



GRADE 2 MATHEMATICS

Patterns and Relations

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

Enduring Understandings:

Patterns show order in the world.
Patterns can be found in many different forms.

Essential Questions:

What is the repeating unit (core) in the pattern?
How can we tell if something is a pattern?
How is the pattern increasing/growing?

SPECIFIC LEARNING OUTCOME(S):	ACHIEVEMENT INDICATORS:
<p>2.PR.1 Predict an element in a repeating pattern using a variety of strategies. [C, CN, PS, R, V]</p>	<ul style="list-style-type: none">→ Identify the core of a repeating pattern.→ Describe and extend a pattern with two attributes.→ Explain the rule used to create a repeating non-numerical pattern.→ Predict an element in a repeating pattern using a variety of strategies.→ Predict an element of a repeating pattern, and extend the pattern to verify the prediction.
<p>2.PR.2 Demonstrate an understanding of increasing patterns by</p> <ul style="list-style-type: none">■ describing■ reproducing■ extending■ creating <p>patterns using manipulatives, diagrams, sounds, and actions (numbers to 100). [C, CN, PS, R, V]</p>	<ul style="list-style-type: none">→ Identify and describe increasing patterns in a variety of contexts (e.g., hundred chart, number line, addition tables, calendar, a tiling pattern, or drawings).→ Represent an increasing pattern concretely and pictorially.→ Identify errors in an increasing pattern.→ Explain the rule used to create an increasing pattern.→ Create an increasing pattern and explain the pattern rule.→ Represent an increasing pattern using another mode (e.g., colour to shape).→ Solve a problem using increasing patterns.→ Identify and describe increasing patterns in the environment (e.g., house/room numbers, flower petals, book pages, calendar, pine cones, leap years).→ Determine missing elements in a concrete, pictorial, or symbolic increasing pattern, and explain the reasoning.

PRIOR KNOWLEDGE

Students may have had experience

- sorting objects using a single attribute
- copying, extending, describing, and creating a repeating pattern with a core of two to four elements using a variety of materials and modalities
- identifying the pattern core in a repeating pattern
- translating a repeating pattern to another mode
- labelling repeating patterns with letters

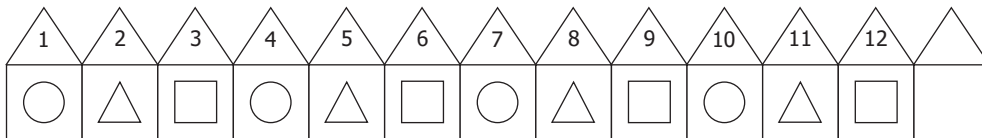
BACKGROUND INFORMATION

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

Repeating patterns can be extended in both directions. It is difficult to identify a pattern from a small part of the pattern. Therefore, the pattern core should be repeated more than twice. The core is the shortest string of elements that repeats in a repeating pattern.

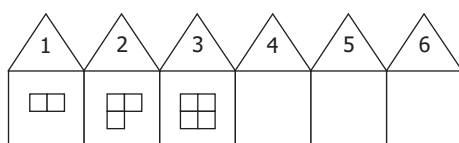
When presenting a repeating pattern, encourage students to verbalize how the pattern repeats. To encourage students to make number relationships, have them present the pattern with numerical term positions.

Example:



Increasing patterns are patterns in which one or more elements of the sequence or arrangement increases. Increasing patterns should be both numerical and non-numerical. Numerical increasing patterns lead to a better sense of number.

When presenting increasing patterns to students, always provide the first three terms. Some students have difficulty identifying an increasing pattern and think of the first terms as being the core of a repeating pattern. Although students may use other language to describe patterns, it is important to model mathematical language and thinking.



MATHEMATICAL LANGUAGE

pattern	element
repeating pattern	extend
increasing pattern	reproduce
core	rule
predict	term

LEARNING EXPERIENCES



Assessing Prior Knowledge

Give students a collection of unifix or interlocking cubes. Have students

- make a pattern
- identify the pattern core
- use the same cubes to make a different pattern
- label the pattern with letters
- translate the pattern into an action or sound pattern

Observation Checklist

Observe students as they work.

