**Big Idea:** Whole numbers can be broken into smaller parts.

<table>
<thead>
<tr>
<th>Class: Grade 6 1-2</th>
<th>Date:</th>
</tr>
</thead>
</table>

**Content Objective:**
- SWBAT find the prime factorization of a prime number.

**Language Objectives:**
- SWBAT orally justify why a number is prime or composite.
- SWBAT explain the relationship between a number and its factors.

**Key Vocabulary:**
Factor
Prime Number
Composite Number
Prime Factorization
Neither
Common
Greatest

**Materials:**
Cupcake WS
SG & I WS
IP WS
Chart Paper
Color Pencils
Markers

**Higher Order Questions:**
What is the meaning of the word prime? *First or original*
What is the meaning of the word composite? *Made up of different parts*
What is the meaning of factor? *One thing that contributes to another. The prime parts of a pizza are sauce, cheese and dough and the composite is the pizza.*

**Warm Up:**
1. Turn and talk to your neighbor. In one minute, come up with a real world object and its parts. Make a list of what makes your object. EX) A cookie is made of up of sugar, flour, eggs, oil and butter. Teacher (T) will collect group papers and share a few examples and guide class discussion.
2. What is the meaning of the word prime? (first or original)
3. What is the meaning of the word composite? (made up of different parts)
4. Think about a house, what do you need to make a house? Nails, wood, metal, and glue.
5. Think of the house as a composite because it’s made out of different things. All the things that make up the house are prime because they can’t be broken down into any smaller parts.
6. Pass out the cupcake worksheet (WS) and ask students to complete the WS as guided practice, labeling ingredients as primes and cupcake as composite.
7. Now look at your WS and in pairs, label the items that you see as either composite or prime.
8. Have students share and guide discussion to focus on a composite being made out of its primes.
   TW will ask students how a composite number may be like a cupcake?
   TW will explain that a cupcake is made up many single ingredients that can’t be broken down anymore. The single ingredients are like prime numbers because they can’t be broken down any smaller. A prime number only has two factors, 1 and itself. The cupcake is like a composite number, it’s made up of prime numbers.

**Learn:**
1. Using the LCD, project the curriculum study guide and intervention on board as visual
2. Using the SG & I 1-2, review the definitions highlighted in the box at the top, pointing to each word. Have students orally repeat the definitions.

3. Work through example number 1 together. T will orally explain which numbers are composite and which numbers are prime. “We know a number is prime when its only factors are one and itself.”

4. Work through example number 2 together.

5. Using the notes on SG & I, in pairs Ss complete exercises 1-16.

6. After 10 minutes, go over the answers as a whole group. Use the following sentence starter to completely answer your question. ____________ (number) is (prime/composite) because ____________.

7. For independent practice, complete the Independent Practice (IP) page. T will circulate the room to check for understanding.

Closing:

1. Working with your group, use what we have discussed today and create an anchor chart to hang up in the room. Be sure to include on your anchor chart: prime, composite, factor, and numerical (number) examples. Design your anchor chart in a way that will help our whole class remember these ideas.

2. Students present examples orally.
Prime or Composite?

1) ______________________
2) ______________________
3) ______________________
4) ______________________
5) ______________________
6) ______________________
Study Guide and Intervention

Prime Factors

Factors are the numbers that are multiplied to get a product. A product is the answer to a multiplication problem. A prime number is a whole number that has only 2 factors, 1 and the number itself. A composite number is a number greater than 1 with more than two factors.

Example 1  Tell whether each number is prime, composite, or neither.

<table>
<thead>
<tr>
<th>Number</th>
<th>Factors</th>
<th>Prime or Composite?</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>$1 \times 15$  \hspace{1cm} $3 \times 5$</td>
<td>Composite</td>
</tr>
<tr>
<td>17</td>
<td>$1 \times 17$</td>
<td>Prime</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>Neither</td>
</tr>
</tbody>
</table>

Example 2  Find the prime factorization of 18.

18 is divisible by 2, because the ones digit is divisible by 2.
Circle the prime number, 2.
9 is divisible by 3, because the sum of the digits is divisible by 3.
Circle the prime numbers, 3 and 3.
The prime factorization of 18 is $2 \times 3 \times 3$.

Exercises

Tell whether each number is prime, composite, or neither.

1. 7
2. 12
3. 29
4. 81
5. 18
6. 23
7. 54
8. 28
9. 120
10. 243
11. 61
12. 114

Find the prime factorization of each number.

13. 125
14. 44
15. 11
16. 56

Chapter 1
1-2
Skills Practice
Prime Factors

Tell whether each number is **prime**, **composite**, or **neither**.

1. 0  
2. 1  
3. 2  
4. 3  

5. 4  
6. 5  
7. 6  
8. 7  

9. 8  
10. 9  
11. 10  
12. 11  

Find the prime factorization of each number.

13. 9  
14. 25  

15. 28  
16. 54  

17. 34  
18. 72  

19. 55  
20. 63  

**SCHOOL** For Exercises 21–24, use the table below.

<table>
<thead>
<tr>
<th>Marisa's History Test Scores</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Test Score</td>
</tr>
<tr>
<td>January 98</td>
<td>67</td>
</tr>
<tr>
<td>February 15</td>
<td>81</td>
</tr>
<tr>
<td>March 5</td>
<td>97</td>
</tr>
<tr>
<td>March 29</td>
<td>100</td>
</tr>
</tbody>
</table>

21. Which test scores are prime numbers?

22. Which prime number is the least prime number?

23. Find the prime factorization of 100.

24. Find the prime factorization of 81.
Big Idea:
Repeated multiplication can be represented by a base and an exponent.

Class:
Grade 6
1-3

Date:

Content Objective:
• SWBAT use powers and exponents in expressions.

Language Objectives:
• In an expression, SWBAT orally identify which number is the base and which number is the exponent.
• SWBAT will use correct phrasing when expressing base numbers and their exponents.

Key Vocabulary:
Base
Exponent
Power
Cubed
Squared
Factorization

Materials:
SG & I WS
IP WS
Vocabulary Development WS

Higher Order Questions:
Why do we use exponents? An easier way to write the same thing multiple times

Warm Up:
1. Ask students to write down two times two times two… (2x2x2x2x2x2x2x2x2x2x2) or (2^10). Most students will write it out the long way, T will write 2^10 on the board.
2. Ask students to write down 5 to the 8th power. T will write 5^8 on the board.
3. T will draw a big 6 on the board. T will label the 6 as the base number and explain that the base number is written bigger because it has to holds up the exponent. T will them write a small 4 next to the big 6 and label the 4 as exponent. T will explain that the exponent tells us how many times to multiply the 6.

Learn:
4. T will explain the four ways to express a number with exponents. All four ways have the same value.
   • Expression: 9 x 9
   • Power: 9^2 – its 9, 2 times
   • Words: Nine to the second power or nine squared
   • Value: 81
5. When you read a base and exponent you read base to the exponent power. Ex. Nine to the second power. Have students practice following this spoken format with each other via examples written on the board.
6. There are two numbers that we use often that are read differently, the exponents 2 and 3. When we say ___ to the second power, we can say ___ squared. When we say ___ to the third power, we can say ___ cubed. Have students practice following this spoken format with each other via examples written on the board.
7. In pairs, complete the teacher created worksheet: Vocabulary Development WS to practice the 4 ways to express a number with exponents.
8. Using the SG & I 1-3 on the LCD, Ss will follow along on their identical worksheets to
review the definitions highlighted in the box at the top, pointing to each word. Have students repeat the definitions.

9. Work through example number 1, 2, and 3 as a class. Repeat the correct format of the numbers.

10. Using the notes on SG & I, in pairs Ss complete exercises 1-16.

11. After 10 minutes, go over the answers as a whole group.

12. For independent practice complete the Independent Practice (IP) page.

Closing:

1. In your groups, complete the following problem: Mr. Youngs’ garden is organized into 6 rows. Each row contains 6 vegetable plants. How many total vegetable plants does Mr. Youngs have in his garden?

• Write your answer using power and exponents, in words two ways, and as the value of plants.
# Vocabulary Development

<table>
<thead>
<tr>
<th>Power</th>
<th>Words</th>
<th>Expression</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$2^2$</td>
<td>Two to the fifth power</td>
<td>$4 \times 4 \times 4 \times 4$</td>
<td></td>
</tr>
<tr>
<td>$7^{10}$</td>
<td>Five squared</td>
<td>$2 \times 2 \times 2$</td>
<td></td>
</tr>
<tr>
<td>$10^3$</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1-3 Study Guide and Intervention
Powers and Exponents

A product of prime factors can be written using exponents and a base. Numbers expressed using exponents are called powers.

<table>
<thead>
<tr>
<th>Powers</th>
<th>Words</th>
<th>Expression</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$2^2$</td>
<td>4 to the second power or 4 squared</td>
<td>$4 \times 4$</td>
<td>16</td>
</tr>
<tr>
<td>$5^3$</td>
<td>5 to the sixth power</td>
<td>$5 \times 5 \times 5 \times 5 \times 5 \times 5 \times 5$</td>
<td>15,625</td>
</tr>
<tr>
<td>$7^2$</td>
<td>7 to the fourth power</td>
<td>$7 \times 7 \times 7$</td>
<td>2,401</td>
</tr>
<tr>
<td>$9^3$</td>
<td>9 to the third power or 9 cubed</td>
<td>$9 \times 9 \times 9$</td>
<td>729</td>
</tr>
</tbody>
</table>

Example 1 Write $6 \times 6 \times 6$ using an exponent. Then find the value.

The base is 6. Since 6 is a factor 3 times, the exponent is 3.
$6 \times 6 \times 6 = 6^3$ or 216

Example 2 Write $2^4$ as a product of the same factor. Then find the value.

