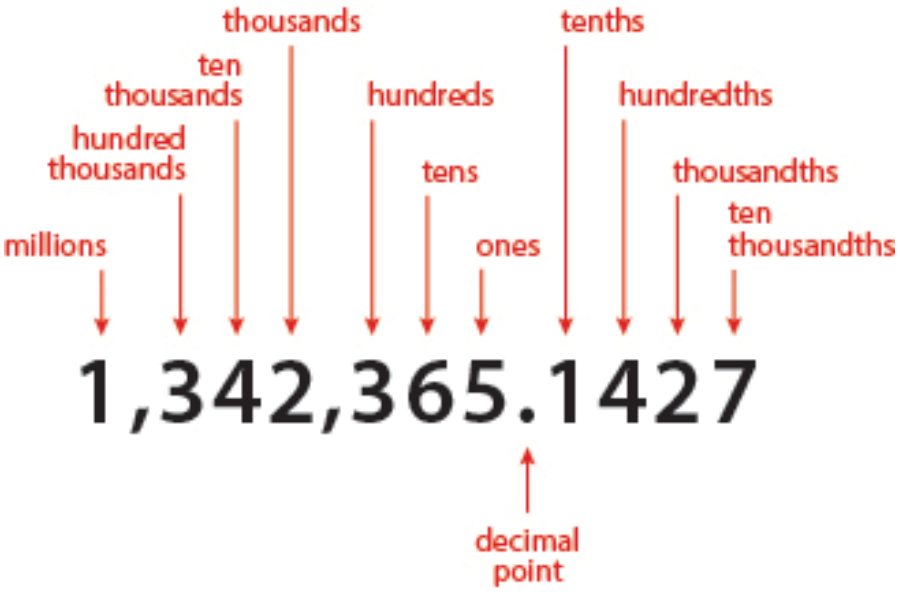
Unit 1 Lesson 1
Whole Numbers – Place Value, Rounding and Estimates

This lesson covers the following information:

- Identifying place value of a digit
- Rounding and estimating numbers

Highlights include the following:

- You must know the value of numbers In order to use numbers correctly.
- Place value is the worth of a digit based on its position in a numeral.



  - Beginning with the ones place at the right, each place value is then multiplied by increasing powers of 10.
  - Zero holds the place for a particular value when no other digit goes in that position.
- The most common way to write numbers is in standard notation.

Example: 203

- Another way to write numbers is in their English word equivalent.

Example: two hundred three.

- The least common way to write a number is in expanded notation.

Example: 203 = 2 x 100 + 0 x 10 + 3 x 1

- Rounding a given number means to find another number close to the given number.
- Numbers are rounded to make them easier to work with.
- Estimation allows you to determine if an answer is reasonable.

Reflection:

You learned to…

- Identify place value of a digit in a number
- Round numbers to a given place value

- Estimate numbers

Notes:

Word Search:

Find all the words in the list. Words can be found in any direction.

DECIMAL STANDARD NOTATION

DIGIT
EXPANDED NOTATION
PLACE VALUE
SYSTEM
WHOLE NUMBER

R F U Q E S D H K R J S E H S E I R W U
C E U R E L C T A B G R U P X S L Y K T
D R B D Z N N Y P P S F L P L K O E N K
X D W M G H R J O X I G A S Y S T E M L
Y L L Q U L C J J Y P N V Z I V Z C T P
T S A M F N B F N N D I E F L K D U F Z
X B R V U I E K H E N V C W C U D L T E
S M T P P M F L D F Z B A O X V A V M Q
E H S L V S T N O R H A L D U M D Z W A
O S X L A J O D L H I B P O I B X A P D
I G V B Z T Z S K G W U Y C F P R R A F
Q H Y U A J C V K B S Z E W U I B H W H
N O I T A T O N D R A D N A T S X U O C
D L I A N M S P Z I V U D D E N V W A G
A O I W H N K D F J G C U U R M Y R F T
N A F O B H D U J R E I F S X V Q V Q P
R Y A P J V N C G E U P T G E B W E J S
O M Q V V Y O K J Y B N L V F V N P E M
Y P V Y S X Z J Z Q M D G M D N E U E T
O N S J L T N Q S G J G Q L C M Z M G M

Practice Problems:

Write the place value of the underlined digit.

