Preview - Information

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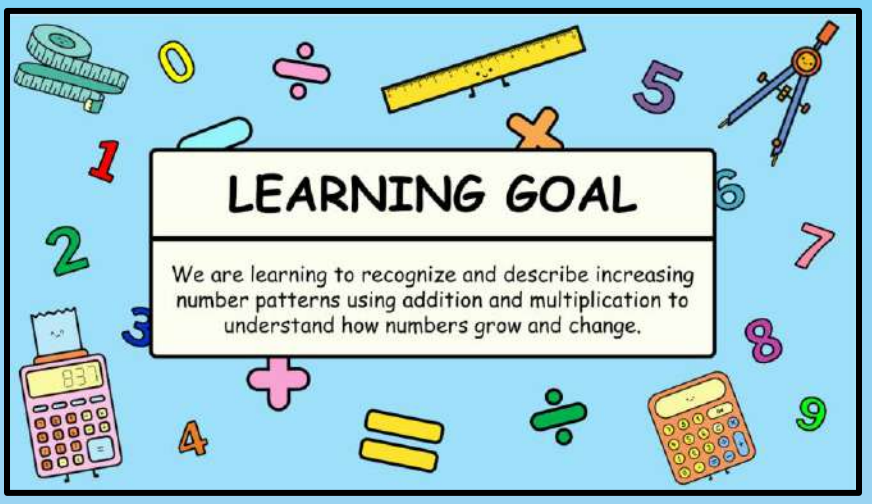
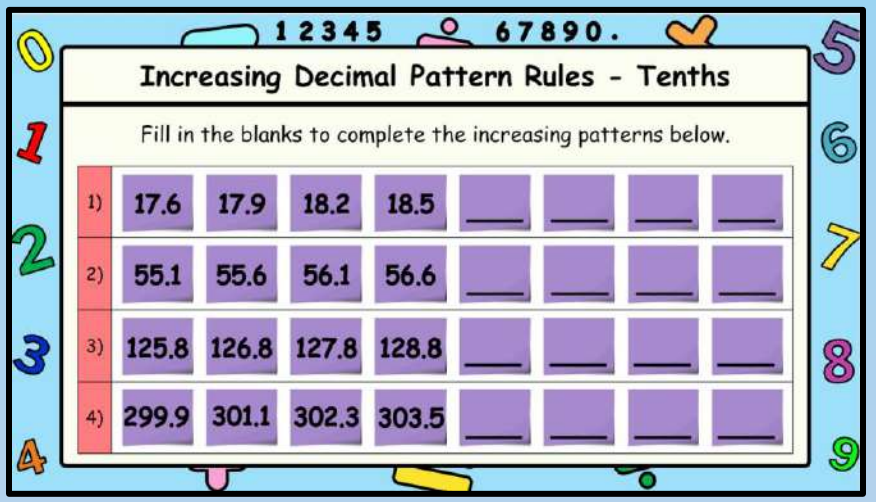
Google Slides Lessons Preview

BC Math Curriculum
Patterning & Equations – Grade 7

3-Part Lesson Format

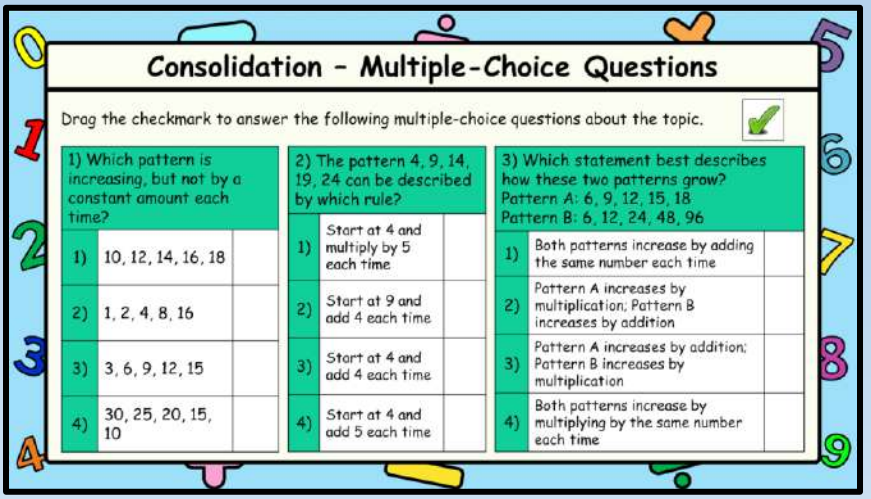
Part 1 – Minds On!
- Learning Goals
- Discussion Questions
- Quotes
- And More!



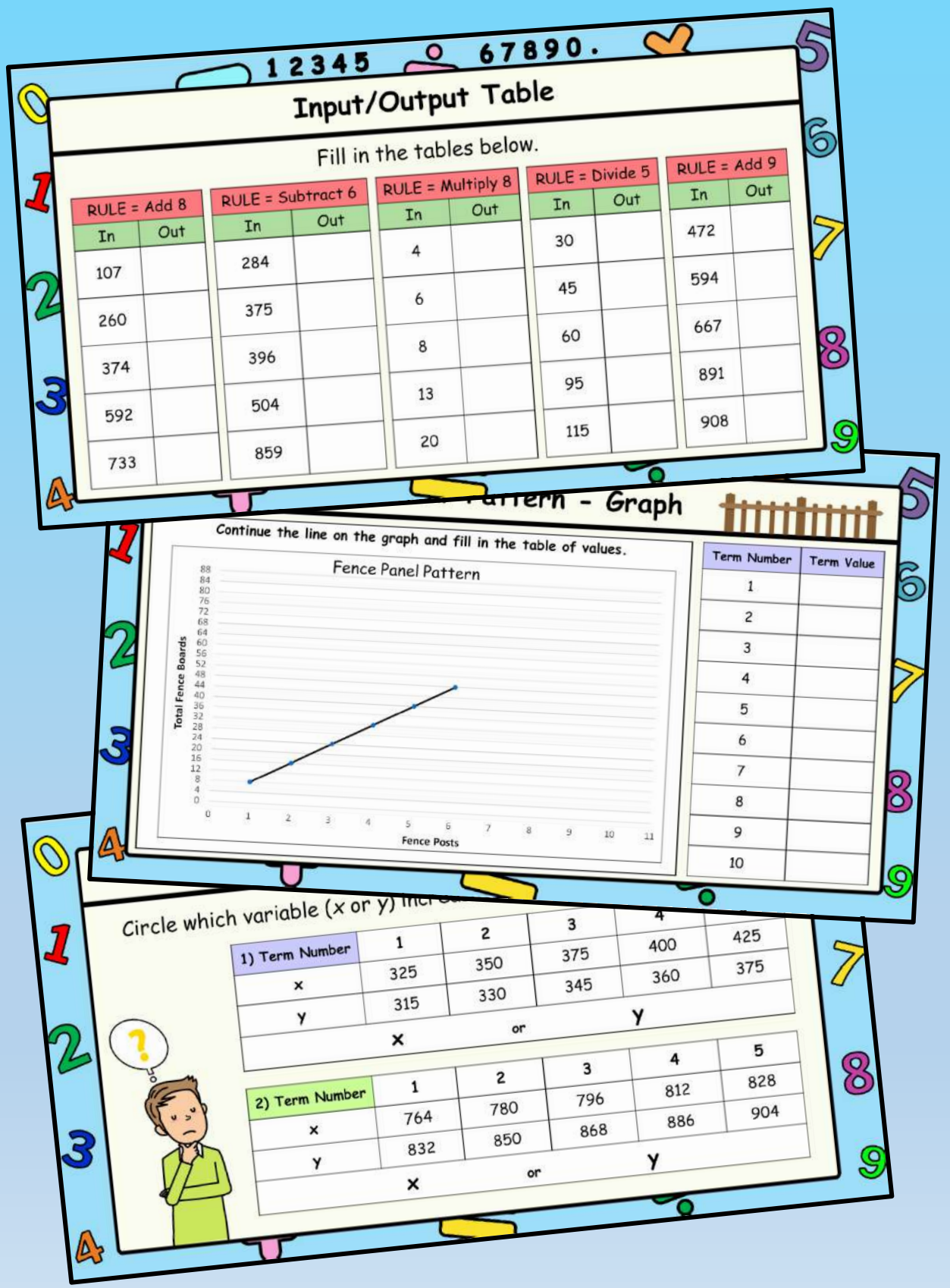


Part 2 – Action!
- Writing
- Matching
- Drag and Drop
- Drawing
- And More!

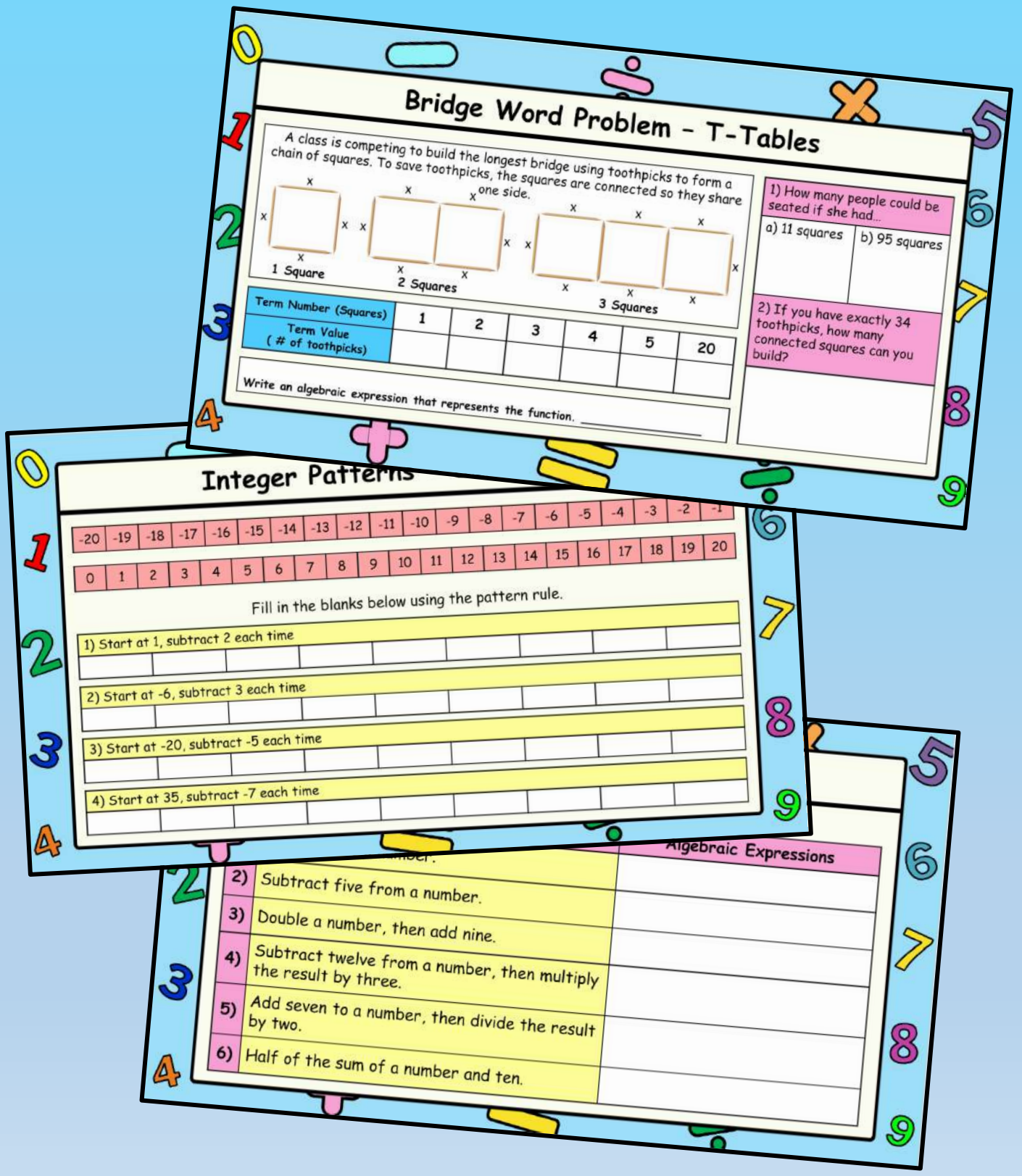
Part 3 – Consolidation!
- Exit Cards
- Quizzes
- Reflection
- And More!



BC Math Curriculum
Patterning & Equations – Grade 7



BC Math Curriculum
Patterning & Equations – Grade 7



Workbook Preview

Grade 7

Patterns

	Curriculum Expectations	Pages That Cover the Expectations
PE.1	discrete linear relations, using expressions,	5 - 78

Name: _____ 6

Curriculum Connection
PE.1

Increasing Pattern Rules - Adding

Part 1 Continue the increasing patterns below.

1) 66, 75, 84, _____, _____, _____

Pattern Rule: Start at 66, add _____ each time

2) 174, 18_____, _____, _____

Pattern _____ add _____ each time

3) 22_____, 243, _____, _____

Pattern Rule _____ each time

4) 376, 389, 402, _____, _____

Pattern Rule: Start at _____ e

5) 462, 478, 494, _____, _____, _____

Pattern Rule: Start at _____ add _____ each t

BONUS

Lily gets paid based on how fast she works. She is getting faster each day! Check out her paycheque for the last 5 weeks.

Week	Pay
1	80
2	100
3	140
4	200
5	280

Question

How much will she make in week 10 if the pattern ntinues?

Part 2 Write your own patterns using the pattern

1) _____, _____, _____, _____, _____, _____

Pattern Rule: Start at 218, add 8 each time

2) _____, _____, _____, _____, _____, _____

Pattern Rule: Start at 395, add 15 each time

3) _____, _____, _____, _____, _____, _____

Pattern Rule: Start at 498, add 13 each time

4) _____, _____, _____, _____, _____, _____

Pattern Rule: Start at 605, add 16 each time

Name: _____ 8

Curriculum Connection
PE.1

Decreasing Subtraction Patterns

Decreasing Patterns

-10 -10 -10 -10 -10

60, 50, 40, 30, 20, 10

-5 -5 -5 -5 -5

45, 40, 35, 30, 25, 20

Part 1

Follow the rule by subtracting the number in the pattern.

1) (subt 9 86, _____, _____, _____	2) (subtract 3) 112, 109, 106, _____, _____, _____
3) (subtract 6 219, 213, 207, _____	4) (subtract 5) 298, 293, 288, _____, _____, _____
5) (subtract 10) 427, 417, 407, _____, _____	ubtract 7) 575, _____, _____, _____
7) (subtract 13) 646, 633, 620, _____, _____, _____	8) (s 25, 7 _____, _____, _____

Part 2

Decreasing Patterns - Subtracting

1) 75, 68, 61, _____, _____, _____	2) 113, 106, 99, _____, _____, _____
3) 138, 126, 114, _____, _____, _____	4) 213, 200, 187, _____, _____, _____
5) 348, 339, 330, _____, _____, _____	6) 425, 400, 375, _____, _____, _____
7) 588, 568, 448, _____, _____, _____	8) 864, 849, 834, _____, _____, _____

Name: _____ 13

Curriculum Connection
PE.1

Pattern Rule – Multiplication

Part 1 Continue the increasing patterns below.

1) 2, 10, 50, _____, _____, _____, _____, _____

Pattern Rule: Start at 2, multiply by _____ each time

2) 3, 9, 2_____, _____, _____, _____, _____

Patte_____t _____ multiply by _____ each time

3) 6, 30, 150, _____, _____, _____, _____, _____

Pattern Rule: _____t _____ multiply by _____ each time

4) 10, 100, 1000, _____, _____, _____

Pattern Rule: Start at _____ _____ each time

5) 9, 18, 36, _____, _____, _____, _____

Pattern Rule: Start at _____ multi_____ch time

Part 2 Write your own patterns using the pattern r_____

1) _____, _____, _____, _____

Pattern Rule: Start at 6, multiply by 3 each time

2) _____, _____, _____, _____, _____

Pattern Rule: Start at 15, multiply by 2 each time

3) _____, _____, _____, _____, _____

Pattern Rule: Start at 1, multiply by 4 each time

4) _____, _____, _____, _____, _____

Pattern Rule: Start at 10, multiply by 5 each time

Name: _____ 14

Curriculum Connection
PE.1

Decreasing Patterns - Division

÷2 ÷2 ÷2
48, 24, 12, 6, 3
Pattern Rule: Start at 48, divide by 2 each time.

Question Complete the decreasing patterns.

1) 24[illegible], 60, _____, _____ Pattern Rule: _____	5) 128, 64, 32, _____, _____ Pattern Rule: _____
2) 112, 56, 28, _____, _____ Pattern Rule: _____	6) 972, [illegible]08, _____, _____ Pattern Rule: _____
3) 3 888, 648, 108, _____, _____, Pattern Rule: _____	7) 567, 189, 63, _____, _____ Pattern Rule: _____
4) 3 072, 768, 192, _____, _____ Pattern Rule: _____	8) 8 192, 2 048, 512, _____, _____ Pattern Rule: _____

Name: _____ 17

Curriculum Connection
PE.1

Pattern Rule – Input/Output Tables

Questions Fill in the input/output tables below.

Rule: add 7	
In	Out
185	
	206

Rule: add 3	
In	Out
	406
	435
458	
483	

Rule: add 9	
In	Out
625	
	647
673	
	698

Rule: sub	5
In	Out
146	
	166
188	
	203

le: subtract 12	
In	Out
	325
348	
	3

Rule: Subtract 7	
In	Out
547	
	563
592	
	605

Rule: multiply by 2	
In	Out
5	
	22
15	
	74

Rule: multiply by 4	
In	Out
3	
6	
	36
	48

Ru tiply by 7	
I	Out
	63
11	
13	

Rule: divide by 4	
In	Out
20	
	8
36	
	11

Rule: divide by 8	
In	Out
24	
40	
	8
	12

Rule: divide by 10	
In	Out
10	
50	
	8
	10

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____

Fill in the input/output tables below:

Rule: add 7	
In	Out
287	
	309

Rule: multiply by 2	
In	Out
12	
	36

Rule: divide by 10	
In	Out
70	
150	

Rule: subtract 5	
In	Out
217	
	356

Name: _____

Fill in the input/output tables below:

Rule: add 7	
In	Out
287	
	309

Rule: multiply by 2	
In	Out
12	
	36

Rule: divide by 10	
In	Out
70	
150	

Rule: subtract 5	
In	Out
217	
	356

Name: _____

Fill in the input/output tables below:

Rule: add 7	
In	Out
287	
	309

Rule: multiply by 2	
In	Out
12	
	36

Rule: divide by 10	
In	Out
70	
150	

Rule: subtract 5	
In	Out
217	
	356

Name: _____ 19

Curriculum Connection
PE.1

Recursive vs. Functional Relationships

A **recursive relationship** describes the pattern between successive numbers in one of the rows/columns of a table of values. A **functional relationship** is a general rule to describe the relationship between two columns/rows of numbers in a table of values. We look across the table, instead of beside it. If there is a functional relationship, then we have a **linear pattern**, which we will learn more about later.

Part 1 — Is Jeffrey describing the recursive or functional relationship?

						Jeffrey's Description	Recursive or Functional
1)	*x*	1			4	The pattern goes up by 3 each time.	
	y	5			11		
2)	*x*	10	20			m number is multiplied by 10.	
	y	100	200				
3)	*x*	1	2	3	4	m nu multiplied by 4 and 1 is d.	
	y	5	9	13	17		
4)	*x*	1	2	3	4	The patte 4 eac	
	y	8	12	16	20		
5)	*x*	1	2	3	4	$7x + 11 = y$	
	y	18	25	32	39		

Part 2 — Provide a recursive and functional description of the patterns.

	Pattern				
1)	*x*	1	2	3	4
	y	3	9	15	21

Recursive	
Functional	

	Pattern				
2)	*x*	1	2	3	4
	y	12	20	28	36

Recursive	
Functional	

Name: _____ 20

Curriculum Connection
PE.1

Table of Values – Finding Term N

When finding a random term in a pattern, we can use a variable. Often *n* is used to take the place of the term number. When we use *n*, we can change the value to find the term value for any term number.

We can find the value for *n* by looking at the pattern between the term number and term value (functional relationship). To do this, we look <u>across</u> the table from the term number to the term value.

Practice Find the pattern rule when you look <u>across</u> the table of values.

Term Number	Term Value
1	5
2	10
3	15
4	20
5	25
8	

<u>5*n*</u>

Term Number	Term Value
1	1
2	
3	
4	
5	
9	

<u>3*n* - 2</u>

Term Number	Term Value
1	6
2	12
3	18
4	24
5	30

_____

Term Number	Term Value
1	4
2	6
3	8
4	10
5	12
9	

_____

Term Number	Term Value
1	5
2	15
3	25
4	35
5	45
10	

_____

Term Number	Term Value
1	6
2	9
3	12
4	15
5	18
11	

_____

Name: _____ 21

Curriculum Connection
PE.1

Table of Values – Finding Term N

Practice Find the pattern rule when you look <u>across</u> the table of values.