The base is 2. The exponent is 4. So, 2 is a factor 4 times.
$2^4 = 2 \times 2 \times 2 \times 2$ or 16

Example 3 Write the prime factorization of 225 using exponents.

The prime factorization of 225 can be written as $3 \times 3 \times 5 \times 5$, or $3^2 \times 5^2$.

Exercises

Write each product using an exponent. Then find the value.

1. $2 \times 2 \times 2 \times 2 \times 2$
2. $9 \times 9$
3. $3 \times 3 \times 3$
4. $5 \times 5 \times 5$
5. $3 \times 3 \times 3 \times 3 \times 3$
6. $10 \times 10$

Write each power as a product of the same factor. Then find the value.

7. $7^2$
8. $4^3$
9. $8^4$
10. $5^5$
11. $2^8$
12. $7^3$

Write the prime factorization of each number using exponents.

13. 40
14. 75
15. 100
16. 147

Chapter 1
1-3 Skills Practice

Powers and Exponents

Write each expression in words.
1. \( 7^2 \)
2. \( 8^3 \)
3. \( 4^4 \)
4. \( 5^6 \)

Write each product using an exponent. Then find the value.
5. \( 4 \times 4 \times 4 \times 4 \)
6. \( 3 \times 3 \times 3 \times 3 \)
7. \( 5 \times 5 \times 5 \times 5 \)
8. \( 7 \times 7 \)
9. \( 3 \times 3 \times 3 \times 3 \times 3 \)
10. \( 2 \times 2 \times 2 \times 2 \times 2 \)
11. \( 6 \times 6 \times 6 \)
12. \( 6 \times 6 \times 6 \times 6 \)

Write each power as a product of the same factor. Then find the value.
13. \( 3^8 \)
14. \( 2^5 \)
15. \( 8^3 \)
16. \( 10^5 \)
17. \( 6^2 \)
18. \( 7^4 \)
19. \( 2^3 \)
20. \( 3^5 \)
21. \( 6^5 \)
22. \( 2^7 \)

Write the prime factorization of each number using exponents.
23. \( 54 \)
24. \( 36 \)
25. \( 63 \)
26. \( 245 \)
<table>
<thead>
<tr>
<th><strong>Big Idea:</strong></th>
<th>Follow PEMDAS to solve an expression.</th>
<th><strong>Class:</strong></th>
<th>Grade 6 1-4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Content Objective:</strong></td>
<td>SWBAT find the value of expressions using the order of operations.</td>
<td><strong>Language Objectives:</strong></td>
<td>SWBAT orally explain PEMDAS.</td>
</tr>
<tr>
<td><strong>Key Vocabulary:</strong></td>
<td>Numerical Expressions</td>
<td><strong>Materials:</strong></td>
<td>Sticky notes Order of Operations guided notes Practice 1-4 worksheet Chart paper Markers</td>
</tr>
<tr>
<td></td>
<td>Operations</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Parenthesis</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Symbols</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Value</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Evaluate</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Higher Order Questions:</strong></td>
<td>What is the rule for walking up and down the stairs at Barnard? Why is it important for all classes to follow that rule? How does this apply to the order of operations?</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Warm Up:</strong></td>
<td>a. T will give class a problem to solve that requires the order of operations. 1 + 9 x (3+8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>b. Students will work to solve the problem. T will post various student answers for the equation on the board.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>c. Ss will discuss the different methods they used to solve the equation and the different outcomes.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>d. T will ask students the rule for walking up and down the stairs at Barnard and the consequences when the rule is not followed. Relate the discussion to the need to follow the order of operations in math.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TW ask the students what will happen if there was no order on the stairs. If one class was coming down on the right side and one class was walking up the left side, what would happen? We follow rules so that everyone has the same outcome. Just like on the stairs, if everyone walks on the right side, then everyone has a clear path. By using PEMDAS, everyone will have the same answer.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Learn:</strong></td>
<td>e. T will clarify the definition of math operations. (operations are addition, subtraction, multiplication and division)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>f. T will explain that the students will be given numerical expression that they will need to evaluate. *T will define numerical expressions (equation) and evaluate (solve).</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>g. T will pass out the Order of Operations guided notes/practice worksheet.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>h. T will write the order of operations acronym (PEMDAS) on chart paper and explain that we follow this order so everyone worldwide finds the same value for each expression.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
i. Students will fill in the PEMDAS blanks on the Order of Operations guided notes/practice worksheet.

j. As a class complete the Order of Operations worksheet. As students solve pieces of the expression, have them cross out the operation they just did and rewrite the simplified expression with their new answer. T will model on board.

k. 8 x 8 ÷ 4
   *Emphasize to students that when solving a problem with multiplication and division, whichever comes first in the expression is done first. The same rule applies for addition and subtraction. Review a few targeted examples to practice this skill.

l. In pairs, students will work to complete Practice 1-4.

Closure:

m. T will say and write formal definition for vocabulary words on board.

n. Students will be asked to say the matching word and rephrase the definition in their own words.

o. T will record these definitions and students will copy the student-worded definitions in their own math notebook.

p. Students will complete the following problem on a sticky note: 9 + 4^3 x (20 – 8) ÷ 2 + 6.

q. Teacher will collect and correct the sticky note.
Name:

Order of Operations

P_________________________________________
E________________________________________
M________________________________________
D________________________________________
A________________________________________
S________________________________________

Math operations are

________________________

_ _

8 \times 8 \div 4 = \quad 17 + 34 - 2 =
16 ÷ 2 + 8 x 3 =

45 ÷ 9 + 8 - 7 + 2 x 3

16 - (4+5)

80 - 8 x 3²

18 + 7² x (8-2) ÷ 3 + 8
Skills Practice
Order of Operations

Find the value of each expression.

1. $7 - 6 + 5$
2. $31 + 19 - 8$
3. $64 - 8 + 21$
4. $17 + 34 - 2$
5. $28 + (89 - 67)$
6. $(8 + 1) \times 12 - 13$
7. $63 \div 9 + 8$
8. $5 \times 6 - (9 - 4)$
9. $13 \times 4 - 72 \div 8$
10. $16 \div 2 + 8 \times 3$
11. $30 \div (21 - 6) \times 4$
12. $6 \times 7 \div (6 + 8)$
13. $88 - 16 \times 5 + 2 - 3$
14. $(2 + 6) \div 2 + 4 \times 3$
15. $4^3 - 24 \div 8$
16. $100 \div 5^2 \times 4^3$
17. $48 \div 2^3 + 25 \times (9 - 7)$
18. $45 \div 9 + 8 - 7 + 2 \times 3$
19. $18 + 7^2 \times (8 - 2) \div 3 + 8$
20. $(5^2 + 3^3) \times (81 + 9) \div 10$
<table>
<thead>
<tr>
<th>Big Idea:</th>
<th>Unknown numbers can be represented as variables.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class:</td>
<td>Grade 6 1-5</td>
</tr>
<tr>
<td>Date:</td>
<td></td>
</tr>
<tr>
<td>Content Objective:</td>
<td>SWBAT evaluate algebraic expressions with variables.</td>
</tr>
</tbody>
</table>
| Language Objectives: | SWBAT identify variables and the numbers they represent.  
                     | SWBAT orally express algebraic expressions using multiple symbols for multiplication. |
| Key Vocabulary: | Algebra, Variable, Algebraic Expression/Equation, Evaluate, Plug in |
| Materials: | SG & I WS, IP WS, Post Its |
| Higher Order Questions: | Why might you have an unknown number in an equation? |
| Warm Up: | TW ask students, to work on the following question in their math journals:  
          | **John is 11 years old. His sister, Mary, is X years older than John. How old is Mary?**  
          | **Mary is _______ years old. Can you solve this problem? What other information do you need?** |
|          | Have students turn and talk with their neighbors about their reasoning for their answer. In 2 minutes they should have one important thing they want to share. Share out group answers and discuss. Introduce the word **variable** at this time as a letter that stands for an unknown number or value. |
|          | “In this story, the variable is X. Mary is X years older than John. The person telling this story does not know exactly how many years older she is. When she finds out, she can switch the X for that number. Then, she can find the answer… What if I told you Mary is 3 years older than John? How old is Mary? So, X = 3- Mary is 3 years older than John.” |
| Learn:  | 1. TW put 11 + x on the board but now add x = 5. Using the vocabulary word, variable, remind students that the letter in the equation represents an unknown number. “The variable is X. X represents the number 5. We can plug in 5 where the X is. Then, we can solve the equation.” “What do you think of when I say “plug in? How is this the same idea as switching a number for a variable?” |
|          | 2. Refer to SG & I 1-5 notes at the top of page. Read through the notes section with the class, pointing on LCD throughout. |
|          | 3. TW write the examples on the board: 2\(n\), 2n, 2(n), 2 x (n).  
          | TW say: Given n=3, lets work through each of these examples. TW call on volunteers to complete the equations. After evaluating each equation, ask what the students notice about the examples. TW recast the answers by saying “Yes, they are different ways to express the same operation.” |
|          | 4. Review examples 1-4 while reinforcing vocabulary words and modeling on board. |
|          | 5. With a partner, SW complete SG & I 1-5 #1-21 |
|          | 6. When groups are mostly finished, they will share answers with another pair. If discrepancies arise, TW assist individually. |
|          | 7. SW independently work on SP 1-5 #1-33. |
|          | 8. TW collect IP to assess understanding. |
| Closing: | 1. Students will write on a Post It, one example of the using a variable in the real world taking ideas from their independent practice. SW post their sticky notes on the board and TW choose a few examples to share that reinforce the concepts |
|          | 2. Students would use the following frame:  
          | I may use a variable if I was ________________________ because ____________________.
I may use a variable if I was shopping because I don’t know how much an item costs.
**Example 1**
Evaluate \(35 + x\) if \(x = 6\).

\[
\begin{align*}
35 + x &= 35 + 6 \\
&= 41
\end{align*}
\]
Replace \(x\) with 6.
Add 35 and 6.

