



GRADE 4 MATHEMATICS

Patterns and Relations

Grade 4: Patterns and Relations (4.PR.1, 4.PR.2, 4.PR.3, 4.PR.4)

Enduring Understandings:

Patterns show order in the world.

Patterns can be found in many different forms.

Graphic organizers can be used to solve problems.

Essential Questions:

What is the increasing or decreasing unit in the pattern?

What strategies can be used to continue an increasing or decreasing pattern?

What strategies can be used to continue a numerical sequence?

How is the pattern increasing or decreasing?

How can graphic organizers help solve problems?

How is the pattern increasing or decreasing?

SPECIFIC LEARNING OUTCOME(S):	ACHIEVEMENT INDICATORS:
<p>4.PR.1 Identify and describe patterns found in tables and charts, including a multiplication chart. [C, CN, PS, V]</p>	<ul style="list-style-type: none"> → Identify and describe a variety of patterns in a multiplication chart. → Determine the missing element(s) in a table or chart. → Identify error(s) in a table or chart. → Describe the pattern found in a table or chart.
<p>4.PR.2 Reproduce a pattern shown in a table or chart using concrete materials. [C, CN, V]</p>	<ul style="list-style-type: none"> → Create a concrete representation of a pattern displayed in a table or chart. → Explain why the same relationship exists between the pattern in a table and its concrete representation.
<p>4.PR.3 Represent and describe patterns and relationships using charts and tables to solve problems. [C, CN, PS, R, V]</p>	<ul style="list-style-type: none"> → Extend patterns found in a table or chart to solve a problem. → Translate the information provided in a problem into a table or chart. → Identify and extend the patterns in a table or chart to solve a problem.

SPECIFIC LEARNING OUTCOME(S):	ACHIEVEMENT INDICATORS:
<p>4.PR.4 Identify and explain mathematical relationships using charts and diagrams to solve problems. [CN, PS, R, V]</p>	<ul style="list-style-type: none"> → Complete a Carroll diagram by entering data into correct squares to solve a given problem. → Determine where new elements belong in a Carroll diagram. → Solve a problem using a Carroll diagram. → Identify a sorting rule for a Venn diagram. → Describe the relationship shown in a Venn diagram when the circles intersect, when one circle is contained in the other, and when the circles are separate. → Determine where new elements belong in a Venn diagram. → Solve a problem by using a chart or diagram to identify mathematical relationships.

PRIOR KNOWLEDGE

Students may have

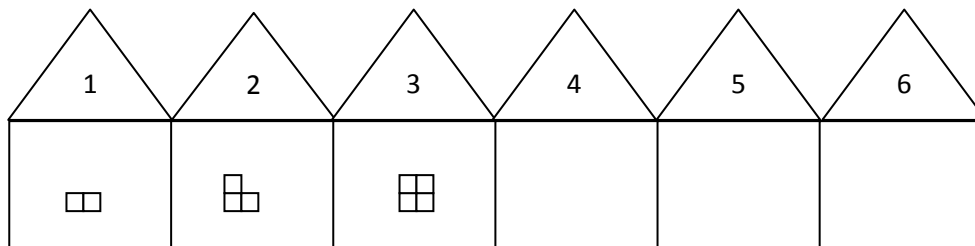
- worked with repeating, increasing, and decreasing patterns
- identified patterns on a hundred chart, addition table, and calendar
- worked with numerical patterns with numbers to 1000

BACKGROUND INFORMATION

Repeating and growing/increasing/decreasing patterns consist of a series of related elements—each new element is related to the previous in some manner. Students must be able to identify the relationship in order to understand the pattern.

Encourage students to make connections with numbers by presenting the pattern with numerical term positions.

Example:

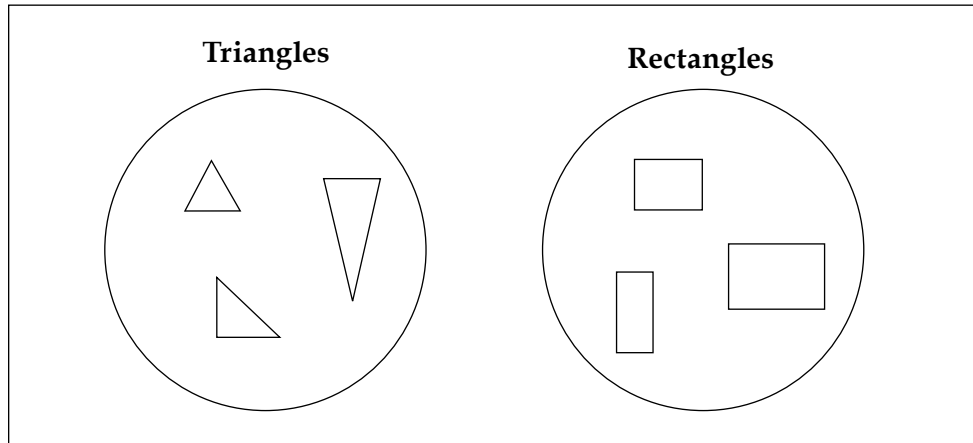


Increasing and decreasing patterns are patterns in which the basic core pattern grows/shrinks or changes in a predictable way.