12<u>2</u>57 _____

185081 _____

591 _____

1883 _____

5466 _____

5946 _____

1043761 _____

4072 _____

39127 _____

736225 _____

Identify the digit in the place value.

5247	_____ thousands,	_____ tens,	_____ ones,	_____ hundreds
2589	_____ thousands,	_____ tens,	_____ ones,	_____ hundreds
9547	_____ thousands,	_____ tens,	_____ ones,	_____ hundreds
3423	_____ thousands,	_____ tens,	_____ ones,	_____ hundreds
5207	_____ thousands,	_____ tens,	_____ ones,	_____ hundreds
6561	_____ thousands,	_____ tens,	_____ ones,	_____ hundreds
2052	_____ thousands,	_____ tens,	_____ ones,	_____ hundreds
7774	_____ thousands,	_____ tens,	_____ ones,	_____ hundreds

Unit 1 Lesson 2
Whole Numbers – Addition, Subtraction, Multiplication, and Division

This lesson covers the following information:

- How to add, subtract, multiply, and divide whole numbers
- Understanding the special rules

Highlights include the following:

- Addends are the numbers being added.
- The **commutative property of addition** means that the order which the numbers are added does not matter.

  Example: 7 + 5 = 5 + 7
- The **associative property of addition** refers to grouping of numbers. You can only add two numbers together at a time before you add the third number.

  Example: 5+7+13
  (5+7)+13
  5+(7+13)
- The **additive identity property** means that any number plus zero is the original number.

  Example: 106+0=106
- Writing numbers vertically helps make sure the place values are lined up in columns.

  Example:
  $$\begin{array}{r} 157 \\ +31 \\ \hline 188 \end{array}$$

- When subtracting numbers, write the numbers vertically so the place values are lined up in columns.
- Subtract only the digits with the same place value.

  Example:
  $$\begin{array}{r} 173 \\ -21 \\ \hline 152 \end{array}$$

- Borrowing happens when the digit is smaller than the digit being subtracted.
- **Factors** are the numbers being multiplied. The result of multiplication is the **product.**
- The **commutative property of multiplication** means the order which the numbers are multiplied does not matter.

  Example: 2 x 3 = 3 x 2
- **Associative property of multiplication** means that you can only multiply three numbers, you can only multiply two at a time.
- **Zero factor law** means that any number times zero is zero.
- In division, you find out how many times one number is contained in another.

Reflection:

You learned how to add, subtract, multiply, and divide whole numbers. You learned addition

properties. You learned the multiplication properties necessary to move to the next step as well! Now you are ready to apply these skills to solve word problems.

Use this table as a way to study multiplication facts.

×	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

Notes:

Word Search:

Find all the words in the list. Words can be found in any direction.

ADDENDS
DIVIDEND
DIVISOR
MULTIPLICATION
QUOTIENT
SUM
DIFFERENCE
DIVISION
FACTORS
PRODUCT
REMAINDER
WHOLE NUMBER

W D D N F F F S M J E H R I I D N K F Q
H Q I L O G B D U C X E U O Y J J N U X
A Z V V M I F Z N T H R G E S R W O T Q
S J I M I X T E I C F G W X S I T L R T
R U D L D S R A K D Y K K V D I V I L N
O Q E J A E I R C P H E C I E M M I O R
T X N D F Q Z O C I F U S N T P W N D E
C W D F O C U G N C L S T C K G M H N B
A I I S D N E D D A F P U V N F J B X M
F D Y O P Z S S C B F D I G J N E S I U
U Z H S U Y U F I I O Z A T C Y X H O N
Y Q B P X E P R V R V M B B L J K Q Q E
C C H Q L K P F P K R N G X M U P D N L
I C O L A W D R X V O K O J S Y M Q N O
H H D L N U P N F F X D Y Q D F T K P H
S P F L L T T B G R E D D A I R C T P W
M S W T W J Z K G O M Y R K T W Y P P G
H J D H J V U J I Q M G F T F M P K T F
N T V Z N C E B C Y E X K X P Q C G R J
S U M J H F C N H G R E M A I N D E R G

Practice Problems:

1. Jason wanted to eat healthier and decided to buy fruit and vegetables at the grocery story. He spent $4.00 for a bag of apples, $7.00 for a large box of oranges, $6.00 for 3 pounds of green beans. He paid the clerk with a $20.00. How much change will Jason receive? _____