**Example 2**
Evaluate \(y + x\) if \(x = 21\) and \(y = 35\).

\[
\begin{align*}
y + x &= 35 + 21 \\
&= 56
\end{align*}
\]
Replace \(x\) with 21 and \(y\) with 35.
Add 35 and 21.

**Example 3**
Evaluate \(4n + 3\) if \(n = 2\).

\[
\begin{align*}
4n + 3 &= 4 \times 2 + 3 \\
&= 8 + 3 \\
&= 11
\end{align*}
\]
Replace \(n\) with 2.
Find the product of 4 and 2.
Add 8 and 3.

**Example 4**
Evaluate \(4n - 2\) if \(n = 5\).

\[
\begin{align*}
4n - 2 &= 4 \times 5 - 2 \\
&= 20 - 2 \\
&= 18
\end{align*}
\]
Replace \(n\) with 5.
Find the product of 4 and 5.
Subtract 2 from 20.

**Exercises**
Evaluate each expression if \(y = 4\).

1. \(3 + y\)  
2. \(y + 8\)  
3. \(4 \times y\)
4. \(9y\)  
5. \(15y\)  
6. \(300y\)
7. \(y^2\)  
8. \(y^2 + 18\)  
9. \(y^2 + 3 \times 7\)

Evaluate each expression if \(m = 3\) and \(k = 10\).

10. \(16 + m\)  
11. \(4k\)  
12. \(m \times k\)
13. \(m + k\)  
14. \(7m + k\)  
15. \(6k + m\)
16. \(3k - 4m\)  
17. \(2mk\)  
18. \(5k - 6m\)
19. \(20m \div k\)  
20. \(m^3 + 2k^2\)  
21. \(k^2 + (2 + m)\)
Skills Practice

Algebra: Variables and Expressions

Complete the table.

<table>
<thead>
<tr>
<th>Algebraic Expressions</th>
<th>Variables</th>
<th>Numbers</th>
<th>Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. $5d + 2e$</td>
<td>?</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>2. $5w - 4y + 2s$</td>
<td>?</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>3. $xy + 4 + 3m - 6$</td>
<td>?</td>
<td>?</td>
<td>?</td>
</tr>
</tbody>
</table>

Evaluate each expression if $a = 3$ and $b = 4$.

4. $10 + b$
5. $2a + 8$
6. $4b - 5a$
7. $a \times b$
8. $7a \times 9b$
9. $8a - 9$
10. $b \times 22$
11. $a^2 + 1$
12. $18 \div 2a$
13. $a^2 \times b^2$
14. $ab \div 3$
15. $15a - 4b$
16. $ab + 7 \times 11$
17. $36 \div 6a$
18. $7a + 8b \times 2$

Evaluate each expression if $x = 7, y = 15,$ and $z = 8$.

19. $x + y + z$
20. $x + 2z$
21. $xz + 3y$
22. $4x - 3z$
23. $z^2 + 4$
24. $6z - 5z$
25. $9y \div (2x + 1)$
26. $15y + x^2$
27. $y^2 + 4 \times 6$
28. $y^2 - 2x^2$
29. $x^2 + 30 - 18$
30. $13y - zx \div 4$
31. $xz - 2y + 8$
32. $z^2 + 5y - 20$
33. $3y \times 40x - 1,000$
Big Idea:
Unknown numbers can be represented as variables.

Content Objective:
- SWBAT complete function tables and find function rules

Language Objectives:
- SWBAT orally identify the rule of a completed function table.
- SWBAT explain in steps how to complete a function table.

Key Vocabulary:
Function
Function Table
Function Rule
Input
Output
Machine
Per

Materials:
SG & I WS
IP WS
LCD Projector
CDROM WS
Carrot, noodle machine

Higher Order Questions:
Given that $h$ stands for hours, evaluate $5h$. How might you say this equation as a sentence? (you get $5$ each hour, or you pay $5$ each hour)
What does it mean when something is a rule in life? In math?

Warm Up:
TW tell the students that she made vegetable noodles the night before. TW show them the whole carrots first. Then show them the machine that makes the noodles. Demonstrate for the students, how when you put the carrot in the machine and turn the handle, that carrot noodles come out. Demonstrate with several carrots. Reinforce the idea that every time you put a carrot into the machine, carrot noodles will come out. Introduce the idea that the carrot going in is the input and the noodles are the output. The machine has the same function each time. The output depends on what the input is.
If I put a tomato in the machine, would I get the same output?
If I put a carrot in the machine, can I get a different kind of output?

Learn:
1. TW read through SG & I, reinforcing the vocabulary words and notes on LCD.
2. Using the LCD to project the function table on SG & I. Work through examples 1-2. Are there any exceptions to the rule of a function? (no) T will point to the input, output and the rule while going over the example. Each time, reinforce the function rule as the variable that determines how the output changes.
3. Students will work in pairs to complete #1-4 on SG & I.
4. TW ask for volunteers to complete the function tables and find function rules on the whiteboard using the LCD.
5. TW assign SP #1-10. Each student will be responsible for completing 1 table.
6. After students complete the assignment, they will pair up with the other students who worked on their particular problem, share the rule and make sure the tables were completed correctly.
7. Each group will share their work with the class, explaining the function rules following the sentence frame.
   The rule for the function table is _______. One input from the table is _______.
   One input from the table is _______.

Closing:
TW say, now that you understand how function machines work, apply what you know to solve the following problem. Given that $h$ stands for hours, evaluate:
Joe mows lawns. He gets $5 per lawn. Write an equation to show how much money Joe would make if he mowed y number of lawns. Identify what the input, output and function rules are.

Ask, what does it mean when something is a rule? Guide the discussion to reinforce that the rule doesn’t change despite the input and output, just like the rule for walking up and down the stairs doesn’t change despite the age of the student.
Study Guide and Intervention

Algebra: Functions

A function rule describes the relationship between the input and output of a function. The inputs and outputs can be organized in a function table.

**Example 1**  
Complete the function table.

<table>
<thead>
<tr>
<th>Input (x)</th>
<th>Output (x - 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

The function rule is \( n - 7 \). Subtract 7 from each input.

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 - 3</td>
<td>6</td>
</tr>
<tr>
<td>8 - 3</td>
<td>5</td>
</tr>
<tr>
<td>6 - 3</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Input (x)</th>
<th>Output (x - 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
</tr>
</tbody>
</table>

**Example 2**  
Find the rule for the function table.

<table>
<thead>
<tr>
<th>Input (x)</th>
<th>Output (____)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
</tr>
</tbody>
</table>

Study the relationship between each input and output.

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 ( \times 4 )</td>
<td>0</td>
</tr>
<tr>
<td>1 ( \times 4 )</td>
<td>4</td>
</tr>
<tr>
<td>2 ( \times 4 )</td>
<td>8</td>
</tr>
</tbody>
</table>

The output is four times the input. So, the function rule is \( 4x \).

**Exercises**

Complete each function table.

1.  

<table>
<thead>
<tr>
<th>Input (x)</th>
<th>Output (2x)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Input (x)</th>
<th>Output (4 + x)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

Find the rule for each function table.

3.  

<table>
<thead>
<tr>
<th>Input (x)</th>
<th>Output (____)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Input (x)</th>
<th>Output (____)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>10</td>
<td>5</td>
</tr>
</tbody>
</table>
1-6 Skills Practice
Algebra: Functions

Complete each function table.

1. | Input (x) | Output (x + 3) |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

2. | Input (x) | Output (3x) |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

3. | Input (x) | Output (x - 1) |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

4. | Input (x) | Output (x ÷ 3) |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

5. If a function rule is 2x - 3, what is the output for 3?

6. If a function rule is 4 - x, what is the output for 2?

Find the rule for each function table. Write the rule in the table.

7. | x  | 7  |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
</tr>
</tbody>
</table>

8. | x  | 12 |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>6</td>
<td>15</td>
</tr>
<tr>
<td>8</td>
<td>17</td>
</tr>
</tbody>
</table>

9. | x  | 0  |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>15</td>
</tr>
</tbody>
</table>

10. | x  | 2  |
    |----|----|
    | 4  | 2  |
    | 6  | 3  |
    | 12 | 6  |
**Big Idea:**
Ordered pairs name points on a coordinate plane.

**Class:**
Grade 6
4-9

**Date:**

**Content Objective:**
- SWBAT use ordered pairs to locate points and organize data.

**Language Objectives:**
- SWBAT name points on a coordinate plane
- SWBAT explain steps to locating points on a coordinate plane

**Key Vocabulary:**
Coordinate Plane
Origin
X-axis
Y-axis
Ordered Pair
X-coordinate
Y-coordinate
Graph (as a verb)
Integers

**Materials:**
Exit slip
Skills Practice worksheet
Guided Notes worksheet
Large coordinate plane
Expo markers

**Higher Order Questions:**
When following directions is it important to do it in a certain order? Will the outcome be the same if done differently?

**Activities:**

**Warm Up:**
1. On the board, you see a large coordinate plane. We use a coordinate plane to help locate a point.
2. TW label the origin, axis numbers and a few points on the coordinate plane as students watch.
3. Today we are going to play a game called Beat the Teacher. I have marked specific points on the coordinate plane. Your goal is to land on the points I have chosen.
4. You will roll two dice. The first di, you will move that many lines to the right. The second di, you will start from the first point and move that many lines up.
5. Mark the coordinate plane with an O if you miss my point and an X if you hit my point.
6. Label your point with ordered pair. An ordered pair lets us know what numbers you rolled. If you land on the point I have marked, you’ve beat the teacher!
7. T will model with student volunteers.
8. T will ask students, when following directions, is it important to do it in a certain order? Will the outcome be the same if done differently? If I switched the numbers in my ordered pair, would I be on the same point? Have a student find 4,2 on the coordinate plane and 2,4. Discuss the difference in location.

