**FIRST GRADING PERIOD**

**Lesson 7: Solving routine and non-routine problems involving factors, multiples, and divisibility rules for 2, 3, 4, 5, 6, 8, 9, 10, 11, and 12**

**Week 3**

**Objective:** Solves routine and non-routine problems involving factors, multiples, and divisibility rules for 2, 3, 4, 5, 6, 8, 9, 10, 11, and 12.

Value Focus: Helpfulness

**Prerequisite concept and skills**:

* Number Theory Concepts including prime and composite numbers, prime factorization, greatest common factor, least common multiple, and divisibility rules for 2, 3, 4, 5, 6, 9, and 10.

**Materials:** counters, charts/tables

**Reference:** K to 12 Grade 5 Curriculum (M5NS-Ic-59); Lesson Guides in Elementary Math 5

**Instructional Procedure:**

1. **Drill:**

Let the pupils answer these questions.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| 1.       Mr. Simon gave exactly 3 pencils to each student in the Math Club.  Which of the following could be the total number of pencils he gave to the students in the Math Club?   |  |  | | --- | --- | | **A.** 13 | **B.** 27 | | **C.** 22 | **D.** 31 |   2.       Farmer Eli collected 66 eggs to sell. He will sell the eggs in baskets. He wants to put the same number of eggs in each basket without any eggs left over. How many eggs could Farmer Eli put in each basket?   |  |  | | --- | --- | | **A.** 5 | **B.** 9 | | **C.** 4 | **D.** 3 |  1. **Review:**   Complete the following chart.  Write “yes” or “no” in each box.   |  |  |  | | --- | --- | --- | | **Is the number…** | 84 | 510 | | Divisible by 2? |  |  | | Divisible by 3? |  |  | | Divisible by 4? |  |  | | Divisible by 5? |  |  | | Divisible by 6? |  |  | | Divisible by 9? |  |  | | Divisible by 10? |  |  | |
| 1. **Motivation:**   Which arrangement do you think is better? Why?   |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |   **B. Developmental Activities:**  **1.** **Presentation:**  Patricia is helping the librarian arrange books in shelves. She was given 180 books. How do you suggest she should arrange them?  **2. Performing the Activities**  ·         Working in threes, the pupils will try to arrange 180 into rows to find out possible arrangements.   1. **Processing the Activities:**   What possible arrangements did you find? How will you be able to find possible arrangements faster and easier?   1. **Reinforcing the Concept and skill**   A sales attendant is arranging 40 mobile phones into groups of equal numbers in a display cabinet. How can the arrangement be?   1. **Summarizing the Lesson**   ·         How can we solve problems on factors, multiples and divisibility?   1. **Applying to New and Other Situations**   **Independent Practice**  ·         Answer the following questions:   1. What is the least number that is divisible by 2, 4, 5, 8 and 10? 2. What numbers, between 100 and 120, are divisible by 4 and 8? 3. What is the smallest multiple of 5 that is divisible by 8?   **C. Assessment**  ·         A clerk is arranging 1 620 pieces of papers on the table. Put a check on the line if she can arrange the papers into the given number of piles.   1. 4 equal piles 2. 6 equal piles 3. 5 equal piles 4. 8 equal piles 5. 10 equal piles     D. **Home Activity**  **Remediation**  Fill in the blanks to solve the problem.  Jose wants his garden to look good. How can he place 84 seedlings equally into rows?   1. 2 rows of \_\_\_\_\_\_\_ seedlings 2. 3 rows of \_\_\_\_\_\_\_ seedlings 3. \_\_\_\_ rows of 6 seedlings 4. \_\_\_\_ rows of 12 seedlings |

**Enrichment:**

|  |  |
| --- | --- |
| *Who am I?* (Hint: I am less than 50.)  Divided by 9, I leave http://www.homeschoolmath.net/teaching/md/images/mystery-numbers2.pnga remainder of 6. Divided by 4, I leave a remainder of 1. Divided by 10, I leave a remainder of 3. | http://www.homeschoolmath.net/teaching/md/images/mystery-numbers2.png*Who am I?* (Hint: I am less than 100.)  I am a multiple of 3, 4, 5, and 6. I am a factor of 120. Divided by 7, I leave a remainder of 4. |

**FIRST GRADING PERIOD**

**Lesson 8: Creating problems (with reasonable answers) involving factors, multiples and divisibility rules**

**Week 3**

**Objective:** Creates problems (with reasonable answers) involving factors, multiples and divisibility rules

Value Focus: Fair Share

**Prerequisite concept and skills**:

* Divisibility rules for 2, 3, 4, 5, 6, 9, and 10?
* Develop technology skills and computer literacy through the use of the spreadsheet program Excel.

