Number Patterns and Rules

STRAND: Patterns, Functions and Algebra

STRAND CONCEPT: Patterns, Relations, and Functions

SOL 4.15 and 5.18

Remediation Plan Summary

Students explore number patterns and determine and describe rules for the patterns.

Common Misconceptions

- Students may jump to conclusions without testing the generalization more than once.
- Students may add one more or subtract one more when looking at patterns in the numbers above or below a number.

Materials

- Displayable 12 x 12 multiplication chart
- Copies of Hundreds Chart with Record Sheet
- Displayable 25 chart with reflection questions

Introductory Activity

- Display a 12 x 12 multiplication chart, and have students identify and describe at least three different patterns in it. Answers will vary and may include: rows and columns of 10; the numbers in any given row increases by the header; entries in the one's column and row increases by one.
    - Additional questions
        - If the multiplication chart was expanded to 15 x 15, explain how you would determine the missing numbers?
        - If the multiplication chart was expanded to 100 x 100, explain how you would determine the missing numbers of the 50's column and row?
        - If a column and row has the following numbers: 0, 17, 34, 51, 68, 85 what is the rule?

Plan for Instruction

- Give each student a copy of the "Hundreds Chart" handout and the "Hundreds Chart Recording Sheet" handout. Have the students choose any number on the chart and write that number in the first space in the "Arrow" column on the recording sheet. Caution students not to choose a number on the perimeter of the chart.

- Tell students that they are going to move one space on the chart in a direction indicated by an arrow. The first arrow points to the right so have the student move one space to the right and write the new number on the recording sheet.

- Ask students what the relationship is between the number chosen and the number that is one space to the right. (The number to the right is one greater than the original number.) Ask whether this is true for any number on the chart. (Yes) If the students are unsure, have them try some other numbers on the chart.

- Tell students that they are going to write a rule for determining the number that is one space to the right of any number on the hundreds chart. In order to write the rule so that it can be used for any number on the chart, a variable will be used. Explain that a variable is a letter (in this case, n) that can represent any number chosen.

- Ask students what needs to be done to the number chosen to find the number that is one space to the right. (Add one to it.) If we use the letter n as our variable to represent the number chosen, what expression could we write to show that we need to add one to that number? ($n + 1$)

- Have the student write the expression in the "Rule" column on the recording sheet.

- Repeat steps 1–6 for the seven other arrows.

- When the recording sheet is complete, have the students practice determining the final number when given a start number and a series of arrows. For the first few examples, allow the student to use the hundreds chart. Then, have the students try it without the chart, but allow them to use the rule sheet.

Pulling It All Together (Reflection)

Reflection

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

Based on the chart above, use a variable to write a rule for the number that is one space away from any number on the chart when you move in the direction indicated by the arrow.

Using the chart shown above, select a starting number, direction, and variable, then write a rule.

Write a rule for the 8th column if the chart is changed to 8 x 8?

Note: The following pages are intended for classroom use for students as a visual aid to learning.

Virginia Department of Education 2018

Hundreds Chart

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

Hundreds Chart Recording Sheet

Arrow	Rule
___ ➡ = ___	_____ ➡
___ ⬅ = ___	_____ ⬅
___ ⬇ = ___	_____ ⬇
___ ⬆ = ___	_____ ⬆
___ ↘ = ___	_____ ↘
___ ↖ = ___	_____ ↖
___ ↙ = ___	_____ ↙
___ ↗ = ___	_____ ↗

Arrow Math Practice

55 → ↑ →

67 ← ← ↓ ↘

16 ↙ ↙ ←

39 ↖ → ↖ → ↓

82 ↗ ↗ ↗ ← ↘