**Learn:**
9. Now I am going to show you how this game relates to math. I will explain to the different parts of a coordinate plane. T will label the large coordinate plane with vocabulary words (origin, x-axis, y-axis). T will explain meaning of each vocabulary word. Students will be following along and filling in the guided practice worksheet.
10. T will model problems 1, 2, 9 and 10 on Skills Practice worksheet 4-9. First look for the letter on the plane. Next which axis should we look for first. (x) Then which one should we look at? (y) Put your finger at zero. Count over to the right until you are under the letter. Next we are going to look at the y-axis. Now move up the y-axis to the letter. You should now be located at the letter you were trying to find. Remember you write the ordered pair like this (x,y). For this example, it should be (6,1). Students will work in pairs to complete the remaining problems.
Closing:

11. Using a large coordinate plane on the board, label the x-axis *days* and the y-axis *inches*. T will ask students, if my plant was 3 inches on day 1, where would I mark my point? 4 inches on day 3? 6 inches on day 5? 9 inches day 8? Have a student come to the board and mark the point and write the ordered pair.

12. Have students explain to the class how they found the correct point and why they wrote the ordered pair the way they did.

13. Students will label a coordinate plane using vocabulary words as an exit slip on a worksheet.
How to Use a Coordinate Plane

- A coordinate plane is formed when ______________________.

- The origin is _______________________________________.

- The horizontal number line on a coordinate plane is called the __________________. The vertical number line on a coordinate plane is called the __________________________.

- You can use _______________________ to name any point on the coordinate plane. The first number in an ordered pair is the ____________________________ and the second number is the ____________________________.

(3, 6)

The x-coordinate lines up with a number on the x-axis

The y-coordinate lines up with a number on the y-axis
Skills Practice

Algebra: Ordered Pairs and Functions

Use the coordinate plane at the right to name the ordered pair for each point.

1. L
2. M
3. N
4. P
5. Q
6. R
7. S
8. T

Graph and label each point on the coordinate plane.

9. A(1, 3)  
10. B(4, 3)  
11. C(2, 0)

12. D(2, 5)  
13. E(2.5, 1.5)  
14. F(1\frac{1}{2}, 2)
1. Use the word bank to label the coordinate plane.
2. Label the numbers on the x-axis and y-axis!

<table>
<thead>
<tr>
<th>X-axis</th>
<th>Origin</th>
<th>Y-axis</th>
</tr>
</thead>
</table>

3. Look at the dot on the coordinate plane. Write the ordered pair for the dot. Label the **x-coordinate** and the **y-coordinate**.

(______, ______)
**Big Idea:**
Unknown numbers can be represented as variables.

**Class:**
Grade 6
1-9

**Date:**

**Content Objective:**
- SWBAT find the areas of rectangles and squares.

**Language Objectives:**
- SWBAT orally explain the formula for finding area.
- SWBAT orally explain what area is.

**Key Vocabulary:**
Area
Formula
Length
Width
Unit
Square
Rectangle
Square unit
Surface

**Materials:**
SG & I WS
IP WS
Area anchor chart
Post-it Notes

**Higher Order Questions:**
Look at the tiles on the floor. How would you know how many tiles cover the floor without counting each square?

**Warm Up:**
TW ask students to look at the tiles on the floor. How would you know how many tiles cover the floor without counting each square? TW record ideas on the board. TW introduce the vocabulary word ‘square unit’ and explain that a square unit can be used to measure the area of the floor. In this room, we are talking about square feet. Another kind of measurement might use square inches, square centimeters, or even square miles. It depends on what you are measuring.

**Learn:**
1. *The area of a figure is the number of square units needed to cover a surface. You can use a formula to find the area of a rectangle. A formula is an equation that shows a relationship among certain quantities. A formula is like a recipe. You follow the steps and add the ingredients to get an end result.*
2. Refer students to the anchor chart and provide them with copies for their notebook. Read chart aloud with them, pointing out length and width and reinforcing the variables for each.
3. Provide Post-it Notes for each pair of students. Ask them to cover the surface (top) of their desk by placing the Post-its next to each other so that the entire surface is covered.
4. Reinforce the idea that area is the number of square units needed to cover the surface. Ask for volunteers to share how many Post-its they needed to cover the desk. Explain that that number is expressed as x units squared or x square units.
5. TW explain that instead of counting each square of an object to find the area, an easier way to find the area of an object would be to use the area formula. TW write the formula on the board and label the rectangle with the variables.

   \[ A = L \times W \]

6. TW read through SG & I, reinforcing the vocabulary words and notes on LCD. TW say: *The area of a rectangle is the number of square units needed to cover a surface. You can either count the square units in the examples or use the formula to multiply length times width.* *Why do you think it is important to learn to find area by using the formula?* Provide the answer frame as needed: I think it is important to find area by using the formula because ____________________.
7. Work through examples 1-2. Each time, reinforcing the term ‘square unit’. TW have students label the examples with the variables as well as with the unit measures on each side.
8. Students will work in pairs to complete #1-6 on SG & I.
9. TW ask for volunteers to find the area of the figures.
10. TW assign SP #1-13.
11. After students complete the assignment, they will pair up with another student and share their answers.
12. TW put this answer frame and the word bank on the board. Each group will share this answer: *We found the ________ of the ________ by multiplying __________ by __________. Our answer was given in square ________.*
   **Word Bank:** units, width, length, area, rectangle
13. Each group will share their work with the class, reading their answer in the frame.

**Closing:**
SW solve the following problem in small groups: (accompanying visual on board)
The floor spaces of two cages are shown. The Cage 1 square is large enough for one guinea pig. For each additional guinea pig, the cage should be 1 square foot larger. How many guinea pigs should be kept in Cage 2?

**Cage 1**

2ft

1ft

**Cage 2**

2ft

2ft

SW turn and discuss their answers with a partner. Each set of partners will come up with a final answer. SW use First, Then, Next, Last to explain their steps.
Area of a Rectangle

• **Words**

   The area $A$ of a rectangle is the product of the length $l$ and width $w$.

• **Formula**

   $A = lw$

• **Model**

   \[ l \]

   \[ w \]
Study Guide and Intervention
Algebra: Area Formulas

The area of a figure is the number of square units needed to cover a surface. You can use a formula to find the area of a rectangle. The formula for finding the area of a rectangle is \( A = \ell \times w \). In this example, we find the area of a rectangle. The formula for finding the area of a rectangle, and \( w \) represents the width of the rectangle.

Example 1
Find the area of a rectangle with length 8 feet and width 7 feet.

\[
A = \ell \times w \\
A = 8 \times 7 \\
A = 56
\]

The area is 56 square feet.

Example 2
Find the area of a square with side length 5 inches.

\[
A = s^2 \\
A = 5^2 \\
A = 25
\]

The area is 25 square inches.

Exercises
Find the area of each figure.

1. 

2. 

3. 

4. 

5. What is the area of a rectangle with a length of 10 meters and a width of 7 meters?

6. What is the area of a square with a side length of 15 inches?
Skills Practice
Algebra: Area Formulas

Complete each problem.

1. Give the formula for finding the area of a rectangle.

2. Draw and label a rectangle that has an area of 18 square units.

3. Give the formula for finding the area of a square.

4. Draw and label a rectangle that has an area of 25 square units.

Find the area of each rectangle.

5. 9 in. 6 in.
6. 14 ft 10 ft
7. 16 cm 32 cm
8. 2 m 11 m
9. 7 yd 3 yd
10. 9 in. 8 in.

Find the area of each square.

11. 7 in. 7 in.
12. 3 cm 3 cm
13. 8 yd 8 yd
### Big Idea:
Estimating decimals is a strategy for mental math.

### Class:
Grade 6 3-4

### Date:

### Content Objective:
- SWBAT estimate sums and differences of decimals

### Language Objectives:
- SWBAT orally explain when they would use estimation in the real world.

### Key Vocabulary:
Estimate (as a Verb and as a Noun)
Clustering
Front-End Estimation
Rounding

### Materials:
SG & I
SP
Color Pencils
Estimation Exit Slip WS

### Higher Order Questions:
If you are going to the movies, why would estimate? Where else do you estimate in the real world? When have you or your family estimated?

### Warm Up:
1. TW write the following information on the board.
   You and your friends are going to the movies. The following are the prices of the items you will need while at the movies.
   - Movie: $7.00
   - Popcorn: $3.75
   - Drink: $2.25

   Answer the following questions:
   - How much money will you need to buy a movie ticket and popcorn?
     I will need ___________________ to buy a ticket and popcorn.
   - How do you know?
     I know I will need ___________________ because ____________________.
   - Suppose I have $14.00. Do I have enough to buy a movie ticket, popcorn, and a drink?
     Yes I will / No I won’t have enough to buy a movie ticket, popcorn and drink.
   - How do you know?
     I know I will/I won’t because a movie ticket, popcorn and a drink cost ________________.

   Working with a partner, find the answers to the questions.

2. Once the groups have completed the activity, TW go over the answers, asking for volunteers. TW also introduce the vocabulary word estimate as a way to quickly add or subtract numbers.
3. If you are going to the movies, why would estimate? Where else do you estimate in the real world? When have you or your family estimated?

