



UNIT 3 WE WILL BE ABLE TO

- Determine the unknown whole number in a multiplication or division equation.
- Apply the properties of operations as strategies to multiply and divide.
- Understand division as an unknown-factor problem.
- Fluently multiply and divide within 100.
- Identify arithmetic patterns and explain the patterns using properties of operations.
- Multiply one-digit whole numbers by multiples of 10-90 using multiplication strategies.
- Tell and write time to the nearest minute and measure elapsed time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, eg. by representing the problem on a number line diagram, drawing a pictorial representation on a clock fact, etc.

Unit 3: Strategies for Multiplication

Students will use strategies to help them understand and learn their multiplication facts. By the end of Third Grade, students should know all one-digit multiplication facts from memory!

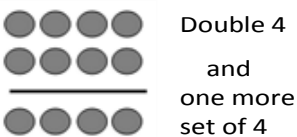
Multiplication Facts-Twos Doubles Strategy

$$\begin{array}{r} 2 \\ \times 7 \\ \hline \end{array}$$

Double 7

$$\begin{array}{r} 7 \\ + 7 \\ \hline \end{array}$$

Multiplication Facts-Threes Double and One More Set



Think:
Double 4 is 8 and one more set of 4 is 12.
($2 \times 4 = 8$; $1 \times 4 = 4$; $8 + 4 = 12$)

$$3 \times 4 = 12$$

Multiplication Facts-Fours Double and Double Again

Think:
Double 9 is 18 and Double 18 is 36.

$$4 \times 9 = 36$$

Multiplication Facts-Eights Double, Double, & Double Again

Think:
Double 7 is 14; Double 14 is 28; and Double 28 is 56.

$$8 \times 7 = 56$$

VOCABULARY

Unit 2

Array – repeated rows of numbers or objects

Multiply - an operation showing how many times a number is added to itself

Equal groups – same number of objects in each group

Factor – number of groups and the number in each group

Equation – a statement that two expressions are equal, for example $5 \times 4 = 20$

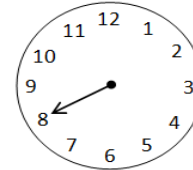
Divide – separate into equal groups

Multiplication Facts-Fives Clock Strategy

$$5 \times 8$$

Focus on the minute hand.

How many minutes after the hour is it? 40 minutes
so $5 \times 8 = 40$



$$\begin{array}{r} 5 \\ \times 8 \\ \hline \end{array}$$

Multiplication Facts-Sixes Multiply by 5 and One More Set

$$6 \times 8$$

Think:

$5 \times 8 = 40$ plus one more set of 8 is 48.
($5 \times 8 = 40$; $1 \times 8 = 8$; $40 + 8 = 48$)

$$6 \times 8 = 48$$

Multiplication Facts-Sevens Multiply by 5 and Two More Sets

$$7 \times 6$$

Think:

$5 \times 6 = 30$ plus two more sets of 6 is 42.
($5 \times 6 = 30$; $2 \times 6 = 12$; $30 + 12 = 42$)

$$7 \times 6 = 42$$

Multiplication Facts-Nines Multiply by 10 and Subtract One Set

$$9 \times 7$$

Think:

$10 \times 7 = 70$ minus one set of 7 is 63
($10 \times 7 = 70$; $70 - 7 = 63$)

$$9 \times 7 = 63$$

Unit 3: Strategies for Division

Students will understand division as an unknown factor problem.

Examples:

$$42 \div 6 = 7$$

$$45 \div 9 = 5$$

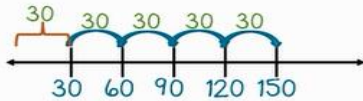
$$7 \times 6 = 42$$

$$5 \times 9 = 45$$

Multiply one-digit whole numbers by multiples of 10-90 using multiplication strategies.

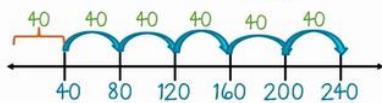
You can use a number line to help you find the product of 5 and 30.

$$5 \times 30 = 150$$



Lexi read six books this summer. Each book was forty pages in length. How many pages did Lexi read in all?

$$6 \times 40 = 240 \text{ pages}$$



Students will discover a pattern when multiplying with multiples of 10.