2. Jolene treated 5 of her friends to a night out at the baseball game. She bought 3 hotdogs, 2 servings of nachos, and 4 pizzas. Each of the items cost $1.50. How much did she pay for all the food? _____

3. A hostess of a birthday party bought 6 pizzas with 8 slices each. There were 5 children and together they ate 15 slices of pizza. How many slices were left?
   _____

4. A group of 8 friends entered the 30-Day Push-Up Challenge. Each day, they did 10 push-ups. How many push-ups were completed during the challenge?
   _____

5. There are 365 days in one year. How many days are in 14 years?
   _____

6. The local adult education program has classes at 7 different locations. Each location has 2 classes, one during the day and one during the evening. There are 12 students in each class. How many students are involved in the adult in the adult education program? _____

7. Mr. Johnson has a field trip planned for the children who attend his community center where he will supervise one group. There are 256 children who want to attend the trip. Mr. Johnson needs 31 adults to help. Each adult will supervise one group. How many children will be in each group? _____

8. A fruit farm packs apples in boxes that hold 10 apples each. One day, 2650 apples were packed. How many boxes were used? _____

9. Kendall has been collecting coins since he was 8 years old. He decided to cash in his change. He discovered there were 4380 pennies. How many dimes would this be?
   _____

10. You want to plan a fundraiser. The expenses are $200.00. Your goal is to earn $600.00 profit. How many tickets would you need to sell at $5.00 each?
    _____

This lesson covers the following information:

- How to define mean, median, mode, and range.
- How to solve math problems involving mean, median, mode, and range

Highlights include the following:

- The mean of a set of numbers is the average.
- In order to find the mean, add all the numbers and then divide the sum by the total numbers of items.
- The median is the exact middle number in a group of numbers.
- If there is an even number of items in the data set, add the two middle numbers and then divide by 2.
- The mode of a set of data is the value in the set that occurs most often.
- Not every set of numbers has a mode.
- Some sets may have more than one mode.
- The range is the difference between the highest and lowest values in a set of numbers.

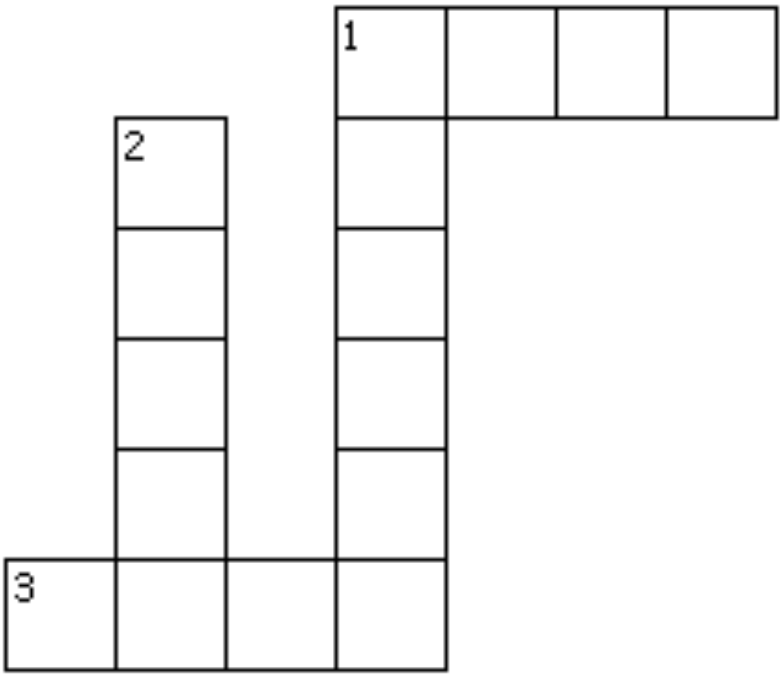
Reflection:

The mean, median, mode and range are measures of central tendency that describes a set of data. The mean is calculated by adding all of the numbers in a set and dividing by the total numbers in the set. The median is the middle value, and the mode is the most common number. Range refers to the difference between the smallest and largest numbers in the set.

Notes:

Crossword Puzzle:

Use the clues to solve the puzzle.



Across
1. The most common value in a set of numbers.
3. The average of a given set of numbers.