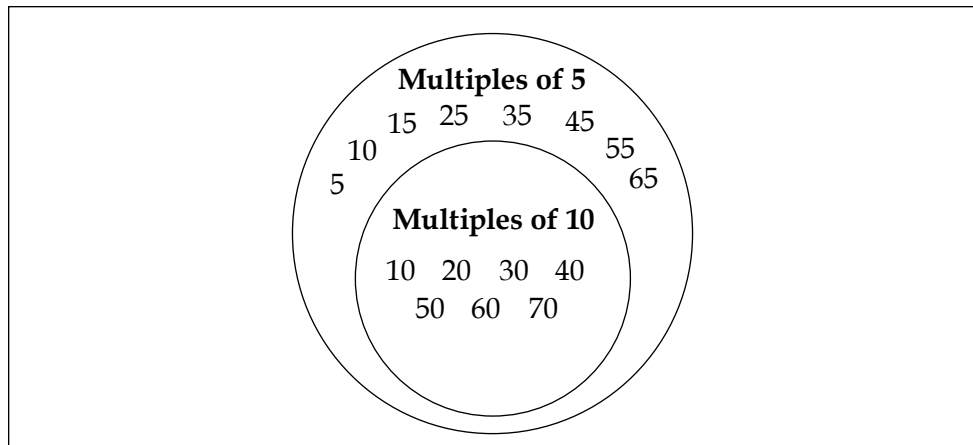
Venn Diagrams: There are three types of Venn diagrams: discrete sets, set and subset, and intersecting sets.

Examples of comparing two sets:

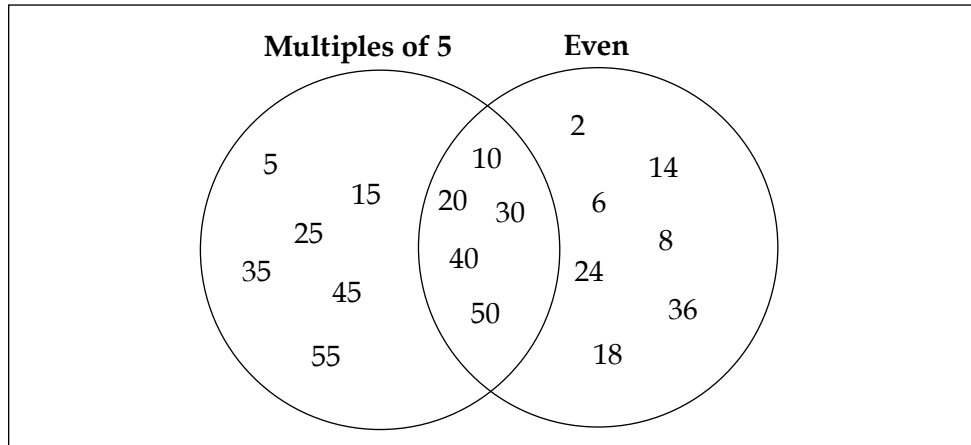
- **Discrete Sets:** The attributes being compared have nothing in common.



- **Set and Subset:** One set is a subset of the other. One of the attributes is contained in the set of the other attribute.



- **Intersecting Sets:** The attributes are shared by some members of both sets. The intersection shows the set of numbers that are both multiples of 5 and even.



Note: Numbers, objects, shapes, et cetera, that do not fit either attribute are placed outside the circles but inside the rectangle because they are still part of the whole set.

Carroll Diagrams: A Carroll diagram is a chart used to sort and display data by attributes. The diagram is done in a yes/no way. The diagrams are named after the mathematician and author (*Alice in Wonderland*), Lewis Carroll.

Example:

Sort the following numbers on the Carroll diagram:

2, 5, 6, 8, 10, 11, 14, 15, 18, 20, 24, 25, 27

	Even	Not Even
Multiple of 5	10, 20	5, 15, 25
Not a multiple of 5	2, 6, 8, 14, 18, 24	11, 27

MATHEMATICAL LANGUAGE

pattern	Carroll diagram
decreasing pattern	table
increasing pattern	attribute
element	set
extend	column
reproduce	row
rule	diagonal
Venn diagram	

LEARNING EXPERIENCES



Assessing Prior Knowledge

- Ask students to do the following:
 - Find an increasing and a decreasing pattern on the hundred chart. Identify the pattern rules.

BLM
4.PR.1.1

Hundred 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

- Extend the pattern.

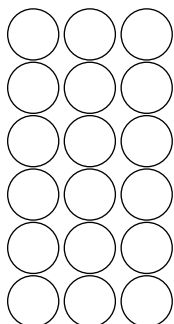


Figure 1

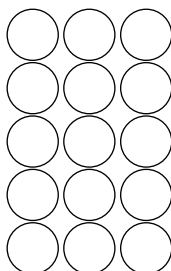


Figure 2

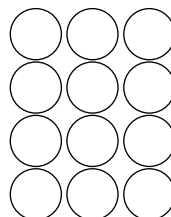


Figure 3

Figure 4

Figure 5

What is the pattern rule?

- c. Create a decreasing pattern. Explain your pattern rule.
- d. Give an example of an increasing or decreasing pattern in the environment.

The student is able to

- identify an increasing pattern on the hundred chart
 - identify a decreasing pattern on the hundred chart
 - identify a pattern rule for an increasing pattern
 - identify a pattern rule for a decreasing pattern
 - extend an increasing pattern
 - create a decreasing pattern and describe the pattern rule
 - give an example of an increasing or decreasing pattern in the environment
-

- **Identify and describe a variety of patterns in a multiplication chart.**

Suggestions for Instruction

BLM
4.PR.1.2

- **Exploring Patterns:** Work with a partner or small group. Select one pattern on the multiplication table. Describe the pattern. Explain why the pattern occurs. Share your pattern with the class.

Possible patterns might include the following:

- skip counting patterns in each row and column
- the products in the 1, 3, 5, and 7 rows and columns alternate between even and odd numbers
- the products on the diagonal are all square numbers (A square number is the product of a number multiplied by itself.)
- the products on either side of the diagonal are mirror images
- in the 9 column and row the sum of the digits in each product is 9
- the products in the 4 column and row are double those in the 2 column and row
- the products in the 8 row and column are double those in the 4 row and column and four times those in the 2 column and row
- the products in the 6 column and row are twice those in the 3 column and row

- Create a class chart showing the patterns identified in the multiplication chart. Use small charts and have students shade/highlight the pattern they are describing.

