

4th Grade Enhanced Math Unit 2

Exploring Real-life Phenomena through Patterning & Algebraic Reasoning

Standards

4.PAR.3 Generate and analyze patterns, including those involving shapes, input/output diagrams, factors, multiples, prime numbers, and composite numbers.

4.MDR.6: Measure time and objects that exist in the world to solve real-life, mathematical problems and analyze graphical displays of data to answer relevant questions.

Learning Goals

- I can explore, analyze, and extend growing patterns using shapes.
- I can create and extend growing shape patterns that follow a rule and explain why the pattern continues as it does.
- I can explore, analyze, and extend numerical patterns.
- I can use input-output tables and charts to represent patterns, find relationships and solve authentic problems.
- I can identify factors of whole numbers in the range 1-100.
- I can find multiples of single-digit numbers up to 100.
- I can use factor reasoning to determine if a product is a multiple of a term.
- I can identify composite numbers and explain what makes a number composite.
- I can identify prime numbers and explain what makes a number prime.
- I can explain the relationship between prime and composite numbers.
- I can analyze data sets and find patterns in them.
- I can create and carry out a statistical investigation.
- I can create an appropriate graphical representation of the data collected.

Unit 2 Major: Tuesday, October 17th

date is tentative

Many, Many Multiples

Few, Few Factors

THE PRODUCT OF A GIVEN NUMBER AND ANOTHER FACTOR

what? TWO NUMBERS MULTIPLIED TO GET A PRODUCT

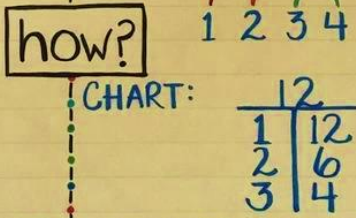
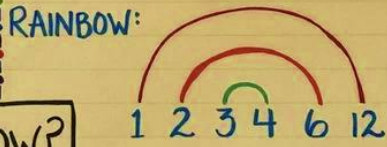
- LEAST COMMON MULTIPLE
- COMMON DENOMINATOR
- SKIP COUNTING

- when?
- GREATEST COMMON FACTOR
 - SIMPLIFYING FRACTIONS
 - PRIME OR COMPOSITE

MULTIPLES OF 6

$$\begin{array}{l} 1 \times 6 = 6 \\ 2 \times 6 = 12 \\ 3 \times 6 = 18 \\ 4 \times 6 = 24 \\ 5 \times 6 = 30 \\ 6 \times 6 = 36 \\ 7 \times 6 = 42 \\ 8 \times 6 = 48 \\ 9 \times 6 = 54 \end{array}$$

FACTORS OF 12



MULTIPLES OF 6

6, 12, 18, 24, 30, 36...

FACTORS OF 12

1, 2, 3, 4, 6, 12

Multiplication

X	0	1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10	11	12
2	0	2	4	6	8	10	12	14	16	18	20	22	24
3	0	3	6	9	12	15	18	21	24	27	30	33	36
4	0	4	8	12	16	20	24	28	32	36	40	44	48
5	0	5	10	15	20	25	30	35	40	45	50	55	60
6	0	6	12	18	24	30	36	42	48	54	60	66	72
7	0	7	14	21	28	35	42	49	56	63	70	77	84
8	0	8	16	24	32	40	48	56	64	72	80	88	96
9	0	9	18	27	36	45	54	63	72	81	90	99	108
10	0	10	20	30	40	50	60	70	80	90	100	110	120
11	0	11	22	33	44	55	66	77	88	99	110	121	132
12	0	12	24	36	48	60	72	84	96	108	120	132	144

PalaceCurriculum.com

Input-Output Tables

Input-output tables are sometimes called function tables or pattern tables. The function or pattern is the rule. The rule helps you understand the relationship between the two columns or rows. If you know the rule you can complete any input-output table.

Kids	Cans of soda
1	2
2	4
3	6
4	8

The rule for this table is $\text{kids} \times 2 = \text{number of cans of soda}$. You can use the same rule to figure out the number of cans of soda needed for 10 kids.

X	Y
4	11
8	15
12	19
16	23

The rule for this table is $X + 7 = Y$. You can use the same rule to figure out future rows added to the chart. If $X = 20$ then $Y = 27$ ($X + 7 = 27$)

Input	output
25	5
35	7
65	13
80	16

The rule for this table is $\text{input} \div 5 = \text{output}$. You can use the rule and the inverse of the rule to figure out future rows of the chart. If output = 20 then input = 100. ($20 \times 5 = 100$)

Set A	4	6	9	13
Set B	10	14	20	28

Sometimes input-output tables have a two part rule. Can you figure out what the rule is for this function table?