Term Number	Term Value
1	5
2	12
3	19
4	26
5	
8	

_____

Term Number	Term Value
1	16
2	17
3	18
4	19
5	20

_____

Term Number	Term Value
1	11
2	17
3	23
4	29
5	35
11	

_____

Term Number	Term Value
1	17
2	24
3	31
4	38
5	45
11	

_____

Term Number	Term Value
1	
2	
3	
4	30
5	40
11	

_____

Term Number	Term Value
1	5
2	14
3	23
	32

_____

Word Problem Use a table of values and find the n^{th} term.

Dennis won 8 points for beating level 1 in a video game. He got 18 for beating level 2 and he received 28 points for beating level 3.

a) If the pattern continues, how many points will he get for beating level 4?

b) How many points will he get for beating level 10?

Name: _____ 22

Curriculum Connection
PE.1

Using Algebraic Expressions

In the expression $6y + 5$, the 6 is the **numerical coefficient** of the variable and the 5 is the **constant term**. The **variable** is the y, which can represent any number.

Part 1 Use the algebraic expression to fill in the tables.

Term Number	Term Value
1	
2	
3	
4	
5	
8	

$4x + 1$

Term Number	Term Value
1	
2	
3	
4	
5	
9	

Term Number	Term Value
1	
2	
3	
4	
5	
11	

$t + 8$

Term Number	Term Value
1	
2	
3	
4	
5	
11	

$6n - 7$

Term Number	Term Value
1	
2	
4	
5	
10	
20	

$20 \div x + 5$

Term Number	Term Value
1	
2	
3	
4	
5	
11	

$8x - 6$

Part 2 Write 4 algebraic expressions using:
Variable = n Constant term = 6 Numerical coefficient = 3

1	
2	

3	
4	

Name: _____ 23

Curriculum Connection
PE.1

Pattern Rule – Input/Output Tables

Instructions Fill in the input/output tables below by using the expression provided.

In n	Out $2n$
1	
2	
4	
5	

In n	Out $2n + 3$
1	
2	
3	
4	

In n	Out $5n - 5$
1	
2	
3	
4	
5	

In x	Out $3x - 3$
10	
20	
30	
40	
50	

In x	Out
4	
6	
8	
10	

In x	Out $20 + x$
1	
9	

In p	Out $3p + 10$
20	
40	
60	
80	
100	

In p	Out $10p - 12$
3	
6	
9	
12	
15	

In p	Out $7p + 20$
5	
10	
15	
20	
25	

Name: _____ 24

Curriculum Connection
PE.1

Activity Title: Algebraic Adventure Hunt

Objective — What are we learning about?

To help students understand and practice filling in input/output tables using given expressions involving all four operations through a fun and engaging treasure hunt.

Materials — What will you need for the activity?

- St tch or d use a smartphone)
- Index card
- Markers
- Small prizes o s (fo s)
- Tape

Instructions — How will you compl ctiv

1) Cut out the input/output tables provided. T ll be e hunt challenge questions.
2) Hide these cards around the classroom or in a desig fe o are taping them under chairs, desks, or tucked into non-obvious sp
3) Divide the class into small teams and give each team a stopwa or
4) Explain the game: each team will hunt for a card, solve the problem o t as quickly as they can, and return to you for verification.
5) Start the timer when you say "Go!" Each team rushes to find their first card.
6) When a team thinks they have the correct answer, they come back to you for verification. If they get it right, the teacher keeps the card. If the answer is wrong, they can try again or hide the card back in its original spot and find a new card.
7) The game continues until all cards are found or you call time. The team with the most correct answers wins.
8) Discuss the game, focusing on the concepts taught on the cards.

Name: _____ 27

Curriculum Connection
PE.1

Instructions Cut out the cards below.

In z	Out $z - 10+20$	In x	Out $x \div 5 +100$	In v	Out $3v-16+1$	In t	Out $t + 30-16$
10		10		33		30	
20		20		66		60	
30		30		99		90	
40		40				120	
50		50				150	

In a	Out $3a + 37$	In y	Out $2y +$	In u	Out $5w + 52$	In u	Out $u \div 4 - 12$
1		3		40			
2		5		60			
3		7		80			
4		9		100			
5		11		120	152		

Name: _____ 28

Curriculum Connection
PE.1

Instructions Cut out the cards below.

In h	Out $h \div 4 + 3$	In f	Out $3f - 45$	In e	Out $15e + 3$	In b	Out $b \div 2 - 1$
8		15		2		10	
16		20		4		20	
24		25		6		30	
32		30				40	
40		35				50	

In k	Out $k \div 5 - 3$	In g	Out $2g$	In d	Out $d \div 3 - 2$	In c	Out $4c + 25$
	0	1		3		3	
20		2		6		5	
25		3		9		7	
30		4		12		9	
35		5			3	11	

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____

Fill in the input/output table below.

In x	Out $9x \div 3$
3	
5	
7	
9	
11	

Name: _____

Fill in the input/output table below.

In x	Out $9x \div 3$
3	
5	
7	
9	
11	

Name: _____

Fill in the input/output table below.

In x	Out $9x \div 3$
3	
5	
7	
9	
11	

Name: _____

Fill in the input/output table below.

In x	$9x \div 3$
3	
5	
7	
9	
11	

Name: _____ 30

Curriculum Connection
PE.1

Increasing Patterns

Instructions How many blocks are in each term? Sketch the next 3 terms.

A)

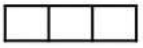
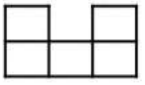
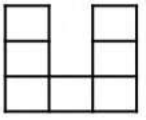
1) Describe the rule in your own words.

2) Represent the pattern using an algebraic expression:

3) How many blocks will the 15th term have?

4) How many blocks will the 30th term have?

B)

1) Describe the pattern rule in your own words.

2) Represent the pattern using an algebraic expression:

3) How many blocks will the 25th term have?

4) How many blocks will the 50th term have?

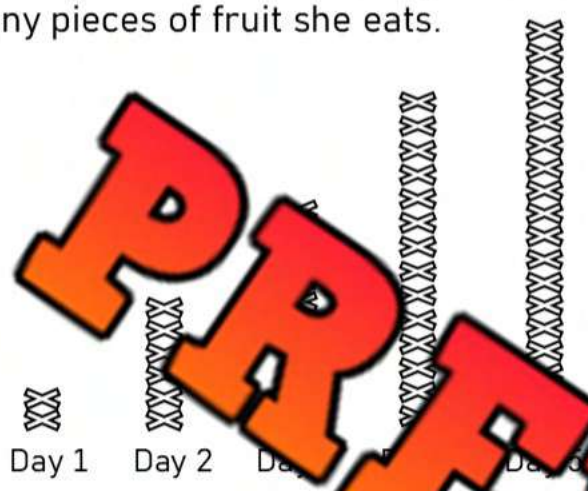
Name: _____ 33

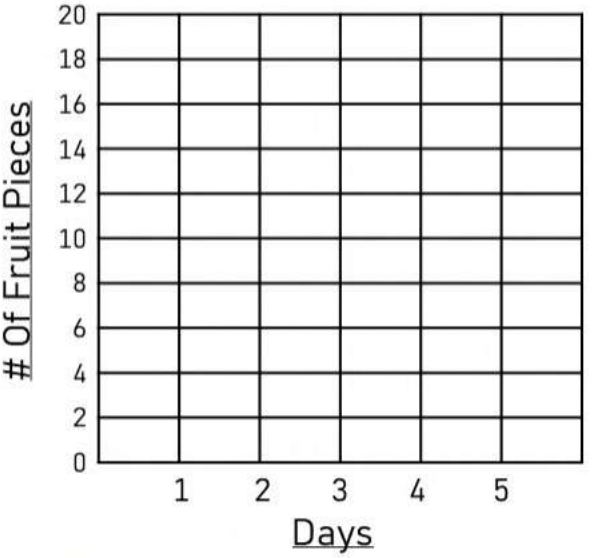
Curriculum Connection
PE.1

Graphing Increasing Patterns

Questions Translate the increasing patterns into a table of values and a line graph.

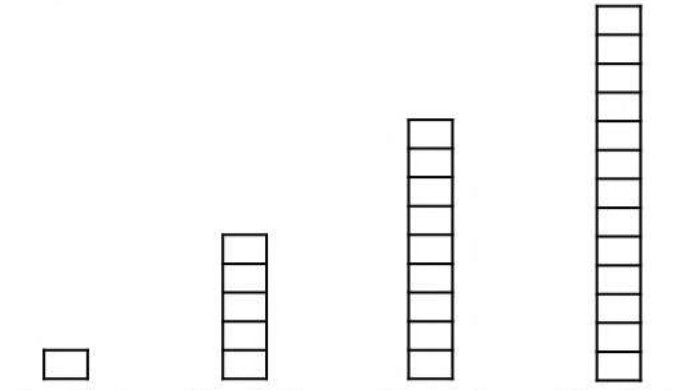
1) Stacy marks an x each day for how many pieces of fruit she eats.

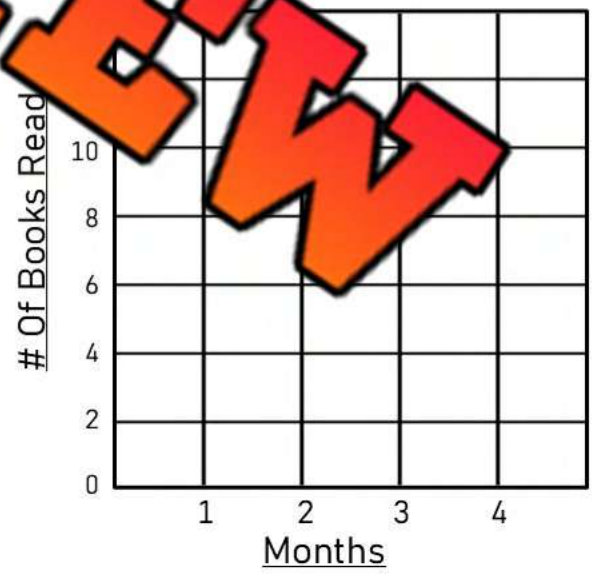




Term Number (Day)	1	2	3	4	5	8	15
Term Value (Fruit Pieces)							

2) Chris puts a rectangle for every book he reads in the first 5 months of school.





Term Number (Month)					7	20
Term Value (Books Read)						

Name: _____ 34

Curriculum Connection
PE.1

Increasing Patterns

Questions How many shaded blocks are in each term? Sketch the next 2 terms.

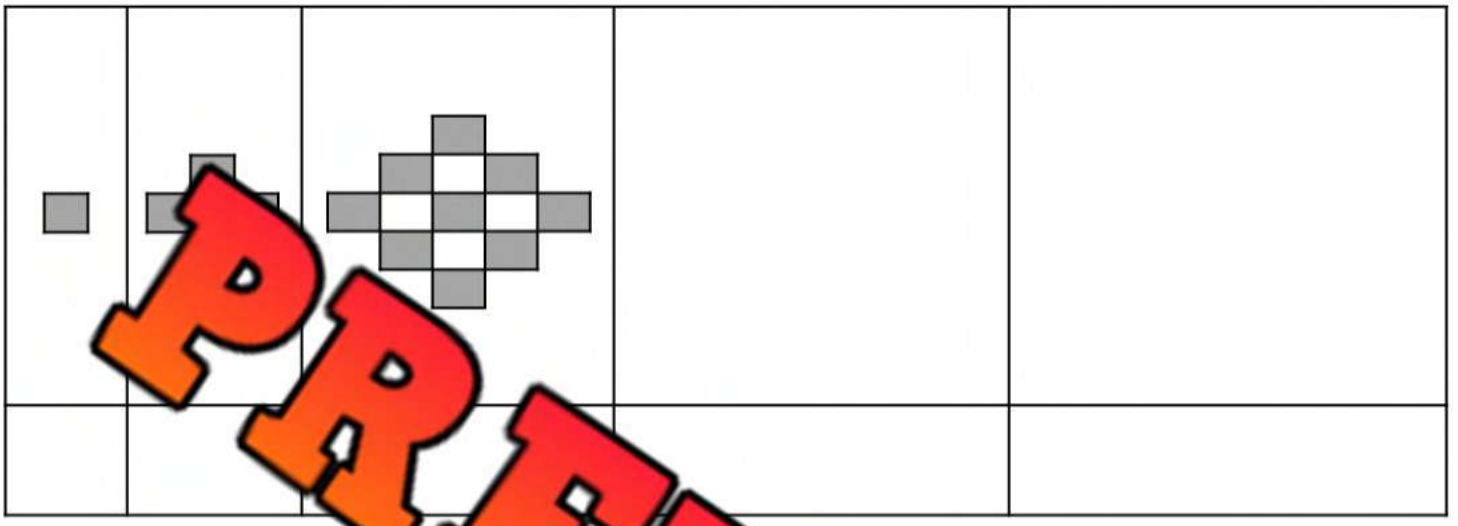
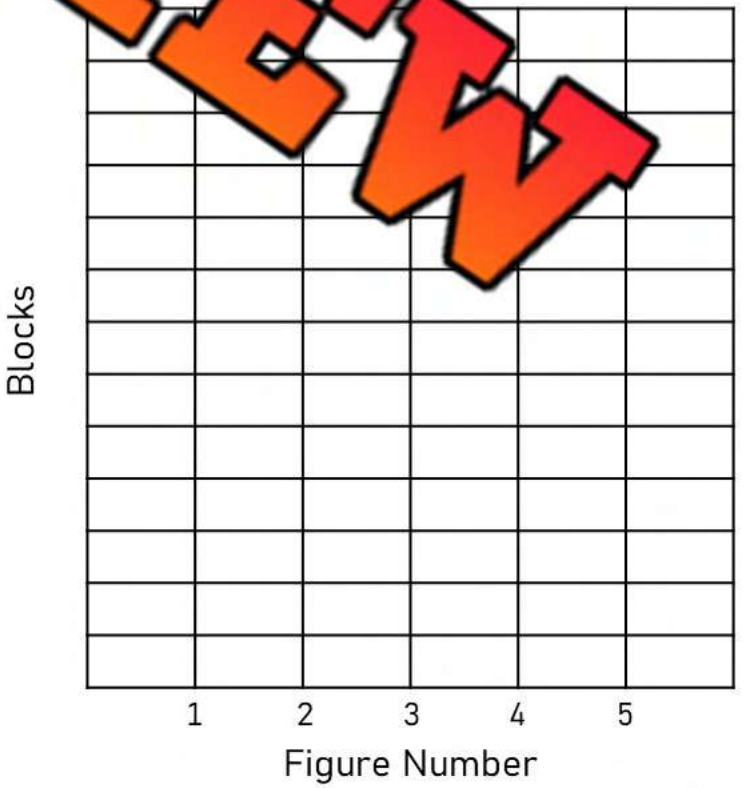


Figure Number	1				5	7	10
Number of Grey Blocks							

1) Describe the pattern rule:

2) How many blocks will the 7th term have?

3) How many blocks will the 10th term have?



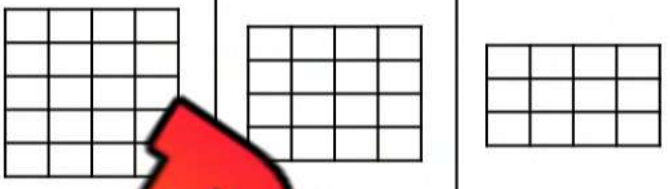
Name: _____ 35

Curriculum Connection
PE.1

Decreasing Patterns

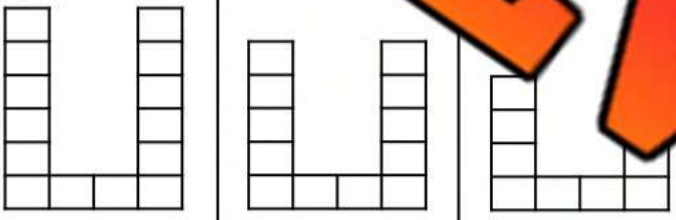
Questions How many blocks are in each term. Sketch the next 3 terms.

1)



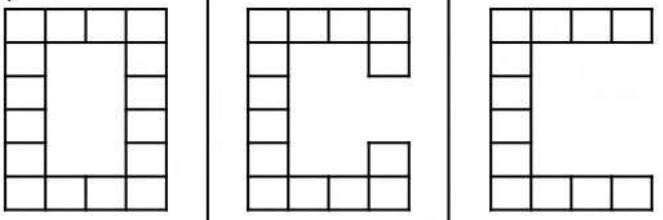
Describe the pat

2)



Describe the pattern rule.

3)



Describe the pattern rule.

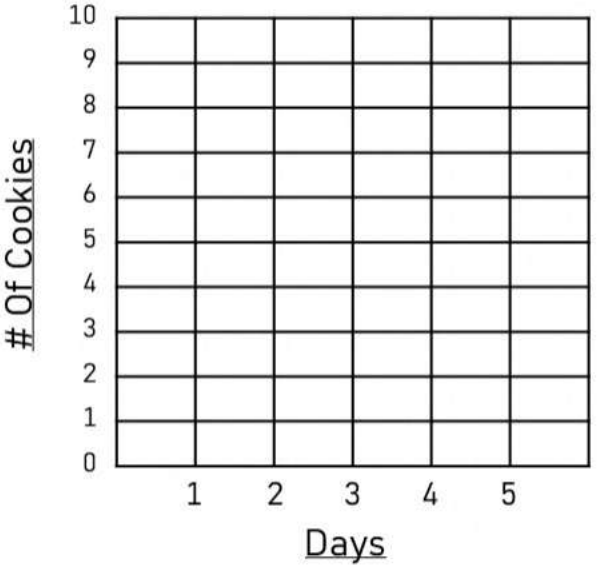
Name: _____ 36

Curriculum Connection
PE.1

Graphing Decreasing Patterns

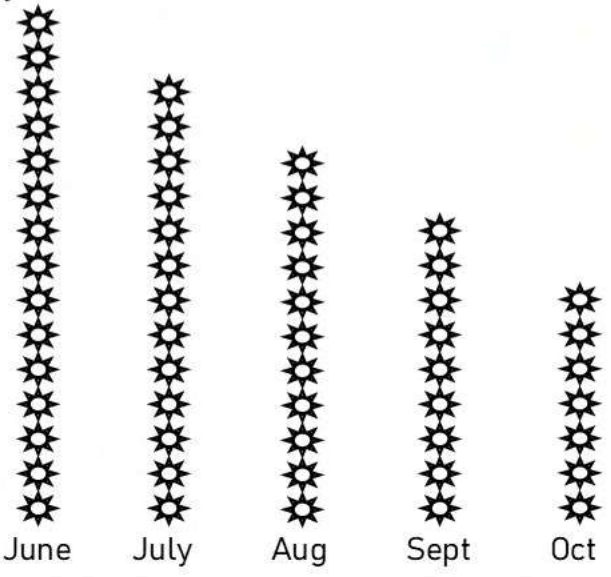
Questions Translate each decreasing pattern into a table of values and a line graph.

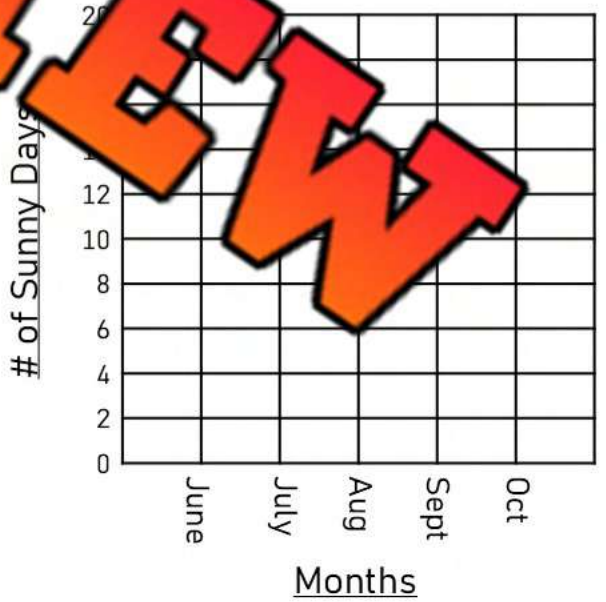
1) Kerry kept track of how many cookies she ate each day using addition signs.



Term Number (Day)					
Term Value (Cookies)					

2) Ally writes down how many days was sunny each month from June – October.





Term Number (Month)						November
Term Value (Sunny Days)						

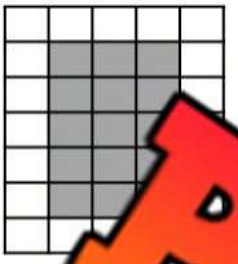
Name: _____ 38

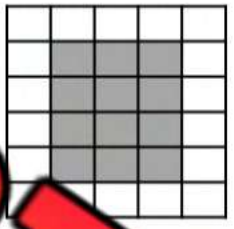
Curriculum Connection
PE.1

Decreasing Patterns

Questions How many total blocks are in each term. Sketch the next 2 terms.