Example:

X	1	2	3	4	5	6	7	8	9
1	1	2	3	4	5	6	7	8	9
2	2	4	6	8	10	12	14	16	18
3	3	6	9	12	15	18	21	24	27
4	4	8	12	16	20	24	28	32	36
5	5	10	15	20	25	30	35	40	45
6	6	12	18	24	30	36	42	48	54
7	7	14	21	28	35	42	49	56	63
8	8	16	24	32	40	48	56	64	72
9	9	18	27	36	45	54	63	72	81

- **Connect to Number Operations/Basic Facts:** Have students explain how the identified pattern might be a useful strategy to use when they are multiplying.

Example:

“The products in the 8 row and column are double the products in the 4 row and column and four times the products in the 2 row and column.

“I can use this pattern when I am multiplying by 4 and 8. For example, if I multiply 32×4 , I can multiply 32×2 and then double the product.

“If I multiply 32×8 , I can multiply 32×2 and then double the product twice to get the answer ($32 \times 2 = 64$, $64 \times 2 = 128$, $128 \times 2 = 256$).”

- **Determine the missing element(s) in a table or chart.**
- **Identify error(s) in a table or chart.**
- **Describe the pattern found in a table or chart.**
- **Create a concrete representation of a pattern displayed in a table or chart.**
- **Explain why the same relationship exists between the pattern in a table and its concrete representation.**

Suggestions for Instruction

- Use a book such as *Anno's Magic Seeds* by Mitsumasa Anno. Have students use materials/pictures to represent the pattern in the story. The author provides support in the illustrations.
 Demonstrate how to transfer this information to a table or chart. Discuss the relationship between the concrete/pictorial representation and the data on the chart.
Note: Students have not done any formal work with tables or charts in previous grades.
- **What's the Pattern?** Describe the pattern(s) on the following chart.

Number of triangles	Number of sides
1	3
2	6
3	9
4	12
5	15
6	18
...	...
10	30

Note: Students will quickly see that the triangle column increases by 1 and that the sides column skip counts by 3s. Help them to see the relationship between the number of triangles and the corresponding number of sides (the number of sides is 3 times the number of triangles). Seeing this relationship will assist students in predicting the number of sides for the “nth” number of triangles.

Provide students with multiple opportunities to work with the pattern relationships on tables and charts.

- Look at the numbers provided in the table:

spiders	1	2	3		5	6
legs			24	32		48

- What number do you think is missing from the top row? Why?
- What numbers are missing from the bottom row? Why?
- Complete the chart.
- Describe the pattern.
- Write number sentences which show how to calculate the number of legs on 1 spider, 2 spiders . . . 6 spiders."

- Marc made a chart for this pattern.

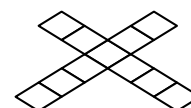
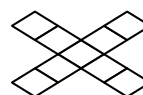
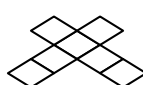


Figure 1

Figure 2

Figure 3

Figure 4

Figure 5

This is the chart he made:

Figure	1	2	3	4	5
Number of boxes	3	5	8	9	11

Compare the pattern with the chart and give feedback to Marc on how he did. Use the pattern rule to help you.

- Make a colour tile/unifix cube pattern to match the information on the chart.

Figure	1	2	3	4	5
Number of cubes	1	4	9	16	25



Assessing Understanding: Performance Task

Student Directions:

1. Use materials such as colour tiles, counters, cubes, or base-10 blocks to make an increasing or decreasing pattern.
2. Record your pattern in your math journal/notebook.
3. Use your pattern to make a table or chart. Explain how you know that your table or chart matches your pattern.
4. Explain your pattern rule.
5. Share your chart with a partner. Have your partner try to make the pattern using the same materials. Compare the patterns. Do both patterns support your pattern rule?

The student is able to




- transfer a concrete pattern to a chart or table
 - identify the pattern rule
 - explain how both representations support/reflect the pattern rule
 - transfer a pattern from a chart to a concrete representation
-

- **Translate the information provided in a problem into a table or chart.**
- **Identify and extend the patterns in a table or chart to solve a problem.**

Suggestions for Instruction

Students should have many opportunities to work with pattern problems.

Samples:

-   
Figure 1 Figure 2 Figure 3

- If this pattern continues, how many triangles and how many trapezoids will there be in Figure 8?
- Create a table or chart to show the pattern.
- Identify the pattern rule.
- Use the rule to solve the problem.

- Sara had a lemonade sale for a week in the summer. She started to record the number of glasses sold each day but forgot after three days. Sara noticed that there was a pattern in the number of sales.

Complete the table to extend the pattern. Describe the pattern rule.

Day of the Week	Number of Glasses Sold
Monday	8
Tuesday	10
Wednesday	12
Thursday	
Friday	
Saturday	
Sunday	

- A robin comes to the birdfeeder every 5 days and a blue jay comes by every 3 days. Today, the robin and blue jay both came to the birdfeeder. How many days will it be before the robin and the blue jay both come on the same day again? Use a chart to help you solve the problem.
- Jean has been exercising.
On the first day he did 1 pushup.
On the second day he did 2 pushups.
On the third day he did 4 pushups.
On the fourth day he did 7 and on the fifth day he did 11.

If this pattern continues, how many pushups will he do on the tenth day?
- The bus made 16 stops before arriving at Summerville. It picked up one passenger at the first stop, three at the second stop, five at the third stop, seven at the fourth stop, and nine at the fifth stop. This pattern continued. How many people were on the bus when it arrived in Summerville?
- When Holly checked a book out of the library, she read this notice: If a book is 1 day overdue the fine is 1¢, 2 days overdue the fine is 2¢, 3 days—4¢, 4 day—8¢, and so on. If Holly’s book is 7 days overdue, how much is her fine?
- The baseball tickets at the stadium were going on sale at 4:00 p.m. At 1:00 p.m. 15 people were in line waiting to buy tickets. Every 15 minutes 10 more people got in line. At what time were 85 people waiting in line? How many people were in line at 2:15 p.m.?
- On Sunday the genie granted Matt three wishes. On Monday he used each wish to wish for three more wishes. On Tuesday he used each wish to wish for 3 more wishes. How many wishes will he have by Saturday?