- How complex is the pattern? (How many elements in the core?)
- Can students
 - identify the pattern core?
 - make another pattern?
 - label the pattern with letters?
 - translate the pattern?

- Identify the core of a repeating pattern.
- Describe and extend a pattern with two attributes.
- Explain the rule used to create a repeating non-numerical pattern.

Suggestions for Instruction

- Show students three patterns in which two have a similar repeating pattern. Ask them to look at the patterns, and to explain which of the patterns are alike and which are different.

Example:



Then ask students to choose the pattern that is different from the others, and to duplicate it and extend it. Ask students to make a pattern that is different from the one they reproduced and explain how it is different.

- Present a pattern using two attributes (e.g., colour and size).



Have students describe the pattern, identify the core, and then extend the pattern.

- Prepare a “pattern slider.” Use a legal size sheet of paper and fold it to form a flat tube. Tape it together. Cut a **V** on one side.

Example:



Use pattern strips. Slide a strip through the slider. Gradually pull the pattern through until two complete pattern cores can be seen. Have students predict the next element(s) in the pattern.

Example:



- Have students use attribute (logic) blocks to create patterns with two attributes.

Note: Attribute blocks are 3-D objects because they have length, width, and thickness. They are, however, described using 2-D vocabulary.

Example:

 is described as a hexagon and not as a hexagonal prism.

Exchange patterns with a partner. Have the partner identify the pattern rule and extend the pattern.

- **Create a Pattern:** Use the following clues and a set of attribute blocks to create repeating patterns with three repeats of the core.
 - A. The pattern has a core of four elements.

The core has three different elements.

The elements that are the same begin and end the core.

What might the pattern be?
 - B. The pattern core is made up of five elements.

The elements differ by shape and size.

Three different elements are used.

What might the pattern be?

Extension: Have students create a pattern and then describe it in riddle form. Exchange riddles and materials used with a partner and have them try to reproduce the pattern.

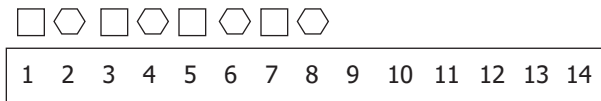
Note: This learning experience can also be used with increasing patterns.

- Predict an element in a repeating pattern using a variety of strategies.
- Predict an element of a repeating pattern, and extend the pattern to verify the prediction.

Suggestions for Instruction

- Prepare a large number line with the numbers 1 to 30. Place the number line on the floor or on a table. Use pattern blocks to make a repeating pattern with a two element core. Place each pattern block above a number on the number line.

Example:



Ask questions such as the following:

- “Can you describe the pattern?”
- “What part of the pattern repeats? What is the pattern core?”
- “What will the next shape be? How do you know?”
- “If this pattern continues, what shape will be above the number 10? How do you know?”
- “What shape will be above the number 15? How do you know?”
- “If we read all of the numbers that have a hexagon above them, what do we know about these numbers?” (They are even numbers. They are counting by 2s.)
- “If we continue the pattern up to the number 20, how many squares will there be altogether?”

Extension: In pairs, have students use a number line and pattern blocks to create a repeating pattern and ask questions to be answered by their partner.

- Students will use different strategies to predict an element in a repeating pattern.

Example:

What will the 20th element be if this pattern continues?



Possible strategies include

- using a multiple: “I doubled the pattern and that made 18 elements and then I added two more.”
- using the size of the pattern core and skip counting: “The core has three elements so I counted by 3s until I got to 21, and then I took one element (the small triangle) away.”
- breaking the pattern into “easy to count” segments: “I counted five elements and I know that it takes four fives to get to twenty so the 20th element is a large white triangle.” Note: This strategy works for this pattern but it would not work if they had used four elements and repeated them five times.

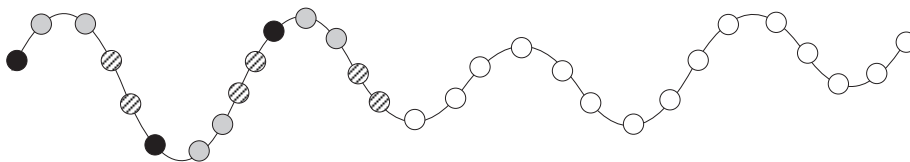
Guide students to try out their strategies with different patterns to see if it is a strategy that can be generalized or one that is specific to a particular pattern.