1)





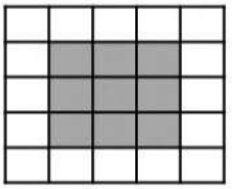
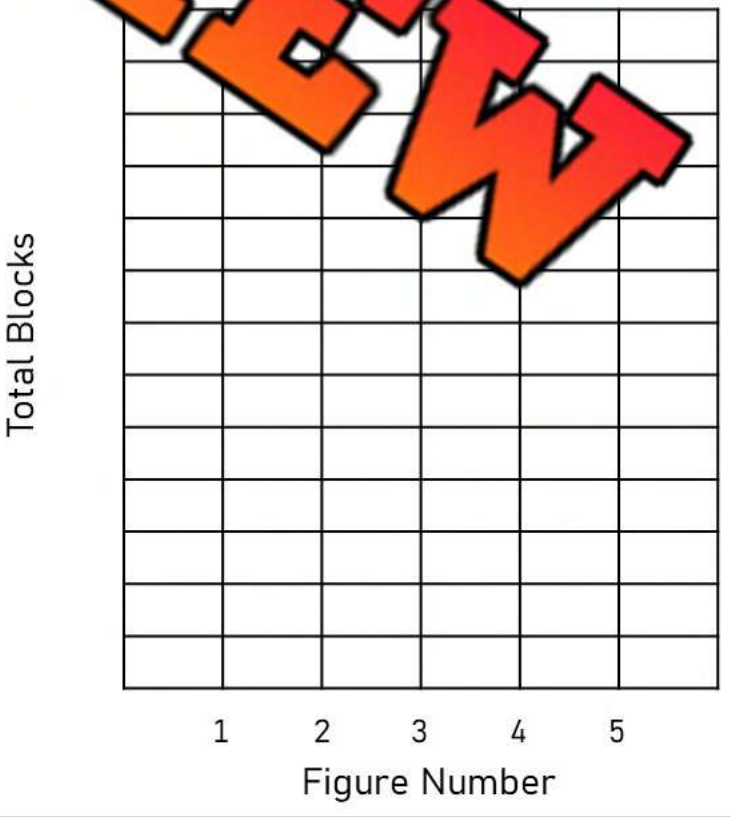


Figure Number			3	4	5	6
Number Of Grey Blocks						
Number Of White Blocks						
Number Of Total Blocks						

1) Describe the pattern rule for the total blocks.

2) Describe the pattern rule for the white blocks.

3) Describe the pattern rule for the grey blocks.



Name: _____ 39

Curriculum Connection
PE.1

Writing Algebraic Expressions

Practice Answer the question below.

1)	Situation	Expression/Answer
a)	Blake sells lemonade at his stand. For every sale (s), he earns $5. Write the expression.	
b)	Blake 12 sales Monday. How much money did he mak expression and the answer.	
c)	old 22 the week, how much money did he make? Writ d the answer.	
d)	Blake earned $ este monade. How many cups (c) did he sell	

2)	Situation	Expression/Answer
a)	Sandy earns $14 for every hour ($h$) she works has spend $2 each time she works to take the te th expression.	
b)	Sandy worked 8 hours yesterday. How much money take home? Write the expression and the answer.	
c)	Sandy worked 12 hours today. How much money did she take home? Write the expression and the answer.	

3)	Situation	Expression/Answer
a)	Jake is driving across Alberta to visit a friend. For every hour (h) he drives, he travels 110km. Write the expression.	
b)	Jake drove 8 hours today. How far did he go? Write the expression and the answer.	
c)	Jake needs to drive 1430km. How many hours does he need to drive? Write the expression.	

Name: _____ 41

Curriculum Connection
PE.1

Uncovering the Relation Between Variables

When we discover a pattern between two things (variables), we need to identify the term number and the term value.

Example: determine the number of students and adults in a school, if there are 20 times more students than adults.

Clues

- There are two terms to quantify – students and adults
- There are 20 times more students than adults, so the number of students to adults is x 20
- We ca lts as the term number. The letter *a* will represent the number of adults.
- The nts is the term value. The letter *s* will represent the number of
- Th tion is or 20a = s

Scenarios

the r r each of the scenarios below.

	Scenari	Relation
Ex.	The number of chairs pr th ( ) for every 1 student (s)	c = s
1)	The number of wheels present in a llection y ca each car has 4 wheels	
2)	The number of pencils there are in class if e stu class has 3 pencils each	
3)	The number of shoes that are in your class if each stu as 2 shoes	
4)	How many total cans collected for a food drive in a school if each class brings on average 25 cans	
5)	The number of students absent today if there is always 1 person absent for every 10 students in a class	

Your Turn

Write your own scenarios and the relation that solves the problem.

	Scenario	Relation
1)		
2)		

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: ______________________

Write the relations for each of the scenarios below.

If each box of chocolates contains 24 chocolates and a store sells 15 boxes, how many chocolates are sold in total?

Relation:

____

____

____

____

Name: ______________________

Write the relations for each of the scenarios below.

If each box of chocolates contains 24 chocolates and a store sells 15 boxes, how many chocolates are sold in total?

Relation:

____

____

____

____

Name: ______________________

Write the relations for each of the scenarios below.

If each box of chocolates contains 24 chocolates and a store sells 15 boxes, how many chocolates are sold in total?

Relation:

____

____

____

____

Name: ______________________

Write the relations for each of the scenarios below.

If each box of chocolates contains 24 chocolates and a store sells 15 boxes, how many chocolates are sold in total?

Relation:

____

____

____

____

Name: _____ 43

Curriculum Connection
PE.1

Constant Rate of Change

A **constant rate** is a rate of change that remains the same and does not go up or down. For example, when you are paid $20 an hour, the rate of change is constant because for every hour you work, your pay goes up by the same amount - $20.

Instructions Fill in the tables below to show a constant rate of change.

1) Phil's [illegible] today has been represented in the table below

[illegible]	1	2	3	4	5	6	7	8
Money Earned		42	63					

What is the rate [illegible]ge? _____ Is the rate of change constant? Yes No

2) Laura sells cars. She e[illegible]om[illegible]n she sells a car. Her earnings for last week are represen[illegible]d in [illegible]. There were some days she did not earn commission.

Days Worked	1	2	[illegible]	4	[illegible]	6	7
Money Earned ($)	105	210	315	[illegible]	[illegible]	[illegible]15	1300

a) Is the rate of change constant? Yes No

b) What day do you think Laura sold the most cars? _____

c) How much did she earn that day? _____

d) How much do you think Laura made if she didn't sell a car? _____

3) Kim sells necklaces that she made. Her sales have been represented in the table.

Necklaces Sold	10	20	30	40	50	60	70	80
Money Earned ($)	30	60	90					

a) What is the rate of change? _____ Is the rate of change constant? Yes No

b) How much would Kim sell 1000 necklaces for? _____ 5000 necklaces: _____

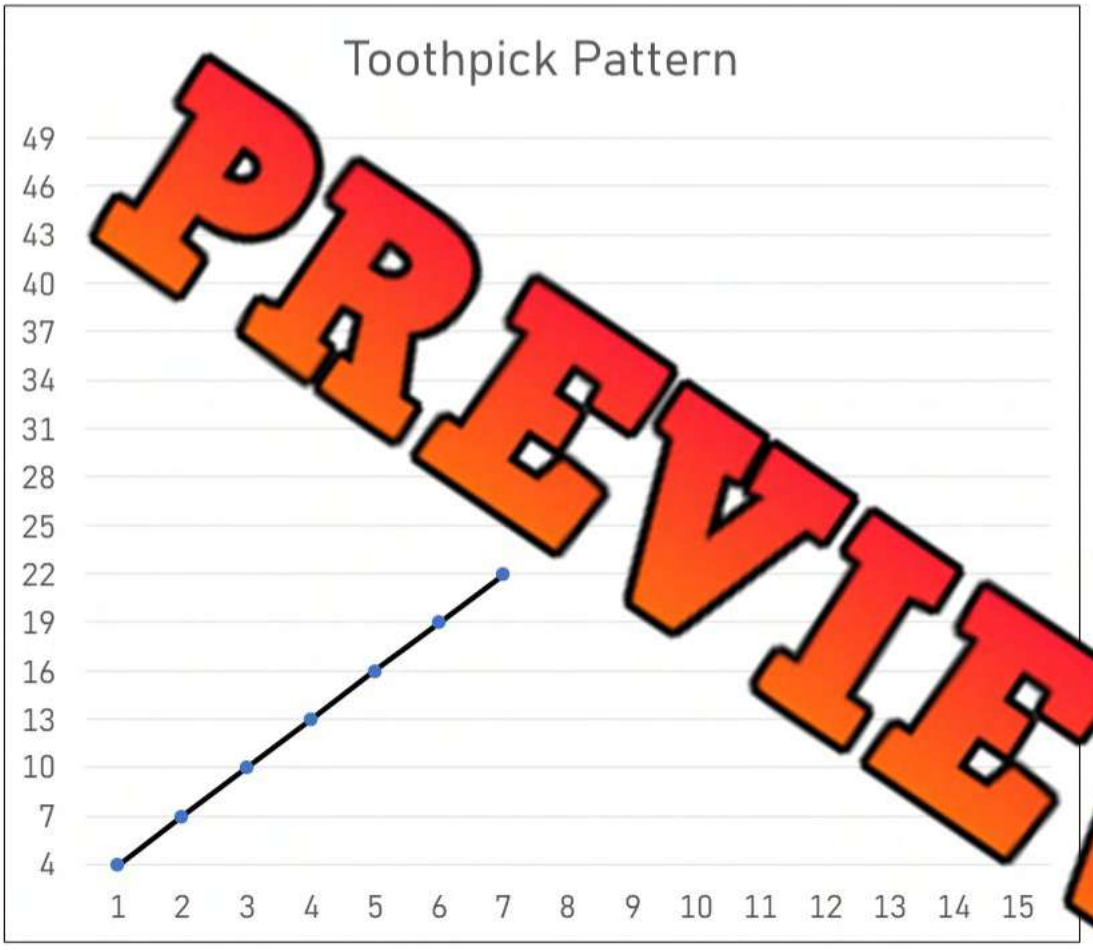
Name: _____ 44

Curriculum Connection
PE.1

Reading a Linear Pattern - Graph

A **linear** pattern displays a constant rate of change. The pattern increases or decreases by the same amount each time.

Instructions Continue the line on the graph and fill in the table of values.



Term Number	Term Value
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	

1) Draw the toothpick pattern below for the graph/table of values. Use any design you'd like.

Term 1	Term 2	Term 3	Term 4	Term 5

2) What is the constant rate of change?

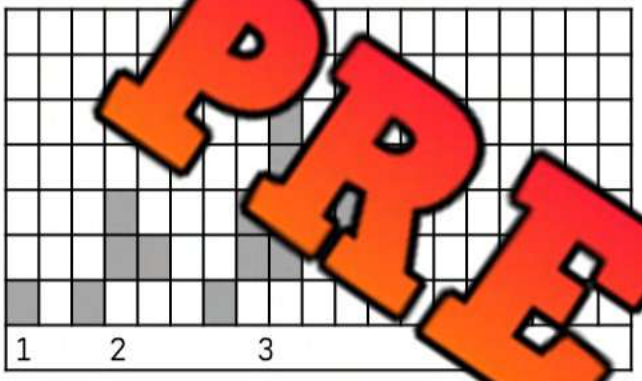
Name: _____ 45

Curriculum Connection
PE.1

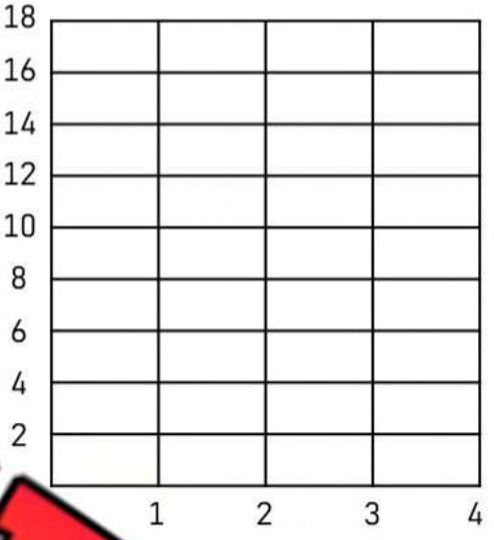
Linear and Non-Linear Patterns

Not all patterns are linear. Some patterns increase/decrease by the same amount each time, while others grow/shrink at different rates. When the pattern grows or shrinks by different amounts, it is called **non-linear.**

Instruction Look at the patterns below and fill in the table of values. Then complete the graph. Is the line straight?



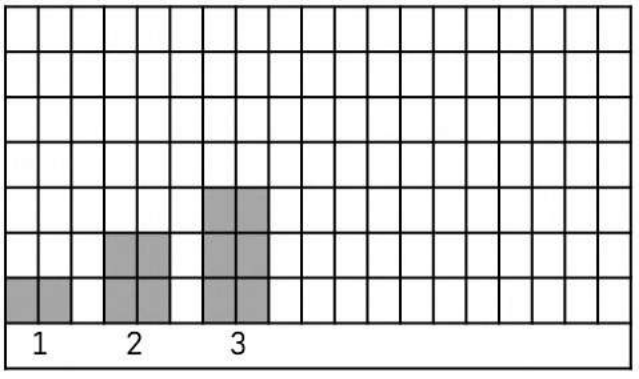
Term Number	Term Value
1	
2	
3	



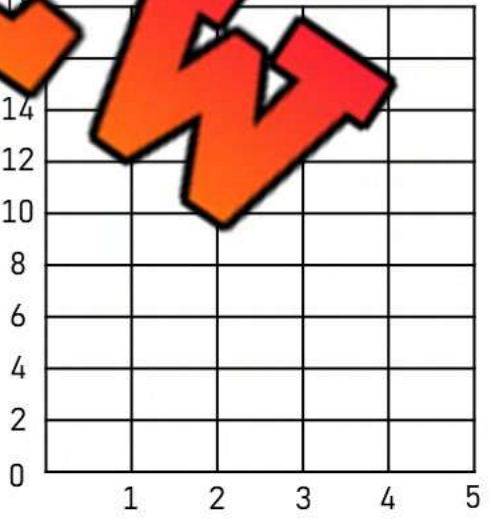
1) Is this pattern linear or non-linear? Explain.

_____

_____



Term Number	Term Value
1	
2	
3	
4	
5	



1) Is this pattern linear or non-linear? Explain.

_____

_____

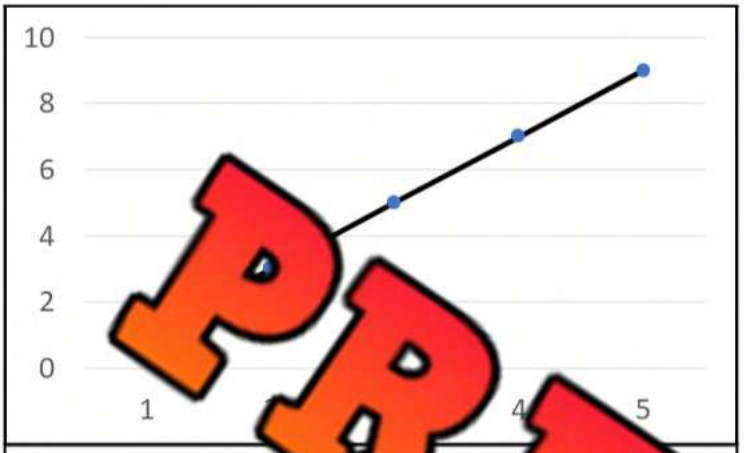
2) How many blocks would be in term number 10?

Name: _____ 46

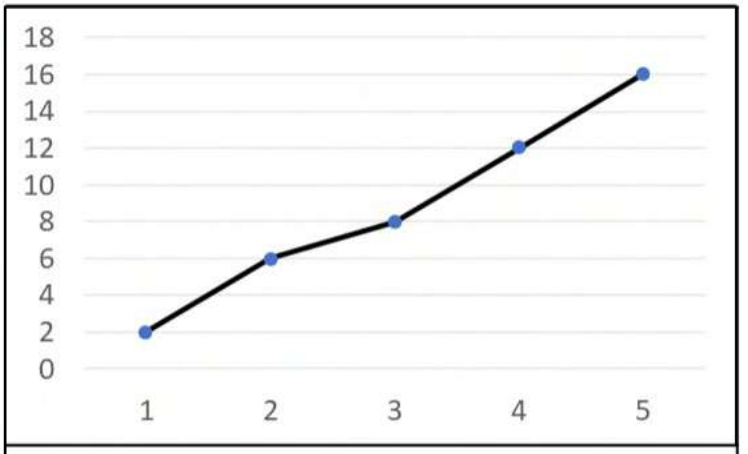
Curriculum Connection
PE.1

Increasing Linear Patterns – Yes or No?

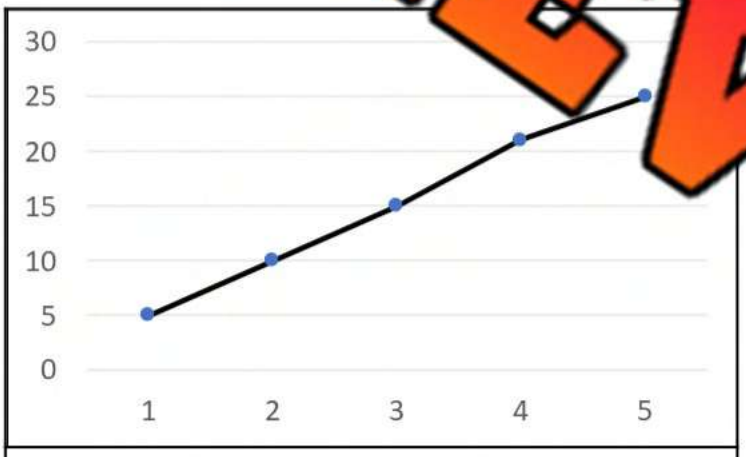
Instructions Circle if the pattern displayed on the graph is linear.



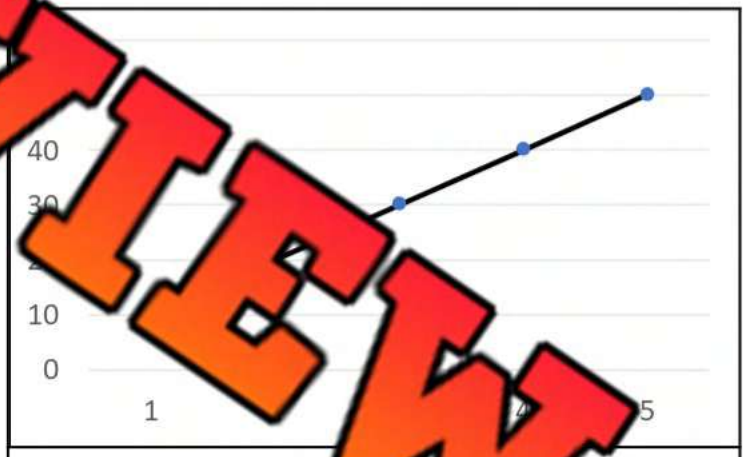
1) Linear Non-Linear



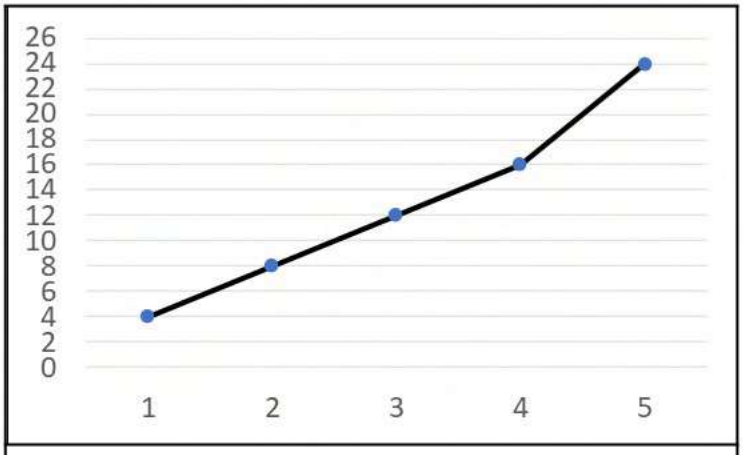
2) Linear Non-Linear



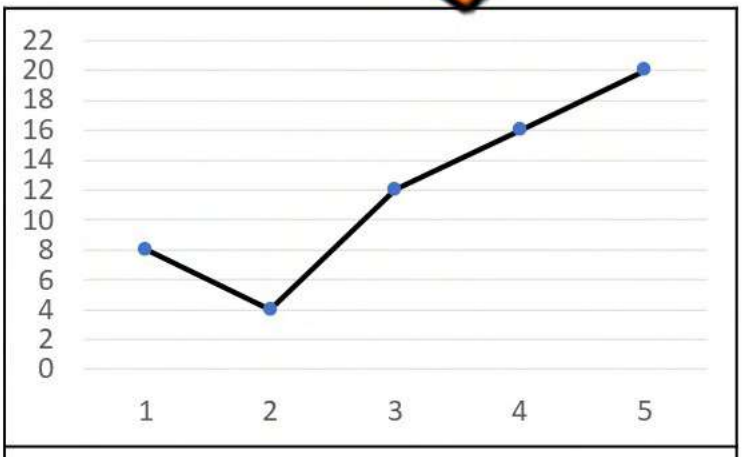
3) Linear Non-Linear



4) Linear



5) Linear Non-Linear



6) Linear Non-Linear

Name: _____ 47

Curriculum Connection
PE.1

Increasing Linear Patterns – Yes or No?

