Lesson 1: Prime Numbers & Factoring

Objectives	Terms
• To understand prime numbers. • To be able to determine if a number is prime, using divisibility rules. • To be able to identify the factors and prime factors of numbers. • To use factoring to find GCF and LCM.	• Prime Numbers • Factors • Factoring • Prime Factorization • Greatest Common Factor • Least Common Multiple

Think about this:

Scenario #1: You are having some friends come over and have a dozen (12) cans of soda to share. You quit drinking soda, so you don't want any soda left over and want to make sure that everyone gets the same number of cans of sodas.

1. If 12 people come over, how many sodas will everyone get (excluding yourself)?

   Fill in the table with your response.

2. What if 1 person comes over?

   Fill in the table with your response.

3. Use the table to figure out how many different numbers of people you can have over and still evenly distribute soda.

   Fill in the table with your response.

Number of People	Number of sodas each person gets
12 people	_____ can(s) each
1 person	_____ can(s) each

Scenario #2: You are having some friends come over, but now you only have 11 cans of soda to share. You quit drinking soda, so you don't want any soda left over and want to make sure that everyone gets the same number of cans of sodas.

1. Use the table to figure out how many different numbers of people you can have over and still evenly distribute soda (excluding yourself).

   Fill in the table with your response.

Number of People	Number of sodas each person gets

Think about this: What did you notice about the different ways you can divide 12 cans of soda evenly versus ways you can divide 11 cans of soda evenly?

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Definitions

- **Prime Number:** Whole numbers that have exactly two factors: _____ and _____.
    - Is _____ a prime number?

- **Factors:** numbers that divide into other numbers evenly.
    - Factors are the values we multiply together when finding a product.
    - **Factoring:** Writing a number as a _____ of _____.
    -
    - **Prime Factorization:** Writing a number as a _____ of its _____.

Which number is a prime number?	
11	12
List the factors of:	
11	12
Write the prime factorization of:	
11	12

Practice: Find the prime factorization of the given numbers.

12	**15**
4	**7**
20	**24**

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Think about this: How can you determine if a number is a prime number?

We can identify prime numbers by using **<u>divisibility rules</u>**.

- **What are divisibility rules?**
  - Divisibility rules can help us identify the factors of different numbers.
- Consider the table below[i].
  - Cross out 1
  - Circle 2, then cross out all multiples of 2.
    - How did you know what to cross out?
  - Circle 3, then cross out all multiples of 3.
    - How did you know what to cross out?
  - What is the next number after 3 that is not crossed out? Circle it.
    - Cross out the multiples of this number.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

- **What numbers did you circle?**

Divisibility Rules

Basic Rules of Divisibility		**Examples**
By 2		
By 3		
By 5		
By 9		
By 10		

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Think about: How can I use factoring and factors to determine relationships between numbers?

1. Write the factors and prime factorizations of the given numbers**:**

	12	**15**	**20**	**24**
Factors				
Prime Factors				

2. What prime factors do they have in common? **Write your answer in the space provided.**

12 and 15	12, 20, and 24

3. What prime factors do they NOT have in common? **Write your answer in the space provided.**

12 and 15	12, 20, and 24

4. What is the smallest value that is divisible by each number set? **Write your answer in the space provided.**

12 and 15	12, 20, and 24

Definitions

Greatest Common Factor: Also known as _____, this is the largest factor that a set of values have in common. All values have a factor of 1 in common.

Least Common Multiple: Also known as _____, this is the smallest value that a set of numbers and/or values can go into.

Greatest Common Factor
4 and 7:
4 and 24:
Least Common Multiple
4 and 7:
4 and 24:

Where will you see factoring in upcoming material?	What are the calculator skills you needed?

[i] Activity adapted from: Bassarear, Tom. Mathematics for Elementary School Teachers, 4th ed. 2008.