
- https://www.math-drills.com
- https://www.mathsisfun.com/definitions/index.html

Resources Used to Help Create the Pacing Guide:

DLM Essential Elements Unpacking

- https://www.dlmpd.com/dlm-essential-elements-unpacking

Instructional Resources for YE Model States

- https://dynamiclearningmaps.org/instructional-resources-ye/mathematics

Dynamic Learning Maps

- https://dynamiclearningmaps.org

Unique Learning System

- https://www.n2y.com/unique-learning-system