Questions Circle if the pattern is linear or not, based on the table of values

Term Number	Term Value
1	2
2	6
3	10
4	
5	
Linear	Non-Linear

Term Number	Term Value
1	10
2	16
3	20
4	26
5	32
Linear	Non-Linear

Term Number	Term Value
1	15
2	18
3	21
4	25
5	28
Linear	Non-Linear

Term Number	Term Value
1	14
2	19
3	24
4	29
5	34
Linear	Non-Linear

Term Number	Term Value
1	
2	
3	
4	60
5	74
Linear	Non-Linear

Term Number	Term Value
1	25
2	75
3	125
4	175
5	
	n-Linear

Term Number	Term Value
1	112
2	126
3	138
4	152
5	166
Linear	Non-Linear

Term Number	Term Value
1	210
2	260
3	310
4	360
5	410
Linear	Non-Linear

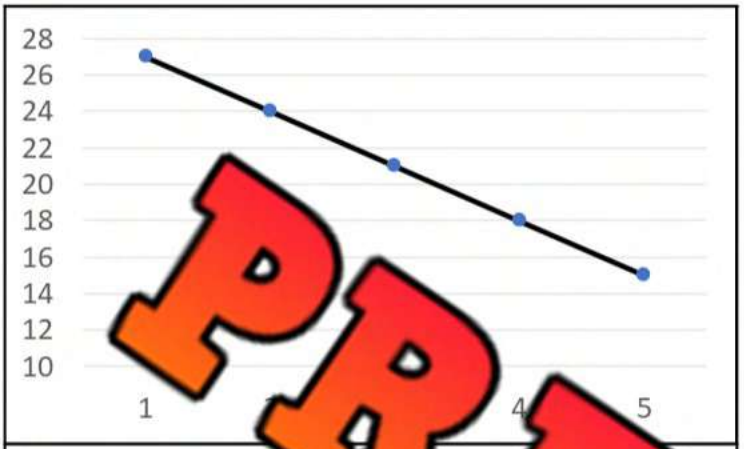
Term Number	Term Value
1	500
2	650
3	700
4	850
5	1000
Linear	Non-Linear

Name: _____ 48

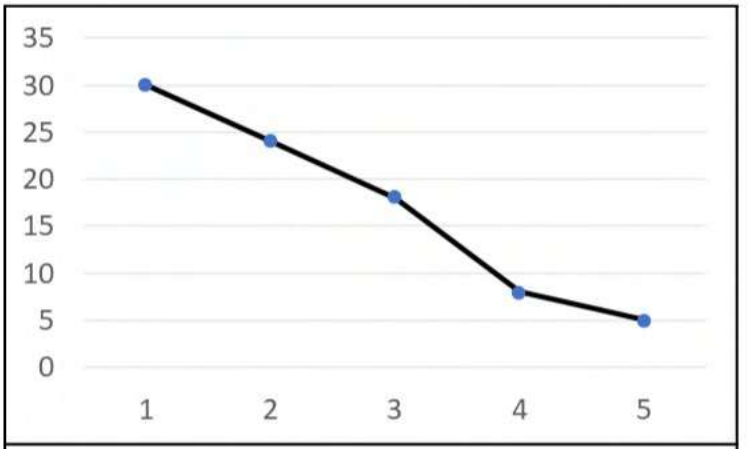
Curriculum Connection
PE.1

Decreasing Linear Patterns – Yes or No?

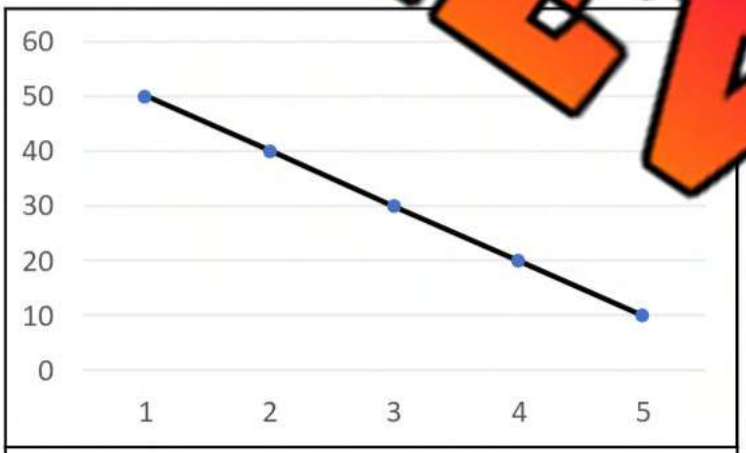
Questions | Circle if the pattern displayed on the graph is linear or not



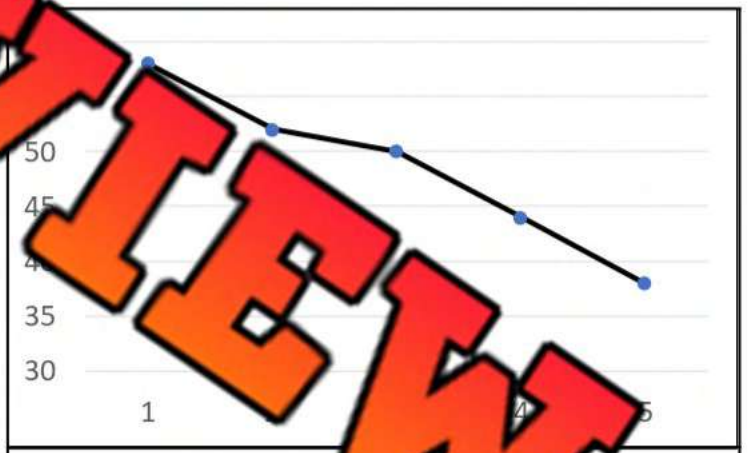
1) Linear Non-Linear



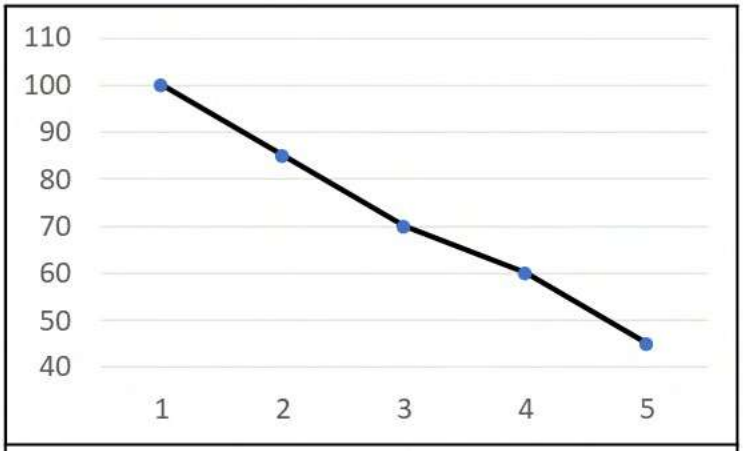
2) Linear Non-Linear



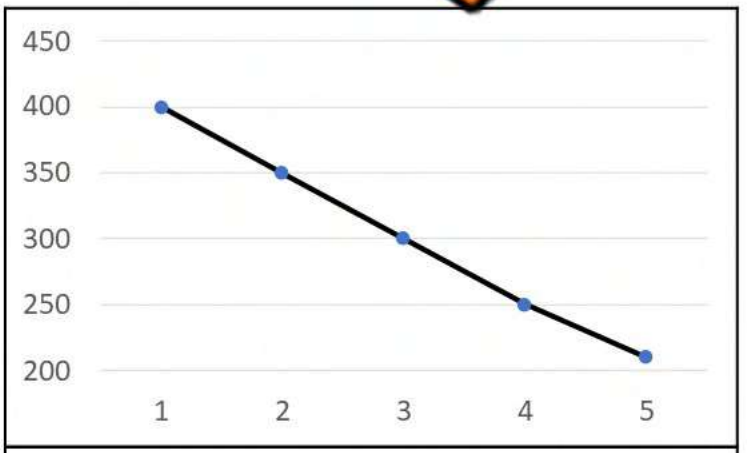
3) Linear Non-Linear



4) Linear N ar



5) Linear Non-Linear



6) Linear Non-Linear

Name: _____ 49

Curriculum Connection
PE.1

Decreasing Linear Patterns – Yes or No?

Questions Circle if the pattern is linear or not, based on the table of values

Term Number	Term Value
1	20
2	17
3	14
4	
5	
Linear	Non-Linear

Term Number	Term Value
1	48
2	42
3	38
4	32
5	26
Linear	Non-Linear

Term Number	Term Value
1	70
2	55
3	40
4	25
5	10
Linear	Non-Linear

Term Number	Term Value
1	120
2	114
3	108
4	102
5	98
Linear	Non-Linear

Term Number	Term Value
1	
2	
3	
4	167
5	161
Linear	Non-Linear

Term Number	Term Value
1	215
2	200
3	195
4	180
5	
Linear	Non-Linear

Term Number	Term Value
1	300
2	275
3	245
4	225
5	200
Linear	Non-Linear

Term Number	Term Value
1	550
2	535
3	510
4	495
5	480
Linear	Non-Linear

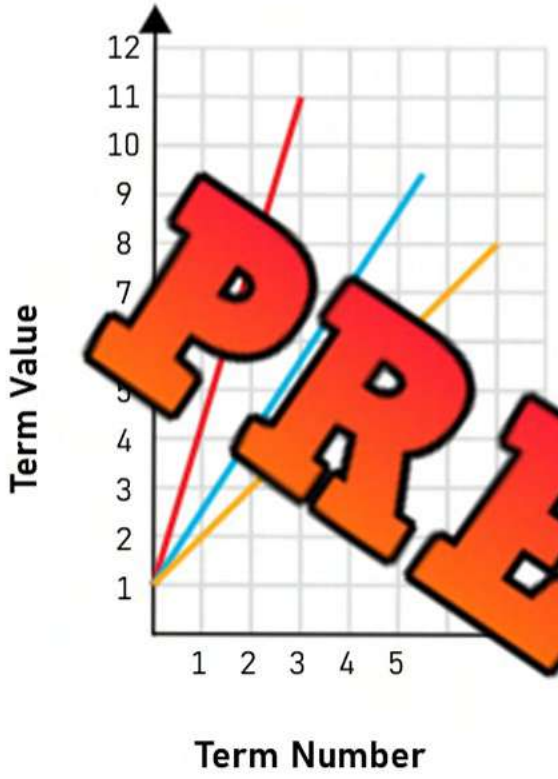
Term Number	Term Value
1	675
2	650
3	625
4	600
5	575
Linear	Non-Linear

Name: _____ 50

Curriculum Connection
PE.1

Linear and Non-Linear Patterns

Instruction Look at the graphs closely. Answer the questions below.



1) How are the lines the same?

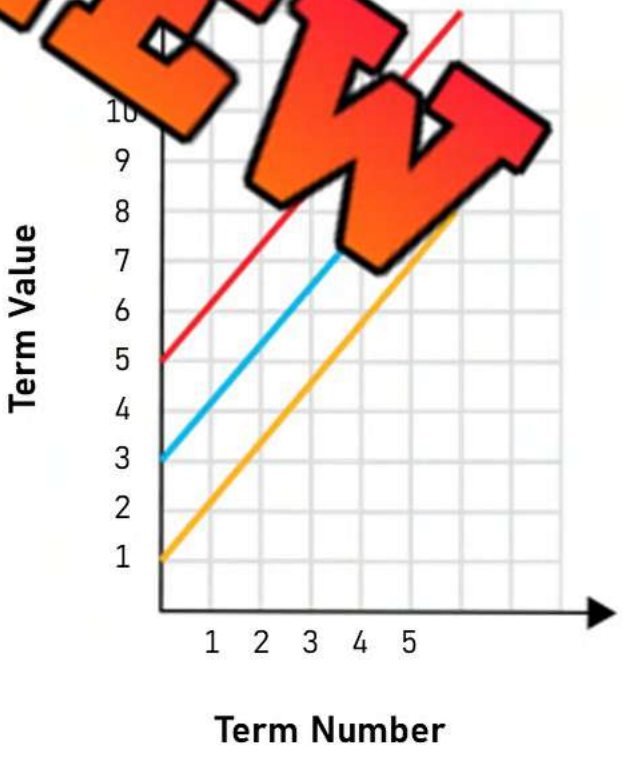
2) How are the lines different?

3) What could these three lines represent?

1) How are the lines the same?

2) How are the lines different?

3) What could these three lines represent?



Name: _____ 51

Curriculum Connection
PE.1

Comparing Rates of Change

Questions Circle which variable (x or y) increases at a greater rate of change?

1) Term Number	1	2	3	4	5
x	15	30	45	60	75
y	5	25	45	65	85
		x	or	y	

2) Te	1	2	3	4	5
	35	70	105	140	175
y	50	80	110	140	170
			or	y	

3) Term Number	1	2	3	4	5
x	22		340	400	460
y	125			275	325
		x	or	y	

4) Term Number	1	2	3	4	5
x	612	635	6		704
y	548	575	602		
		x	or	y	

5) Term Number	1	2	3	4	5
x	315	450	585	720	855
y	438	579	720	861	1002
		x	or	y	

6) Term Number	1	2	3	4	5
x	530	715	900	1085	1270
y	655	829	1003	1177	1351
		x	or	y	

Name: _____ 52

Curriculum Connection
PE.1

Comparing Rates of Change - Employees

Jeffrey is the boss at his company. He determines how much to pay his employees. Sometimes, Jeffrey pays his employees a starting bonus, where they get a one-time payment for starting their job.

Questions Who will get paid more money over time?

	0	1	2	3	4	5	6	7
Colton's Earnings ($)	750	1000	1250	1500	1750			
Spe[illegible]	0	400	800	1200	1600			

a) Who will [illegible]? _____

b) How much is [illegible] ea[illegible]ek? _____

c) How much is Spence[illegible]gs per _____

d) Whose earnings increase[illegible]grea[illegible]rate? _____

Weeks	0	1	2	[illegible]	[illegible]	5	6	7
Jacob's Earnings ($)	1550	2000	245[illegible]	[illegible]00				
Jeremy's Earnings ($)	0	650	1300	[illegible]950	[illegible]0			

a) Who will earn more after 7 weeks? _____

b) How much is Jacob's earnings per week? _____

c) How much is Jeremy's earnings per week? _____

d) If we graphed both of their earnings, whose graph would be steeper? _____

Weeks	0	1	2	3	4	5	6	7
Amelia's Earnings ($)	0	600	1200	1800	2400			
Raven's Earnings ($)	250	825	1400	1975	2550			

a) Who earned a bonus to start their job? _____

b) How much is Amelia's earnings per week? _____

c) How much is Raven's earnings per week? _____

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: ______________________________

Who will plant more trees over time?

Ethan and Mia are planting trees in a community park. They each plant a certain number of trees each month.

Month	0	1	2	3	4	5	6	7
E	360	620	880	1140	1400			
M	0	400	800	1200	1600			

Who will have planted more trees after 7 months? ______________________

How many trees does Ethan plant per month? ______________________

How many trees does Mia plant per week? ______________________

Name: ______________________________

Who will plant more trees over time?

Ethan and Mia are planting trees in a community park. They each plant a certain number of trees each month.

Month	0	1	2	3	4	5	6	7
E	360	620	880	1140	1400			
M	0	400	800	1200	1600			

Who will have planted more trees after 7 months? ______________________

How many trees does Ethan plant per month? ______________________

How many trees does Mia plant per week? ______________________

Name: ______________________________

Who will plant more trees over time?

Ethan and Mia are planting trees in a community park. They each plant a certain number of trees each month.

Month	0	1	2	3	4	5	6	7
E	360	620	880	1140	1400			
M	0	400	800	1200	1600			

Who will have planted more trees after 7 months? ______________________

How many trees does Ethan plant per month? ______________________

How many trees does Mia plant per week? ______________________

Name: ______________________________

Who will plant more trees over time?

Ethan and Mia are planting trees in a community park. They each plant a certain number of trees each month.

Month	0	1	2	3	4	5	6	7
E	360	620	880	1140	1400			
M	0	400	800	1200	1600			

Who will have planted more trees after 7 months? ______________________

How many trees does Ethan plant per month? ______________________

How many trees does Mia plant per week? ______________________

Name: _____ 54

Curriculum Connection
PE.1

Writing Algebraic Expressions – Increasing Pattern

Questions Draw the 4th and 5th term, then answer the questions.

				
Ter	rm 2	Term 3	Term 4	Term 5

1) Questions	Expression
a) Write an expr at rep w many shapes are in the pattern.	
b) How many shapes will 0th te	
c) How many shapes will be in th 0th t	
d) How many **rectangles** will be in the erm?	
e) How many **stars** will be in the 1000th term?	

Term 1	Term 2	Term 3	Term 4	Term 5

2) Questions	Expression
a) Write an expression that represents how many shapes are in the pattern.	
b) How many shapes will be in the 10th term?	
c) How many shapes will be in the 20th term?	
d) How many **rectangles** will be in the 50th term?	

Name: _____ 56

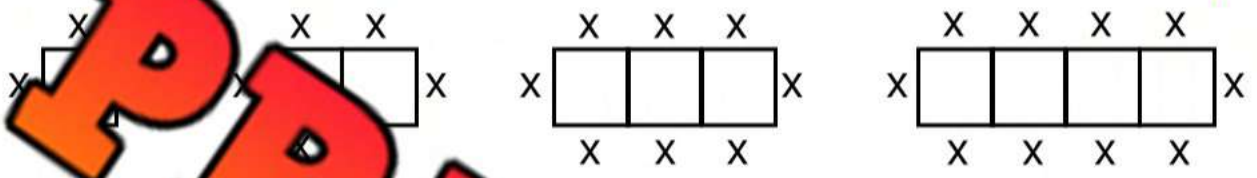
Curriculum Connection
PE.1

Picnic Word Problem – T-Tables

Challenge Answer the word problem below. Use the T-Table to help.

You have been put in charge of organizing the end of the year banquet for your baseball team. You want to have as many seats as you can.

The diagram below shows how many people can sit at the tables.



a) Fill in the t… learn … about the pattern of how many people can attend the banqu…

Tables	1		3	5	10	20	50
# of Seats							

b) Write the algebraic expression you used to … the …

_____

c) What if you didn't put the tables together? Would 8 tab… tog… … less than 8 tables apart? Draw a diagram to help and fill in the …

Tables	1	2	3	4	5	6	20	50
# of Seats	4							

d) Write the algebraic expression you could use to solve any number of tables.

_____

Name: _____ 57

Curriculum Connection
PE.1

Hockey Tickets – Challenge Problem

Challenge Answer the word problem below.

Nathan is organizing a trip to see a hockey game with his friends. The cost for the bus rental is $200. The cost per person is $20.

a) Write an algebraic expression that represents the cost if p people go.

b) How [illegible] trip cost Nathan if 5 people go?

c) How much [illegible] trip c[illegible]n if 20 people go?

d) Nathan wants to offer food as we[illegible] Suppos[illegible] fo[illegible]cts $10 per person. Write an algebraic expression that repr[illegible] the c[illegible]e bus, food, and ticket if p people go.

e) Suppose 20 people attend the hockey game and get food. How [illegible]will it cost Nathan?

f) How much will Nathan charge each person if 20 people go?

Name: _____ 58

Curriculum Connection
PE.1

Ice Cream Sundae – Challenge Problem

Challenge Answer the word problem below.

At Ivy's Ice Cream Shop, a plain ice cream sundae costs $5.00. Each extra topping costs $0.50.

a) Write an algebraic expression that represents the cost of a sundae with *e* extra toppi

b) A ants t ndae with 5 toppings. How much will it cost?

c) Warren ordered a s th 8 t . How much will it cost Warren?

d) Warren paid with a $20 bill. How much rece nge?

e) On Thursdays, sundaes are half price! Write an algebraic expres hat represents the cost of a sundae with *e* extra toppings.

f) Dan ordered a sundae on Thursday with 10 toppings. How much did it cost him?

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____

Answer the word problem below:

At Bella's Bookstore, a notebook costs $3.00. Each additional sticker for the notebook costs $0.25.

1) Write an algebraic expression that represents the cost of a notebook with *s* extra stickers.

_____

2) Jamie wants to buy a notebook with 6 stickers. How much will it cost?

_____

3) Jamie paid with a $20 bill. How much will they receive as change?

_____

Name: _____

Answer the word problem below:

At Bella's Bookstore, a notebook costs $3.00. Each additional sticker for the notebook costs $0.25.