Down
1. The middle value of an ordered set of values.
2. The difference between the highest and lowest values in an ordered set.

Practice Problems:

1. There are 6 employees working at a fast food restaurant. Their weekly salaries are $140, $220, $90, $180, $140, $200?
   a. What is the mean? _____
   b. What is the median? _____
   c. What is the mode? _____
   d. What is the range? _____

2. The basketball team has total scores of 84 points, 65, and 76 in the last three games. What score is needed to have an exact average of 80 for the fourth game?
   _____

3. You are thinking about moving to a warmer state. In order to make the decision, you decided to track the number of warm days each month. Your data set for the year is 14, 14, 10, 12, 11, 13, 11, 11, 14, 10, 13, 8.
   a. What is the mean? _____
   b. What is the median? _____
   c. What is the mode? _____
   d. What is the range? _____

4. If the number of sunny days doubles in the next year…
   a. What is the mean? _____
   b. What is the median? _____
   c. What is the mode? _____
   d. What is the range? _____

5. Use the chart to answer the questions.

Home Values	Number of Homes
$50,000.00	5
$100,000.00	2
$125,000.00	3
$150,000.00	1

   a. What is the mean? _____
   b. What is the median? _____
   c. What is the mode? _____
   d. What is the range? _____

Whole Numbers – Exponents

This lesson covers the following information:

- How to solve problems with exponents or powers.
- How to simplify powers of 0 and 1.
- How to use exponents with geometry.

Highlights include the following:

- Exponents are an abbreviated way to show multiplication.
- A power is the product of multiplying a number by itself while the exponent tells how many times the base number is being multiplied.
- Any whole number raised to the first power is equal to itself.
- Any non-zero number raised to the 0 power is equal to one.
- Examples of formulas using exponents are area of a square and volume of a cube.
- Area of a square is $A = s^2$ where A = area and s = side.
- Volume of a cube is $V = s^3$ where V = volume and s= side.
- The square root of a number is the number that when multiplied by itself equals the given number.
- The Pythagorean Theorem is “The square of the hypotenuse of a right triangle is equal to the sum of the square of the other two sides.” The formula is $c^2 = a^2 + b^2$

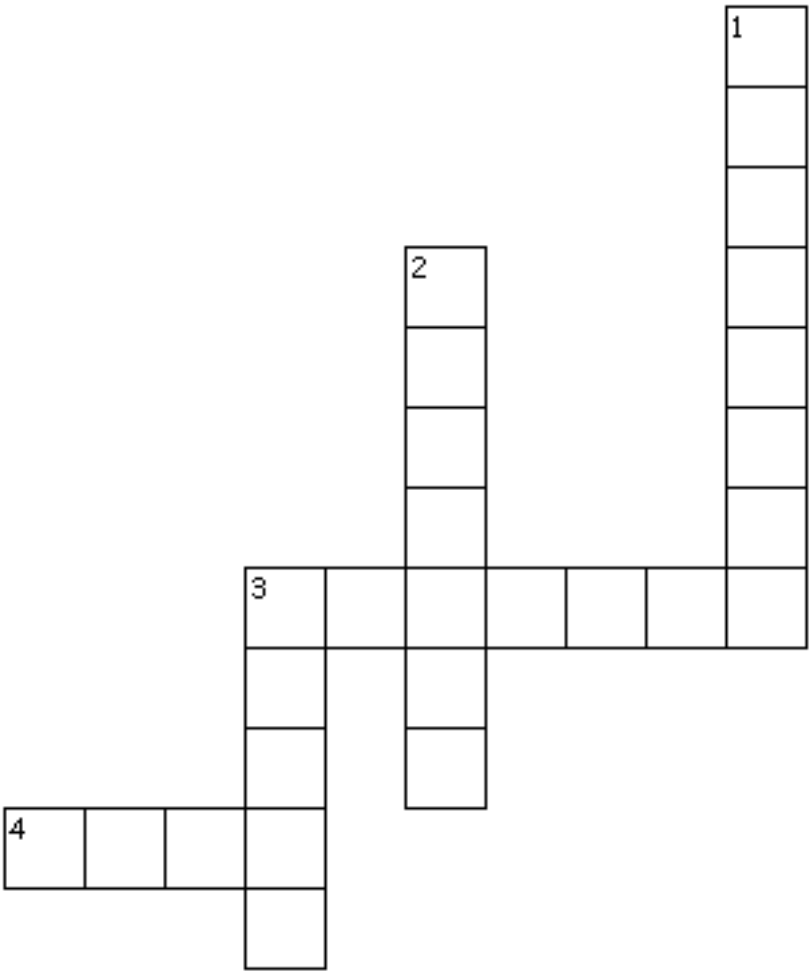
Reflection:

You've covered the basics of exponents. It’s important to learn the terms base, exponent, and product. There were three formulas containing exponents that were covered in the lesson. They included the area of a square, volume of a cube, and Pythagorean Theorem. When you label the answer to a volume problem, the units will always be cubed.