**Materials and Equipment:**

Pencil Paper

White board, chalkboard, dry erase board (any)

Computer with Excel

*Mathematics*

Number Sense & Numeration; Fractions & Decimals

*Topic:* Factor, Prime, Multiple, GCF, LCM  
*Standard:*Identifies and applies divisibility, factors, prime factors, greatest common factor, and least common multiple.

Number Sense & Numeration; Fractions & Decimals

*Topic:*Factor, Multiple, Prime, Composite  
*Standard:*Identifies factors multiples, primes and composites.   
  
**References:** K to 12 Grade 4 Curriculum (M5NS-Ic-60 9)

**Instructional Procedure:**

1. **Preliminary Activities**
2. **Drills**

|  |  |  |
| --- | --- | --- |
| **Is the number…** | 84 | 510 |
| Divisible by 2? |  |  |
| Divisible by 3? |  |  |
| Divisible by 4? |  |  |
| Divisible by 5? |  |  |
| Divisible by 6? |  |  |
| Divisible by 9? |  |  |
| Divisible by 10? |  |  |

1. **Review:** Let the pupils state the different divisibility rules.
2. **Motivation:** What possible numbers can be written on the blank to make the number divisible by 2, 3, 5, 6, 9 and 10?

**58\_20**

**Value Focus:** Emphasize that if the answer is not correct, there will be a remainder. This may be related to giving fair shares when dividing something among individuals.

1. **Developmental Activities**
2. **Presentation:**

Students will explore Excel and discover rules of divisibility for  the numbers 2, 3, 4, 5, 6, 9, and 10.  First, students will examine multiples of 2 using pencil and paper.  Then students will learn to create a chart in Excel that will allow them to more easily see patterns of numbers and determine rules of divisibility for the numbers listed above.

1. **Performing the Activities:**

* Teacher will recreate a chart that identifies the multiples of a given number, 2.
* Put the number 2 in the first column. Have the students list ten multiples of the number 2. These can include 4, 6, 8, 10, 12, 14, 16, etc. After the students have listed the multiples on their paper, have them help you fill in the multiples column on your chart.
* Discuss the observations found concerning the multiples of 2. Use these observations to develop a divisibility rule for 2, example:  all numbers divisible by 2 are even.
* Use same chart that was created by pencil and paper.  Explain and demonstrate the formula necessary to demonstrate the multiples of 2
* Repeat steps above with the numbers 3, 4, 5, 6, 9, and 10.

1. **Processing the Activities:**

Students will use chart that demonstrates the patterns associated with the divisibility of  2, 3, 4, 5, 6, 9, and 10?

1. **Reinforcing the concept and skills**

Divisibility by Eight

If the last three digits in any integer greater than 1000 is divisible by eight, then is the entire number divisible by 8? Explain why or why not.

1. **Summarizing the Lesson**

**Divisibility by 2**

Numbers that are divisible by 2 are called ***even*** numbers.  
Numbers that are NOT divisible by 2 are called ***odd*** numbers.

Even numbers end in 0, 2, 4, 6, or 8. Every second number is even

**Divisibility by 5**

Numbers that end in 0 and 5 are divisible by 5.

For example, 10, 35, 720, and 3,675 are such numbers.

1. **Applying to New and Other Situations**

Supply the missing digit to make the number divisible by the number opposite it.

1. 5\_1 ---- 3
2. 712\_ ----5
3. 139\_ --- 2
4. 463\_ ---10
5. 273\_ --- 4
6. 626\_ --- 9
7. 823\_ --- 6
8. 385\_ --- 6
9. 423\_ --- 3
10. 216\_ --- 8
11. **Assessment**

Mark with “x” if the numbers are divisible by 2 or 5.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| |  |  |  | | --- | --- | --- | | **number** | **divisible** | | | **by 2** | **by 5** | | 750 |  |  | | 751 |  |  | | 752 |  |  | | 753 |  |  | | 754 |  |  | | |  |  |  | | --- | --- | --- | | **number** | **divisible** | | | **by 2** | **by 5** | | 755 |  |  | | 756 |  |  | | 757 |  |  | | 758 |  |  | | 759 |  |  | | |  |  |  | | --- | --- | --- | | **number** | **divisible** | | | **by 2** | **by 5** | | 760 |  |  | | 761 |  |  | | 762 |  |  | | 763 |  |  | | 764 |  |  | |