1) Write an algebraic expression that represents the cost of a notebook with *s* extra stickers.

_____

2) Jamie wants to buy a notebook with 6 stickers. How much will it cost?

_____

3) Jamie paid with a $20 bill. How much will they receive as change?

_____

Name: _____

Answer the word problem below:

At Bella's Bookstore, a notebook costs $3.00. Each additional sticker for the notebook costs $0.25.

1) Write an algebraic expression that represents the cost of a notebook with *s* extra stickers.

_____

2) Jamie wants to buy a notebook with 6 stickers. How much will it cost?

_____

3) Jamie paid with a $20 bill. How much will they receive as change?

_____

Name: _____ 62

Curriculum Connection
PE.1

Integer Patterns - Adding

-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Instructions Write the pattern rule and complete the pattern.

1)

-5		3	7			

2)

-19			-1			

3)

8	5	2				

4)

15	11	7	3			

5)

-17	-12	-7	-2			

6)

-20	-14	-8	-2			

7)

17	12	7	2			

8)

20	15	10	5				

Name: _____ 63

Curriculum Connection
PE.1

Pattern Rule – Input/Output Tables - Integers

Instructions Fill in the input/output tables below.

In n	Out $n + (-3)$
1	
2	
4	
5	

In n	Out $2n + (-5)$
1	
2	
3	
4	

In n	Out $n + 6$
-1	
-2	
-3	
-4	
-5	

In x	Out $x + (-2)$
-2	
-4	
-6	
-8	
-10	

In x	Out
4	
6	
8	
10	

In x	Out $x + 11$
-1	
-9	

In p	Out $3p + (-10)$
20	
40	
60	
80	
100	

In p	Out $p + (-12)$
-3	
-6	
-9	
-12	
-15	

In p	Out $p + (-8)$
-3	
-1	
2	
4	
6	

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: ______________________

Fill in the input/output tables below:

[illegible]	**Out** *(-5)n + 7*
-5	
-3	
-1	
1	
3	

Name: ______________________

Fill in the input/output tables below:

In *n*	**Out** *(-5)n + 7*
-5	
-3	
-1	
1	
3	

Name: ______________________

Fill in the input/output tables below:

In *n*	**Out** *(-5)n + 7*
-5	
-3	
-1	
1	
3	

Name: ______________________

Fill in the input/output tables below:

In *n*	[illegible] *(-5)n + 7*
-5	
-3	
-1	
1	
3	

Name: _____ 65

Curriculum Connection
PE.1

Integer Pattern – Adding Word Problem

-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Instructions Answer the word problem below.

Richard is playing football. He plays defense, so he is often running backwards. He decides to track his steps forwards and backwards. For every step forward, he adds 1. For every step backward, he adds -1.

a) Each quarter he takes 50 steps forwards, and -100 steps backwards. If every step is an integer step forward, how many steps did Richard take in the 4 quarters of the game?

b) Fill in the table of values that represents how many steps Richard takes in two games (8 quarters).

1	2	3	4	5	7	

c) Write an algebraic expression to help you solve how many steps Richard took in *n* number of quarters.

d) In 5 games, does Richard take more steps forward or backward?

e) How many steps does Richard take in 5 games?

Name: _____ 66

Curriculum Connection
PE.1

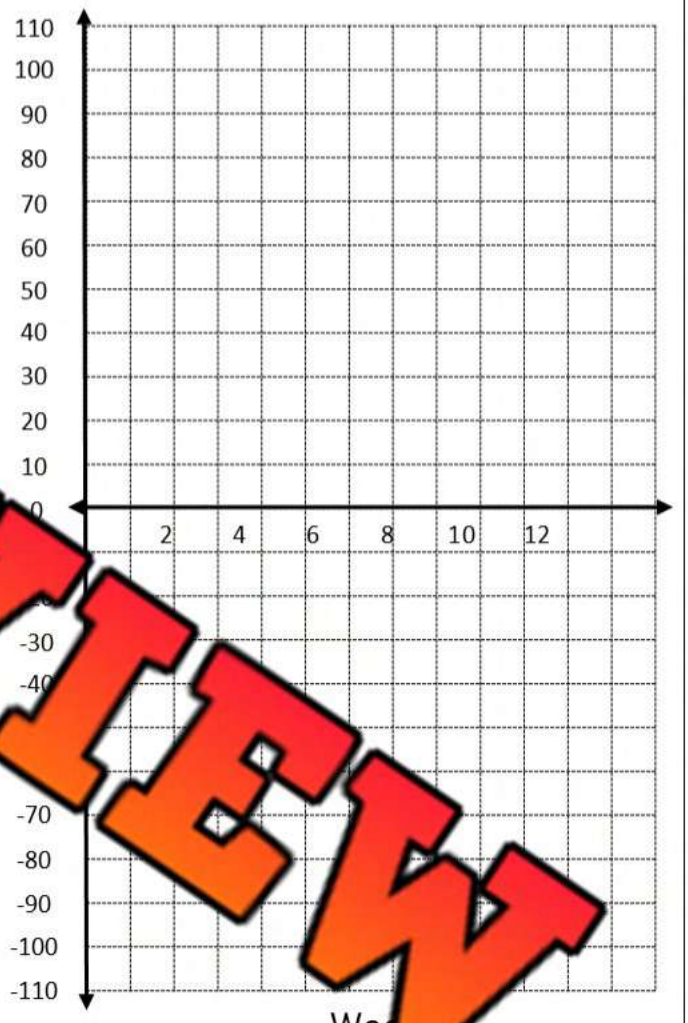
Pattern Using Negative Integers – Olivia's Money

Instructions Answer the problems below.

Olivia owes her sister $100, and she has no other money. Therefore, she has -$100. Luckily, she gets an allowance of $15 a week.

Fill in the table of values below to learn more about how long it will take Olivia to pay back her sister.

Term Number	Term Value (Money)



a) Graph the table of values.

b) How many weeks will it take for Olivia to pay back her sister?

c) Is this a linear pattern? Explain how you know.

d) Use the graph to determine how much money Olivia will have in 12 weeks.

e) Use an algebraic expression to determine how much money Olivia will have in 26 weeks.

Name: _____ 67

Curriculum Connection
PE.1

Integer Patterns - Subtraction

-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Instructions Fill in the blanks below using the pattern rule.

1) Start a[illegible]ubtract 2 each time

2) Start [illegible] 5, su[illegible]h t[illegible]e

3) Start at -3, subtract 4 [illegible]

4) Start at 2, subtract -2 each time

5) Start at -7, subtract -4 each time

6) Start at -16, subtract -3 each time

7) Start at -1 subtract 2 each time

8) Start at 2, subtract -3 each time

Name: _____ 69

Curriculum Connection
PE.1

Pattern Rule – Input/Output Tables - Integers

Instructions Fill in the input/output tables below.

In n	Out $n - (-2)$
1	
2	
4	
5	

In n	Out $3n - 5$
1	
2	
3	
4	

In n	Out $n - 4$
-1	
-2	
-3	
-4	
-5	

In x	Out $x - (-5)$
-2	
-4	
-6	
-8	
-10	

In x	Out
4	
6	
8	
10	

In x	Out $x - 9$
-1	

In p	Out $3p - 10$
20	
40	
60	
80	
100	

In p	Out $p - (-15)$
-3	
-6	
-9	
-12	
-15	

In p	Out $p - (-12)$
-3	
-1	
2	
4	
6	

Name: _____ 70

Curriculum Connection
PE.1

Integer Patterns – Average Temperatures

Instructions Fill in the blanks below using the pattern rule.

In one of the coldest cities in Canada, the average temperature in January is -32. Every month after January until August, the temperature warms +8° C. In September, the pattern reverses, with the temperature decreasing each month by -11° C. From December to January, the temperature drops -12° C.

Mo[illegible]	Temperature
[illegible]	-32
Fe[illegible]ary	
March	
April	
May	
June	
July	
August	
September	
October	
November	
December	

a) Fill in the table to display the average temperatures each month.

b) What is the difference in temperatures between January and August?

c) [illegible] pattern rule from January to [illegible].

d) What is [illegible] September to December?

e) What is the difference in temperatures between February and July?

f) Which month has the biggest change in temperature?

g) If you wanted to escape the coldest winter months, which months would you travel south for?

Name: _____ 71

Curriculum Connection
PE.1

Task Cards: Patterning – All Operations

Objective

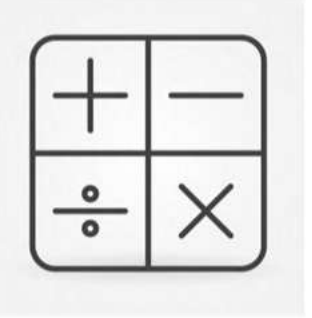
What are we learning about?

To recognize and create patterns using the four basic mathematical operations.

Materials

What will you need for the activity?

- 24 ta
- S ets er for answers
- Pe



Instructions

ll yo the activity?

1. Introduce the concept o s in perations and their relevance to problem-solving in everyda e.
2. Organize the students into pairs an ovide e air their sets of task cards.
3. Give each pair an answer recording sheet t dow ir ses.
4. Encourage teamwork by having students collabora eir p on finding solutions.
5. Allow students to select any task card to begin with, emphasiz tha an complete the cards in any order they prefer.
6. Instruct students to record the letter of their chosen answer (A, B, or C) on their answer sheet beside the task card's number.
7. Consider using a timer to create a dynamic challenge, adjusting the duration to fit the lesson's objectives and complexity.
8. After the activity, review the answers collectively, discussing any challenging patterns and strategies used to solve them.
9. Have students reflect on the activity, sharing the methods they applied and obstacles they overcame.

Name: ____________________ 73

Task Cards | Cut out the task cards below.

Card 9:
Start with 12. Multiply by 3 and then add 6 for the next number. What is the second number?

a) 36
b) 42
c) 48

Card 13:
Start at 75, subtract 15 each time. What is the fourth number?

a) 30
b) 45
c) 60

[illegible]
Start at -12, [illegible] each [illegible] What is the [illegible] number?

a) -11
b) -18
c) -15

Card 14:
Begin with 90. Subtract 10 and then multiply by 3 for the next number. What is the third number?

a) 240
b) 180
c) 210

Card 11:
Begin with 60. Add 30 and then divide by 6 for the next number. What is the second number?

a) 10
b) 15
c) 12

Card [illegible]5:
St[illegible] Multi[illegible] 4 and then subtract [illegible] the ne[illegible]nber. What is th[illegible]ond [illegible]

a) [illegible]
b) -110
c) -120

Card 12:
Start with 48. Divide by 4 and then add 10 for the next number. What is the second number?

a) 22
b) 18
c) 12

Card 16:
Begin with 140. Divide by 7 and then add 5 for the next number. What is the third number?

a) 25
b) 15
c) 20

Name: _____ 74

Curriculum Connection
PE.1

Task Cards | Cut out the task cards below.

Card 17:
Start with -32. Divide by 8 and then subtract 2 for the next number. What is the second number?

a) -2
b) 6
c) -6

Card 21:
Start with 36. Divide by 6 and then add 7 for the next number. What is the second number?

a) 13
b) 12
c) 15

Start at -20, e[illegible]ime. [illegible]is the th[illegible]ber?

a) -4
b) 0
c) -8

Card 22:
Begin with 120. Subtract 40 and then divide by 4 for the next number. What is the third number?

a) 20
b) 10
c) 15

Card 19:
Begin with 45. Subtract 15 and then multiply by 2 for the next number. What is the second number?

a) 30
b) 15
c) 60

Card 23:
St[illegible] M[illegible]y 2 and then subtrac[illegible]e nex[illegible]ber. What is th[illegible]ond[illegible]

a)
b) -30
c) -42

Card 20:
Start with 50. Multiply by 2 and then subtract 25 for the next number. What is the second number?

a) 75
b) 50
c) 100

Card 24:
Start at 100, subtract 25 each time. What is the fourth number?

a) 25
b) 0
c) 50

Name: _____ 75

Algebra Quiz - Patterning

Part 1 Is Anna describing the recursive or functional relationship?

	Pattern					Anna's Description	Recursive or Functional
1)	x	1	2	3	4	The term number is multiplied by 3 and then 4 is added.	
	y		10	13	16		
2)	x		1	2	3	The y variable has 15 added each time	
				20	35		

Part 2 H... ck... in each term? Sketch the next 3 terms.

1)

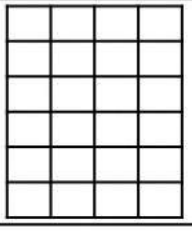
1) Describe the recursive relationship betwee... n...

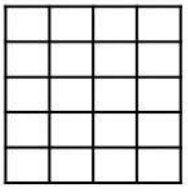
2) Represent the pattern using an algebraic expression:

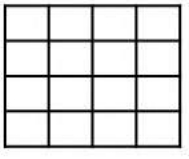
3) How many blocks will the 15th term have?

4) How many blocks will the 30th term have?

2)



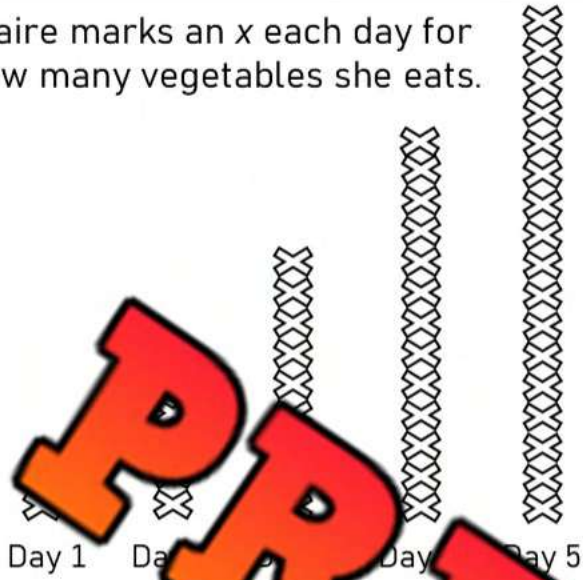


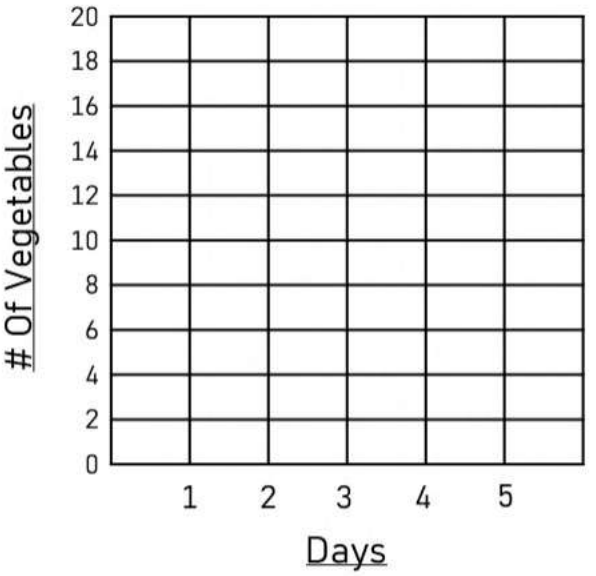


Describe the recursive relationship between the number of blocks.

Part 3 Translate the increasing patterns into a table of values and a graph.

Claire marks an *x* each day for how many vegetables she eats.





Term Number (Day)					10	25
Term Value (Vegetables)						

Part 4 Fill in the input/output tables below.

Rule: add 7	
In	**Out**
135	
142	
163	
178	

Rule: multiply [illegible]	
In	**Out**
3	
5	
8	
11	

[illegible] subtract 8	
	Out
[illegible]	
453	
488	

In *n*	**Out** 2*n* + 5
1	
2	
3	
4	
5	

In *n*	**Out** 2*n* + (-3)
5	
10	
15	
20	
25	

In *n*	**Out** *n* - (-5)
-1	
-2	
-3	
-4	
-5	

Part 5 Answer the word question below.

Admission to Fun Haven is $10. For each ride in Fun Haven, it costs an additional $2.

a) Write an algebraic expression that represents the cost to enter Fun Haven and ride extra *e* rides.

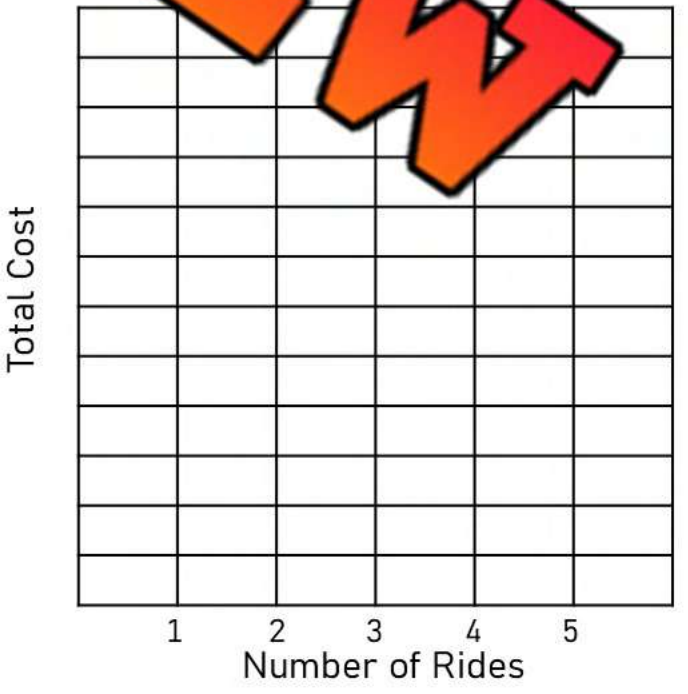
b) Claire entered the park and has gone on 8 rides. How much did it cost her?

c) Claire has $ d at the park. How many rides can she go on?

d) Fill in the table below t pre ts related to going to Fun Haven.

Number of Rides	0	1	2		4	5	6
Total Cost							

e) Translate the table of values into a line graph.



f) Is the rate of change constant?

YES NO

g) What is the rate of change?

Part 6 — Who will get paid more money over time?

Weeks	0	1	2	3	4	5	6	7
Sam's Earnings ($)	500	650	800	950				
Logan's Earnings ($)	0	250	500	750				

a) Who will earn more after 7 weeks? _____

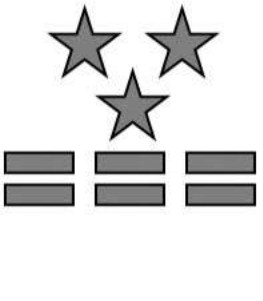
b) How [illegible] Sam's earnings per week? _____

c) [illegible] earnings per week? _____

d) Whose e[illegible] greater constant rate? _____

e) Who received t[illegible] without working? _____

Part 7 — Draw the [illegible] nd 5 [illegible] answer the questions.

Term 1	Term 2	Term 3	Term 4	Term 5
				

Questions	Expression
a) Write an expression that represents how many shapes are in the pattern.	
b) How many shapes will be in the 10th term?	
c) How many shapes will be in the 20th term?	
d) How many rectangles will be in the 100th term?	
e) How many stars will be in the 1000th term?	

Grade 7

Equations

	Curriculum Expectations	Pages That Cover the Expectations
PE.2	two-step equations with whole-number coefficients, constants, and solutions	80 - 164

Name: _____ 80

Curriculum Connection
PE.2

Equation or Expression?

An **equation** is a mathematical sentence which states that one or more quantities are equal. Equations have an equal sign with values on both sides to show they are equal. An **expression** is a mathematical sentence that does not have an equal sign.

Equation = 3 + n = 21

Expression = 3y + 2

Question Is the number sentence an expression or equation?

1) [illegible] 20 Expression [illegible]	2) 25 + y Expression Equation
3) 3y + 8 = [illegible] Expression Equation	4) 2n + 5 [illegible] Equation
5) 8 – 4 + n = 10 Expression Equation	[illegible] + n Expre[illegible]
7) 12 ÷ 4 = 3 Expression Equation	8) 56 [illegible] Expression Equation
9) 100 ÷ n + 3 Expression Equation	10) $\frac{25}{n}$ + 10 = 15 Expression Equation
11) $\frac{40}{n}$ – 8 Expression Equation	12) 65 + 3 – n ÷ 10 Expression Equation

Name: _____ 83

Curriculum Connection
PE.2

Writing Algebraic Expressions

Using algebraic expressions helps us understand mathematical situations. We can use a variable to replace a changing number, like how many tickets are sold to a game – t x 10

Part 1 Write each algebraic expression in words.
Use the words "a number" in place of the variable.

1) 7 – t

Seven su[illegible]number

2) n [illegible]

3) 8 + b

4) 9r

5) $\frac{y}{5}$

Part 2 Write an algebraic expression for eac[illegible]nt.