BLM
2.PR.1.1

Assessing Understanding: Paper-and-Pencil Task

If the following pattern continues, what will be the 50th bead? Explain your thinking.



Observation Checklist

Look for

- the use of an efficient strategy (using the “fiveness” of the core and skip counting, grouping into tens and counting, etc.)
- the correct use of mathematical language related to patterns

- **Represent an increasing pattern concretely and pictorially.**

Suggestions for Instruction

- **Introduction:** Group the class into five or six small groups. Begin the activity by having the first group snapping their fingers. The second group takes their turn by snapping their fingers and then adding an action like clapping their hands. The third group repeats the first and second actions and adds a third. This pattern continues until the last group adds their own action. Now have the whole class do the entire sequence together. Ask students to explain what was happening in the activity. Model the pattern with materials.
- Read a book (or sing a song) such as *There Was an Old Lady Who Swallowed a Fly* by Michael Twinn. Ask students to describe what is happening in the story/song (the number of animals swallowed increases by one each time). Reread the story. Represent the pattern in the story using unifix cubes or colour tiles.

Example:

There was an old lady who swallowed a fly . . .

There was an old lady who swallowed a spider . . .

There was an old lady who swallowed a bird . . .

- Have students select a counting book, poem, or song and represent the pattern concretely and pictorially.

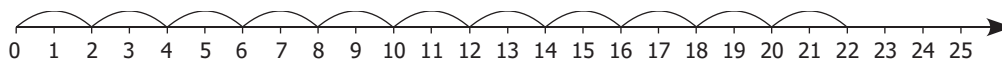
- **Identify and describe increasing patterns in a variety of contexts (e.g., hundred chart, number line, addition tables, calendar, a tiling pattern, or drawings).**

Suggestions for Instruction

- **Patterns on a Number Line:** Increasing patterns can be shown on the number line.

Example:

Skip counting by 2s



- **Patterns on the Hundred Chart:** Possible increasing patterns include
 - for each row, left to right, numbers increase by 1
 - for each column, top to bottom, numbers increase by 10
 - numerous skip-counting patterns
 - on the diagonal from left to right numbers increase by 11
 - on the diagonal from right to left numbers increase by 9

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

- **Patterns in Other Number Charts:** Students need opportunities to notice patterns in a variety of number charts, not just one type. Students need to understand that the numbers have a particular order and that there are patterns in the numeration system that enables us to predict a number. After students have explored the patterns in a Hundred Chart, use a 0 to 99 Chart to look for patterns. To explore other patterns, ask students to visualize what the chart would look like if it had five columns, and have them create the chart.

0 to 99 Chart

0	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

- **Patterns on the Calendar:** Possible increasing patterns include
 - in each row numbers increase by 1
 - in each column numbers increase by 7
 - on the diagonal from left to right numbers increase by 8
 - on the diagonal from right to left numbers increase by 6

Sun	Mon	Tues	Wed	Thurs	Fri	Sat
		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		

The increasing patterns on a calendar are naturally occurring because of the size of the grid and the sequence of the numbers. Artificially creating repeating patterns with colours and shapes, et cetera, is not a meaningful use of the calendar.

- **Patterns on the Addition Table:** Possible increasing patterns include
 - in each row and column numbers increase by one
 - on the diagonal from left to right numbers increase by two

Addition Table

+	0	1	2	3	4	5	6	7	8	9
0	0	1	2	3	4	5	6	7	8	9
1	1	2	3	4	5	6	7	8	9	10
2	2	3	4	5	6	7	8	9	10	11
3	3	4	5	6	7	8	9	10	11	12
4	4	5	6	7	8	9	10	11	12	13
5	5	6	7	8	9	10	11	12	13	14
6	6	7	8	9	10	11	12	13	14	15
7	7	8	9	10	11	12	13	14	15	16
8	8	9	10	11	12	13	14	15	16	17
9	9	10	11	12	13	14	15	16	17	18