1. **Home Activity**

**Remediation**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  | | --- | --- | --- | --- | | **r** | **divisible** | | | | **by 2** | **by 5** | **by 10** | | 860 |  |  |  | | 861 |  |  |  | | 862 |  |  |  | | 863 |  |  |  | | 864 |  |  |  | | |  |  |  |  | | --- | --- | --- | --- | | **number** | **divisible** | | | | **by 2** | **by 5** | **by 10** | | 865 |  |  |  | | 866 |  |  |  | | 867 |  |  |  | | 868 |  |  |  | | 869 |  |  |  | | |  |  |  |  | | --- | --- | --- | --- | | **number** | **divisible** | | | | **by 2** | **by 5** | **by 10** | | 870 |  |  |  | | 871 |  |  |  | | 872 |  |  |  | | 873 |  |  |  | | 874 |  |  |  | |

**Enrichment**

. **a.** Write a list of numbers divisible by 2, from 0 to 60.

        \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

        This is also a list of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of 2.

**b.** In the list above, *underline* those numbers that are divisible by 4.  
        What do you notice?

**c.** In the list above, *color* those numbers that are divisible by 6.  
        What do you notice?

**d.** Which numbers are divisible by both 4 and 6?

9. **a.** Write a list of numbers divisible by 3, from 0 to 60.

        \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

        This is also a list of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of 3.

**b.** In the list above, *underline* those numbers that are divisible by 6.  
        What do you notice?

**c.** In the list above, *color* those numbers that are divisible by 9.  
        What do you notice?

10. Use the lists you made in (7) and (8). Find numbers that are divisible by *both* 2 and 9.

**FIRST GRADING PERIOD**

**Lesson 9: Stating, Explaining, and Interpreting Parenthesis, Multiplication, Division, Addition, Subtraction (PEMDAS) or Grouping, Multiplication, Division, Addition, Subtraction (GMDAS) Rule**

**Week 3**

**Objective:** States, explains, and interprets Parenthesis, Multiplication, Division, Addition, Subtraction (PEMDAS) or Grouping, Multiplication, Division, Addition, Subtraction (GMDAS) Rule.

**Prerequisite concept and skills**:

* PEMDAS as an acronym for order of operations.
* Four basic operation

**Materials**

* Paper and pencil for each student
* Newsprint or chart paper, 1 sheet per pair of students
* Markers, 2 different colors per pair of students

**Reference:** K to 12 Grade 5 Curriculum **(**M5NS-Ic-61.2)

**Instructional Procedure**

1. **Preliminary Activities**
2. **Drill**

On note sheet, students should practice the following problems:

* Is 47 divisible by 3?
* Is 58 divisible by 6?
* Is 312 divisible by 9? 10? 5? 6? 4? 3? 2?

1. **Review**

* 26\_ is divisible by 10 154\_ is divisible by 2
* \_6\_ is divisible by 6
* 26\_ is divisible by 3
* 1\_2 is divisible by 9
* 15\_ is divisible by 4

1. **Motivation:**

Introduce the idea of using conventions to clarify meaning by displaying the following sentences:

*“Paul,” said the teacher, “is very intelligent.”*

*Paul said the teacher is very intelligent.*

Ask students to talk to a partner about the meaning of each sentence and be ready to share their ideas with the whole class.

1. **Developmental Activities**
2. **Presentation**

Next, ask the students to complete the following number sentence:

*4 + 4 × 4 – 4 = \_\_\_\_\_\_\_.*

1. **Performing the Activity**

Many students are unaware of the convention of the order of operations and the answers students offer might vary,

including 28, 16, and 0. As students share how they arrived at their answers, record their thinking for the class. Some examples:

*28 16 0*

*4 + 4 = 8 4 × 4 = 16 4 + 4 = 8*

*8 × 4 = 32 4 + 16 – 4 = 16 4 – 4 = 0*

*32 – 4 = 28 8 × 0 = 0*

2. Continue by discussing how confusing this could be when we are trying to communicate our thinking in writing.

Explain that, just like in using agreed upon punctuation to clarify meaning with written words, we use an agreed upon

order of operations to clarify meaning with written math sentences.

Introduce the order of operations for the four basic operations:

*First: Simplify all operations inside parentheses.*

*Then: Simplify all exponents, working from left to right.*

*Next: Perform all multiplications and divisions, working from left to right.*

*Finally: Perform all additions and subtractions, working from left to right.*

1. **Processing the Activity**

Ask the students to again complete the number sentence but this time use the agreed upon order, or conventional order.

