Grade 6: Mathematics

Alberta Math Education Curriculum Component: PATTERNS AND RELATIONS Unit

Chapter 1: Patterns in Mathematics

General Outcome:	***Students will able to:***
➔ Use patterns to describe the world and to solve problems ➔ Represent algebraic expressions in multiple ways.	• write a rule to describe a relationship between numbers in a table • use a rule to create a table of values • identify and create equivalent equations • use number patterns to make predictions and to solve problem

Alberta Math Education Specific Concept (learning outcome): 1 to 5.

Classroom assessment is generally divided into three types: assessment *for* learning (Diagnostic Assessment: D), assessment *of* learning (Summative Assessment: S), assessment *as* learning (F).

*** PLEASE NOTE: I WOULD HIGHLY ENCOURAGE TO VISIT brmustafa.weebly.com FOR EXTRA HELP ***

➔For lesson **extra practice**, please visit:

http://www.mathk8.nelson.com/math6/studentcentre/studtryout.html

Lesson Outline:

Lesson	Textbook Lesson Title	Learning Goals	Task **	Done
1	1.1-Identifying Number patterns	Describe a number pattern within each column or row of a table of values. ➔ **Materials:** pattern blocks and linking cubes	Unit launch: Chapter Opener (**D**) □ HW: Workbook (pg. 1) **(F)** ➔ On line: Extra Practice	
2	1.2-Describing Relationships in Tables	Describe how the numbers in one column of a table of values relate to the numbers in the other column. ➔**Materials:** linking cubes or counters	□ HW: Workbook (pg. 2) **(F)** ➔ On line: Extra Practice	
3	1.3-Using Expressions to Create Tables	Create and use a mathematical expression to make a table of values.	□ HW: Workbook (pg. 3) **(F)**	
4	1.4-Comparing Expressions	Create related number patterns, and compare the expressions that describe them. ➔**Materials:** linking cubes or counters	□ HW: Workbook (pg. 4) **(F)** ➔ On line: Extra Practice	
5	**Mid-Chapter Review**	Preparation for the quiz: Quiz Date: __/__/__ **(mm/dd/yyyy)**	□ Textbook: Pg 19 # 1-3 **(F)**	
6	1.5-Equivalent Equations	Model and create equivalent equations. ➔**Materials:** balance scales, linking cubes and small paper bags	□ HW: Workbook (pg. 5) **(F)** ➔ On line: Extra Practice	
7	1.6-Solving Problems Using Patterns	Identify and use patterns to solve problems.	□ HW: Workbook (pg. 6) **(F)** ➔ On line: Extra Practice	
8	**Chapter Review**	Preparation for the test: Test Date: __/__/__ **(mm/dd/yyyy)**	□ Textbook: **(F)** ➔ Pg. 29-30 (Q1 to Q9: DOSO on letter) ➔ Workbook (pg. 7) □ Handout: **(S)** ➔ Chapter 1: Journal Questions ➔ **Unit Project (Textbook – Pg. 32):** Organizing a Movie Night ➔ Chapter 1: Self-Assessment: Lesson Goals ➔ Review of Essential Skills: Chapter 1	

Here are some of the *Key Words* that are being used in this chapter:

*tables of values *pattern rule *variable *expression *equivalent equations *solution to the equation

**** If the class work is not completed during class time, must be done for homework.**

I have read and went over this "*Patterns and Equations -Unit 2 Plan*" with my child. JazakAllahu khayran

_____ Parent/Guardian name (print)

_____ Parent/Guardian signature

__/__/____ **(dd/mm/yyyy)**

Address: 14525 127 ST, Edmonton, AB T6V 0B3 Phone: (780) 454-4573

RE: Unit – Patterns and Relations Information Letter

As-salaamu Alaikum Wa Rahmatu Allahi Wa Barakaatuhu, ("Peace be unto you and so may the mercy of Allah and His blessings"),

Dear Respected Parents and Guardians of Grade 6:

Over the next two weeks, your child will be learning about patterns in mathematics. Students will identify and extend number patterns in tables of values, create tables of values using mathematical expressions, identify and model equivalent equations, and use number patterns to solve problems.