Assessing Understanding

- Observe students as they work with problems.
Ask questions such as the following:
 - What information does the problem give you?
 - What is the question?
 - What labels will you use for your chart/table?
 - What pattern do you see?
 - What is the pattern rule?
 - How can you use the rule to solve the problem?
- Have students write their own pattern problems. Use these problems at a centre or station for others to solve.
- **Challenge Problem:** Give students a partially completed chart or table. Have them write a pattern problem based on this information.

Example:

Number of guests	1	2	3	4	5	6	7
Number of ice cream scoops	2	4	6				

Student response:

Lucas wants to buy an ice cream cone for each of the 7 guests at his birthday party. If each guest gets 2 scoops of ice cream, how many scoops will Lucas have to buy altogether?



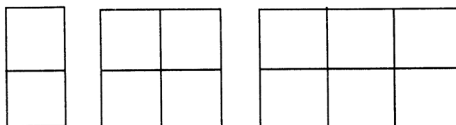
Assessing Understanding: Paper-and-Pencil Task

- Juan was learning to type. He decided to practise each day and to test himself at the end of each day. His score on the first day was 10 words per minute. On the second day, his score was 21 words per minute. On the third day, his score was 32 words per minute. If he continued at this rate, how many words would Juan write on the seventh day? On the tenth day?

Show your thinking.

- Gary used toothpicks to make this pattern. How many toothpicks does he need for the next shape in his pattern?

Gary said that he needed 51 toothpicks to make the tenth shape in the pattern. Was Gary right? Use a chart to prove your conclusion.





Assessing Understanding: Performance Task

- When 2 square tables are pushed together, 6 people can be seated. Eighteen people are coming to dinner. How many square tables are needed to make 1 long table to seat everyone?

Sample Rubric:

Needs ongoing help:

- attempts to draw tables pushed together
- calculations/drawings are incomplete to arrive at the number of tables needed

Approaching expectations:

- draws 8 tables to explain how many tables are needed

Meeting expectations:

- may or may not draw a diagram, but uses a mathematical operation or numerical relationship to explain how many tables are needed
-

- **Complete a Carroll diagram by entering data into correct squares to solve a given problem.**
- **Determine where new elements belong in a Carroll diagram.**

Suggestions for Instruction

Note: Carroll diagrams and Venn diagrams are interchangeable. Students should be able to transfer data from one to the other.

- Have students use a Carroll diagram to represent data (limited to 2 choices) collected from the class.

Example:

Do you have a dog or a cat?

	Dog	No dog
Cat		
No cat		

Do you like white milk or chocolate milk?

	White	Not white
Chocolate		
Not chocolate		

BLM
4.PR.4.1

- Solve problems using a Carroll diagram.

Examples:

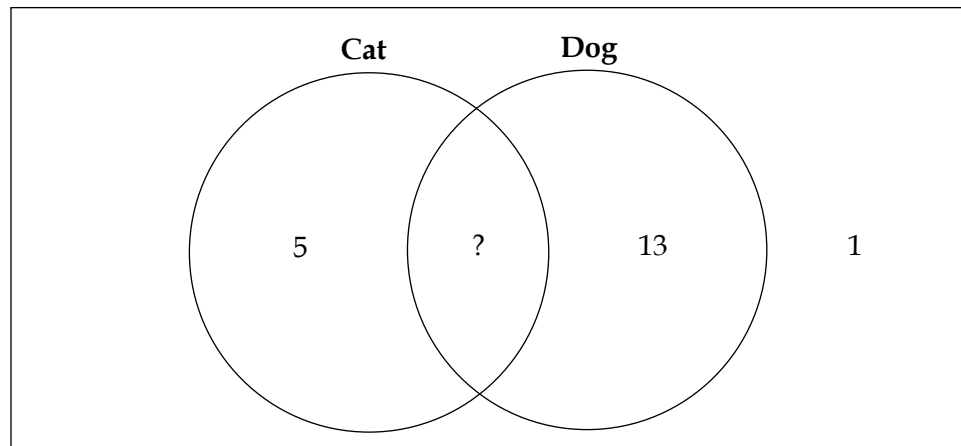
- a. The 24 students in Mrs. Lee’s class completed a survey about pets. Thirteen students said they have a dog. Five students said they have a cat. One student said they do not have a pet. How many students have both a dog and a cat?

	Dog	No dog
Cat	?	5
No cat	13	1

The total number of students represented on the chart so far is 19. This leaves 5 students who have both a cat and a dog.










Have students transfer this information to a Venn diagram.

Example:



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4.PR.4.2

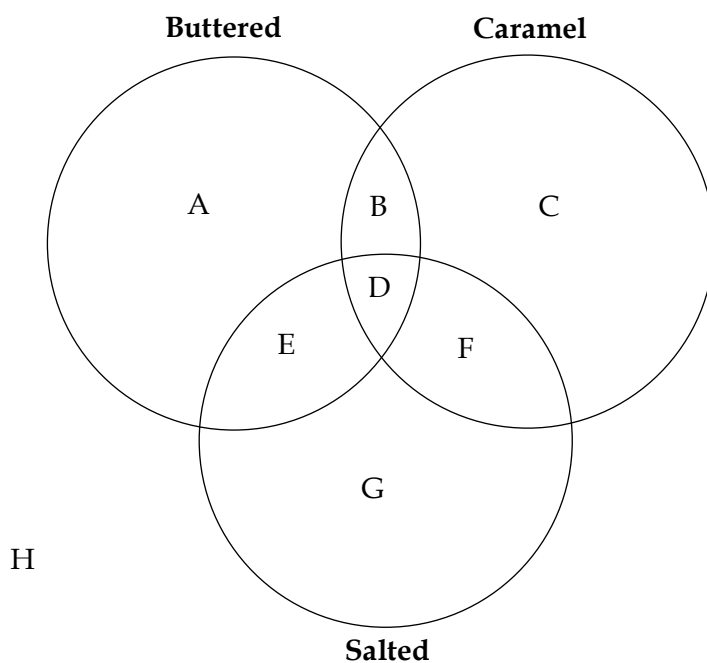
- b. Meg sorted attribute blocks using a Carroll diagram.