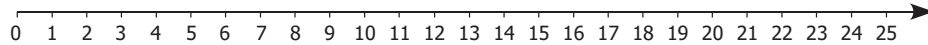
BLM
2.PR.2.2

Assessing Understanding: Paper-and-Pencil Task

1. Identify and describe increasing patterns on the following chart.

2	4	6	8	10
12	14	16	18	20
22	24	26	28	30
32	34	36	38	40
42	44	46	48	50

2. Use the number line to show an increasing pattern. Describe your pattern.



3. Explain how the pattern shown below grows. If this pattern continues, what would the next term look like?



Term 1



Term 2



Term 3




Term 4




- Determine missing elements in a concrete, pictorial, or symbolic increasing pattern, and explain the reasoning.
- Explain the rule used to create an increasing pattern.



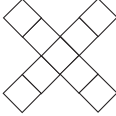
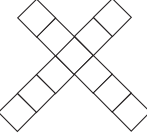
Suggestions for Instruction

- Present students with a variety of increasing patterns. Have them identify the missing elements and explain the rule used to create the pattern.

Examples:

a)    _____ _____
 Term 1 Term 2 Term 3 Term 4 Term 5

b)    _____ _____
 Term 1 Term 2 Term 3 Term 4 Term 5

c)   _____  
 Term 1 Term 2 Term 3 Term 4 Term 5

d) 2, 4, 6, 8, ____, 12, 14, ____

As students are working ask questions such as the following:

- How does the pattern grow?
- What changes as the pattern grows?
- What remains the same as the pattern grows?

- **Identify errors in an increasing pattern.**

Suggestions for Instruction

- **Pattern or Not a Pattern:** Prepare a set of increasing pattern strips, some with errors and others without. Students sort the strips under the headings “Pattern” or “Not a Pattern.” Have students justify the placement of each strip.
- Have students work with a partner. Each student creates a pattern that contains an error. Students exchange patterns and identify and correct the errors in each others’ pattern.

- **Create an increasing pattern and explain the pattern rule.**
- **Represent an increasing pattern using another mode (e.g., colour to shape).**

Suggestions for Instruction

- Provide many opportunities for students to create increasing patterns and to explain the pattern rule.
- **Translating Patterns:** Provide students with an increasing pattern.

Example:



Ask the following:

- How does the pattern grow?
- What changes as the pattern grows?
- What remains the same as the pattern grows?
- What might the pattern look like if we used
 - different shapes?

Example:



- numbers?

Example:

2, 3, 4, 5

– size?

Example:



– actions?

Example:

snap, clap snap, clap, clap snap, clap, clap, clap

– letters?

Example:

AB ABB ABBB ABBBB

– people?

Example:

boy, girl boy, girl, girl boy, girl, girl, girl

- **Presto Change-o!** Divide the class or a small group into two teams.

Materials:

- a set of cards with possible ways to represent a pattern (e.g., letters, sounds, actions, shape, colour, size, numbers, people, attribute blocks, etc.)
- materials such as unifix cubes, pattern blocks, attribute blocks, two-colour counters, et cetera
- a set of pictorial representations of increasing patterns
- game board
- a 1-to-6 dice

Directions: Place the increasing pattern in the centre of the game board. Shuffle the cards and place them face down on the board.

Teams take turns drawing a card. The word on the card describes how the team is to change the representation of the pattern. If correct, they roll the dice and move the number of spaces shown. If incorrect they lose a turn. The first team to reach the finish wins.

BLM
2.PR.2.3


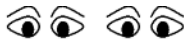

■ **Solve a problem using increasing patterns.**

Suggestions for Instruction

- **People Patterns:** Tell students that they are going to explore increasing patterns using the people in the classroom.

Ask, “How many eyes are there in our classroom? How can we use increasing patterns to find the answer?” Model the process using pictures and then translating them to numbers.

Example:

			
1 student	2 students	3 students	et cetera
Number of Eyes	2	4	6 8
Number of Students	1	2	3 4

Ask students to find out how many fingers, how many noses, et cetera, in the classroom. Have them use increasing patterns to explain their findings.

- Sample problems:

1.

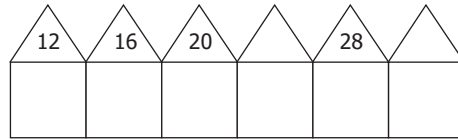
Row 1
Row 2
Row 3
Row 4
Row 5

How many s in Row 5? How do you know?