### Learn:
1. TW read through SG & I, reinforcing the vocabulary words and notes. TW point to the vocabulary words on LCD and have students repeat them.
2. Using the LCD to project the SG & I, the TW explain the steps for example 1 using the front-end estimation process as found on SG & I. Using colored pencils, the SW underline the steps for front-end estimation on their work sheets.
3. Using the LCD to project the SG & I, the TW explain the steps for example 2 using the clustering estimation process as found on SG & I. Using colored pencils, the SW underline the step for clustering estimation.
4. Before assigning SG & I examples 1-9, TW write the word “estimate” on the board twice, once as a noun and once as a verb. TW explain the two usages of the word. SW repeat each of the following statements.

To make sure I have enough money I estimate. (Verb)
5. In pairs, the students will work through examples 1-9. Using the assigned strategies.
6. TW ask for volunteers to complete those estimation problems on the whiteboard using the LCD.
7. TW assign SP #1-18. Each student will be responsible for completing 3 problems from each section.
8. After students complete the assignment, they will pair up with another student who worked on different problems and share answers.
9. TW call for volunteers from each group to assess understanding. Students will explain their answers using the following sentence.

   I used clustering/front end estimation/rounding to solve the problem because ________________.

Closing:
TW pass out the estimation exit slip. The TW ask students to complete the exit slip.
**TW say:** I have written a problem on the exit slip. Working by yourself, solve the problem and tell me which rounding strategy you used. Explain why you would use that strategy.
Study Guide and Intervention
Estimating Sums and Differences

### Estimation Methods

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rounding</td>
<td>Estimate by rounding each decimal to the nearest whole number that is easy for you to add or subtract mentally.</td>
</tr>
<tr>
<td>Clustering</td>
<td>Estimate by rounding a group of close numbers to the same number.</td>
</tr>
<tr>
<td>Front-End Estimation</td>
<td>Estimate by adding or subtracting the values of the digits in the front place.</td>
</tr>
</tbody>
</table>

### Example 1

Estimate $14.07 + 43.22$ using front-end estimation.

Add the front digits. Add the next digits.

\[
\begin{array}{c}
14.07 \\
+ 43.22 \\
5
\end{array}
\]

\[
\begin{array}{c}
14.07 \\
+ 43.22 \\
57.00
\end{array}
\]

An estimate for $14.07 + 43.22$ is $57$.

### Example 2

Use clustering to estimate $7.62 + 7.89 + 8.01 + 7.99$.

To use clustering, round each addend to the same number.

\[
\begin{array}{c}
7.62 \rightarrow 8.00 \\
7.89 \rightarrow 8.00 \\
8.01 \rightarrow 8.00 \\
+ 7.99 \rightarrow + 8.00 \\
32.00
\end{array}
\]

An estimate for $7.62 + 7.89 + 8.01 + 7.99$ is $32$.

### Exercises

Estimate using rounding.

1. $59.118 + 17.799$  
2. $45.85 + 6.82$  
3. $4.65 + 4.44$

Estimate using clustering.

4. $0.99 + 1.15 + 0.52$  
5. $3.65 + 4.02 + 3.98$  
6. $6.87 + 6.97 + 7.39$

Estimate using front-end estimation.

7. $81.23 + 5.51$  
8. $42.06 + 17.39$  
9. $754.23 - 23.17$
Skills Practice
Estimating Sums and Differences

Estimate using rounding.
1. 2.32 + 2.52
2. 87.146 - 24.953
3. 18.93 + 27.45
4. $46.83 + $18.60
5. $13.23 - $2.87
6. 43.058 - 15.726

Estimate using clustering.
7. 59.62 + 60.4 + 60 + 61
8. $4.79 + $5.29 + $4.99
9. 8.2 + 7.8 + 7.2 + 7.99
10. 89.04 + 87.55 + 90.101 + 91

11. 15.044 + 14.765 + 14.689
12. $1.44 + $0.86 + $1.00 + $0.70

Estimate using front-end estimation.
13. 51.62
   + 6.58
14. $233.10
   - 23.62

15. 4.57360
   - 0.58256
16. 820.1
   + 3.2

17. $102.34 + $23.00 + $32.67

18. 652.355 - 52.736
Read the following story problem. Circle which strategy you used to solve the problem. Then answer the question.

Sandra went shopping. She bought a pair of pants for $24.99 and a shirt for $19.95. Finally, she bought a pair of shoes for $39.00. About how much did Sandra spend?

My Estimate $__________________

I used rounding/front end estimation/clustering to solve the problem. I chose this strategy because

____________________________________________.

____________________________________________.
<table>
<thead>
<tr>
<th>Big Idea:</th>
<th>Class:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solving problems using whole numbers, decimals, and fractions</td>
<td>Grade 6 3-5</td>
<td></td>
</tr>
</tbody>
</table>

**Content Objective:**
- SWBAT add and subtract decimals.

**Language Objectives:**
- SWBAT orally explain the steps to adding and subtracting decimals.

**Key Vocabulary:**
- Add
- Subtract
- Difference
- Sum
- Annex a Zero
- Decimal
- Tenths
- Hundredths
- Thousandths

**Materials:**
- Chart paper
- Carbonated Soft Drink Consumer Worksheet
- 3-5 Practice Worksheet
- Exit Slip
- Decimal Bars (magnets)

**Higher Order Questions:**
What does the decimal point represent in a number? Why is it important? (2.4 vs. 24)

**Activities:**

**Warm Up:**
1. Give students the Carbonated Soft Drink Consumer worksheet. TW explain that the data is presented on a T chart. This is a way to organize information. Each decimal is the number of gallons of soda each person in each country drinks. TW show students a gallon jug and explain that people in America drink almost 52 of these!
2. Have students work with a partner to complete the worksheet.
3. Have pairs share out their guess on how to add decimals and justify their answer using sentence starters on the worksheet.

**Learn:**
4. Define vocabulary terms. T will say and define each word. *Decimal. A decimal represents a part of the whole. *Students repeat the word. Using the magnetic decimal bars show students that 1.0 represent 1 whole, 0.5 represents half of one whole, etc.
5. Using chart paper, write the steps on how to add decimals. Include annexing zeros. Accompany each step with an example of that step. To add or subtract decimals line up the decimal point, then add or subtract digits in the same place value and position.*work through 6 – 4.78 for the example.*

   Explain how you can use estimation to check your answer. *I am not sure if I solved this problem correctly. To check my work, I can use estimation. The number 6 will stay the same. 4.78 will round up to five. My answer will be about 1. Now I can compare my actual answer to my estimated answer. Are they close? Is this reasonable? If they are, your answer is probably correct. If they are not, go back and check your work.*

6. Teacher will call on student helpers to help complete 6 sample problems on the board.
   1) 54.7 + 21.4  2) 14 + 23.5  3) 17.3 + 33.5  4) 9.543 – 3.67  5) 18.4 – 12.9  6) 50.62 – 39.81
7. Student volunteers at their seat will verify if the student helpers completed the problems correctly using the sentence starter given by the teacher.
8. Students will work in pairs to complete Practice 3-5.

Closing:
9. Review vocabulary terms by calling on student volunteers to repeat the word and share the definition in their own words. Record student’s correct definitions on chart paper and display in the classroom for later use as anchor chart.
10. Have students complete Adding and Subtracting Decimals exit slip.
Carbonated Soft Drink Consumers

<table>
<thead>
<tr>
<th>Country</th>
<th>Consumption for One Person (gallons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>United State of America</td>
<td>51.7</td>
</tr>
<tr>
<td>Mexico</td>
<td>33.3</td>
</tr>
<tr>
<td>Norway</td>
<td>32.2</td>
</tr>
<tr>
<td>Ireland</td>
<td>32.0</td>
</tr>
<tr>
<td>Canada</td>
<td>30.9</td>
</tr>
</tbody>
</table>

1) Estimate the sum of the two countries with the highest consumption.

2) Find the true sum of those two countries with NO estimation.

3) Compare the estimate with the actual sum.

   The estimated sum is ________________________.

   The actual sum is ________________________.

   The estimated sum is the same/different than the actual sum because __________________________________________________________________________.

4) Make a guess about how to add decimals.

   To add decimals, I think you need to…
   I think this because…
Find each sum.
1. $5.4 + 6.5$
2. $6.0 + 3.8$
3. $3.65 + 4$
4. $52.47 + 13.21$
5. $91.64 + 19.5$
6. $0.675 + 28$

Find each difference.
7. $7.8 - 4.5$
8. $69 - 12.88$
9. $17.46 - 6.79$
10. $74 - 59.29$
11. $87.31 - 25.09$
12. $19.75 - 12.98$

ALGEBRA Evaluate each expression if $a = 219.6$ and $b = 12.024$.
13. $a - b$
14. $b + a$
15. $a - 13.45 - b$

Find the value of each expression.
16. $4.3 + 6 \times 7$
17. $3^2 - 2.55$
18. $19.7 - 4^2$

19. BIKE RIDING The table shows the distances the members of two teams rode their bicycles for charity.

<table>
<thead>
<tr>
<th></th>
<th>Lori's Team</th>
<th>Tati's Team</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lori</td>
<td>13.8 mi</td>
<td>Tati</td>
</tr>
<tr>
<td>Marcus</td>
<td>11.8 mi</td>
<td>Luis</td>
</tr>
<tr>
<td>Hassan</td>
<td>15.4 mi</td>
<td>15.1 mi</td>
</tr>
</tbody>
</table>

a. How many total miles did Lori's team ride?

b. How many more miles did Lori's team ride than Tati's team?
1. The world’s population is 6.3 billion people now. It will increase by 2.6 billion by 2050. How many people will there be in 2050?

2. 19.86 – 4.94=

3. 97 – 16.98=

4. You buy a hat for $10.95 and a T-shirt for $14.20. How much change will you receive if you pay with a $50 bill?
Big Idea:
When we multiply numbers with decimal points we count spaces in our answer.