	Large	Not large
Thin	A  	B   
Not thin	C  	D  

Where should she place this block ? Explain your choice.

■ **Three-Circle Venn to Carroll Diagram:**

How Do You Like Your Popcorn?



How do you like your popcorn?	Buttered		Not Buttered	
	Salted	Not Salted	Salted	Not Salted
Caramel	D	B	F	C
Not Caramel	E	A	G	H



Assessing Understanding: Performance Task

Student Directions:

1. Design a survey question with two possible responses (not yes or no).
2. Collect the data from your class.
3. Represent your data using a Carroll diagram.
4. Survey an adult in the room but do not include their data on the diagram.
5. Instead provide the data separately along with the question, "Where does this belong on the diagram?"
6. Share your findings with the class. Have someone explain where the additional data belongs on your diagram.

Note: Before beginning work on the task, have the class develop the assessment criteria.

Criteria might include the following:

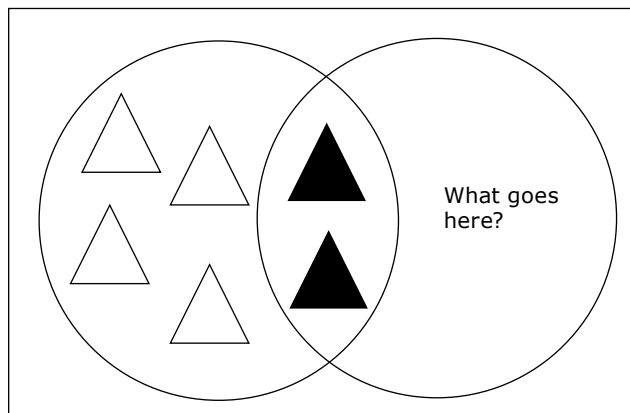
- Survey question is developed.
 - Data is collected.
 - Carroll diagram is created with correct labels based on the question.
 - Data is correctly represented on the diagram.
 - Additional data is placed correctly.
-

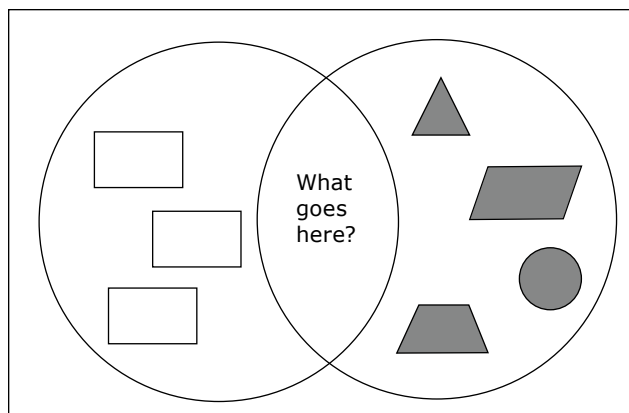
- **Identify a sorting rule for a Venn diagram.**
- **Describe the relationship shown in a Venn diagram when the circles intersect, when one circle is contained in the other, and when the circles are separate.**
- **Determine where new elements belong in a Venn diagram.**
- **Solve a problem by using a chart or diagram to identify mathematical relationships.**

Suggestions for Instruction

- Provide students with concrete Venn diagrams with objects in only 2 of the 3 sections. Ask: "What objects would go in the empty section?"

Examples:





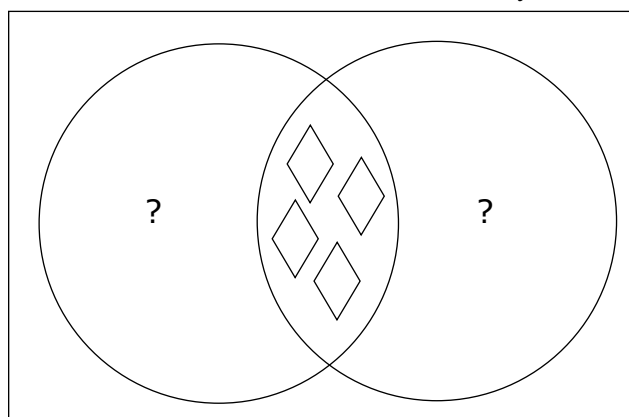
Note: Initially, students should have a collection of objects from which to choose.

Do students

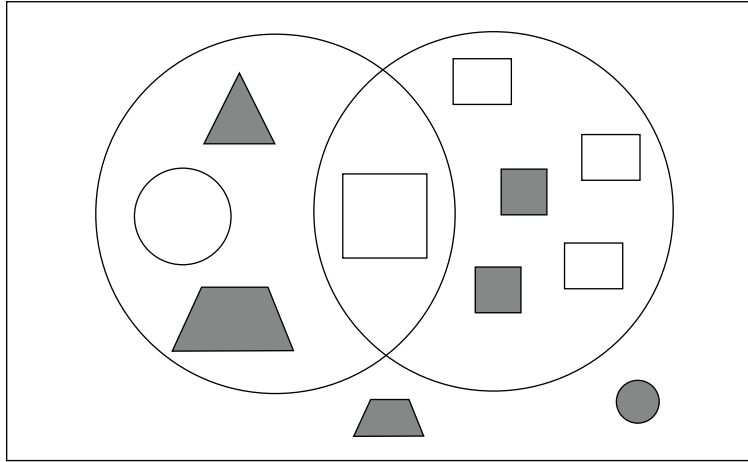
- correctly identify the attributes?
- recognize the intersection?
- use appropriate language?
- need assistance? (If they do, they need more practice.)