1) Nineteen add a number

2) Divide a number by three

3) A number is subtracted by nineteen

4) Triple a number and add seven

5) Subtract 19 from a number, then multiply by four

Name: _____ 87

Curriculum Connection
PE.2

Evaluating Algebraic Expressions - Addition

Part 1 Evaluate the following expressions for $x = 8$

1) $x + 12$	2) $8 + x$	3) $23 + x$	4) $x + 24$
5) 41	6) $63 + x$	7) $82 + 13 + x$	8) $92 + x + 11$

Part 2 Evalu[illegible] ssions for $y = 8$ and $n = -2$

1) $y + (n)$	2) $5 + ( ) + y$	[illegible] $+ (n)$	4) $y + 12 + (n)$
5) $43 + y + (n)$	6) $(n) + y + 20$	7) [illegible]	[illegible] $53 + (n) + y$

Part 3 Evaluate the following expressions for x = -5 and p = 5[illegible]

1) $(x) + (p) - 10$	2) $10 + (x) + (p)$	3) $15 + (x) + (p)$	4) $(x) + 11 + (p)$
5) $(p) + 20 + (x)$	6) $(x) + 18 + (p)$	7) $(x) + 5 + (p)$	8) $22 + (p) + (x)$

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____

Evaluate the following expressions for $x = 7$ and $p = -4$

1) $(x) + 5 + (p)$

2) $(x) + (p) + 98$

3) $61 + (n) + (p)$

Name: _____

Evaluate the following expressions for $x = 7$ and $p = -4$

1) $(x) + 5 + (p)$

2) $(x) + (p) + 98$

3) $61 + (n) + (p)$

Name: _____

Evaluate the following expressions for x = 7 and p = -4

1) $(x) + 5 + (p)$

2) $(x) + (p) + 98$

3) $61 + (n) + (p)$

Name: _____

Evaluate the following expressions for x = 7 and p = -4

1) $(x) + 5 + (p)$

2) (x) + (p) + 98

3) $61 + (n) + (p)$

Name: _____ 89

Curriculum Connection
PE.2

Evaluating Algebraic Expressions - Subtraction

Subtraction Integers Rule

To subtract integers, it is easiest to change the operation to addition and then follow the addition rules. We can do this by using the rule – Keep, Flip, Change. We keep the first number the same, flip the operation from subtraction to addition, and then change the third number's sign.

Example: 5 – (-6) = ? becomes 5 + 6 = 11

Keep the first integer

Flip the operation

Change the sign of the next integer

Part 1

Evaluate the following expressions for $x = 5$

1) $x - 12$	2) x	23 - x	4) $x - 24$
5) $41 - x$	6) $63 - x$	- 12	92 - x - 11

Part 2

Evaluate the following expressions for $y = 10$ and n =

1) $y - (n)$	2) $11 - (n) - y$	3) $15 - y - (n)$	4) $y - 6 - (n)$
5) $21 - y - (n)$	6) $(n) - y - 13$	7) $y - (n) - 3$	8) $32 - (n) - y$

Name: _____ 90

Curriculum Connection
PE.2

Evaluating Algebraic Expressions - Cafe

Whitney works at a café selling muffins, coffee, tea, and scones. She uses algebraic expressions to determine the cost of her customer's orders.

Menu	
Scone (s)	$3.50
Muffin (m)	$2.25
Tea (t)	$2.00
Coffee (c)	$2.50

Solve Write t[illegible]ic expression and then evaluate using the menu prices.

Customer Order	Expression	Answer
1) 2 coffees, 1 muffin	[illegible] $c + m$ [illegible] + 2.25	$7.25
2) 3 teas, 1 scone		
3) 4 coffees, 2 teas		
4) 2 coffees, 2 teas, 2 muffins		
5) 3 teas, 4 muffins, 2 scones		
6) 10 coffees, 10 muffins		
7) 5 teas, 3 muffins, 2 scones		
8) 3 coffees, 3 scones		

Name: _____ 91

Curriculum Connection
PE.2

Evaluating Algebraic Expressions - Canteen

Brad works at a canteen selling chips, drinks, and gummies. He calculates the cost of orders (o) and subtracts it from the payment (p) he is given - to determine how much change to give his customers.

Menu	
Chips	$1.50
Drinks	$2.50
Gummies	$1.00

Evaluate Solve the subtraction expressions below.

le Values		Expression - Customer's Change
	p	*p* − *o*
$ 0	20.00	
$17.50	$2	
$9.25	$	
$35.65	0	

Evaluate Calculate the order and [illegible] tomer's change.

Order			Expression	Pay	Change (*c*)
c	*d*	*g*			
1	0	2	*c* + (2 x *g*) 1.50 + (2 x 1.00) 1.50 + 1.00 $2.50	$5.	[illegible]
3	1	0		$10.00	
1	2	1		$10.00	
2	2	2		$20.00	
3	3	5		$20.00	

Name: _____ 92

Curriculum Connection
PE.2

Evaluating Algebraic Expressions – (x ÷)

Part 1 Evaluate for x = 3. Use brackets to separate the numbers.

1) $5x$	2) $9x$	3) $3x$	4) $8x + 6$
5) $21x$	6) $12x - 12$	7) $5x - x$	8) $9x + 8 - x$

Part 2 Evaluate for y = 10 expressions for $y = 10$

1) $\frac{y}{2}$	2) $\frac{30}{y}$		4) $\frac{y}{5} + 5$
5) $\frac{30}{y} + 8$	6) $\frac{100}{y} + y$	7) $\frac{}{y}$	x y

Part 3 Write the expressions using the values/operations below

9 8 4 n + x – ÷

1) Nine times a number, add four	
2) Eight divided by four, subtract a number	
3) A number multiplied by eight, add nine	
4) Eight more than four divided by a number	
5) A number divided by nine, add eight	

Name: _____ 94

Curriculum Connection
PE.2

Writing Expressions

An **equation** is a statement that **two expressions** are **equal**. An expression has no equal sign, whereas an equation has an equal sign. When we can solve the answer to an expression, it becomes an equation because we add an equal sign.

Expression	**Equation**
Eight more than a number $8 + n$ $n = ?$	Eight more than a number is 14 $8 + n = 14$ $n = 6$

Part 1 Write equations for each sentence.

	Equation	Answer
1) Nine less than a number		
2) Fifteen more than a number is 22		
3) Eight times a number is 24		
4) Twelve divided by a number is three		
5) A number plus eight divided by two is 10		
6) Seven times a number plus four is 39		

Part 2 Write a sentence in words for each equation.

Equation	Sentence	Value of n
1) $4n = 24$		
2) $8 + n - 3 = 10$		
3) $5 + \frac{12}{n} = 7$		
4) $3n - 3 = 12$		

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____

Write a sentence in words for each equation:

1) $7d - 5 = 9$

2) $4 + \frac{10}{n} = 9$

Name: _____

Write a sentence in words for each equation:

1) $7d - 5 = 9$

2) $4 + \frac{10}{n} = 9$

Name: _____

Write a sentence in words for each equation:

1) $7d - 5 = 9$

2) $4 + \frac{10}{n} = 9$

Name: _____

Write a sentence in words for each equation:

1) $7d - 5 = 9$

2) $4 + \frac{10}{n} = 9$

Name: _____ 97

Curriculum Connection
PE.2

Addition – Find the Variable

When we write an algebraic expression with an equal sign, it becomes an equation. An equation is a statement that two expressions are equal.

We can solve for a variable by balancing an equation, making sure both sides of the equal sign have the same value.

Part 1 Find out the value of the variable.

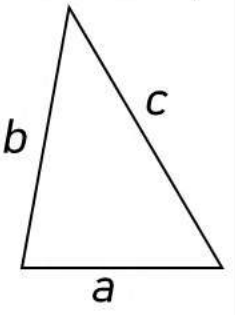
1) [illegible] n =	2) $n + 15 = 22$ n =	3) $32 + n = 41$ n =
4) $45 + p$ p =	5) $41 + p = 62$ p =	6) $p + 63 = 81$ p =
7) $77 + y = 96$ y =	8) y [illegible] 115	9) $132 + 15 = y$ y =
10) $157 + t = 192$ t =	11) [illegible] $+ t = 21$ t =	12) $236 + t = 248$ t =
13) $123 + a = 243$ a =	14) $165 + a =$ [illegible] a =	15) [illegible] $a = 308$
16) $238 + 449 = s$ s =	17) $311 + n = 445$ s =	[illegible]

Part 2 The formula for calculating the perimeter of a shape is to add the side lengths.

Use the following equation to find the perimeter of a triangle: $p = a + b + c$

1) a=6 b=12 c=10	p=
2) a=7 b=15 c=19	p=
3) a=9 b=17 c=23	p=

4) a=22 b=15 c=41	p=
5) a=19 b=32 c=49	p=
6) a=25 b=23 c=46	p=



Name: _____ 98

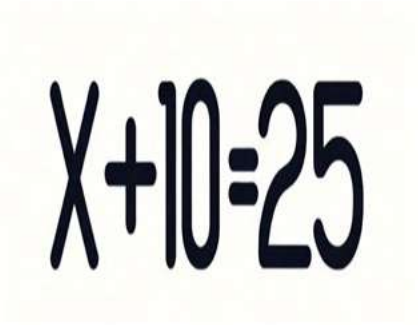
Curriculum Connection
PE.2

Activity – Math Hot Seat: Addition Challenge

Objective

What are we learning about?

Students will practice solving addition problems to find unknown values by participating in a fun and interactive game, enhancing their arithmetic skills and quick thinking.



Material

What will you need for the activity?

- Inde cards w problems
- Chairs arr rcle
- Stopwatch o
- Whiteboard and xer

Instructions

How will you iple

1. Prepare a stack of index cards with various a on p ms. Ensure some problems require finding a missing numb
2. Arrange chairs in a circle with one "hot seat" in nte.
3. Explain the rules of the game to the students. One stud t wil t while the rest sit in the surrounding chairs.
4. The teacher will read an addition problem from the stack. The stud in the hot seat has a limited time (e.g. 30 seconds) to solve the problem.
5. If the student in the hot seat answers correctly within the time limit, they stay in the hot seat for the next round. If they answer incorrectly or run out of time, they switch places with another student from the circle.
6. Continue the game until each student has had the opportunity to sit in the hot seat multiple times, or until the designated game time is up.
7. Keep track of the number of correct answers each student provides while in the hot seat. The student with the most correct answers wins the game.

Name: _____ 100

Curriculum Connection
PE.2

Index Cards | Use the math problems below.

6 + 4x = 26	x = 5
3x - 5 = 19	x = 8
x / 2 + 5 = 11	x = 12
4x - 7 = 21	x = 7
8 + x / 4 = 10	x = 8
9x + 3 = 30	x = 3
7 + 3x = 2	x = 5
x / 5	x = 30
5x + 6	x = 5
A farmer has 4 ... field ... ces the same number of bags of wheat. After harvesting, ... 15 ba ... 25 bags left. How many bags of wheat did each field produc	10
A teacher has 5 boxes of p ... Each bo ... s the same number of pencils. She gives 12 pencils to each ... tud ... 4 pencils left. How many pencils were in each box?	8
A chef buys 6 crates of oranges. Each c ... ntains ... e number of oranges. He uses 40 oranges to make juice and has ... ang ... How many oranges were in each crate?	15
A warehouse has 80 boxes. Each box contains the ... pr ... hey ship out 30 items and have 450 items left. How many it ... re in eac	6
A gardener plants 7 rows of flowers. Each row has the sam ... er ... She then plants 8 more flowers and has 71 flowers in total. Ho ... man ... were in each row?	
A bookstore received 10 boxes of books. Each box has the same number ... books. They sold 20 books and have 100 books left. How many books were ... each box?	12
A factory produces the same number of gadgets per hour. After working for 4 hours, they give 60 gadgets as samples and have 140 gadgets left. How many gadgets do they produce per hour?	50
A runner completes 5 laps. Each lap is the same distance. After running, he walks an additional 600 meters to cool down, covering a total of 2600 meters. How long is each lap?	12
A chef has 96 eggs. He uses the same number of eggs for each cake. After baking 8 cakes, he has 48 eggs left. How many eggs does he use for each cake?	6
A car rental company has 45 cars. They divide the cars into 5 groups and then add 3 more cars to each group. How many cars were originally in each group?	6

Name: _____ 101

Curriculum Connection
PE.2

Adding Decimals – Solve The Variable

Practice Find the value of the variables below.

1) $4.5 + n = 6$ $n =$	2) $n + 5.5 = 7$ $n =$	3) $s + 5.3 = 8$ $s =$
p	5) $9.2 + p = 11$ $p =$	6) $10.1 + r = 11.5$ $r =$
7) $15.3 + n =$ $n =$	$.5 = 20.5$	9) $t + 14.4 = 18$ t =
10) $24.6 + n = 28.2$ $n =$	11) $28.6 + 4$ $t =$	12) $31.6 + 5 = p$ $=$

Word Problem Write the equations below and find the

1) Jake has 1.25 pizzas left over from last night. His friend brings over some more pizza. They now have 4.25 pizzas. How much pizza did his friend bring?

2) Kelly is 1.5 meters tall. She hopes to grow to be 1.75 metres tall. How much will she have to grow?

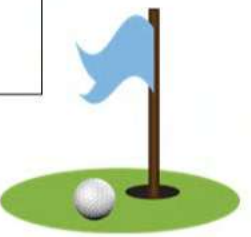
3) Carter has $1.33 but needs $1.88 to buy a bag of chips. How much more does he need?

Name: _____ 102

Curriculum Connection
PE.2

Addition Equations – Golf Tournament

Zack hosted a 2-round golf tournament. He has the results and needs to find out who won the tournament. The leaderboard is below but is missing numbers.



Instructions Fill in the leaderboard.

Pl	Round 1	Round 2	Final Score
[illegible]	-2	-5	
Charlie			-5
Dominic		-2	-6
Kayden		-1	
Silas			-1
Lillian	3		
Brooklyn	-2		-5
Natalie			-1
Andrew	-4	6	
Santiago		5	

Results Who won the golf tournament?

1) Who won the golf tournament?	
2) The entry fee for the tournament was $100. All the money went to the prize (p). Write an equation that determines the value for (p).	
3) More golfers joined the tournament. The prize ended up being $1400. Write an equation that determines how many golfers (g) participated in the tournament.	

Name: _____ 103

Curriculum Connection
PE.2

Addition Equations – Golf Tournament - Challenge

Zack hosted a 4-round golf tournament. He has the results and needs to find out who won the tournament. The leaderboard is below but is missing numbers.

Instructions Fill in the leaderboard.

Player	Round 1	Round 2	Round 3	Round 4	Final Score
Ri		-5	3	-6	
Charlie		1	3		-5
Dominic				7	-6
Kayden	-1	-1	-2	-4	
Silas	3	2			-1
Lillian	3	7			2
Brooklyn	-2	-1			-5
Natalie		5	1	-4	-1
Andrew	-4	6	2		
Santiago		5	1		2

Results Who won the golf tournament?

1) Who won the golf tournament?	
2) The entry fee for the tournament was $100. All the money went to the prize (p). Write an equation that determines the value for (p).	
3) More golfers joined the tournament. The prize ended up being $1400. Write an equation that determine how many golfers (g) participated in the tournament.	

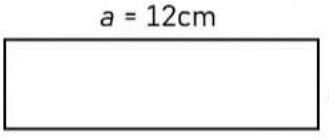
Name: _____ 105

Curriculum Connection
PE.2

Addition Equations – Perimeter of a Rectangle

When we calculate the perimeter of a rectangle, we need to add all the sides together. The order of how we decide to add the sides together will not affect the answer due to the communitive property of addition.

Formula 1 – $p = a + b + a + b$
$p = 12 + 4 + 12 + 4$
$p = 32$



Formula 2
$p = 2(a + b)$
$p = 2 \times (12 + 4) = 32$

Part 1 Write equations for the side lengths below.

#	Side length *a*	Side length *b*	Equation 1	Equation 2
1	5			
2	7			
3	11			
4	15	12		
5	17	15		
6	23	21		
7	28	31		
8	41	46		
9	55	24		
10	35	43		

Part 2 Using multiplication and addition, write two equations for the side lengths.

#	Side Length *a*	Side Length *b*	Equation 1	Equation 2
1	7	3	2 x (7 + 3) = 20	2 x (3 + 7) = 20
2	6	8		
3	9	4		
4	5	7		

Name: _____ 108

Curriculum Connection
PE.2

Subtraction – Find the Variable

A **variable** is a letter that represents an unknown number. When we don't know a number, we can use a letter to take the place of the unknown number.
Example: 39 – n = 25
We can figure out the unknown number by balancing the equation. In this equation, n = 14.

Part 1

Find out the value of the variable.

1) [illegible] = [illegible] *n* =	2) *n* – 21 = 35 *n* =	3) 52 – *n* = 41 *n* =
4) 73 – [illegible] *p* =	[illegible] – *p* = 53	6) *p* – 32 = 50 *p* =
7) 87 – *y* = 61 *y* =	8) [illegible]	9) 102 – 13 = *y* *y* =
10) 109 – *t* = 94 *t* =	11) 124 – [illegible] *t* =	143 – *t* = 129 =
13) 158 – *a* = 127 *a* =	14) 174 – *a* = 142 *a* =	15) [illegible] 175

Part 2

Calculate the change a customer gets when they buy something.

When a customer buys something, the formula for calculating their change (*c*) is money given (*m*) subtracted from the price (*p*) of the item. Therefore, *c = m – p*

m = 20 *p* = 12	*c* = 20 – 12	*c* = 8
m = 40 *p* = 19	*c* = ___ – ___	*c* =
m = 60 *p* = 27	*c* = ___ – ___	*c* =

m = 80 *p* = 61	*c* = ___ – ___	*c* =
m = 100 *p* = 68	*c* = ___ – ___	*c* =
m = 100 *p* = 44	*c* = ___ – ___	*c* =

Name: _____ 109

Curriculum Connection
PE.2

Subtracting Decimals – Solve the Variable

Practice Find the value of the variables below.

1) $6.5 - n = 2$ $n =$	2) $n - 4.5 = 3$ $n =$	3) $s - 5.2 = 3$ $s =$
4) [illegible] $p =$	5) $10.1 - p = 7$ $p =$	6) $14.3 - r = 10.5$ $r =$
7) 17.4[illegible] $n =$	[illegible] $n - 4.5 = 12.5$	9) $t - 5.4 = 15$ t =
10) $24.7 - n = 20.2$ $n =$	11) [illegible] [illegible] =	12) $34.6 - 5 = p$ $p =$

Word Problem Write an equation and solve using a [illegible]te for the [illegible]own amount.

1) Laura has $4.35 to spend on candy. She leaves the candy s[illegible] How much did she spend on candy (c)?

2) Randy works for 8.5 hours today. He only has 2 hours left to work. How much time (t) has elapsed?

3) Ryan jumped 3.58m in long jump. Jody jumped 2.98m. What is the difference (d) between their jumps?

4) Rebecca has 200g of sugar. She used 42.5g of sugar to make cookies. How many grams of sugar (s) does she have left?

Name: _____ 114

Curriculum Connection
PE.2

Integer Patterns – Average Temperatures

Instructions Answer the questions below.

The table below shows the average temperatures in four Canadian cities. We can use the table to compare the average temperatures in February and October.

City	October (o) Temperature	February (f) Temperature	Temperature Difference (d)
C[illegible] (NB)	6	-7	
[illegible] (ON)	10	-3	
Victoria (BC)	12	6	
Yellowknife (NT)	[illegible]	-21	
Winnipeg (MB)	[illegible]	-14	
Ottawa (ON)	[illegible]	-8	
Eureka (NU)	-21	[illegible]	
Quebec City (QC)	7	[illegible]	

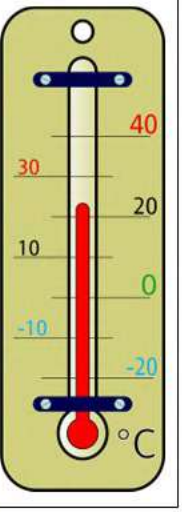
a) Fill in the table with the temperature di[illegible]ce fr[illegible] to February.

b) Write an equation using the variables: f, o, and [illegible]nds th[illegible]rence between the temperatures in each city from Oct[illegible]ebr[illegible]

c) Which city had the largest difference between their October and [illegible]ary months?

d) What is the difference between Victoria's February temperature and Eureka's February temperature?

e) What is the difference between Yellowknife's October temperature compared with Eureka's October temperature?



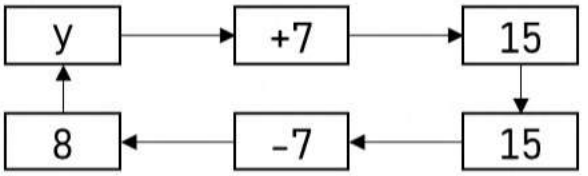
Name: _____ 115

Curriculum Connection
PE.2

Adding and Subtracting Equations – Flow Chart

We can use a reverse flow chart to calculate the value of a variable in an equation.

Example: $y + 7 = 15$



- Equation represented the same

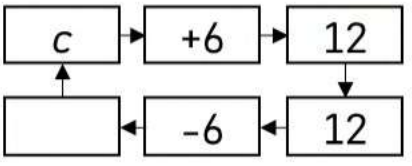
- Use the opposite operation in the middle and solve for the last box

Instructio Use the flow chart to find the value of the variable.