Class: Grade 6
3-6

Date:

Content Objective:
• SWBAT estimate and find the product of decimals and whole numbers

Language Objectives:
• SWBAT orally explain the steps to multiplying decimals.

Key Vocabulary:
Product
Evaluate
Annex a Zero – to add a zero at the beginning or end of a decimal

Materials:
SG & I
SP
Color Pencils
Multiplying Decimals Exit Slip WS

Higher Order Questions:
What is an advantage to multiplying over repeated adding?

Warm Up:
1. TW write the following problem on the board. TW will say: Look at the following problem. Read the question and choose the correct answer. After choosing the correct answer, explain why you picked that answer.

   A recipe for a batch of cookies calls for one 5.75-ounce package of coconut. How many ounces of coconut are needed for 5 batches of cookies?
   a. 20.20 oz
   b. 25.25 oz
   c. 28.75 oz
   d. 29.75 oz

   I picked letter ______ as my answer because ________________________________.

2. Individual students will share their answers and reasons. Record on the board. TW highlight any answers that involve multiplication. Any answers involving addition, the TW ask if there is another way to solve the problem. Multiplication is a form of repeated addition. What are the advantages to multiplying over repeated addition? Is it faster? More accurate?

Learn:
1. TW read through SG & I, reinforcing the vocabulary words and notes. TW point to the vocabulary words and have students repeat them.

2. TW say when you multiply a decimal by a whole number, you multiply the numbers as if you were multiplying whole numbers. Then you use estimation or you count the number of decimal places to decide where to place the decimal point. Remember if there are not enough decimal places in the product, annex zeros to the left.

3. Using the LCD to project the SG & I the TW explain the steps for examples 1 and 2 using estimation and counting the decimal places to determine where the decimal points goes in the answer. Using colored pencils, the SW underline the steps for estimation and counting the decimal place.

4. In pairs, the students will work through examples 1-8. Using the steps.

5. TW ask for volunteers to complete those multiplication problems on the whiteboard using the LCD.

6. TW assign SP #1-20. Each student will be responsible for completing 8 problems of their choice.

7. After students complete the assignment, they will pair up with another student who worked on different problems and share answers.

8. TW call for volunteers from each group to assess understanding. Students will explain their answers using the following sentence. TW model filling in this example on the board.

   First I ________________.
   Then I ________________.
   Next I ________________.
Finally I __________________.
My answer is __________________.

Closing:
TW say: I have written a problem on the exit slip. Working by yourself, solve the problem and explain why multiplication the best way to solve the problem.
1. TW will collect exit slips at the end of class.
Study Guide and Intervention

Multiplying Decimals by Whole Numbers

When you multiply a decimal by a whole number, you multiply the numbers as if you were multiplying whole numbers. Then you use estimation or you count the number of decimal places to decide where to place the decimal point. If there are not enough decimal places in the product, annex zeros to the left.

Example 1
Find $6.25 \times 5$.

Method 1 Use estimation.
Round 6.25 to 6.

\[
\begin{align*}
6.25 \times 5 & \rightarrow 6 \times 5 \\
1 & 2 \\
6.25 & \cdot 5 \\
31.25 & \\
\end{align*}
\]

Since the estimate is 30, place the decimal point after 31.

Example 2 Find $3 \times 0.0047$.

\[
\begin{align*}
2 & \cdot 0.0047 \\
\times & 3 \\
0.0141 & \\
\end{align*}
\]

There are four decimal places.

Annex a zero on the left of 141 to make four decimal places.

Example 3 Find $6.3 \times 1,000$.

Method 1 Use paper and pencil.

\[
\begin{align*}
1,000 & \\
\times & 6.3 \\
3,000 & \\
60,000 & \\
6,300.0 & \\
\end{align*}
\]

Method 2 Use mental math.
Move the decimal point to the right the same number of zeros that are in 1,000 or 3 places.

\[
6.3 \times 1,000 = 6,300
\]

Exercises

Multiply.

1. $8.03 \times 3$
2. $6 \times 12.6$
3. $2 \times 0.012$
4. $0.0008 \times 9$
5. $2.32 \times 10$
6. $6.8 \times 100$
7. $5.2 \times 1000$
8. $1.412 \times 100$

Chapter 3 42 Course 1
### Skills Practice

**Multiplying Decimals by Whole Numbers**

1. \(1.5 \times 3\)  
2. \(0.9 \times 6\)  
3. \(0.45 \times 5\)  
4. \(3.12 \times 8\)  
5. \(3.47 \times 5\)  
6. \(2.08 \times 6\)  
7. \(9.14 \times 2\)  
8. \(0.82 \times 9\)  
9. \(6.3 \times 9\)  
10. \(0.02 \times 3\)  
11. \(9.12 \times 4\)  
12. \(27.3 \times 8\)  
13. \(4.007 \times 4\)  
14. \(3.13 \times 3\)  
15. \(5.02 \times 8\)  
16. \(6.31 \times 6\)  
17. \(8.01 \times 5\)  
18. \(4.325 \times 7\)  
19. \(0.762 \times 2\)  
20. \(0.08 \times 8\)  
21. \(6 \times 3.04\)  
22. \(2.6 \times 9\)  
23. \(13 \times 2.5\)  
24. \(1.006 \times 4\)  
25. Evaluate \(42.3t\) if \(t = 110\).  
26. Evaluate \(231a\) if \(a = 3.6\)  
27. \(3.2 \times 10\)  
28. \(4.5 \times 100\)  
29. \(6.2 \times 1,000\)
Read the following problem and answer the question.

Rachel and her 4 friends were going to the museum. Each ticket cost $13.95. How much will the five friends pay altogether?

Answer $___________

Why is multiplication a good choice to solve this problem?

Using multiplication is a good choice to solve this problem because ___________________________
__________________________________________________________________________________________

Another way to solve this problem is to use repeated addition. Repeated addition would look like this:

__________________________________________________________________________________________.
Big Idea:
When you multiply two decimals the product is larger.

Class:
Grade 6
3-7

Date:

Content Objective:
• SWBAT find the product of two decimals

Language Objectives:
• SWBAT orally explain the steps to multiplying decimals.

Key Vocabulary:
Product
Evaluate
Annex a Zero – to add a zero at the beginning or end of a decimal
Align

Materials:
Chart paper
Markers
Practice 3-7 WS
Lined paper

Higher Order Questions:
Is it important to align two decimal points when multiplying decimals? Why or why not?

Warm Up:
1. I have 7 pounds of apples. Each pound cost $4. How much did I spend on apples? T will take student answers and record on the board.
2. Now instead of having 7 pounds of apples, I have .7 of a pound of apples. It cost $.4 per pound of apples. How much did I spend on apples now?
3. Students will work to solve the problem independently. T will record answers on the board.

Learn:
4. Using the second problem, T will model how to solve the problem. Record steps on chart paper and display in classroom for later use.

   • Multiply the numbers as whole numbers. Ignore the decimal points.
   • Count the digits after the decimal points. This is how many places you will move the decimal in the answer.
   • Now move the decimal in the answer to the left starting at the end of the number.
   • Check you answer by using estimation.

   If a whole pound is worth $.4, will .7 of a pound equal more than, less than or equal to $.4? If your answer is more than .4, you will need to go back and check your work.

5. Have student helpers come up and solve three practice problems checking off each step as they go.

6. Students will explain each step when solving. T will assist students when necessary.
   Is it important to line up decimals when multiplying two decimals?
   (No, you move the decimal once you have your answer.)
   You don’t bring the decimal down, you count it over.
   Is your answer getting bigger or smaller when multiplying two decimals? (Smaller)
   Why? (Your starting with a small piece, .4, and your only taking a piece of that piece, only .7 of it.)

7. T will demonstrate this explanation using a rectangle drawn on the board by shading in the necessary pieces. Now that we have done that problem, who can help me solve this problem? My company has .9 million dollars, I am donating .2 of it to charity. How much will be given to charity? Students will come up with the equation to solve the problem. What
8. Students will work in pairs to complete Practice 3-7 worksheet.

Closing:
9. Students will create a word problem on lined paper that involves multiplying decimals.
   
   Let’s brainstorm some things that use decimals for our stories. (money, weight, area)
   
   I had _________ . I paid … for each _________. How much did I spend?
   I had _________ . Each _________ weighed .......... pounds. How many pounds did they all weigh?
   I had _________ . Each _________ was ........ square feet. How many square feet were they altogether?

10. T will collect and check students problems. T will give each student one of the created problems to solve.
Multiply.
1. $0.3 \times 0.9$
2. $2.6 \times 1.7$
3. $1.09 \times 5.4$
4. $17.2 \times 12.86$
5. $0.56 \times 0.03$
6. $4.9 \times 0.02$
7. $2.07 \times 2.008$
8. $26.02 \times 2.006$

ALGEBRA Evaluate each expression if $r = 0.034$, $s = 4.05$, and $t = 2.6$.
9. $5.027 + 4.68r$
10. $2.9s - 3.7t$
11. $4.13s + r$
12. $rst$

13. MINING A mine produces 42.5 tons of coal per hour. How much coal will the mine produce in 9.5 hours?

14. SHOPPING Ms. Morgan bought 3.5 pounds of bananas at $0.51$ a pound and 4.5 pounds of pineapple at $1.19$ a pound. How much did she pay for the bananas and pineapple?
Big Idea:
Solving problems using whole numbers, decimals, and fractions

Class:
Grade 6
3-8

Date:

Content Objective:
• SWBAT divide decimals by whole numbers

Language Objectives:
• SWBAT orally explain the steps to dividing decimals by whole numbers.

Key Vocabulary:
Dividend
Divisor
Quotient

Materials:
SG & I
SP
Color Pencils
Unit Pricing WS

Higher Order Questions:
Why is your answer always less when you divide with a whole number?