Repeat a similar activity using Carroll diagrams.

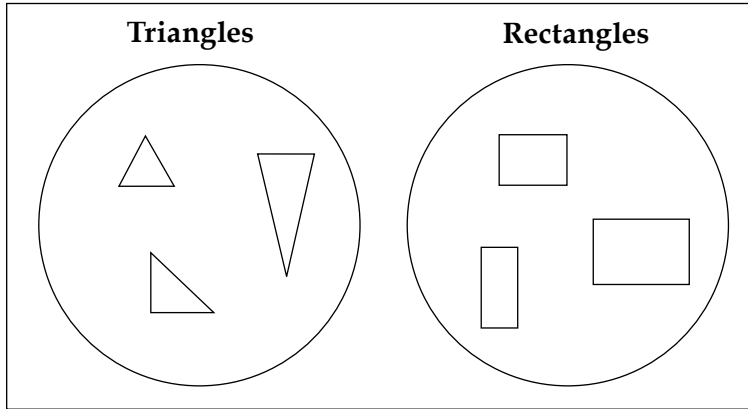
- **Extension:** A more difficult task for students is to ask them to determine the characteristics of the two sets when only the intersection of the sets is shown.



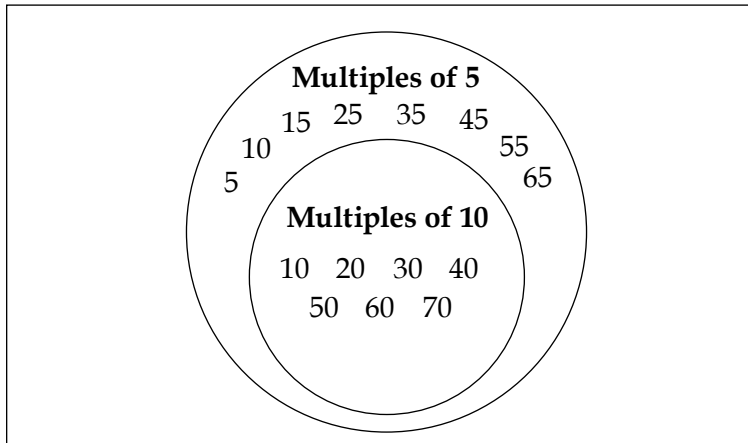
- Give students a set of presorted materials in a Venn diagram (see below).
Ask: "What are the attributes of these sets?"



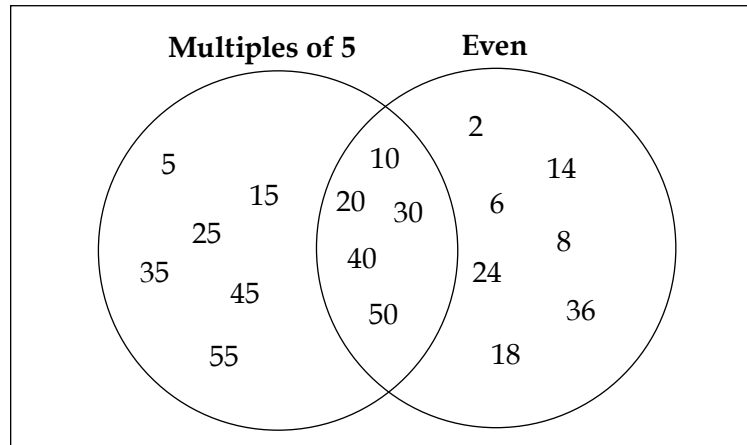
- Have students explain why these objects are sorted on the Venn diagram below in this way.



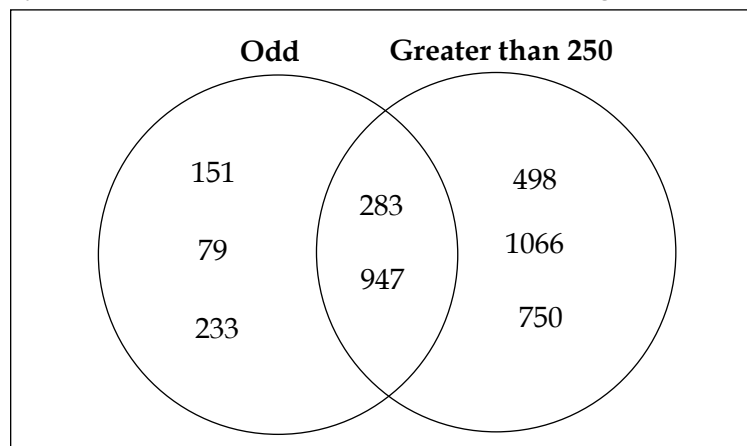
- Have students explain why the numbers are sorted in this way on the Venn diagram below.



- Have students explain why the numbers are sorted in this way on the Venn diagram below.



- Tyler sorted a set of numbers on the Venn diagram below.



Where do the numbers below belong on Tyler's Venn diagram?

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Explain your thinking.