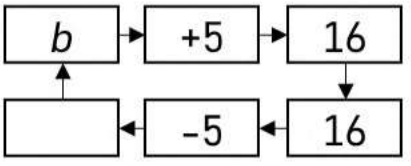
1) $t - 3 = 10$

2) $r - 5 = 8$

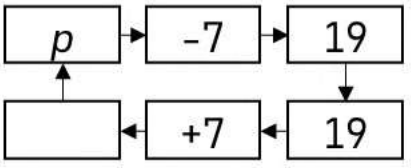
3) $c + 6 = 12$



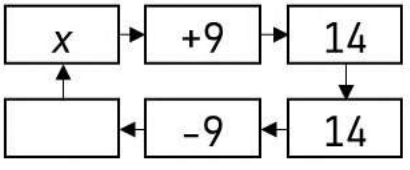
4) $b + 5 = 16$



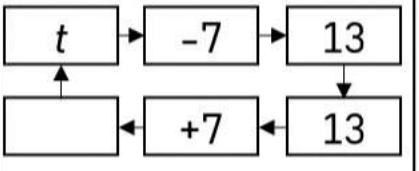
5) $p - 7 = 19$



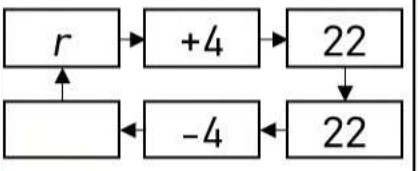
6) $x + 9 = 14$



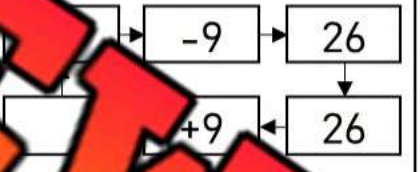
7) $t - 7 = 13$



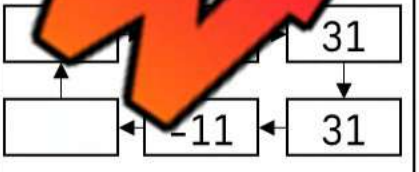
8) $r + 4 = 22$



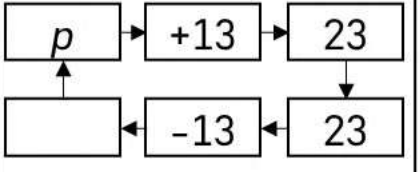
9) $c - 9 = 26$



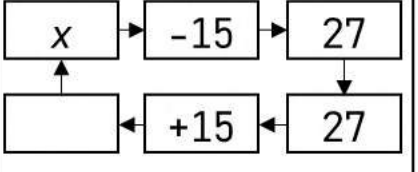
10) $b + 11 = 31$



11) $p + 13 = 23$



12) $x - 15 = 27$

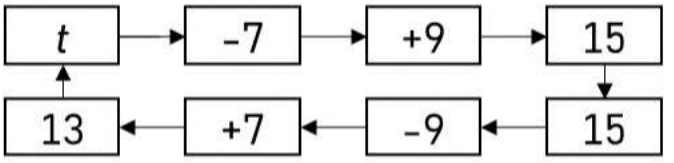
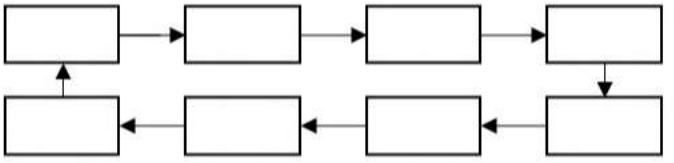
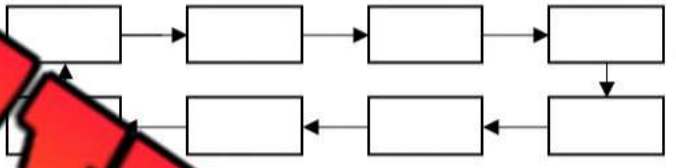
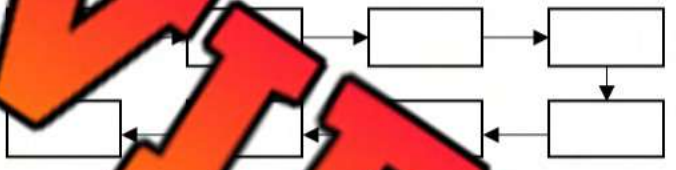
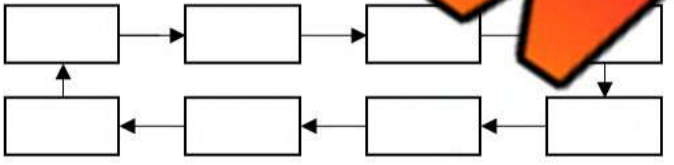
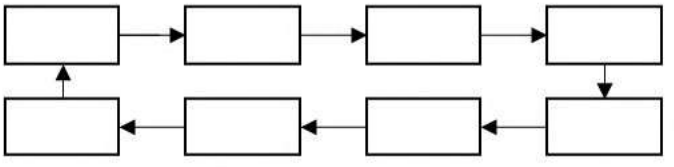
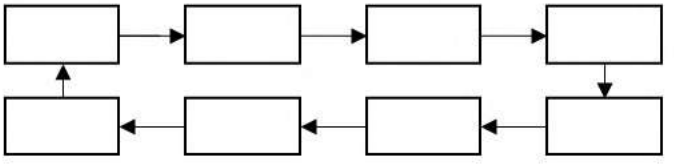


Name: _____ 117

Curriculum Connection
PE.2

Adding and Subtracting Equations – Flow Chart

Instructions Fill in the blank in the flow chart.

1) $t - 7 + 9 = 15$	
2) r	
3) $c + 5 - 8 = 13$	
4) $b - 11 + 7 = 19$	
5) $p - 9 + 10 = 14$	
6) $c + 4 - 11 = 4$	
7) $b + 6 + 8 = 21$	
8) $p - 7 - 11 = 21$	

Name: _____ 119

Curriculum Connection
PE.2

Multiplication – Find the Variable

When we multiply a number by a variable, we do not need to use the multiplication sign. It is known that any variable next to a number means the operation we are using is multiplication.

Example: $7n = 14$ means $7 \times n = 14$

We can figure out the unknown number by balancing the equation – $n = 2$.

Part 1

Find out the value of the variable.

1) [illegible] n =	2) $4n = 16$ n =	3) $8(s) = 48$ s =
4) $9 \times 4 = p$ p =	[illegible] [illegible]	6) $7k = 21$ k =
7) $3n = 21$ n =	[illegible] [illegible]	9) $n \times 7 = 77$ n =
10) $5n = 45$ n =	11) $8 \times 7 = t$ t =	[illegible] $9 \times 4 = p$
13) $8n = 96$ n =	14) $10n = 100$ n =	[illegible] $7d$
16) $9(s) = 27$ s =	17) $8 \times 8 = s$ s =	18) t =

Part 2

Calculate the area using the variables for length and width.

The formula for calculating area is: A = L x W
Calculate the area in the questions below using the values for the variables L and W

L = 3 W = 9	A =
L = 8 W = 7	A =
L = 10 W = 11	A =

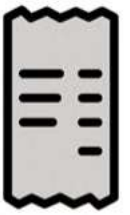
L = 5 W = 9	A =
L = 11 W = 7	A =
L = 4 W = 13	A =

Name: _____ 120

Curriculum Connection
PE.2

Writing Multiplication Equations – Lottery Tickets

Amelia is selling lottery tickets for $15 a ticket. She needs to calculate how much money her customers owe her for her tickets.



Part 1 Use multiplication equations to fill in the table.

#	# ...ets (t)	Equation 1 $t \times 15 = ?$	Equation 2 $15 \times t = ?$
1	6		
2			
3	8		
4	3		
5	7		
6	9		
7	10		
8	5		

Part 2 Amelia sells tickets to two different people in the s...tion.

#	# of Tickets Person 1	# of Tickets Person 2	Equation
1	5	3	(5 x 15) + (3 x 15) = 120
2	4	7	
3	9	2	
4	2	5	
5	6	6	

Name: _____ 121

Curriculum Connection
PE.2

Writing Multiplication Equations – Bakery

Jasmine works at a bakery. She sells bread, muffins, cakes, and donuts. When a customer orders from Jasmine, she uses an equation to figure out their total (t) – how much they owe for their order.

Bread (b)	Muffin (m)	Cake (c)	Donut (d)
$5.00	$3.00	$14.00	$2.00
			

Instructions: Complete the table below. The first one is done for you.

#					Equation	Answer
	b	***m***	***c***	***d***		
1	1	2	0		$+ 2m$	$t = 5 + 6$ $t = 11$
2	1	0	0	1		
3	0	2	1	0		
4	1	1	0	2		
5	2	2	0	0		
6	3	1	1	0		
7	0	2	1	2		
8	2	0	1	3		
9	1	2	1	4		

Name: _____ 123

Curriculum Connection
PE.2

Math Basketball: Multiplication Equations Challenge

Objective

What are we learning about?

To reinforce students' understanding and application of multiplication of decimals through engaging word problems and a fun basketball shooting game.

Materials

What will you need for the activity?

- Index cards with problems
- Recording sheets (one per team)
- Paper balls (one per team)
- Bins or baskets (one per team)
- Desks (one per team)

Instructions

How will you complete the activity?

1. Arrange the classroom so that there is enough space for multiple teams to work simultaneously. Place a desk about 6 feet away from the designated spot.
2. Place a stack of index cards with problems on each desk.
3. Provide each team with a recording sheet and a pencil.
4. Divide the students into teams of about five members each.
5. Each team stands in a line behind their respective desk.
6. The first student in line flips over an index card and solves the problem.
7. Once the answer is recorded, the student attempts to shoot the paper ball into the bin.
8. If the student makes the shot, they place a tally mark on the team's tally sheet for a point. If they miss, no tally is given.
9. The student then goes to the end of the line, and the next student steps up to the desk to repeat the process.
10. The activity continues until all index cards have been solved.
11. Once all index cards are completed, the teacher collects the recording sheets and reviews the answers with the class.
12. For each incorrect answer, the team loses one point.
13. The team with the highest number of points after deductions is declared the winner.

Name: _____ 125

Curriculum Connection
PE.2

Index Cards | Use the following table for the game.

A machine produces 9.3 parts per minute and produced a total of 74.4 parts. How many minutes (*m*) did the machine run?
A delivery truck travels at a speed of 10.2 kilometers per hour and travelled a total distance of 71.4 kilometers. How many hours (*h*) did it travel?
A worker [illegible]7.8 per hour and earned a total of $62.4. How many hours (*h*) did the work[illegible]
A stud[illegible]eads [illegible]er minute and read a total of 37.6 pages. How many minutes (*m*) d[illegible] r[illegible]
A train travels at a [illegible]d of [illegible] hour and traveled a total distance of 92 miles. How many hours [illegible]e trai[illegible]?
A farmer plants 5.6 seeds per r[illegible]w an[illegible] [illegible]f 44.8 seeds. How many rows (*r*) did the farmer plant?
A construction worker lays 3.9 bricks per mi[illegible]nd la[illegible]f 31.2 bricks. How many minutes (*m*) did the worker lay bricks?
A hairdresser cuts 2.4 heads of hair per hour and cut a t[illegible]of 1[illegible] many hours (*h*) did the hairdresser work?
A dog drinks 1.7 litres of water per day. It drank a total of 13.6 litres[illegible] many days (*d*) did it take for the dog to drink that much water?
A bus travels at a speed of 12.6 miles per hour and travels a total distance of 88.2 miles. How many hours (*h*) did the bus travel?
A cook prepares 4.2 dishes per hour and has prepared a total of 33.6 dishes. How many hours (*h*) did the cook work?
A scientist measures 3.8 grams of a substance per sample and measured a total of 30.4 grams. How many samples (*s*) were measured?

Name: _____ 127

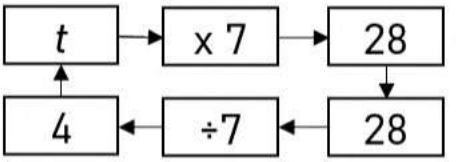
Curriculum Connection
PE.2

Multiplying Equations – Flow Chart

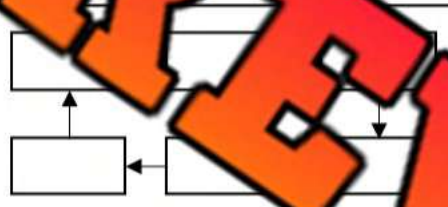
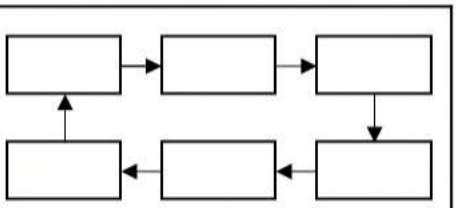
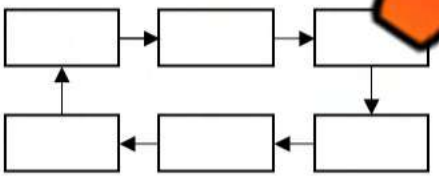
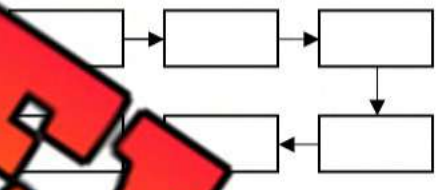
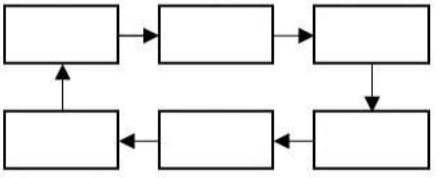
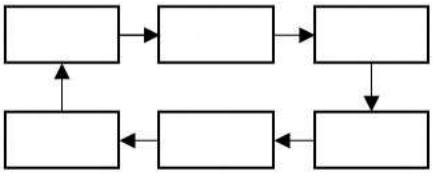
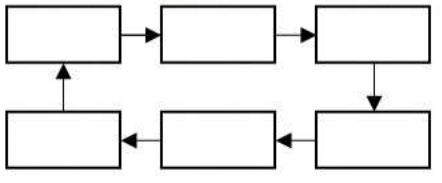
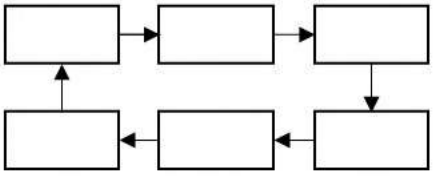
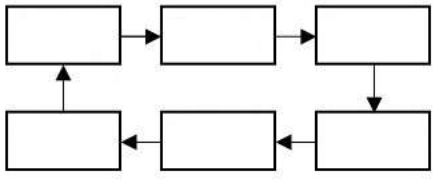
Steps to fill in a flow chart:

1) Write the variable in the first box.
2) Write the second value in the second box.
3) Write the answer in the third box.
4) We are working in reverse now. Write the answer in the first box.
5) We d opposite to the next box as we did with the second box.
6) Fill i t box to find the value of the variable, which it points to.

Example: $7t = 28$



Instruc s in the blank in the flow chart.

1) $4t = 12$		$11t = 77$	
2) $8r = 48$		$= 48$	
3) $5c = 35$		8) $7c = 56$	
4) $6b = 42$		9) $12b = 144$	
5) $9p = 72$		10) $9n = 63$	

Name: _____ 131

Curriculum Connection
PE.2

Division – Find the Variable

A **variable** is a letter that represents an unknown number. When we don't know a number, we can use a letter to take the place of the unknown number.

Example: $27 \div n = 3$

We can figure out the unknown number by balancing the equation: $n = 9$.

Part 1

Find out the value of the variable.

0 ÷ *n* = *n* =	2) *n* ÷ 8 = 3 *n* =	3) *s* ÷ 4 = 3 *s* =
4) 32 ÷ 4 = *p* =	28 ÷ *p* = 4	6) 56 ÷ *r* = 8 *r* =
7) 42 ÷ *n* = 6 *n* =	8	9) *t* ÷ 11 = 7 *t* =
10) 81 ÷ *n* = 9 *n* =	8 = *t* *t* =	12) 63 ÷ 9 = *p* *p* =
13) 64 ÷ *n* = 8 *n* =	14) 63 ÷ *n* =	56 ÷ *s* = 7
16) 28 ÷ *s* = 4 *s* =	17) 12 ÷ 4 = *s* *s* =	

Part 2

Calculate the area using the variables for length a idth.

Servers at a restaurant share tips (*t*) equally at the end of the day. The number of people that share the tips depends on how many servers (*s*) were working. We can use a formula to find out how much money (*m*) each server takes home: $m = t \div s$

t = 150 *s* = 5	*m* = 150 ÷ 5	*m* = 30
t = 80 *s* = 4	*m* = ÷	*m* =
t = 200 *s* = 5	*m* = ÷	*m* =

t = 180 *s* = 3	*m* = ÷	*m* =
t = 280 *s* = 7	*m* = ÷	*m* =
t = 440 *s* = 4	*m* = ÷	*m* =

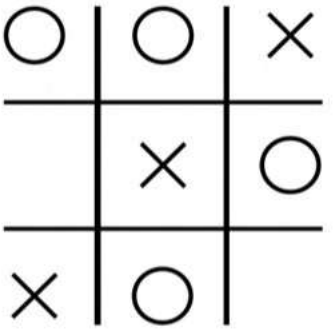
Name: _____ 132

Curriculum Connection
PE.2

Math Tic-Tac-Toe: Solving Variables

Objective — What are we learning about?

To help students practice solving division equations involving variables in a fun and interactive way through a Tic-Tac-Toe game.



Materials — What will you need for the activity?

- Tic-Tac-Toe boards provided

Instructions — How will you complete the activity?

1. Find a partner to play the game.
2. The goal is to solve and balance the algebraic equations in each square to place your marker (X or O).
3. One player will be "X" and the other will be "O".
4. Take turns choosing a square and solving the equation in that square to find the value of the variable.
5. Write down the solution below the equation and place your marker (X or O) in the square.
6. If a player chooses a square and solves the equation incorrectly, they do not get to place their marker in that square. The other player gets a chance to solve it correctly and place their marker.
7. The first player to get three markers in a row (horizontally, vertically, and diagonally) wins the game. Continue playing with different tic-tac-toe grids on the sheet.

Name: _____ 134

Curriculum Connection
PE.2

Tic-Tac-Toe

Use the following tic-tac-toe grids for the game.

66 ÷ r + 5 = 11	100 ÷ s - 8 = 2	t ÷ 25 + 2 = 6
42 ÷ u + 4 = 10	72 ÷ v - 6 = 3	w ÷ 8 + 5 = 14
55 ÷ x - 3	÷ y + 2 = 10	z ÷ 6 - 2 = 5

81 ÷ j + 6 = 15	48 ÷ k - 2 = 6	y ÷ 4 + 7 = 16
54 ÷ l + 5 = 14	96 ÷ m - 3 = 9	n ÷ 12 + 1 = 7
60 ÷ o - 4 = 6	36 ÷ p + 2 = 8	q ÷ 9 - 3 = 2

72 ÷ a + 5 = 17	99 = 5	
56 ÷ d - 3 = 4	108 ÷ e + 2 = 11	f ÷ 7 + 6 =
63 ÷ g - 4 = 5	90 ÷ h + 3 = 12	i ÷ 5 - 1 = 5

104 ÷ k - 2 = 10	75 ÷ 5 + x = 20	y ÷ 10 + 3 = 12
64 ÷ 4	121 ÷ 11 - 2 = 9	k ÷ 9 + 5 = 10
45	84 ÷ x	p ÷ 6 + 2 = 13

135 ÷ s + 5 = 14	56 ÷ t - 2 = 5	u ÷ 7 + 4 = 10
99 ÷ v - 3 = 6	48 ÷ w + 2 = 8	x ÷ 4 - 1 = 7
63 ÷ y + 5 = 14	72 ÷ z - 4 = 2	a ÷ 6 + 3 = 12

84 ÷ j + 4 = 11	120 ÷ k - 8	l ÷ 8 + 5 = 15
108 ÷ m - 6 = 3	75 ÷ n + 2 = 17	o ÷ 5 - 1 = 6
66 ÷ p + 3 = 12	96 ÷ q - 7 = 1	r ÷ 16 + 3 = 7

Name: _____ 135

Curriculum Connection
PE.2

Writing Division Equations - Sharing

Riley is the best boss! Every week, she brings in treats for her staff to share. Each week, there are different treats and a different number of staff members working at the office.

Questions Use a formula to find out how many treats (t) each person gets.