Activities:

Warm Up:
1. TW will say: Have you ever gone to the grocery store and tried to decide which was the better deal? Well, I was at the grocery story this past weekend and I was trying to decide which tuna to buy. We are going to complete a WS that will show us which tuna is the better deal.
2. TW will pass out the Unit Pricing WS and the class will complete it as guided practice. TW say, let’s find out how much Underwater TUNA costs per ounce. We will divide .79 by 6. If we are talking about money how many decimal places should we use? So, in this example 0.1316666, we will round the number to 0.13. How would you say this decimal as money? (thirteen cents)
3. So Underwater TUNA costs thirteen cents per ounce.
4. TW reinforce the key vocabulary for this lesson.

Learn:
1. TW read through SG & I, reinforcing the vocabulary words and notes. TW point to the vocabulary words and have students repeat them.
2. Using the LCD to project the SG & I the TW explain the steps for examples 1 and 2. TW explicitly talk out how to divide decimals.
   First, move the decimal point in the dividend up to the dividing line. (the number being divided). Then divide as whole numbers.
3. Using colored pencils, the SW underline the steps for dividing decimals.
4. Before assigning SG & I examples 1-8, TW will write a division problem on the board and explicitly show how to solve it. TW will label each step for student reference.
5. In pairs, the students will work through examples 1-8. Using the steps.
6. TW ask for volunteers to complete the division problems on the whiteboard using the LCD.
7. TW assign SP #1-18. Each student will work in a small group. Each student in the small group will be responsible for a certain number of problems. EX) groups of 3s and each student will complete 6 problems.
8. TW call for volunteers from each group to assess understanding. Students will explain their answers using the following sentence.
   First I ____________________.
   Then I ____________________.
   Next I ____________________.
   Finally I ____________________.
   My answer is ____________________.

Closing:
1. TW will write the following problem on the board: Find the error. Felicia and Tabitha are finding 11.2 ÷ 14. Who is correct? Explain your reasoning. Felicia said the answer is 8.0 and Tabitha said the
answer is 0.8.

2. SW use the following sentence to answer the question.

____________________ is correct because_____________________.


Unit Pricing Worksheet

The **unit price** of an item is the cost of an item given in terms of **one unit** of the item. The unit might be something that you count, like jars or cans. Or, it might be a unit of measure like ounces or pounds. You can find a unit price by using this formula.

\[
\text{unit price} = \frac{\text{cost of item}}{\text{number of units}}
\]

**Let’s decide which tuna is the better buy.**

**Advertisement 1**

<table>
<thead>
<tr>
<th>Underwater TUNA</th>
</tr>
</thead>
<tbody>
<tr>
<td>79¢</td>
</tr>
<tr>
<td>6 ounce can</td>
</tr>
</tbody>
</table>

**Advertisement 2**

<table>
<thead>
<tr>
<th>Yellow Star TUNA</th>
</tr>
</thead>
<tbody>
<tr>
<td>$0.90</td>
</tr>
<tr>
<td>10 ounce can</td>
</tr>
</tbody>
</table>

**Advertisement 3**

<table>
<thead>
<tr>
<th>Alby’s TUNA</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1.90</td>
</tr>
<tr>
<td>for two 6 ounce cans</td>
</tr>
</tbody>
</table>
Study Guide and Intervention
Dividing Decimals by Whole Numbers

When you divide a decimal by a whole number, place the decimal point in the quotient above the decimal point in the dividend. Then divide as you do with whole numbers.

**Example 1**  Find $8.73 \div 9$.

Estimate: $9 \div 9 = 1$

\[
\begin{array}{c}
9)8.73 \\
\underline{-9} \\
87 \\
\underline{-81} \\
63 \\
\underline{-63} \\
0
\end{array}
\]

Place the decimal point directly above the decimal point in the quotient.

Divide as with whole numbers.

$8.73 \div 9 = 0.97$  Compared to the estimate, the quotient is reasonable.

**Example 2**  Find $8.58 \div 12$.

Estimate: $10 \div 10 = 1$

\[
\begin{array}{c}
12)8.580 \\
\underline{-12} \\
84 \\
\underline{-84} \\
18 \\
\underline{-12} \\
60 \\
\underline{-60} \\
0
\end{array}
\]

Place the decimal point.

Annex a zero to continue dividing.

$8.58 \div 12 = 0.715$  Compared to the estimate, the quotient is reasonable.

**Exercises**

Divide.
1. $9.2 \div 4$
2. $4.5 \div 5$
3. $8.6 \div 2$
4. $2.89 \div 4$
5. $3.2 \div 4$
6. $7.2 \div 3$
7. $7.5 \div 5$
8. $3.25 \div 5$
Skills Practice
Dividing Decimals by Whole Numbers

Divide. Round to the nearest tenth if necessary.

1. 9.6 ÷ 3
2. 5.15 ÷ 5
3. 16.08 ÷ 2
4. 24.64 ÷ 7
5. 132.22 ÷ 11
6. 142.4 ÷ 16
7. 79.2 ÷ 9
8. 47.4 ÷ 15
9. 217.14 ÷ 21
10. 34.65 ÷ 5
11. 20.72 ÷ 8
12. 72.6 ÷ 10
13. 57.48 ÷ 15
14. 264.5 ÷ 25
15. 317.594 ÷ 34
16. 122.32 ÷ 11
17. 42.48 ÷ 18
18. 323.316 ÷ 24
**Big Idea:**
When you divide decimals by decimals the answer represents how many times the divisor fits into the dividend

<table>
<thead>
<tr>
<th>Class: Grade 6 3-9</th>
<th>Date:</th>
</tr>
</thead>
</table>

**Content Objective:**
- SWBAT divide decimals by decimals

**Language Objectives:**
- SWBAT orally explain the steps to dividing decimals by decimals.

**Key Vocabulary:**
- Dividend
- Divisor
- Quotient
- Power of ten

**Materials:**
- Chart paper
- Construction paper
- Markers

**Higher Order Questions:**
When dividing a decimal by a decimal, why does the quotient sometimes get larger?

**Activities:**

**Warm Up:**
1. Discuss the three key vocabulary words. T will say and define each word. Students will repeat the word. Label each word on a division problem on chart paper.
   
   \[44.22 \div 2.2 = 20.1\]

**Divisor – the number you are dividing by**

**Dividend – the number being divided**

**Quotient – the answer**

2. Students will work in pairs to estimate the answer to 14.19 ÷ 2.2.
   - What is your estimated answer? (7) Now try to find the actual answer to the problem.
   - What are some things you did to solve the problem? What was difficult or confusing? T will ask students to share things they tried when solving the problem.

**Learn:**
3. T will model how to solve the problem. Record steps on chart paper and display in classroom for later use. An example will be worked through next to each step. *T will use .52 ÷ 0.4=

   \[When \text{ you are dividing decimals, why does the quotient sometimes get bigger?} \text{ (Because you are finding out how many times a number goes into another number)}\]
   
   \[a. \quad 0.25 = 10\]

   TW illustrate this on the board using fraction bars.

   - Change the divisor into a whole number. *To do this, multiply both the divisor and the dividend by the same power of 10. T will review that the power of ten is simply multiplying by 10, 100, 1000 etc.
   - Divide like whole numbers.
   - Place the decimal point in the answer directly above the dividend.

4. Teacher will model how to solve 3.69 ÷ 0.3 on the board.

5. Student helpers will come to the board and solve a problem. Student will explain and check off each step as they complete it. 1) 0.45 ÷ 0.3  2) 0.6÷0.0024  3) 13.95 ÷3.1

6. T will assign Skills Practice 3-9. Students will be given different parts of the assignment to complete. The class will then come back together, share their answers and allow the whole class to complete the whole assignment. (Jigsaw)

**Closing:**
7. Put students in groups of 3. Assign each group 3 problems. Have them solve the problems round robin style on Dividing Decimal worksheet. For each problem the students should complete a different step.
example: if student 1 completes step 3 for problem 1, for the second problem they should do step 1 or 2.
Dividing Decimals

- Change the divisor into a whole number. *To do this, multiply both the divisor and the dividend by the same power of 10. T will review that the power of ten is simply multiplying by 10, 100, 1000 etc.
- Divide like whole numbers.
- Place the decimal point in the answer directly above the dividend.

1.44 ÷ 0.4 = 

2.07 ÷ 0.9 = 

0.0338 ÷ 1.3 =
**Big Idea:**
Numbers share factors.

**Class:**
Grade 6
4-1

**Date:**

<table>
<thead>
<tr>
<th><strong>Content Objective:</strong></th>
<th><strong>Language Objectives:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• SWBAT find the greatest common factor of two or more numbers.</td>
<td>• SWBAT orally state how to create a list of factors.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Key Vocabulary:</strong></th>
<th><strong>Materials:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Greatest Common Factor</td>
<td>Exit Slips</td>
</tr>
<tr>
<td>Factor</td>
<td>Chart paper</td>
</tr>
<tr>
<td>Common Factor</td>
<td>Markers</td>
</tr>
<tr>
<td>Organized List</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Higher Order Questions:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Do larger numbers have more factors than smaller numbers?</td>
</tr>
</tbody>
</table>

| **Warm Up:** | On the board I have two numbers 16 and 24. Each of them has a list under them. Why did I list these numbers under 16 and 24? Why did I organize them this way? (they are factors, numbers that can be multiplied to get the numbers) Do these numbers have any common factors? (1,2,4,8) Students should write these in a list on paper. Which of these common factors is the greatest? (8) Common means shared. If Maria and Juan have a hair color in common, what does that mean? That they both have the same hair color. Just like if 16 and 24 have common factors of 1, 2, 4, and 8. |

| **Learn:** | Today we are going to be learning about GCF (greatest common factor). You will be creating a list of factors to find the greatest one they both have. Teacher will write steps on chart paper and hang in the classroom for later use. Make a list of all the factors for the first number. These are all the numbers that can be multiplied to get the number. (1 x ____, 2 x ______, 3 x _____) Make a list of all the factors for each of the other numbers. Circle all the common factors. Put the circled common factors in a list from least to greatest. Find the largest circled number. That is your greatest common factor. T will model 3 problems for the class. T will explain the steps as she solves the problem. 1) 25, 60 2) 18, 27, 36 3) 11, 44 |

<table>
<thead>
<tr>
<th><strong>Closing:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Students will complete an exit slip independently. T will work with ELLs at the back table.</td>
</tr>
</tbody>
</table>
Exit Slip

A bakery arranges three different types of muffins in a display case. There are a total of 40 blueberry, 24 cinnamon raisin and 32 chocolate chip muffins. There should be an equal number of muffins in each row in the case. What is the greatest possible number of muffins in each row?