Assessing Understanding: Paper-and-Pencil Task

1. Sort these addition facts onto the Venn diagram:

$4 + 4 =$

$8 + 4 =$

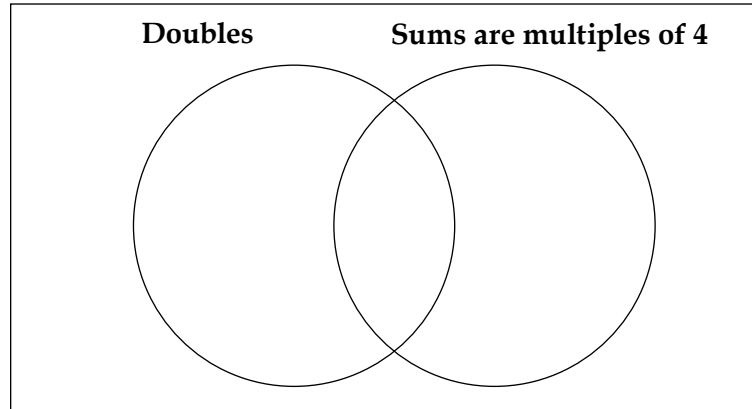
$7 + 3 =$

$3 + 3 =$

$6 + 6 =$

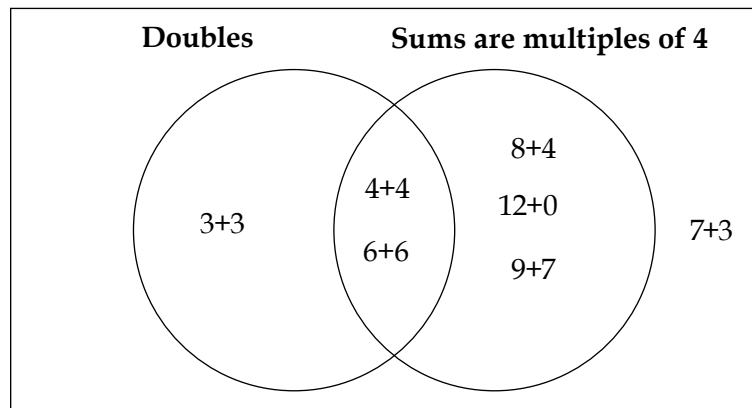
$9 + 7 =$

$12 + 0 =$



- Explain why you placed $12 + 0$ where you did.
- Explain why you placed $7 + 3$ where you did.
- Transfer this information to a Carroll diagram.

Scoring Rubric:



Needs support:

- has 1 error in sorting
- places $7 + 3$ incorrectly
- has limited reason for $7 + 3$ placement

Approaching:

- has 1 error in sorting
- places $7 + 3$ correctly
- states 1 or 2 reasons for $7 + 3$ placement

Meets expectations:

- has no errors
- lists the 2 reasons why $7 + 3$ is on the outside

Student Self-Assessment: Have students add to the chart several times during the year (perhaps close to reporting periods). Student samples could accompany the self-assessment to provide evidence of the learning.

Name:				
Patterns				
	September	November	March	June
I can				
I can				
I can				

Example:

Name:				
Patterns				
	September	November	March	June
I can	identify and describe patterns in a multiplication table	use Venn diagrams to sort		
I can	describe patterns in a chart or table	use Carroll diagrams to sort		
I can	identify the pattern rule on a chart or table	solve problems using a table or chart		

Notes

Grade 4: Patterns and Relations (4.PR.5, 4.PR.6)

Enduring Understandings:

"Equals" indicates equivalent sets.

Unknown quantities can be found by using the balance strategy.

Number patterns and relationships can be represented using variables.

Essential Questions:

How is a number sentence like a balance scale?

What does the equal sign mean?

What is the purpose of a symbol in an equation?

What strategies can be used to solve the unknown in an equation?

SPECIFIC LEARNING OUTCOME(S):	ACHIEVEMENT INDICATORS:
<p>4.PR.5 Express a problem as an equation in which a symbol is used to represent an unknown number. [CN, PS, R]</p>	<ul style="list-style-type: none"> → Explain the purpose of the symbol, such as a triangle or circle, in an addition, subtraction, multiplication, or division equation with one unknown (e.g., $6 = 36 \div \square$). → Express a pictorial or concrete representation of an equation in symbolic form. → Identify the unknown in a story problem, represent the problem with an equation, and solve the problem concretely, pictorially, or symbolically. → Create a problem in context for an equation with one unknown.
<p>4.PR.6 Solve one-step equations involving a symbol to represent an unknown number. [C, CN, PS, R, V]</p>	<ul style="list-style-type: none"> → Solve a one-step equation using manipulatives. → Solve a one-step equation using guess and test. → Describe, orally, the meaning of a one-step equation with one unknown. → Solve an equation when the unknown is on the left or right side of the equation. → Represent and solve an addition or subtraction problem involving a "part-part-whole" or comparison context using a symbol to represent the unknown. → Represent and solve a multiplication or division problem involving equal grouping or partitioning (equal sharing), using symbols to represent the unknown.

PRIOR KNOWLEDGE

Students may be able to

- demonstrate and explain the meaning of equality and inequality by using manipulatives and diagrams (0 to 100)
- record equalities and inequalities symbolically using the equal symbol or the not-equal symbol
- solve one-step addition and subtraction equations involving symbols representing an unknown number

BACKGROUND INFORMATION

The equal symbol represents a relation between two equal quantities. In other words, the expression on the left-hand side of the equal symbol represents the same quantity as the expression on the right-hand side of the equal symbol.

Many students have misconceptions about the equal symbol. Many think that the equal symbol means “give answer.” As a result they have difficulty with questions such as the following:

$4 + \underline{\quad} = 7$ Students will add across the equal sign and fill the blank with 11.

$\underline{\quad} = 2 + 5$ Students will say that the question itself is incorrect because the blank is on the wrong side.

$3 + 4 = 5 + \underline{\quad}$ Students will add all the numbers and put 12 in the blank.

Equation: A mathematical sentence stating that two expressions are equal. An equation contains an equal sign (=).

Equal sign: A symbol that means two things have the same amount, size, number, or value.

Equality: A mathematical statement indicating that two quantities (or expressions) are in balance; two expressions that are equivalent (e.g., $2 + 5 + 1 = 4 + 4$).

MATHEMATICAL LANGUAGE

same	equal sign
more	equal symbol
less	inequality
equal	equality
not equal	symbol
balance	unknown
match	equation

LEARNING EXPERIENCES



Assessing Prior Knowledge

Present the following equations. Have students fill in the missing numbers.