How many s in Row 8? How do you know?

2. There are frogs and lily pads in the pond.
Each lily pad has two frogs sitting on it.
How many frogs are in the pond if there are six lily pads altogether?
Use an increasing pattern to explain your answer.

3. There are eight markers in a box.
We have 40 markers at our table.
How many boxes do we have?
Use an increasing pattern to explain your answer.
4. Mr. Jones delivers mail on Centre Street.
He finds some of the house numbers difficult to see.
Write in the missing numbers for him.
Explain your thinking.



Extension: Have students find out how the house/apartment numbers increase on their streets/buildings.

5. Look at each increasing pattern.
Find a similar pattern on the hundred chart.

a) ☺ ☺☺ ☺☺☺ ☺☺☺☺
(any pattern that increases by 1)

b) ♥♥ ♥♥♥♥ ♥♥♥♥♥♥
(skip counting by 2s)

c) ☆☆☆☆☆ ☆☆☆☆☆ ☆☆☆☆☆ ☆☆☆☆☆
 ☆☆☆☆☆ ☆☆☆☆☆ ☆☆☆☆☆
 ☆☆☆☆☆ ☆☆☆☆☆
(skip counting by 5s)



Observation Checklist

Observe students as they work on the problems. The student is able to

- identify the pattern rule and apply it to solving the problem
- use mathematical language related to increasing patterns
- use an increasing pattern to solve a problem
- identify similar patterns in different modes

- **Identify and describe increasing patterns in the environment (e.g., house/ room numbers, flower petals, book pages, calendar, pine cones, leap years).**

Suggestions for Instruction

- Have students use a digital camera to take pictures of increasing patterns in the environment (Literacy with ICT connection).
- **Science Observation Centre:** Students bring in objects from nature that have increasing patterns and place them at the science centre. Have students identify and record the increasing patterns observed.

PUTTING THE PIECES TOGETHER



Performance Task

Work with a partner.

Choose two different shapes.

Use the shapes to

Part A

- create a repeating pattern with three repeats of the pattern core
- explain your pattern rule
- represent your pattern in another way
- predict the 50th element in your pattern and explain your thinking

Part B

- make an increasing/growing pattern with four figures/terms
- explain your pattern rule
- represent your pattern in another way

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

Enduring Understandings:

"Equals" indicates equivalent sets.

Unknown quantities can be found by using the balance strategy.

Essential Questions:

How do you know the sets are equal?

How do you know the sets are not equal?

SPECIFIC LEARNING OUTCOME(S):	ACHIEVEMENT INDICATORS:
<p>2.PR.3 Demonstrate and explain the meaning of equality and inequality by using manipulatives and diagrams (0 to 100). [C, CN, R, V]</p>	<ul style="list-style-type: none"> → Determine whether two quantities of the same object (same shape and mass) are equal by using a balance scale. → Construct and draw two unequal sets using the same object (same shape and mass), and explain the reasoning. → Demonstrate how to change two sets, equal in number, to create inequality. → Choose from three or more sets the one that does not have a quantity equal to the others, and explain why.
<p>2.PR.4 Record equalities and inequalities symbolically using the equal symbol or the not-equal symbol. [C, CN, R, V]</p>	<ul style="list-style-type: none"> → Determine whether two sides of a number sentence are equal (=) or not equal (\neq). Write the appropriate symbol and justify the answer. → Model equalities using a variety of concrete representations, and record. → Model inequalities using a variety of concrete representations, and record symbolically.

PRIOR KNOWLEDGE

Students may have had experience

- describing equality as a balance and inequality as an imbalance, concretely and pictorially (0 to 20).
- recording equalities using the equal symbol (0 to 20).

The not-equal symbol may have not been introduced.

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. The equal symbol means “is the same as.” This type of thinking is critical in algebra, and it can enrich the number sense of students by allowing them to be more flexible in applying and developing mental mathematics strategies.

Many students have misconceptions about the equal symbol. Many think that the equal symbol means “give answer.” These students see the equal symbol as an action rather than as a relationship. As a result, they have difficulty.