To reinforce the concepts your child is learning at school, you and your child can work on some at-home activities such as these:

- Provide the total monthly cost of a major item in your budget, such as groceries or utilities. Have your child create a table of values for the cost of this item over 12 months. Repeat with other items, if time permits.
- Play a guessing game with your child using equations. You might say "I am thinking of a number. Twelve more than nine times this number equals 102. What is the number?"

You may want to visit the Nelson website at
http://www.mathk8.nelson.com/math6/studentcentre/studtryout.html
for more suggestions to help your child learn mathematics and develop a positive attitude toward learning mathematics. As well, you can check the Nelson website for links to other websites that provide online tutorials, math problems, brainteasers, and challenges.

Sincerely,

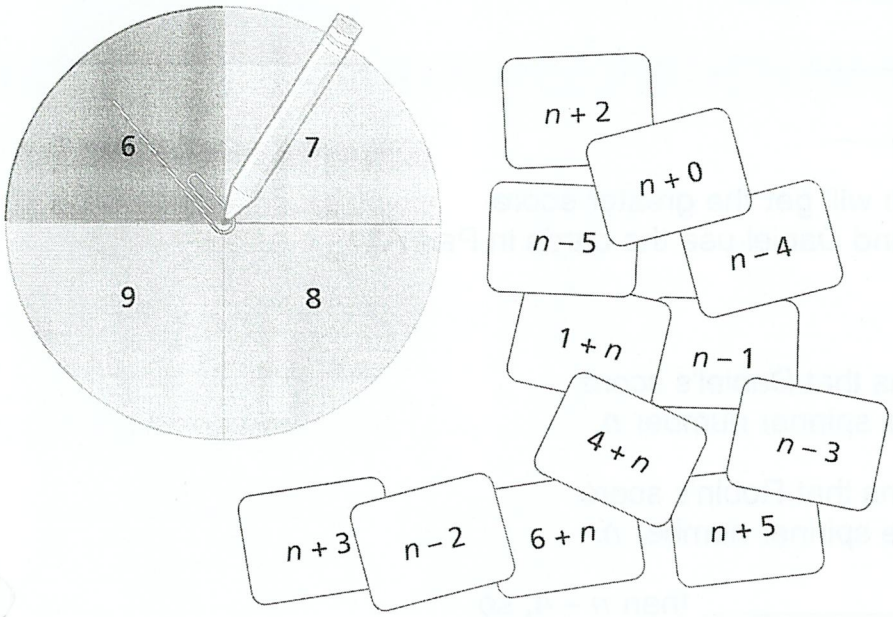
Mustafizur Rahman, **ATA, OPC, OCT**
Ed.D (candidate), **MEd, BEd, BSc**
Grade 6 Math

Name: _____ Date: _____

Scaffolding for Getting Started Page 1

STUDENT BOOK PAGES 2–3

Daniel and Robin invented a game called Number Spin. They used the **variable** *n* to represent the number spun on a spinner. Then they wrote **expressions** on cards to show different operations with *n*.



Suppose you are playing this game with a partner.

- Place the cards face down in a pile.
- Each player chooses a card.
- One player spins. Both players put the spun number in place of the variable *n* in their expressions. Then they calculate to get a score for that turn.
- Play until there are no cards left.

The player with the greater total score wins.

? Before spinning, can the players always tell which expression will give the greater score?

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Scaffolding for Getting Started

STUDENT BOOK PAGES 2–3

A. For the first turn, Daniel picks $n - 4$. Robin picks $n + 2$. If they spin 6, what are their scores?

The value of the spinner number n is 6.