Notes:

Crossword Puzzle:

Use the clues to solve the puzzle.



Across
3. The answer to a multiplication problem.
4. The factor that is multiplied repeatedly.

Down
1. The number of times that the base is used as a factor.
2. Numbers that are multiplied.
3. The product of multiplying a number by itself while the exponent tells how many times the base number is being multiplied.

Practice Problems:

1. 7^4 = _____

2. 6^3 = _____

3. 25^5 _____

4. 8^3 = _____

5. 10^0 = _____

6. A carpenter takes a piece of plywood that is 10 inches long and uses a table saw to make a 15-inch cut from corner to opposite corner. What was the width of the piece of plywood?
_____

7. To get from the bottom of a slide to the ladder, you have to walk 8 feet. The ladder is 10 feet high. How long is the ladder? _____

8. You are moving and want to pack a small square jewelry box into a larger packing box. The length of a side of the small square box is 3 inches. The length of a side of the bigger box is 7 inches. You want to know what else might fit in the large box. What is the area of the region that is outside the small square but inside the large square? _____

9. Find the volume of a cube if the length of one side is 3 centimeters. _____

10. What is the length of a side of a cube if the volume $75cm^3$?_____

Whole Numbers – Order of Operations

This lesson covers the following information:

- How to use order of operations to solve math problems.

Highlights include the following:

- The order of operations does not matter in addition or multiplication.
- The order of operations does matter in subtraction and division.
- Subtraction and division must be performed from left to right.
- When more than one mathematical operation is used, the rules for order of operations is followed.
    - **P –** Complete all work inside parenthesis and any work above and below fraction bars.
    - **E –** Simplify exponents and roots.
    - **M & D** – Start at the left, and then complete the multiplication and division working toward the right.
    - **A & S –** Start at the left, and then complete the addition and subtraction working toward the right.

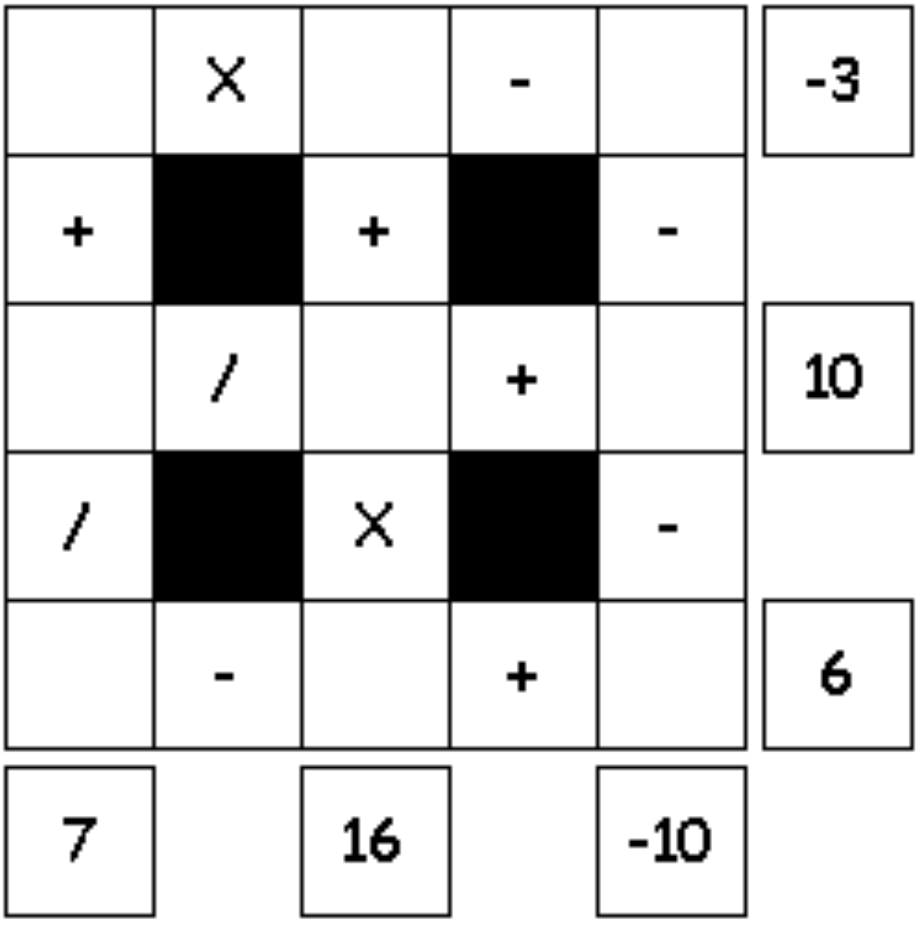
Reflection:

It is important to have rules about which mathematical operations should be done first. If those rules aren't followed, you may arrive at an incorrect answer. The mnemonic used to remember the order of operations is Please Excuse My Dear Aunt Sally.

Notes:

Math Box:

Each row and each column is a math equation. Use the numbers 1 through 9 to complete the equation. Each number is only used once.



Practice Problems:

1. $(4+3)^2+(18\div 2)=$ _____

2. $(96-6^2)\div(9-7)=$_____

3. $2\bullet(10-2)+3^2=$_____

4. $(10\bullet 8+2^2)+8=$_____

5. $(68-6^2)\div(8-6)=$_____

6. $(10+22-4)\div 4+5^2=$_____

7. $(12+45-5^2)\div(2+6)=$_____

8. $7(7\bullet 3-5^2)+2=$_____

9. $2(8\bullet 6-7^2)+3=$_____

10. $(12-3)^2+(16-14\div 2)=$_____

Whole Numbers – Prime Numbers

This lesson covers the following information:

- How to identify prime and composite numbers.
- How to identify at least two pairs of factors of composite numbers.
- How to find pairs of factors that add up to a given number.

Highlights include the following:

- Prime numbers are counting numbers with exactly two factors.
- A composite number has more than two factors.
- 1 is neither composite nor prime.
- If you look for pairs of factors in order until you find a factor that has already been used, you will not overlook any factors.
- Understanding factoring with numbers is used in algebra.

Reflection:

Prime numbers are important in math. They are used in fractions and in simplifying equations. It's important to remember that prime numbers have exactly two factors. It is also important to remember that 1 is neither prime nor composite and two is the only even prime number.

Notes:

Cryptogram:

Each number represents a letter of the alphabet. When you have identified the number / letter connection, you will reveal a phrase.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
															3										

P

3 6 1 11 16 26 17 11 14 16 6 13 15 6 16 4 23 17 26 5 1 26 10

26 17 11 14 16 6 13 9 1 5 25 16 22 15 4 5 19 21 5 9 23 24 15 4 5 23

6 13 . 6 16 11 16 11 14 16 6 5 25 15 5 24 15 4 5 23 6 13

P

15 6 16 26 17 11 14 16 6 13 5 25 15 5 15 6 16 11 17 19 5 1 3 19 1 16

18 .

Practice Problems:

1. A rectangle has an area of 11 square feet. The area is found by multiplying length times the width. What whole number dimensions (length and width) are possible?

2. A rectangle has an area of 9 square feet. The area is found by multiplying the length times the width. What whole number dimensions (length and width) are possible?

3. List all the prime numbers from 1 – 20.

4. List all the composite numbers from 1 – 20.

5. 75 is a _____ number.

6. 89 is a _____ number.

7. 63 is a _____ number.

8. 21 is a _____ number.

9. 32 is a _____ number.

10. 57 is a _____ number.

Whole Numbers – Prime Factorization

This lesson covers the following information:

- How to identify the product of a prime.
- How to find the prime factorization for any counting number.