Examples:

- $4 + \underline{\quad} = 7$

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.

Avoid using the equal symbol incorrectly. Present equations in various ways.

Examples:

- $8 = 8$

- $14 = 7 + 7$

- $5 + 1 + 2 = 8$

Exploring the Relationship between Terms

Exploring the relationship between terms on either side of an equal symbol enables students to develop an understanding of the relationship that exists between the terms. It is important that they discover this relationship on their own.

You may wish to provide examples for students to explore the relationship.

Examples:

- $16 + 18 = 18 + 16$
- $13 + 9 = 15 + 7$
- $16 + 26 = 8 + 34$
- $2 + 8 = 1 + 9$

Ask students what relationship they notice between the terms. If students don't notice any relationship, provide more examples. Observation of the relationship between the numbers has to come from the students. The goal is to engage students in using relational thinking when solving equations. When students are comparing mathematical expressions, encourage them to use relational thinking instead of actually carrying out the calculations. To encourage relational thinking, provide examples that discourage calculations.

MATHEMATICAL LANGUAGE

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



Assessing Prior Knowledge

True or False: Prepare a classroom set of cards with the word *True* on one side and the word *False* on the other. Present the following equations one at a time. Have students hold up their True/False card to indicate whether the equation is true or false. Ask students to justify their answer using materials, pictures, number lines, numbers, et cetera.

- $6 + 5 = 11$
- $8 + 1 = 6 + 4$
- $6 = 6$
- $5 - 1 = 6 - 2$
- $7 + 9 = 10 + 5$
- $6 + 4 = 5 + 5$

This assessment could be done with a small group or with individual students.

- **Determine whether two quantities of the same object (same shape and mass) are equal by using a balance scale.**
- **Construct and draw two unequal sets using the same object (same shape and mass), and explain the reasoning.**
- **Demonstrate how to change two sets, equal in number, to create inequality.**
- **Choose from three or more sets the one that does not have a quantity equal to the others, and explain why.**
- **Determine whether two sides of a number sentence are equal ($=$) or not equal (\neq). Write the appropriate symbol and justify the answer.**
- **Model equalities using a variety of concrete representations, and record.**
- **Model inequalities using a variety of concrete representations, and record symbolically.**

Suggestions for Instruction

- Read the book *Equal Shmequal* by Virginia Kroll.

The story begins with a group of animals attempting to make equal teams for a tug-o-war. The meaning of the word *equal* is discussed. The animals explore using equal numbers for the teams and later use a seesaw to look at equal weight.

The story provides the basis for a discussion about using objects of the same size and mass when using a balance scale to explore equality and inequality.

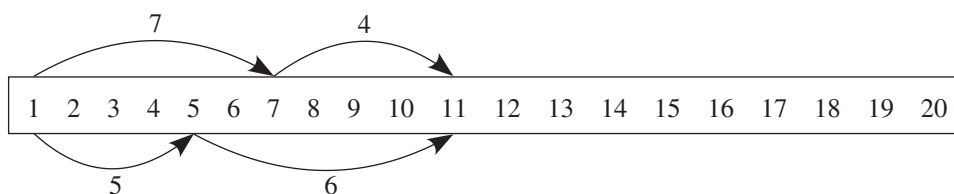
- **Equal or Not Equal:** Group the class into small groups. Each group needs a balance scale and a set of number sentences/equations. Have each group use the balance scale and a set of cube or counters to determine whether the number sentences are equal or not equal.

- $2 + 9 \square 11$
- $10 \square 4 + 6$
- $12 + 4 \square 13 + 2$
- $9 \square 9$
- $7 \square 5 + 3$
- $6 + 8 \square 5 + 9$

- Use a double number line to show equality/inequality.

Example:

Show that $7 + 4 = 5 + 6$.



- Have students work in pairs. Provide each pair with a balance scale mat. Give each student 10 of one colour of cube and 10 of another colour.

Student A places any combination of the cubes on their side of the mat (e.g., 4 red cubes and 5 blue cubes, making a total of 9).