- What is Daniel's score? _____
- What is Robin's score? _____

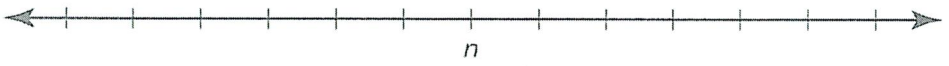
B. How do you know that Robin will get the greater score for any number spun if she and Daniel use the cards in Part A?

Use these clues.

- The expression $n - 4$ means that Daniel's score is 4 _____ than the spinner number n.
- The expression $n + 2$ means that Robin's score is 2 _____ than the spinner number n.
- The expression $n + 2$ is _____ than $n - 4$, so Robin's score must be greater than Daniel's score for any number spun using the cards in Part A.

C. How do you know that Robin's score will always be 6 more than Daniel's score if they use the cards in Part A? Draw a diagram to explain.

- Daniel's score is $n - 4$. Label his score on the number line.
- Robin's score is $n + 2$. Label her score on the number line.
- How much greater is $n + 2$ than $n - 4$? Show using the number line. _____



- What must be added to Daniel's score to get to n? _____
- What must be added to get from n to Robin's score? _____
- What must be added to get from Daniel's score to Robin's score? _____

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Scaffolding for Getting Started Page 3

STUDENT BOOK PAGES 2–3

D. For the second turn, Daniel picks $\boxed{1 + n}$. Robin picks $\boxed{n + 3}$. How can you tell whose score is greater, without knowing which number was spun?

- The expression $1 + n$ means that Daniel's score is 1 _____ than the spinner number n.
- The expression $n + 3$ means that Robin's score is 3 _____ than the spinner number n.
- Who will have more added to the spinner number, Robin or Daniel? _____
- Explain how you can tell whose score is greater without knowing the spinner number.

_____

_____

E. The third spin is 7. Daniel scores 11 points. Robin scores 2 points. Which cards do they have?

The value of the spinner number n is 7.

- How can you get from n to 11? _____
- How can you get from n to 2? _____
- Which card does Daniel have? _____
- Which card does Robin have? _____

F. Play the game. Before spinning, can you always tell which expression will give the greater score? Explain your thinking.

- Which expression gives the greater score, $n + 2$ or $n - 2$? Explain.

_____

_____

- Which expression gives the greater score, $n + 2$ or $n + 6$? Explain.

_____

_____

- Which expression gives the greater score, $n - 4$ or $n - 5$? Explain.

_____

_____

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Unit: PATTERNS AND RELATIONS
Chapter 1: Patterns in Mathematics

Journal Questions (Hint: *Make sure to show all your work.*):

1. Ibrahim made a penny pattern by adding the same number of pennies each time. How many pennies would he need to make shape 8?

shape 1 shape 2 shape 3

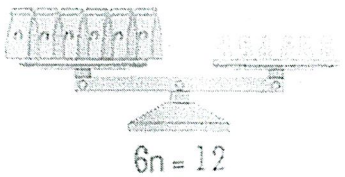
2. A fitness club charges $20 to join. The members then pay $5 for each fitness class they take. Which expression could Arowa use to calculate the total cost of joining the club and taking any number of fitness classes?

Number of classes (c)	Total cost ($)
1	25
2	30

3.

Which equation is equivalent to $6n = 12$?

A. $6n + 6 = 12$
B. $6 = 12n$
C. $3n = 6$
D. $2n = 6$



Name: _____ Date: _____

Mid-Chapter Review—Frequently Asked Questions

STUDENT BOOK PAGES 18–19

Q: How can you use an expression to create a table of values?

A: _____

Q: How can you figure out the rule or expression that was used to create a table?

A: _____

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Chapter Review—Frequently Asked Questions

STUDENT BOOK PAGES 28–30

Q: How can you write equivalent equations?

A: _____

Q: How can you show that two equations are equivalent?