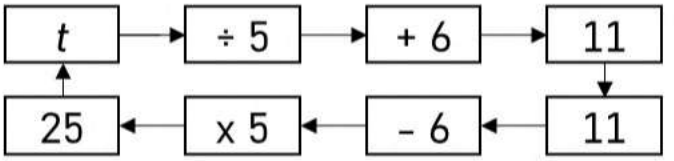
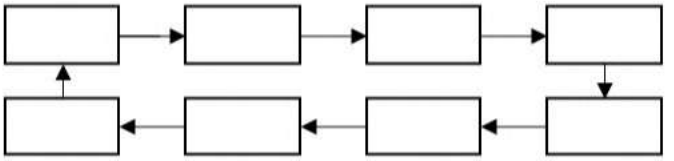
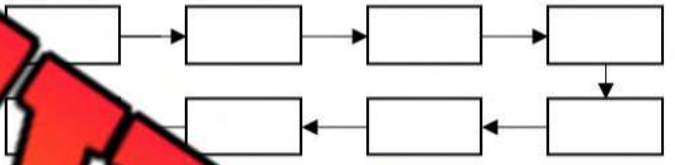
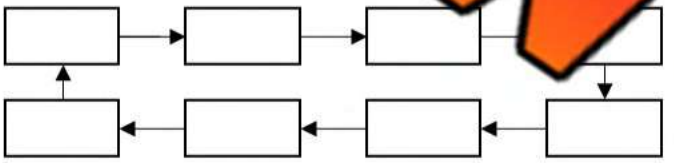
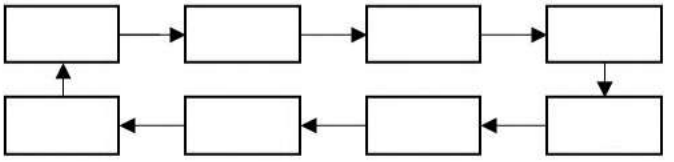
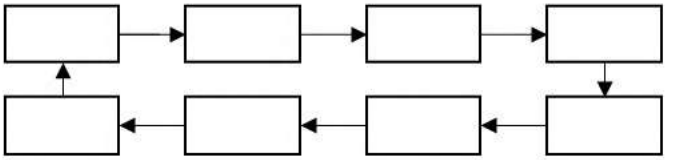
#		# of Staff	Formula	Answer
1	donu	8	$\frac{d}{s} = t$	$\frac{16}{8} = 2$
2	12 coo		$\frac{c}{s} = t$	$\frac{12}{6} = 2$
3	24 muffins (m)	4		
4	60 slices of pizza (p)	20		
5	42 bagels (b)	7		
6	36 donuts (d)	12		
7	40 cookies (c)	10		
8	56 muffins (m)	8		
9	27 pastries (p)	9		
10	54 cookies (c)	6		
11	55 slices of pizza (p)	11		
12	60 bagels (b)	15		
13	48 muffins (m)	12		

Name: _____ 137

Curriculum Connection
PE.2

Division Equations – Flow Chart

Directions Fill in the blank in the flow chart.

1) $\frac{t}{5} + 6 = 11$	
2) $\frac{r}{8}$	
3) $\frac{c}{4} + 8 = 18$	
4) $\frac{b}{6} - 9 = 0$	
5) $\frac{p}{7} - 7 = 2$	
6) $\frac{n}{3} + 12 = 22$	
7) $\frac{t}{2} - 6 = 5$	
8) $\frac{r}{11} + 8 = 15$	

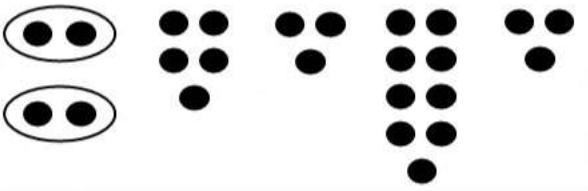
Name: _____ 138

Curriculum Connection
PE.2

Equivalent Forms of an Equation

When we add or subtract the same amount from both sides of an equal sign, the equation does not change. This is called **preservation of equality.**

Instructions Draw circles to represent the equations.

#	Original Equation	Change	New Equation
1	$2n + 5 = 9$ 	Add 3	$2n + 5 + 3 = 9 + 3$ 
2	$7 + n$		
3	$13 - n = 6$	Add 3	
4	$2n + 6 = 14$	Subtract 5	
5	$5 + 3n = 17$	Add 7	

Name: _____ 141

Curriculum Connection
PE.2

Equivalent Forms of an Equation

When we change an equation by adding, subtracting, multiplying, and dividing the same amount from both sides, does the equation change? Investigate below!

Instructions Fill in the table below.

#	Original Equation	Change	New Equation
1	$5n = 20$	Add 8 to each side	$5n + 8 = 20 + 8$ $n = 4$
2	$18 =$	Add 6 to each side	
3	$15 + n = 3$ $n =$	Subt from each	
4	$6n = 18$ $n =$	Multiply each by 2	
5	$4n = 24$ $n =$	Divide each side b	
6	$52 - n = 38$ $n =$	Subtract 15 from each side	
7	$68 + n = 93$ $n =$	Add 14 to each side	
8	$5n = 50$ $n =$	Multiply each side by 5	
9	$2n = 24$ $n =$	Divide each side by 2	

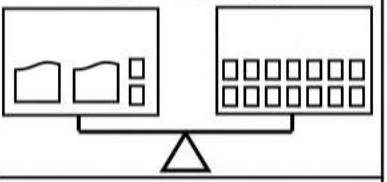
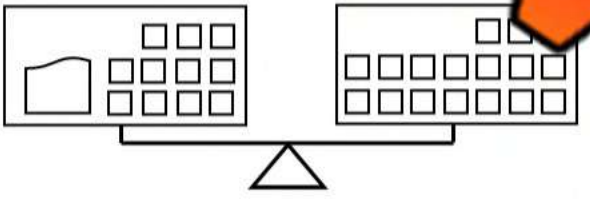
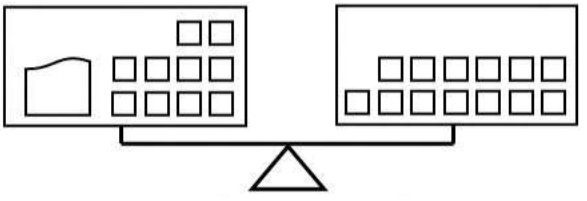
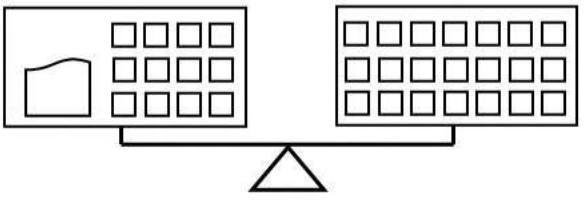
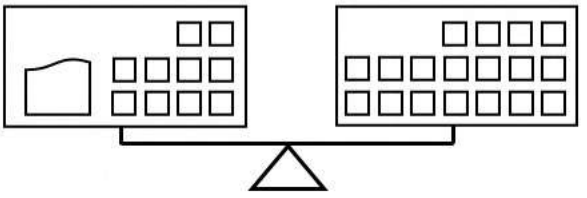
Name: _____ 142

Curriculum Connection
PE.2

Representing Equivalent Equations – Balance Scale

Blocks are placed on a balance scale. Some of the blocks on the left side of the scale are put in a bag before being placed on the scale. Use *b* to represent 'bag' in your equation.

Instructions Write 2 different equations for each pictorial representation.

#	Pictorial Representation	Equation # 1	Equation # 2
Ex)		$b + 8 = 14$	$2b + 2 = 14$ 
1)			
2)			
3)			
4)			
5)			

Name: _____ 144

Curriculum Connection
PE.2

Matching Game: Do The Variables Match?

Objective — What are we learning about?

To enhance students' understanding of equivalent variables. Students will identify and match pairs of equations where the variable yields the same value, fostering critical th and problem-solving skills in a collaborative group setting.

Mat — W you need for the activity?

- Pre-prepar re-c g cards
- Small bags or envel ld t ts for each group

Instructions — How will you complete the a ?

1. Before the class, the teacher will cut out the p ed m ng game cards.
2. Divide the students into small groups and give each group ag elope containing a set of the matching cards.
3. In their groups, students will spread out the cards face down on their table.
4. Each person takes a turn to try to match two cards. They will need to solve both equations to see if they match (equal the same).
5. If they find a correct match, they keep the cards out and continue with their next turn. If the cards don't match, they turn them back over in the same place, and the next player takes a turn.
6. The activity continues until all pairs are correctly matched within each group.

Name: _____ 147

Curriculum Connection
PE.2

Cards | Matching Game Cards

$2z - 1 = 15$	$4z - 17 = 15$
$3w$ [illegible]	$4w + 5 = 37$
$x - 4 = 12$	$5x$ [illegible] $= 76$
$2y + 1 = 23$	$3y - 10$ [illegible] 23
$3z - 2 = 19$	$5z - 16 = 19$

Name: _____ 148

Curriculum Connection
PE.2

Cards | Matching Game Cards

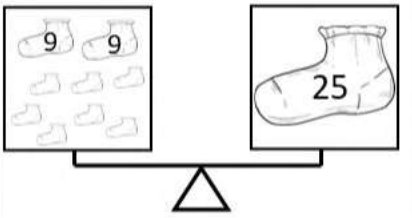
$4w + 1 = 37$	$3w + 10 = 37$
$x + 9 = 40$	$5x - 4 = 166$
$2y - 1 = 29$	$4y - 31 = 29$
$3z + 4 = 31$	$5z + 2 = 47$
$4w - 8 = 36$	$2w + 14 = 36$

Name: _____ 149

Curriculum Connection
PE.2

Using Linear Equations and Pictorial Representations

Instructions Write a pictorial representation and linear equation of the example.

#	Real-World Example	Linear Equation	Pictorial Representation
Ex)	Kennedy has 25 socks. She has an equal number of black and white socks that she keeps in 2 piles. She randomly coloured so many socks are in	$2p + 7 = 25$ $p = 9$	
1)	brou es to school a all She gave eache to each of he ds. friends did she g o?		
2)	Harley earned $42 from ob today after she worked for 2 hours. She received a $10 tip as part of the $42. What does Harley earn per hour at her job?		
3)	You paid $15 for admission to the movies. Snacks were $4 each. If you spent $27 in total, how many snacks did you buy?		
4)	In a basketball game, Henry scored 23 points. This was 5 more than double the points he scored last game. How many points did he score last game?		
5)	Katie and Sam went on an Easter egg hunt. Katie found 24 eggs. Katie found 3 times more eggs than Sam. How many eggs did Sam find?		

Name: _____ 150

Curriculum Connection
PE.2

Representing Linear Equations (x + a = b)

Questions Write a pictorial representation of the linear equations provided.

#	Linear Equation ($x + a = b$)	Pictorial Representation
Ex)	$x + 8 = 15$ $x = 7$	 7 + 8 = 15
1)	$x +$	
2)	$x + 6 =$ 2 $x =$	
3)	$x + 15 = 42$ $x =$	
4)	$x + 6 = 35$ $x =$	
5)	$x + 22 = 37$ $x =$	
6)	$x + 12 = 31$ $x =$	
7)	$x + 17 = 33$ $x =$	

Name: _____ 152

Curriculum Connection
PE.2

Representing Linear Equations (ax = b)

Questions Write a pictorial representation of the linear equations provided

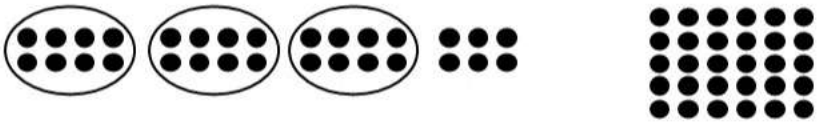
#	Linear Equation ($ax = b$)	Pictorial Representation
Ex)	$4x = 20$ $x = 5$	(5) (5) (5) (5) = (20) 4 groups of 5 = 20
1)	$5x$	
2)	$7x$ = x =	
3)	$9x = 45$ x =	
4)	$8x = 48$ x =	
5)	$2x = 96$ x =	
6)	$6x = 72$ x =	
7)	$4x = 52$ x =	

Name: _____ 153

Curriculum Connection
PE.2

Representing Linear Equations (ax + b = c)

Questions Write a pictorial representation of the linear equations provided

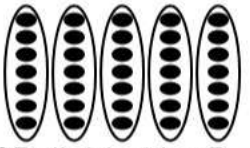
#	Linear Equation	Pictorial Representation
Ex)	$3x + 6 = 30$ $x = 8$	 3 groups of 8 + 6 = 30
1)	$4x +$	
2)	$8x + 2 =$ $x =$	
3)	$5x + 4 = 29$ $x =$	
4)	$7x + 6 = 34$ $x =$	
5)	$2x + 9 = 23$ $x =$	
6)	$4x + 9 = 25$ $x =$	
7)	$8x + 5 = 29$ $x =$	

Name: _____ 154

Curriculum Connection
PE.2

Representing Linear Equations (x/a = b)

Questions Write a pictorial representation of the linear equations provided

#	Linear Equation	Pictorial Representation	Verification
Ex)	$\frac{x}{5} = 7$ $x = 35$	 35 divided by 5 = 7	$\frac{35}{5} = 7$ ✓
1)	$\frac{x}{4} = 6$ $x =$		
2)	$\frac{x}{3} = 9$ $x =$		
3)	$\frac{x}{7} = 4$ $x =$		
4)	$\frac{x}{3} = 8$ $x =$		
5)	$\frac{x}{9} = 6$ $x =$		
6)	$\frac{x}{8} = 5$ $x =$		
7)	$\frac{x}{6} = 11$ $x =$		

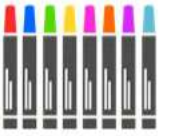
Name: _____ 155

Curriculum Connection
PE.2

Representing Problems with Linear Equations (x + a = b)

Questions Represent the problems with linear equations ($x + a = b$) and solve for x.

1) Camila had some markers and then bought 24 more. Now she has 56 markers. How many markers did she have before she bought more?



Linear equation: $x =$

2) Carter [illegible] last year and has been adding to it. Today he added $15 [illegible] much did he have before?

Linear equation: $x =$

3) Mia tracks how many steps she takes each [illegible] had taken a lot of steps. From noon until the end of the day she took 7,[illegible] steps. In total, she took 16,340 steps for the day. How many steps [illegible] noon?

Linear equation: $x =$

4) Caleb scored a bunch of points in the first half of a basketball game. In the second half, he only had 7 points. At the end of the game, he finished with 31 points. How many points did he score in the first half?

Linear equation: $x =$

Name: _____ 157

Curriculum Connection
PE.2

Representing Problems with Linear Equations (ax = b)

Questions | Represent the problems with linear equations (ax = b) and solve for x

1) Avery has 4 boxes of cookies. In total, she has 96 cookies. How many cookies are in each box?

Linear equation: $x =$

2) Jus… running back. He has played 5 games this season and has …. How many yards did he average each game?

…ar eq… $x =$

3) Cooper bought 7 n… …e game… …80. How much did he spend on average for each vide…

Linear equation: …

4) Kayden gets an allowance each week. Af… we… …225 from his allowance. How much is his allowance each w…

Linear equation: x …

5) Arya is a rower. Every minute she rows, she pulls a certain numb… of strokes. After 20 minutes, she had pulled 600 strokes. How many strokes does she average a minute?

Linear equation: $x =$

6) Brooklyn has a job that pays her by the hour. She worked 6 hours today and earned $96. How much money does she earn per hour?

Linear equation: $x =$

Name: _____ 158

Curriculum Connection
PE.2

Representing Problems with Linear Equations (ax + b = c)

Questions Represent the problems with linear equations (ax + b = c) and solve for x

1) Hunter's cousin is 24 years old. He is 2 years older than twice Hunter's age. How old is Hunter?

Linear equation: x =

2) Je… t… treats to work and gave them all away. She gave 8 to her … to … her friends. How many friends did she give treats to?

… equ… x =

3) Cindy has $8. Her … 3 tim… uch as her brother. The three of them have $44. How much … oe… have?

Linear equation: … =

4) Dylan went to an amusement park. He ha… pa… went on. He decided to go on 8 rides. He also had to pay $… …er the… In total, it cost him $52 at the amusement park. How much … rid…

Linear equation: x …

5) Carson earned $63 from work today. He worked for 4 hours and received a bonus of $15. How much does he earn per hour?

Linear equation: x =

6) Shelly collected 66 treats on Halloween. She went to 15 houses and started with 6 candies at the beginning. How many candies on average did she collect at each house?

Linear equation: x =

Name: _____ 159

Curriculum Connection
PE.2

Representing Problems with Linear Equations (x/a = b)

Questions Represent the problems with linear equations ($\frac{x}{a}$ = b) and solve for x

1) Claire bought a lot of donuts for her party. She is expecting 32 guests and bought enough for each guest to have 3 donuts. How many donuts did she buy?

Linear equation: x =

2) Ev…nds earned some money by selling lemonade. They split the …qual…en the 6 friends and each got $24. How much total money did …ey ea…

…ar eq… x =

3) Amara collected s… …as…er eg… …a hunt. She split her eggs up equally between herse… …sist… …rother. Each sibling got 36 eggs. How many eggs did she co…lect…

Linear equation:

4) David is given some money to spend on va…ti… …de… …ending it all during the 5-day vacation, spending $13 each … muc… …ey was he given?

Linear equation: x …

5) Weston practiced piano for a long time this week. He practiced each day for 44 minutes. How many minutes total did he practice for the week?

Linear equation: x =

6) Declan doesn't have many chocolates left from Valentine's Day. He rationed them out for the next 8 days, allowing himself to eat 13 chocolates each day. How many chocolates did he have left before the 8 days?

Linear equation: x =

Name: _____ 161

Algebra Quiz - Equations

Part 1 Is the example an expression or equation? Circle your answer.

	Sentence	Answer
1)	$8n$	Expression Equation
2)		Expression Equation
3)	8 +	Expression

	Sentence	Answer
4)	$11x + 12 = 26$	Expression Equation
5)	$\frac{28}{x} + 12 = 16$	Expression Equation
6)	$\frac{35}{x} + x$	Expression Equation

Part 2 Evaluate the following expressions for x = 5

1) $x - 10$	2) $9 - x$	3)	4) $x - 14$
5) $44 + x$	6) $67 + x$	7) $65 +$	+ 11

Part 3 Evaluate the following expressions for y = 8

1) $5y$	2) $9y - 5$	3) $3y + 5$	4) $8y + 6$
5) $\frac{32}{y} + 8$	6) $\frac{64}{y} + y$	7) $\frac{24}{y} - 9$	8) $\frac{y}{y} \times y$

Part 4 Write the expressions using the values/operations below

6 8 2 *n* + *x* − ÷

1) Six times a number, add two	
2) Eight divided by two, subtract a number	
3) A number multiplied by eight, add six	
4) Eight m… than six divided by of a number	

Part 5 …equations for each sentence.

	Equation	Answer
1) Seven less tha… mbe… 5		
2) Twelve more than a nu… 31		
3) Six times a number is 48		
4) Eighteen divided by a number is 3		

Part 6 Fill in the missing number to balanc… …ation.

1) ☐ + 12 = 95	2) ☐ + 25 = 50	3) ☐ … = 66
4) 58 − ☐ = 45	5) 48 − ☐ = 39	6) 65 − ☐ = 55
7) 4 x ☐ = 44	8) ☐ x 6 = 30	9) 8 x ☐ = 48
10) 63 ÷ 7 = ☐	11) 48 ÷ ☐ = 4	12) ☐ ÷ 8 = 9

Part 7 Whoops, some golfers forgot to fill in their scores. Help them out!

Player	Round 1	Round 2	Final Score
Ruby	-4	-1	
Iris	-2		-5
Emery		-1	-6
Ro	-1		5
	3		-3

Part 8 equa helps solve the problem.

1) Jayce walks at an a eed He walked a total of 3 hours. What distance (d) did he walk

2) It snowed 3.2cm every hour. In total, it snow H hours (h) did it snow?

3) Ayden earns $15.50 per hour working at a grocery store. He made $93 today. How many hours (h) did he work?

4) Zara bought a case with 4 cans of tomato soup. The case has 4.8L of soup in total. How many litres (l) are in each can?

Part 9 Write four equivalent forms of the equation below.

Original Equation	
$3n + 5 = 20$	
Add 4 to each side	
Subtract 8 from each side	
Multiply each side by 4	
Divide each side by 5	

Part 10 Representing linear equations – $ax = b$, $x + a = b$, $ax + b = c$, $x/a = b$

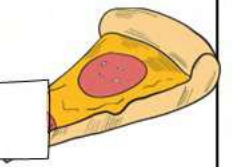
1) Ryder had some hockey cards. Then his brother bought 24 more. Now he has 56 hockey cards. How many hockey cards did he have before he bought more?

Linear equation: $x =$

2) Jordan earned $250 at his new job this week. He received a $50 signing bonus to begin his job. He worked 10 hours this week. How much did Jordan earn per hour?

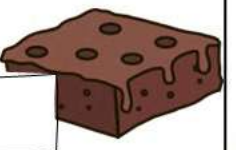
Linear equation: $x =$

3) Melody bought pizza for a party she was hosting. She expects 7 people to come to the party and bought enough so that each guest could have 4 slices of pizza. How many slices of pizza did she buy?



Linear equation: $x =$

4) Sadie made 7 trays of brownies today for a bake sale. When she cut up the brownies, she had 112 brownies in total. How many brownies were in each tray?



Linear equation: $x =$