Examples:

6 groups of 4 is 24 ($6 \times 4 = 24$) and

6 groups of 40 is 240 ($6 \times 40 = 240$)

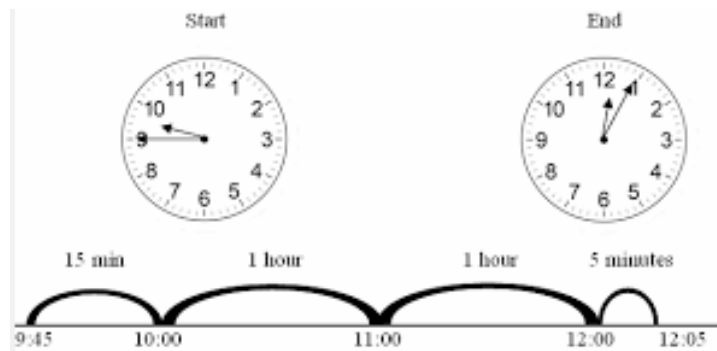
7 groups of 3 is 21 ($7 \times 3 = 21$) and

7 groups of 30 is 210 ($7 \times 30 = 210$)

Solve word problems involving addition and subtraction of time intervals in minutes, eg. by representing the problem on a number line diagram, drawing a pictorial representation on a clock face, etc.

Example:

Tony and Jimmy went to a movie last Saturday. The movie started at 9:45 and ended at 12:05. How long was the movie?



15 minutes + 1 hour + 1 hour + 5 minutes = 2 hours 20 minutes
The movie lasted 2 hours and 20 minutes.

Suggested order to learn the multiplication facts

(Starting with discovering patterns and then developing strategies and practicing strategy retrieval for each set of facts.):

Start with the Foundation Facts: Building on the Foundation Facts:

• 2s

• 10s & 5s

• 0s

• 1s

• 4s & 8s

• 3s & 6s

• 9s

• 7s

Identify arithmetic patterns and explain the patterns using properties of operations.

Students need ample opportunities to observe and identify important numerical patterns related to operations. They should build on their previous experiences with properties related to addition and subtraction. Students investigate addition and multiplication tables in search of patterns and explain why these patterns make sense mathematically.

x	0	1	2	3	4	5	6	7	8	9	10
0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10
2	0	2	4	6	8	10	12	14	16	18	20
3	0	3	6	9	12	15	18	21	24	27	30
4	0	4	8	12	16	20	24	28	32	36	40
5	0	5	10	15	20	25	30	35	40	45	50
6	0	6	12	18	24	30	36	42	48	54	60
7	0	7	14	21	28	35	42	49	56	63	70
8	0	8	16	24	32	40	48	56	64	72	80
9	0	9	18	27	36	45	54	63	72	81	90
10	0	10	20	30	40	50	60	70	80	90	100

Example:

Teacher: What pattern do you notice when 2, 4, 6, 8, or 10 are multiplied by any number (even or odd)?

Student: The product will always be an even number.

Teacher: Why?

+	0	1	2	3	4	5	6	7	8	9	10
0	0	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10	11
2	2	3	4	5	6	7	8	9	10	11	12
3	3	4	5	6	7	8	9	10	11	12	13
4	4	5	6	7	8	9	10	11	12	13	14
5	5	6	7	8	9	10	11	12	13	14	15
6	6	7	8	9	10	11	12	13	14	15	16
7	7	8	9	10	11	12	13	14	15	16	17
8	8	9	10	11	12	13	14	15	16	17	18
9	9	10	11	12	13	14	15	16	17	18	19
10	10	11	12	13	14	15	16	17	18	19	20

More Examples of Arithmetic Patterns:

• Any sum of two even numbers is even.

• Any sum of two odd numbers is even.

• Any sum of an even number and an odd number is odd.

• The multiples of 4, 6, 8, and 10 are all even because they can all be decomposed into two equal groups.

• The doubles (2 adds the same) in an addition table fall on a diagonal while the doubles (multiples of 2) in a multiplication table fall on horizontal and vertical lines.

• The multiples of any number fall on a horizontal and a vertical line due to the commutative property.

• All the multiples of 5 end in a 0 or 5 while all the multiples of 10 end with 0. Every other multiple of 5 is a multiple of 10.