A: _____

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Chapter 1 Task Page 1

Organizing a Movie Night

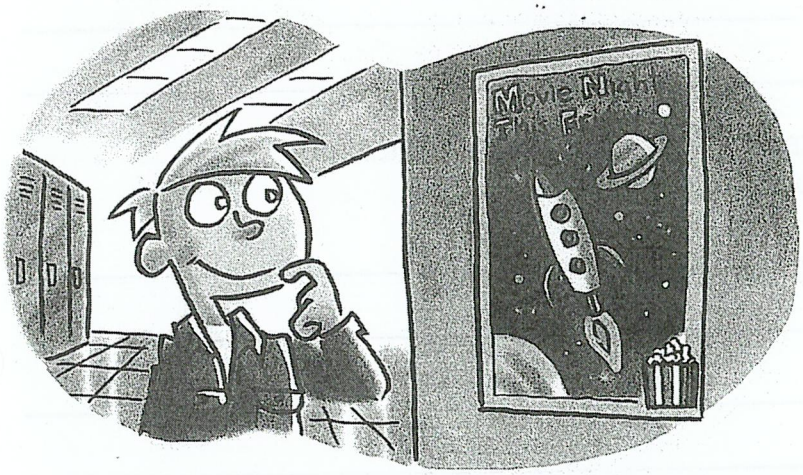
STUDENT BOOK PAGE 31

Jason's class is planning a school movie night to raise money for a food bank. At least 50 people will attend.

- The students plan to charge either $2 or $3 for admission.
- If they charge $3, the guests will get free popcorn.
- The popcorn and bags will cost the class a total of $75.

Task Checklist

- ❑ Did you explain your thinking clearly?
- ❑ Did you use math language and expressions?
- ❑ Did you show all your steps?
- ❑ Did you check your solution?



? Which admission charge will help the class raise more money?

A. Make a table for each admission charge to show how much money the class can raise.

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Name: _____ Date: _____

Chapter 1 Task Page 2

Organizing a Movie Night

B. Describe the number pattern in each column of each table. Why does each number pattern make sense?

C. For each table, what rule can you use to figure out the amount of money raised if you know the number of people?

The rule for Table 1 is _____

The rule for Table 2 is _____

D. How many people must attend before the $3 charge will raise more money than the $2 charge?

E. How can the students decide which admission charge will help them raise more money?

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Chapter 1: Patterns in Mathematics

Chapter Task: Organizing a Movie Night

A.

Amount Raised with $2 Admission	
Number of people	Amount raised ($)
50	100
51	102
52	104
53	106

Amount Raised with $3 Admission	
Number of people	Amount raised ($)
50	75
51	78
52	81
53	84

Grade 6: Mathematics

Chapter 1: Organizing a Movie Night

Date: __/__/____(dd/mm/yyyy)

Term: ¤ 1 ¤ 2

Name: _____ Assessment type: ¤ D ¤ F ¤ S Overall: Mark//Level:___//__; Class Average:___ Parent Signature:_____

Criteria \ Level	**Excellent** Level 4	**Proficient** Level 3	**Adequate** Level 2	**Limited*** Level 1	**Insufficient/ Blank***
Prompts A–E **PR1.** Demonstrate an understanding of the relationships within tables of values to solve problems. [C, CN, PS, R] (__/2)	• demonstrates an insightful understanding of number patterns • chooses efficient and effective strategies when applying pattern rules • provides a precise and insightful explanation of pattern rules	• demonstrates a complete understanding of number patterns • chooses workable and reasonable strategies when applying pattern rules • provides a clear and logical explanation of pattern rules	• demonstrates a basic understanding of number patterns • chooses partially appropriate and workable strategies when applying pattern rules • provides a partially clear explanation of pattern rules	• demonstrates a limited understanding of number patterns • chooses inappropriate and/or unworkable strategies when applying pattern rules • provides a vague and/or inaccurate explanation of pattern rules	No score is awarded because there is insufficient evidence of student performance based on the requirements of the assessment task.
Prompts C & D **PR1** **PR3.** Represent generalizations arising from number relationships using equations with letter variables. [C, CN, PS, R, V] (__/2)	• uses effective and specific mathematical language, symbols, and conventions to enhance communication • comprehensively analyzes situations and makes insightful generalizations about number relationships • makes insightful connections between real-world contexts and number relationships • demonstrates an insightful understanding of the problem	• uses appropriate and correct mathematical language, symbols, and conventions to support communication • completely analyzes situations and makes logical generalizations about number relationships • makes meaningful connections between real-world contexts and number relationships • demonstrates a complete understanding of the problem	• uses mathematical language, symbols, and conventions to partially support communication • superficially analyzes situations and makes simple generalizations about number relationships • makes simple connections between real-world contexts and number relationships • demonstrates a basic understanding of the problem	• uses mathematical and nonmathematical language and conventions incorrectly and/or inconsistently, interfering with communication • is unable to analyze situations and make generalizations about number relationships • makes minimal or weak connections between real-world contexts and number relationships • demonstrates a limited understanding of the problem	
Days Late (__/1)	0	1	2	3++	--Not Hand In