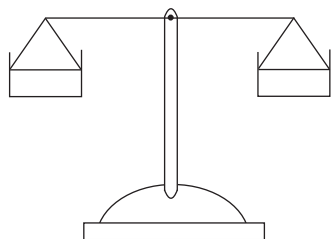
Student B places a different combination of red and blue cubes on their side of the mat so that both buckets have the same total (e.g., 2 red cubes and 7 blue cubes).

Both students record their findings using drawings, numerals, symbols and/or words.

Example:

$$4 + 5 = 2 + 7 \text{ or}$$

$4 + 5$ is equal to $2 + 7$



BLM
2.PR.3.1

Extension: Have students use the unequal balance mat.

Student A places any combination of cubes on one side of the mat (e.g., 2 red and 4 blue cubes).

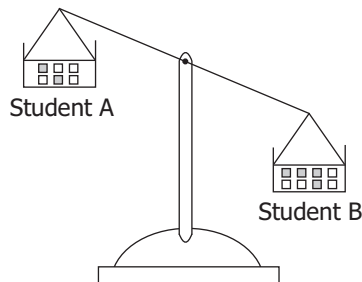
Student B places a combination of cubes on the other side of the mat to match the scale (e.g., 4 red cubes and 4 blue cubes because that side of the scale has to be greater than Student A's side).

Have students record their work.

Example:

$2 + 4$ is not equal to $4 + 4$ or

$2 + 4 \neq 4 + 4$



- **Inequality:** Place two equal sets of objects on the balance scale. Have students describe what they see. Ask, “What could you do to make the sets not equal?” Responses should highlight either adding objects to or subtracting objects from one side of the scale.

Students work with a partner to make equal sets and then change them to represent an inequality. Have students record their work e.g. $6 = 6$, $6 + 1 \neq 6$

- **Which Set Does Not Belong?** Use a set of dominoes. Select three dominoes – two that are equal and one that is unequal. Have students identify the set that is not equal to the others and explain how they know.

Example:



- **Classroom Routine – Nifty Number Sentences:** Use a laminated chart or white/chalk board. Write a number between 0 and 100 at the top of the chart each day. Students take turns writing a number sentence to equal the number on the chart. Encourage students to try to write a sentence that is different from the ones already on the chart.

- Pocket Chart:** Copy some of the expressions (the part of the number sentence without the equal symbol e.g., $3 + 8$ or $16 - 9$) from the Nifty Number Sentences chart each day on to cards. Note: Use the same colour of marker for all of them. Mix the expressions up. Place equal or not equal symbols down the centre of a pocket chart. Have students make true number sentences by placing equivalent expressions on the either side of each symbol.

Make True Number Sentences		
$23 + 8$	\neq	$25 + 10$
$46 + 29$	\neq	$57 + 18$
	\neq	
	\neq	
	\neq	
	\neq	



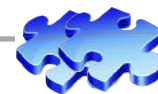
Assessing Understanding

Have students fill in the Understanding Words charts to demonstrate their understanding of the equality and inequality.

BLM
2.PR.3.4

<i>What does it mean?</i>	<i>Word</i> equal	<i>Picture</i>
<i>Number examples</i>	<i>Symbol</i>	
<i>What does it mean?</i>	<i>Word</i> not equal	<i>Picture</i>
<i>Number examples</i>	<i>Symbol</i>	

PUTTING THE PIECES TOGETHER



True or False Game

BLM
2.PR.4.1

Materials:

- game board
- true or false game cards
- game pieces

Directions:

Game cards are placed with number sentences facing up on the table.

Players take turns drawing a card, stating whether the number sentence/equation is true or false. If correct, the player moves their game marker five spaces for a true statement and three spaces for a false statement.

Scenario:

We have been asked to help design a True or False game for Grade 2 students. We already have the game board but we don't have the game cards. I need each of you to make five cards for the game. Each card needs to have a number sentence. The number sentence can be either true or false. The answer needs to be on the back of the card. Put a **T** for true or an **F** for false in the bottom right hand corner.

Sample:

$$26 + 32 = 44 + 14$$

Front



Back

To address student needs, do the following:

- Vary the number range assigned to each student.
 - combinations to 20
 - combinations to 50
 - combinations to 100
- Vary the operations used.
 - use only addition
 - use only subtraction
 - use a combination of both operations
- Colour code the cards based on the complexity of the equations.