Highlights include the following:

- A **prime factorization** for any number is the product of all the prime factors of a number.
- You can tell if you have a prime factorization for a number if the following are true.
  - The factors multiply to give the number
  - All the factors are prime.
- For every number greater than 1, there is one unique prime factorization. This means that each number will only have its own prime factorization.
- The goal in writing the prime factorization of a given number is to write that number as a product of prime numbers.
- Method One:
  - Think of one prime number that will divide evenly into the given number.
  - Divide the given number by the prime number you've chosen.
  - Think of one prime number that divides evenly into the quotient.
  - Continue this process until the final quotient is also a prime number.
- Method Two: The Factor Tree
  - Think of any number that will divide evenly into the given number.
  - Write the number below the original number as the product of two numbers.
  - Continue the process until you find the prime number.

Reflection:

Each number in the prime factorization is a prime number. If it isn't, you need to continue factoring until all numbers are prime. It is helpful to write the prime factors in order from least to greatest.

Notes:

Word Scramble:

Each block of letters is considered a tile. Unscramble the tiles to solve the phrase.

MBE	NG	LIE	PR	D,	A	ED	US
ERS	SE	AT,	EN	TH	REP	HE	SET
NUM	IZA	FAC	EAT	OF	EN	IME	FAC
DE	RS	TIP	RIM	PRI	S A	UMB	MAY
ME	NTI	N I	MUL	L G	NU	CLU	TOR
WIL	COU	. T	WH	S .	TOR	F P	TIO
IN	IVE	BER	T O				

Practice Problems:

List the prime factorization for each number.

1. 63

2. 80

3. 105

4. 95

5. 114

6. 51

7. 22

8. 46

9. 99

10. 135

Unit 1 Lesson 8
Whole Numbers – Prime Numbers and Least Common Multiple

This lesson covers the following information:

- What is the least common multiple?
- How do you find the least common multiple for a group of two or three numbers?
- What is the connection between prime numbers and least common multiples?

Highlights include the following:

- Multiples of a number are the result of multiplying a given number by 1, 2, 3, 4, and 5.
- The least common multiple, LCM, of two numbers is the smallest number that is a multiple of both numbers.
- Steps to find the LCM:
    - Write the prime factorization of each number.
    - Make a list of prime factors.
    - Include repeated prime factors the maximum times it is used in any one factorization.
    - Multiply these factors together to find the LCM.

Reflection:

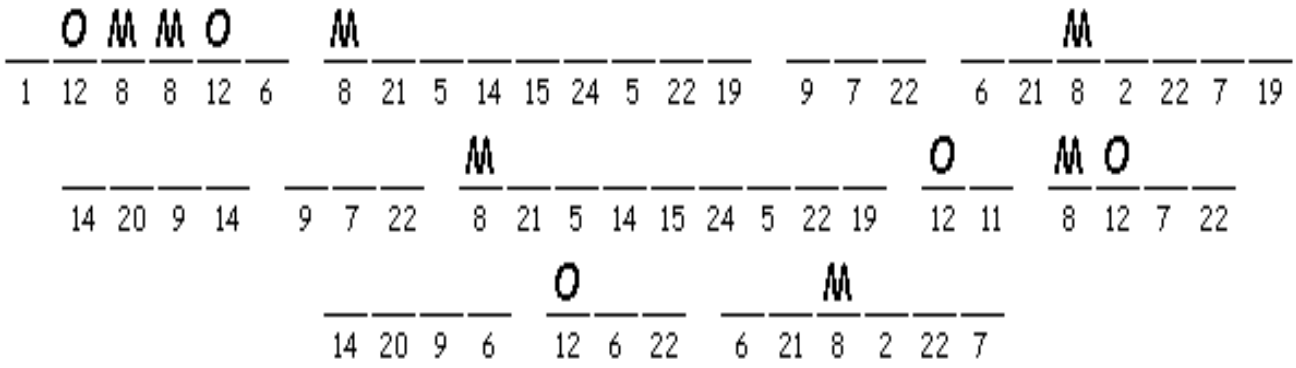
Prior to this lesson, we discussed exponents. In order to work with exponents and parenthesis, we learned order of operations. After that, we talked about prime numbers and then prime factorization. All of this was preparation for finding the least common multiple. Together, these are the building blocks of higher math skills.