Factors of 40:

Factors of 24:

Factors of 32:

Greatest Common Factor:
Practice
Greatest Common Factor

Identify the common factors of each set of numbers.
1. 12 and 20
2. 12, 24, 36
3. 15, 33, 45
4. 12 and 30
5. 50 and 40
6. 20 and 27
7. 28, 42, 56
8. 14, 56, 63
9. 9, 21, 60

Find the GCF of each set of numbers.

Find three numbers whose GCF is the indicated value.
10. 3
11. 16
12. 18

TOYS For Exercises 13 and 14, use the following information.
A store is organizing toys into bins. The toys must be put into bins such that each bin contains the same number of toys without mixing the toys.

13. What is the greatest number of toys that can be put in a bin?

<table>
<thead>
<tr>
<th>Toys to Place in Bins</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toy</td>
</tr>
<tr>
<td>airplanes</td>
</tr>
<tr>
<td>boats</td>
</tr>
<tr>
<td>cars</td>
</tr>
</tbody>
</table>

14. How many bins are needed for each type of toy?
Big Idea: Simplifying a fraction does not change its value.

Class: Grade 6 4-2

Date:

<table>
<thead>
<tr>
<th>Content Objective:</th>
<th>Language Objectives:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• SWBAT express fractions in simplest form.</td>
<td>• SWBAT orally express fractions in simplest form and name fraction pictures.</td>
</tr>
</tbody>
</table>

1/2 = 3/6

<table>
<thead>
<tr>
<th>Key Vocabulary:</th>
<th>Materials:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equivalent fractions</td>
<td>Fraction Bars</td>
</tr>
<tr>
<td>Simplest form</td>
<td>Equivalent Fraction Matching Cards</td>
</tr>
<tr>
<td>Numerator</td>
<td>Index Cards</td>
</tr>
<tr>
<td>Denominator</td>
<td></td>
</tr>
<tr>
<td>Simplify</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Higher Order Questions:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Which changes when you simplify a fraction: the size or quantity of the fraction?</td>
</tr>
<tr>
<td>Why do we simplify?</td>
</tr>
</tbody>
</table>

Warm Up:
1. TW will pass out fraction bars to pairs of students. TW will tell students that two fractions will be written on the board. The students must then represent those fractions using fraction bars. After the two fractions are made, the TW ask students what they notice about the fractions. Students will use the sentence - What I notice about _____________ and _____________ is that they are both ___________. (to answer the question)
2. Some examples of fractions to be represented with fraction bars would be:
   • Show me 3/6 and ½, Show me 3/12 and ¼, Show me 6/10 and 2/5
3. Once students are comfortable with this, the TW will lead the students in a discussion about equivalent fractions. TW explain what equivalent fractions (two fractions with the same value) and refer back to the activity to show that the student made equivalent fractions.

Learn:
1. TW explicitly teach how to simplify a fraction. First, find the common factors of the N and D. Then find the GCF. Then divide the N and D by the GCF. The teacher will support student learning by writing examples on the board and labeling. TW make sure that students understand that when a fraction is simplified, it is not changing the size or quantity of the fraction. TW say: How can we make 2/6 smaller? Use your fraction bars to find a fraction that is equal to 2/6. (A diagonal line separates the numerator and denominator.)
2. Once students have an understanding of equivalent fractions and putting fractions into simplest form, they will be given an envelope that contains written fractions and fractions written in word form. (Students will work individually except for ELLs, who may work with a partner if appropriate.)
3. The students will lay the cards out upside down and try to match each fraction with an equivalent fraction. The students will then find the word form for each fraction. At the end of the cycle, the students will have 2 fractions and matching word form cards, (4 cards total).
4. TW will walk around to support students and answer questions on an individual basis.

Closing:
AT the end of the game, the TW call the students back and write the following on the board to discuss.

What did you learn about the game? I learned that ________________.
What was one thing you liked about the game? One thing I liked about the game was ____________.
What is one thing you still need to work on? One thing I still need to work on is ________________.
When simplifying a fraction, is the size or quantity of the fraction changing? Yes/No the size or quantity is changing because ________________.
<table>
<thead>
<tr>
<th>Fraction</th>
<th>Mixed Number</th>
<th>Improper Fraction</th>
<th>Equivalent Fractions</th>
</tr>
</thead>
<tbody>
<tr>
<td>one half</td>
<td>1/2</td>
<td>5/10</td>
<td>five tenths</td>
</tr>
<tr>
<td>one fourth</td>
<td>1/4</td>
<td>2/8</td>
<td>two eighths</td>
</tr>
<tr>
<td>one third</td>
<td>1/3</td>
<td>3/9</td>
<td>three ninths</td>
</tr>
<tr>
<td>one fifth</td>
<td>1/5</td>
<td>5/25</td>
<td>five twenty fifths</td>
</tr>
<tr>
<td>one sixth</td>
<td>1/6</td>
<td>4/24</td>
<td>four twenty fourths</td>
</tr>
<tr>
<td>one seventh</td>
<td>1/7</td>
<td>2/14</td>
<td>two fourteenths</td>
</tr>
<tr>
<td>one eighth</td>
<td>1/8</td>
<td>2/16</td>
<td>two sixteenths</td>
</tr>
<tr>
<td>one ninth</td>
<td>1/9</td>
<td>3/27</td>
<td>three twenty sevenths</td>
</tr>
<tr>
<td>one tenth</td>
<td>1/10</td>
<td>2/20</td>
<td>two twentieths</td>
</tr>
<tr>
<td>one twelfth</td>
<td>1/12</td>
<td>3/36</td>
<td>three thirty sixths</td>
</tr>
<tr>
<td>three sevenths</td>
<td>3/7</td>
<td>6/14</td>
<td>six fourteenths</td>
</tr>
<tr>
<td>four eighths</td>
<td>4/8</td>
<td>8/16</td>
<td>eight sixteenths</td>
</tr>
<tr>
<td>three nineths</td>
<td>3/9</td>
<td>6/18</td>
<td>six eighteenths</td>
</tr>
<tr>
<td>one twentieth</td>
<td>1/20</td>
<td>3/60</td>
<td>three sixtieths</td>
</tr>
<tr>
<td>one thirtieth</td>
<td>1/30</td>
<td>2/60</td>
<td>two sixtieths</td>
</tr>
<tr>
<td>four tenths</td>
<td>4/10</td>
<td>8/20</td>
<td>eight twentieths</td>
</tr>
</tbody>
</table>

**Big Idea:**
A specific quantity can be represented by a mixed number and an improper fraction.

**Class:**
Grade 6
4-3

**Date:**

**Content Objective:**
- SWBAT write mixed numbers as improper fractions and vice versa.

**Language Objectives:**
- SWBAT orally compare a mixed number to an improper fraction.

**Key Vocabulary:**

**Materials:**
Higher Order Questions:
What makes an improper fraction, improper?

Warm Up:
1. TW write the following on the board.
   My cousin is 46/5 (forty-six fifths) years old. Is my cousin a younger or older person? Draw a picture and use words to answer the question.
   Ms. Smith’s cousin is ___________________ because ______________________
2. TW lead the class in a discussion about how to draw 46/5 and how to find out how old her cousin is.

Learn:
3. TW write the following on the board:
   23/4 and 5 ¾
4. TW instruct the class about how the two about fractions represent the same thing. TW state that 23/4 is written as an improper fraction and 5 ¾ is written as a mixed number. Teacher will draw a pictorial representation of this on the board.
   TW: We do not write fractions as improper fractions. We write them as mixed numbers.
5. TW will then go over the steps on how to turn the improper fraction into mixed numbers.
6. TW will write the following on the board.
   First, divide the denominator by the numerator.
   Second, the number on top of the division line is your whole number.
   Third, the remainder is your new numerator.
   Fourth, the denominator stays the same.
   \[23 ÷ 4 = 5 \frac{3}{4}\]
7. TW will label each step of the process for students and keep examples on the board to use as anchor charts for the activity.
8. Once student have an understanding of improper fractions and mixed numbers, they will be given a WS that contains mixed numbers and improper fractions. In pairs, the students must draw a representation of each mixed number or improper fraction. Once students are done, they will cut out each individual card.
9. The students will lay the cards out upside down and try to match each mixed number, improper fraction, pictures and word forms of each. At the end of the cycle, the students will have a total 6 cards.
10. TW will walk around to support students and answer questions on an individual basis.

Closing:
AT the end of the game, the TW call the students back and write the following on the board.
   What did you learn about the game? I learned that ____________________.
   What was one thing you liked about the game? One thing I liked about the game was ________________.
   What is one thing you still need to work on? One thing I still need to work on is ____________________.
   What makes an improper fraction, improper? ________________ makes an improper fraction, improper.

TW will read the questions and point to the question on the board. SW write answers on index cards and hand to teacher.