Grade 4 Advanced Math

Unit 2: Exploring Real Life Phenomena Through Patterning and Algebraic Reasoning

Dear Families,

We want to make sure that you understand the mathematics your child will be learning this year. Below you will find the standards we will be learning in Unit 2.

Each standard is in bold print, and below each one is an explanation with examples. Please let your teacher know if you have any questions. We appreciate your partnership and support.

4.PAR.3.1: Generate both number and shape patterns that follow a provided rule.

Students should be able to...

- connect each term in a growing or shrinking pattern with its term number (e.g., in the sequence 1, 4, 7, 10, …, the first term is 1, the second term is 4, the third term is 7, and so on).
- record the patterns in a table of values that shows the term number.

Examples:

1. If the rule is +2, which of the following patterns could be generated?
   a. 2, 4, 8, 16
   b. 1, 3, 5, 7
   c. 2, 12, 22, 32
   d. 2, 3, 4, 5
2. A company rents electric scooters. It costs $8 for each hour you rent. Complete the pattern in the table.

Hours	1	2	3	4
Cost of rental ($)	8	?	?	?

Answers:

1. B
2. 16, 24, 32

4.PAR.3.2: Use input-output rules, tables, and charts to represent and describe patterns, find relationships, and solve problems.

Students should be able to...

- analyze numerical patterns.

- use input-output tables and charts to represent patterns.
- find relationships and solve authentic problems.

Example:

Answer:

6, 1, 12, 13

4.PAR.3.3: Find factor pairs in the range 1–100 and find multiples of single-digit numbers up to 100.

Students should be able to...

- recognize that a whole number is a multiple of each of its factors.

Helpful vocabulary:

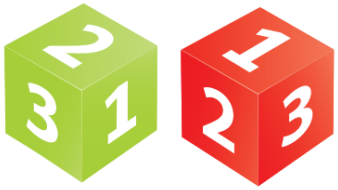
- factor – a number that is multiplied by another number to find a product
- factor pair – two factors that make a product
- multiple – a number that is the product of two counting numbers

Example (Game):

1. Use two number cubes or dice. The first player rolls the number cubes or dice to make a two-digit number (if the numbers are the same, roll again).

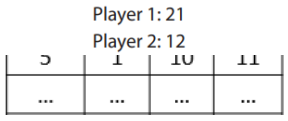


2. The second player reverses the order of the digits to make another two-digit number.



3. Each player finds all the factor pairs of their number.

Example:



Player 1 factor pairs of 21 are 1 and 21, 3 and 7.

Player 2 factor pairs of 12 are 1 and 12, 2 and 6, 3 and 4.

4. The player with more factor pairs is the winner of the round.

Example:

Player 2 wins the round because the number 12 has 3 factor pairs and player 1's number 21 has only 2 factor pairs.

4.PAR.3.4: Identify composite numbers and prime numbers and explain the relationship with the factor pairs.

Students should be able to...

- determine whether a given whole number in the range 1–100 is prime or composite or neither.
- describe the relationship between the numbers related to the factor pairs.

Helpful Vocabulary:

- Prime number - a number that has exactly two factors: 1 and itself
- Composite number - a number having more than two factors

Examples:

Tell whether the number is *prime* or *composite*.

1. 34 _____
2. 27 _____
3. 19 _____
4. 69 _____
5. 71 _____
6. 64 _____

Answers:

1. composite
2. composite
3. prime
4. composite
5. prime
6. Composite

4. MDR 6.1 Use the four operations to solve problems involving elapsed time to the nearest minute, intervals of time, metric measurements of liquid volumes, lengths, distances, and masses of objects, including problems involving fractions with like denominators, and also problems that require expressing measurements given in a larger unit in terms of a smaller unit, and expressing a smaller unit in terms of a larger unit. (*Only metric measurements of liquid volumes, lengths and distances).

Students should be able to...

- represent measurement quantities, such as time, using number line diagrams that feature a measurement scale.
- reason about the relative sizes of measurement units within the metric system.
- accurately record measurement equivalents in a two-column table.

Example:

Colton has a fishing line that is 5 meters long. Harrison has a fishing line that is 500 centimeters long. There are 100 cm in 1m. Who has the longer fishing line and how do you know?

Answer:

Their fishing lines are the same length because 100 cm = 1 m, so 500 cm = 5 m.

4.MDR.6.2: Ask questions and answer them based on gathered information, observations, and appropriate graphical displays to solve problems relevant to everyday life.

Students should be able to...

- solve relevant mathematical problems, including word problems that are meaningful to a student's real environment.

Examples:

If the pattern continues, do people at this school want to go exploring in the woods, the mountains, the ocean, or outer space? How many people would want to explore outer space?

Woods	
Ocean	
Mountains	
Outer Space	

Answers:

Outer space; 60

5.PAR.6.1: Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms by completing a table.

Students should be able to...

- generate two numerical patterns using two given rules.
- identify apparent relationships between corresponding terms by completing a table.

Example:

Bottles of water cost $2 and bottles of juice cost $3. Write a pattern for the cost of 0 to 5 bottles of water and a second pattern for the cost of 0 to 5 bottles of juice. How do the corresponding terms of the two patterns compare?

Water: _____ _____ _____ _____ _____ _____

Juice: _____ _____ _____ _____ _____ _____

Compare: _____

_____

Answer:

Water: 0 2 4 6 8 10

Juice: 0 3 6 9 12 15

Compare: **Answers will vary. Possible answer: Each term in the pattern for juice is 1.5 times greater than the corresponding term in the pattern for water.**