Invite each student to compare his solution with that of another student sitting nearby. Finally, ask for studentsto share their solutions with the whole class.

This time *most* of the solutions should be the same.

Confirm the process and solution using the order of operations.

Refer back to the record of their thinking and model how to record their original thinking using number sentences. Use Parentheses to communicate the order of operations used by each method:

28 16 0

4 + 4 = 8 4 × 4 = 16 4 + 4 = 8

8 × 4 = 32 4 + 16 – 4 = 16 4 – 4 = 0

32 – 4 = 28 8 × 0 = 0

(4 + 4) × 4 – 4 = 28 4 + (4 × 4) – 4 = 16 (4 + 4) × (4 – 4) = 0

1. **Reinforcing the concept and skill**

Next, introduce the Four 4s challenge. Note with students that in the lesson, three different values have already been created using only four 4s—28 and 16 and 0. Ask students to work with a partner to complete the challenge.Four 4s Challenge

How many of the numbers from 1 to 10 can you create using four 4s?

1 =

2 =

3 =

4 =

5 =

6 =

7 =

8 =

9 =

10 =

Record your findings on newsprint using dark markers and large lettering so others

can read it from across the classroom.

This challenge engages students in exploring how changes in operations affect the value of a numerical expression.

In searching for expressions equal to given solutions, they develop strategies for manipulating the value of an expression and record expressions using conventional methods.

1. **Summarizing the Lesson**

1. Ask the following questions as a way for students to demonstrate new learning and to reflect on the lesson objective.

Q. What do you notice is the same about all of the newsprint posters?

Q. What is different?

Q. Which number sentences, if any, have the same value even though the operations were performed in a

different order?

Q. With which solution, if any, do you disagree? How might you correct it?

Q. Why is it important that we have an agreed upon order of operations?

Q. Who can state, using your own words, the standard order of operations?

Q. The saying “Please excuse my dear Aunt Sally” has been used by many students to recall the standard order of operations. How do you think it helps?

Recap today’s lesson.

Remind students that PEMDAS and GEMDAS are both common acronyms used for

remembering the order of operations.

Allow students to ask questions that they still have and make comments about what they

have learned.

1. **Applying to new and other Situations**
2. 60 – 4 x (7 -2) + 23 + 32
3. 30 - 2 x (3-2 ) + 24 + 45
4. 95- 35 x (7-2 ) + 42 + 64
5. **Assessment**

7 + (6 × 52 + 3)=

3 + 6 × 2 =

12 / 6 × 3 / 2 =

13+ (4 × 32 + 12) =

36+ 16 × 23=

1. **Home Activity**

**Enrichment**

GEMDAS Independent Practice

G= Grouping Symbols **( ), [ ], { }, \_\_\_\_,** E= Exponents

M/D= Multiplication and Division (from left to right)

A/S= Addition and Subtraction (from left to right)

1) 8 + **[(**7 - 6**)** + 6**]** - 2

2) 4 x**[**62 + **(**1 + 92**)]**

3) **{**8 **× [**4 + **(**2 **×** 9**)]} ×** 93

4) 73 + **{**72 - **[**22 - **(**9 + 72**)]}**

5) **[**33 - **(**23 - 3**)]** + **(**3 + 82**)**

6) 52 **× [**93 + **(**23 + 72**)]**

7) **{**4 - **[(**3 **×** 9**)** + 12**]}** + 63

8) (82 ×5**)]** + 7**}** + **(**53 **×** 52**)**

9) 52 **× [**93 + **(**23 + 72**)]**

10) 63 **× [**32 + **(**9 + 3**)]**

**Remediation**

GEMDAS Guided Practice

1. 100 − [50 − (20 +10)]

2. 2²{40 − 2[10 − 2(8− 6)]}

3. 120 – {5 [8 + 122– (2 x 9)]} ÷ 67

GEMDAS Guided Practice—KEY

1. 1.100 − [50 − (20 +10)]

100 − [50 − (30)]

100 − 20=

80

1. 22{40 − 2[10 − 2(8− 6)]}

22{40 − 2[10 − 2(2)]}

22{40 − 2[10 − 4]}

22{40 − 2[6]}

22{40 − [12]}

22{28}

2x2{28}

4{28}=

112

1. 120 – {5 [8 + 122– (2 x 9)]} ÷ 67

120 – {5 [8 + 122– (18)]} ÷ 67

120 – {5 [8 + 144– 18]} ÷ 67

120 – {5 [134]} ÷ 67

120 – 670÷ 67

120 – 10 =

110