Teacher's Comments – Area for Growth and Action Plans (if below "level 2"):

□ Please use the given time in the classroom wisely by *asking questions to further clarify the assignment or focus on the task at hand.* Also, you need to follow the sample work shown in the class (*if applicable*) as a guideline to achieve *level 3* in this rubric.

Name: _____ Date: _____

Chapter 1: Patterns in Mathematics

Describe and extend patterns.

Pattern rules describe how a pattern begins and how it continues. Pattern rules can be represented using words and operations. For example, a pattern rule for 3, 5, 7, 9, . . . is "start at 3 and add 2 each time."

1. Daniel is on a bike trip. The table shows the distance Daniel travels each hour.

Distance Travelled Each Hour

Time (h)	Distance (km)
1	6
2	12
3	18
4	12

a) Describe a pattern for the second column of the table.

_____

_____

b) If the pattern continues, how many kilometres will Daniel travel in 7 hours?

_____

2. Write a pattern rule for each pattern. Is it an increasing pattern or a decreasing pattern?

a) 4, 8, 12, 16, . . . _____

b) 50, 41, 32, 23, . . . _____

c) 3, 12, 48, 192, . . . _____

3. Extend each pattern for four more terms.

a) 21, 18, 28, 24, 35, 30, . . . _____

b) 35, 31, 27, 23, 19, . . . _____

c) 16, 19, 22, 25, 28, . . . _____

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Name: _____ Date: _____

Use patterns to solve a problem.

4. Nikesh and Hannah are travelling east to visit their relatives. Nikesh travels by train 105 km each hour. Hannah travels by car 90 km each hour. Hannah starts 1 h before Nikesh. How many hours will it take Nikesh to catch up to Hannah?

Hannah's Trip

Time (h)	Distance (km)
1	
2	

Nikesh's Trip

Time (h)	Distance (km)
1	
2	

Solve equations.

5. Solve each equation.

a) $x + 2 = 5$ $x =$ _____

b) $6 = s - 2$ $s =$ _____

c) $3 + z = 7$ $z =$ _____

d) $6 \times c = 24$ $c =$ _____

e) $4 + n = 7$ $n =$ _____

f) $12 = 3 \times d$ $d =$ _____

g) $y - 5 = 13$ $y =$ _____

h) $12 = t - 5$ $t =$ _____

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Name: _____ Date: _____

Chapter 1 Self-Assessment: Lesson Goals

Place a check mark in the box that best describes your work.

Lesson Goals	Yes, on my own	Yes, with help	Sometimes/ Not sure	Not yet
I can describe a number pattern within each column or row of a table of values.				
I can describe how the numbers in one column of a table of values relate to the numbers in the other column.				
I can create and use a mathematical expression to make a table of values.				
I can create related number patterns, and compare the expressions that describe them.				
I can model and create equivalent expressions.				
I can identify and use patterns to solve problems.				

Choose one of your answers from above. Give your evidence.

My evidence for _____ is

_____

_____

_____

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