- $16 + \square = 17 + 5$
- $\triangle - 6 = 17 - 5$
- $32 + 19 = \bigcirc + 20$
- $100 = 64 + \hexagon$

As students work, ask questions such as the following:

- What is the question asking?
- What strategy did you use to solve the problem?

Students are able to

- identify what the question is asking
 - solve the equation maintaining the balance on either side of the equal sign
 - explain the strategy used
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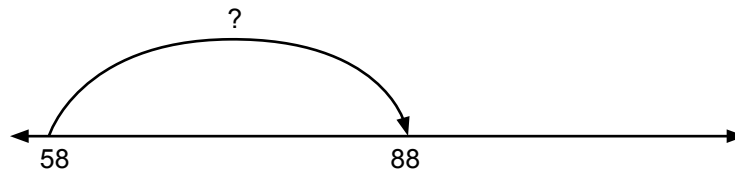
- Explain the purpose of the symbol, such as a triangle or circle, in an addition, subtraction, multiplication, or division equation with one unknown (e.g., $6 = 36 \div \square$).
- Express a pictorial or concrete representation of an equation in symbolic form.
- Describe, orally, the meaning of a one-step equation with one unknown.
- Solve an equation when the unknown is on the left or right side of the equation.

Suggestions for Instruction

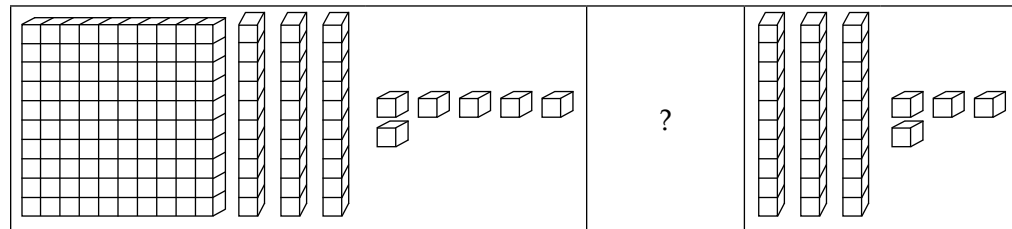
- Provide a variety of opportunities for students to “read” equations with one unknown. For example, $6 = 36 \div \square$ can be read as “6 is the same as 36 divided by what number?” or as “36 divided by what number equals 6?”
By “reading” the equation the student is able to demonstrate their ability to interpret the meaning/purpose of the symbol.
- Have students write equations to match concrete or pictorial representations.

Examples:

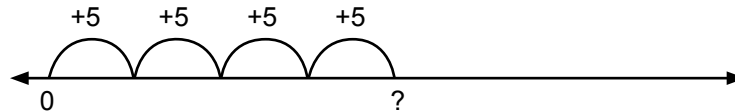
1.



2.



3.



- Identify the unknown in a story problem, represent the problem with an equation, and solve the problem concretely, pictorially, or symbolically.
- Create a problem in context for an equation with one unknown.
- Solve a one-step equation using manipulatives/guess and test.

Suggestions for Instruction

- Give students addition and subtraction word problems. Have them write an equation using a symbol for the unknown.

Example:

Directions: Write an equation/number sentence for each problem. Use a symbol for the missing part.

1. Chiara has 34 candies. She eats some and now she has 25 left. How many candies did she eat?
2. Jim is saving money to buy a new video game. The game costs \$28. He has saved \$16 so far. How much more does he need to save?
3. Len added 56 and 49. What answer did he get?

- The Grade 4 class was given the following problem:

There are 49 students in the two Grade 4 classrooms. If there are 24 students in the first room, how many are in the second room?

Jill wrote:

$$49 - 24 = \triangle$$



John wrote:

$$49 - 24 = \square$$



Who is correct? Explain your thinking.

Explanation should include the following:

- Both students are correct.
- It doesn't matter what symbol you use to represent the unknown.

- **Represent and solve an addition or subtraction problem involving a “part-part-whole” or comparison context using a symbol to represent the unknown.**

Suggestions for Instruction

There are 28 students in Mr. Martin’s class and 32 students in Mrs. Powell’s class. How many more students are there in Mrs. Powell’s class than in Mr. Martin’s class?

Note: Students can use a bar model to represent the problem. The bar model is a problem-solving (visualization) strategy taught in the Singapore Math program. Students represent problems by drawing bars to show how the known elements of the problem relate to one another and to the question. The bar model is a powerful way to represent part-part-whole relationships.

Mrs. Martin’s class	28	?
Mrs. Powell’s class	32	

$$28 + \triangle = 32$$

- **Represent and solve a multiplication or division problem involving equal grouping or partitioning (equal sharing), using symbols to represent the unknown.**

Suggestions for Instruction

- Sandra has 54 candies. She wants to make 6 goodie bags for her party. How many candies should she put in each bag?

Sandra’s candies	54					
Goodie bags	?					

$$54 \div 6 = \square$$

- Marc has 28 marbles. He gives 4 marbles to each of his friends. How many friends got marbles from Marc?

Marc's marbles	28	
Friends	4	...?...

$$28 \div 4 = \square$$



Assessing Understanding: Paper-and-Pencil Task

Write an equation/number sentence for each problem using a symbol to represent the unknown. Solve the problem.

1. Sarah has 26 bubble gum pieces. She buys 7 more. How many pieces of gum does she have now?
 2. Alex is inviting 5 friends to his party. He has 20 party favours. How many party favours will each friend get?
 3. At the beginning of the school year each student in Mrs. Leckie's class has 6 pencils. If Mrs. Leckie has 20 students, how many pencils does the class have altogether at the beginning of the year?
 4. Harold has 234 stickers in his collection. He decides to give 58 stickers to his sister. How many stickers does he have left in his collection?
 5. Mrs. Ames's cookie recipe calls for 2 eggs. If Mrs. Ames has one dozen eggs, how many cookie recipes can she make?
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Notes