Notes:

Cryptogram:

Each number represents a letter of the alphabet. When you have identified the number / letter connection, you will reveal a phrase.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
												8		12											



Practice Problems:

1. Find the least common multiple of 16 and 8.
2. Find the least common multiple of 50 and 35.
3. Find the least common multiple of 12 and 15.
4. Find the least common multiple of 2 and 3.
5. Find the least common multiple of 4, 8, and 12.
6. Find the least common multiple of 3, 9, and 36.
7. Every 4 days, Michael and his friends go out to lunch. Every 5 days, he goes out to breakfast with his mother. If he had both events today, when is the next time he will have lunch with his friends and breakfast with his mother on the same day?
8. Jackie is starting a new workout routine. Every 4 days, she goes to the gym to use the weight room, every 6 days, she runs one mile, and every 16 days she swims. If she did all three activities today, when will the next time she will do all three activities?
9. If a half-moon appears once every 30 days and the last half-moon was on Sunday night, how long before there is another half moon.
10. Hot dog buns are sold in packages of 6. However, hotdogs are packaged with 8 to a package. If you want to have enough buns for the hot dogs, what is the least amount of buns and hotdogs that need to be purchased?

Unit 1 Lesson 9
Whole Numbers – Problem Solving

This lesson covers the following information:

- How to solve word problems.

Highlights include the following:

- Word problems are short stories that ask questions.
- The TIPS Strategy:
  - Thought
  - Information
  - Plan
  - Solution
- Thought: Read the whole problem and identify the question. What are you trying to solve?
- Information: Identify the key words and parts of the problem.
- Plan: How are you going to solve the problem?
- Solution: Solve the problem and make sure the answer makes sense. Does it answer the question?

Reflection:

Story problems require you to use many different math operations. You may need to add, subtract, multiply, and divide. By using the information covered in the lessons and applying a strategy such as TIPS, solving word problems becomes less complicated. Being able to decide which operation to perform is based on experience and practice as well as being able to look for key words.

Notes:

Word Search:

ADDED TO
DECREASED BY
INCREASED BY
MINUS
SUM
COMBINED
DIFFERENCE
LESS THAN
MORE THAN
TOTAL

R J N S U N I M W H D N O U Q
G B E L E C N E R E F F I D W
O H E A D H C V C S V W N E K
P C F T C F R R K U G O N N P
I O Z O L C E O Y M X I Z I O
M K O T E A A T O Q D D U B H
E D T D S A S R N V P Q E M O
P J D E S R E T Z O Y Q K O F
H P D D T T D L H Q B V F C A
Y B L D H W B Y S U D E G Z O
Y K I A A L Y F Q F J B K H G
G L N J N O Z R W U G E M S H
T Y Z V M D T W O K T S O C R
A T O M I T Y I V K V N F Y O
S W I D O N B M L P U K K O S

Practice Problems:

1. Gary's son gave him a gift certificate for $150. Gary bought 2 concert tickets for $10 each. He bought a shirt, pants, and shoes for $90.00. How much money was left on the gift card?

2. Angie makes homemade berry jam every year. To make enough jam to get through the winter, Angie needs 15 cartons of fruit. She already has 1 carton of blackberries and 2 cartons of strawberries. Angie is getting ready to go to the Farmer's Market because they have a sale of 4 cartons of berries for $6.00. How many cartons of fruit should Angie buy?

3. 12 children and 6 adults went on a field trip to a zoo. They needed to purchase tickets to get into a show. However, two adults had coupons for the event. For each adult who purchased a ticket, a child ticket was free. How much was the total cost of the tickets?

4. Coryn is organizing her office. She has 6 red folders. She has 4 less yellow folders than red envelopes. However, she has 8 times as many white folders as yellow. How many folders does Coryn have in total?

5. Bobby's Bike Store has 20 used bicycles and 8 tricycles in storage. How many wheels are there in all? (Hint: bi means two and tri means three.)

6. The school was trying to determine if there were enough lunch chairs for the Kindergarten class. There were 9 round tables and 6 rectangular tables. Each round table has 5 chairs, and each rectangular table has 4 chairs. There were 75 students. Are there enough chairs for the Kindergarten class? If so, how many? If not, how many more are needed?

7. The basketball team wanted to donate money to the local booster club. For every person that attended the Friday night game, the team pledged $3.00 out of very $5.00 ticket sold. 500 tickets were sold at the game. How much did the team donate to the booster club?

8. Francis bought books at the library book sale. He bought 8 hard copy books at $3.00 each. He also purchased 20 paperbacks for a total of $15.00. How much did Francis spend at the book sale?