When you think you have figured out the rule for the function table, you want to make sure it works with every set of numbers! Make sure you always double check each set.

Prime Number

a number that has only two factors:

1 and itself

5

My factors? That's easy! It's just 1 and me!



PRIME

PRime = 1 and ME!

Composite Number

a number that has more than two factors (they create colorful factor rainbows!)

25

36



0 and 1 are neither prime nor composite.

4th Grade Enhanced Math Unit 3

Reasoning through Multiplication and Division

Standards

4.NR.2: Using part-whole strategies, solve problems involving addition and subtraction through the hundred-thousands place, as well as multiplication and division of multi-digit whole numbers presented in real-life, mathematical situations.

4.MDR.6: Measure time and objects that exist in the world to solve real-life, mathematical problems and analyze graphical displays of data to answer relevant questions.

Learning Goals

- I can demonstrate simple multiplicative relationships using concrete materials, drawings and equations.
- I can solve mathematical problems involving multiplicative comparisons.
- I can distinguish between additive (the difference of two quantities) and multiplicative comparisons (one group being a multiple of another).
- I can multiply a number 2 by 1, 3 by 1, 4 by 1, and 2 by 2 whole number whole numbers using strategies based on place value and the properties of operations.
- I can illustrate and explain multiplication using dot arrays and equations with an understanding of place value and properties of operations.
- I can understand, interpret, and solve real-life problem-solving situations in the context of word problems.
- I can solve real-life division problems involving up to 4-digit dividends and 1-digit divisors without remainders (whole number quotients).
- I can use mental computation and estimation strategies to justify the reasonableness of solution
- I can estimate and measure capacity using appropriate tools.
- I can estimate and measure mass using appropriate tools
- I can solve elapsed time problems to the nearest hour, half-hour, quarter-hour, to the nearest five minutes, and to the nearest minute.
- I can draw an open number line and solve elapsed time problems by determining when something begins, ends, or how long the event lasts (duration).
- I can use the given information to help solve problems related to time and how it connects to everyday life

Unit 3 Major: Thursday, November 16th

date is tentative

Multiplication Strategies

Box Method	Standard Method									
23×42 $20 + 3$ <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding: 5px;">$20 \times 40 =$</td> <td style="padding: 5px;">$3 \times 40 =$</td> </tr> <tr> <td style="padding: 5px;">800</td> <td style="padding: 5px;">120</td> </tr> <tr> <td style="padding: 5px;">$20 \times 2 =$</td> <td style="padding: 5px;">$3 \times 2 =$</td> </tr> <tr> <td style="padding: 5px;">40</td> <td style="padding: 5px;">6</td> </tr> </table> $800 + 120 + 40 + 6$	$20 \times 40 =$	$3 \times 40 =$	800	120	$20 \times 2 =$	$3 \times 2 =$	40	6	<p>Step 1: 154 $\times 28$ <hr style="width: 50px; margin-left: 0;"/> $1,232$</p> <p>Step 2: 154 $\times 28$ <hr style="width: 50px; margin-left: 0;"/> $1,232$ 0</p> <p>Step 3: 154 $\times 28$ <hr style="width: 50px; margin-left: 0;"/> $1,232$ $3,080$</p> <p>Step 4: 154 $\times 28$ <hr style="width: 50px; margin-left: 0;"/> $1,232$ $+ 3,080$ <hr style="width: 50px; margin-left: 0;"/> $4,312$</p>	<p>Multiply the top number by the digit in the ones place.</p> <p>Put a zero as a place holder.</p> <p>Multiply the top number by the digit in the tens place.</p> <p>Add the numbers together.</p>
$20 \times 40 =$	$3 \times 40 =$									
800	120									
$20 \times 2 =$	$3 \times 2 =$									
40	6									

Step 1: Expand each of the factors you are multiplying.
Step 2: Set up the numbers above the boxes.
Step 3: Multiply the numbers in the rows and columns.
Step 4: Add all of the products found in each of the boxes to get the total.

Division Strategies

Box Method

$756 \div 5 = ?$

dividend divisor quotient

$100 \quad 50 \quad 1 = 151 \text{ R } 1$

$5 \overline{) 756}$	$5 \overline{) 256}$	$5 \overline{) 6}$	remainder
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Step 1: What can I multiply the divisor by to get as close to my dividend without going over?
Step 2: Subtract the product from the dividend.
Step 3: Take the difference and move it to the next column.
Step 4: Repeat the steps until you get a 0 or a number less than your divisor.

Standard Algorithm for Long Division

An algorithm is a set of steps or rules that you can follow to solve a basic mathematical problem. These are the steps for the standard algorithm for long division.

Standard set up for division	Set up for long division
$8,281 \div 7$	$7 \overline{) 8,281}$

<p>Dad divide</p> <p>Mom multiply</p> <p>Sister subtract</p> <p>Brother bring down</p> <p>Rover repeat</p>	$7 \overline{) 8,281}$ 7 <hr style="width: 20px; margin-left: 0;"/> 12 7 <hr style="width: 20px; margin-left: 0;"/> 58 56 <hr style="width: 20px; margin-left: 0;"/> 021 21 <hr style="width: 20px; margin-left: 0;"/> 0	<p>Step 1: Divide 8 by 7. $8 \div 7 = 1$</p> <p>Step 2: Multiply 7 by 1. $7 \times 1 = 7$</p> <p>Step 3: Subtract 7 from 8. $8 - 7 = 1$</p> <p>Step 4: Bring down the next digit in the dividend in this case it is the 2.</p> <p>Step 5: Repeat Steps 1-5 with the remaining digits</p>
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Conversions

Mass

Grams (g)
The weight of a paperclip.

Kilograms(kg)
The weight of a pineapple.

Kilogram	Gram
1	1,000
2	2,000
10	10,000
12	12,000
50	50,000

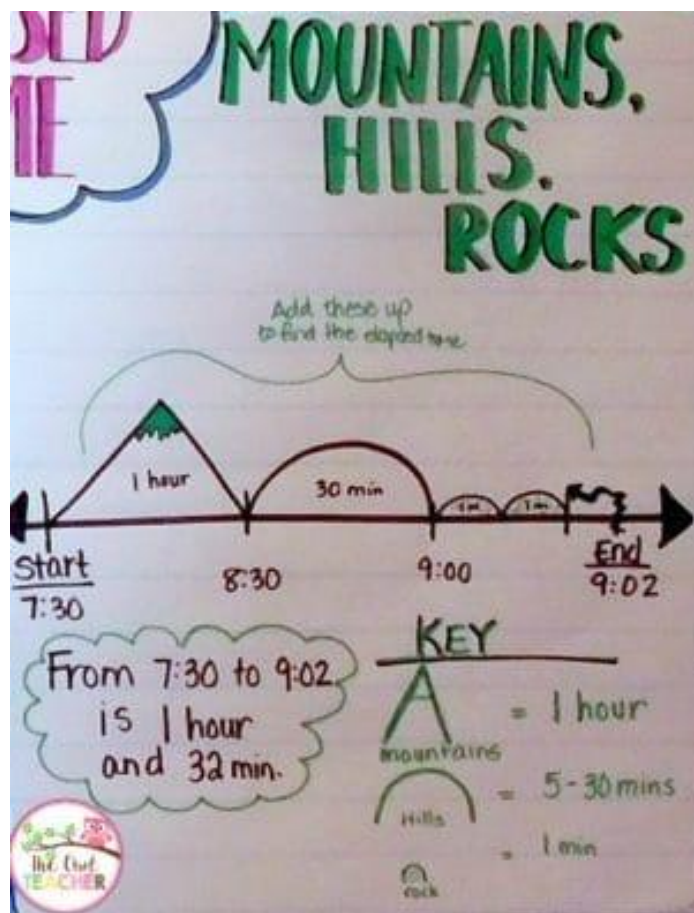
Capacity

Milliliters (ml)
The amount of water in an eyedropper.

Liters(L)
The amount of liquid in a bottle of soda.

Liters	Milliliters
1	1,000
2	2,000
10	10,000
12	12,000
50	50,000

Elapsed Time



Videos to Support Learning at Home:

Multiplication:

Area Model

<https://youtu.be/qiwJQxMvPMM>

Standard Method

https://www.youtube.com/watch?v=od-tHGrudcA&list=PLt3pCvK_cfW6bAJ19WEL1xYqGGi9Lri&index=3

Division:

Standard Method

<https://youtu.be/ITpzAicMmqo?si=Tgl5x4xgoo5mQ7jc>

Elapsed Time:

https://youtube.com/playlist?list=PLlu3HXXXgocRaa0hGbl_yNnoLLUzw1j9E&si=-ZbFwePOYir7D3YU

