Contents

Welcome to Pearson Mathology!

Why Choose Pearson Mathology?

Co-created with Canadian educators to best support the diversity in Canadian classrooms, Pearson Mathology unlocks the joy in learning math by engaging students and teachers with materials that
- are curriculum aligned;
- develop student curiosity through engaging math stories and activities;
- include lessons and stories reflecting multiple perspectives; and
- are available in print and digital formats.

Pearson Mathology includes practical classroom resources (developed along the Pearson Canada Mathematics Learning Progression) and targeted professional learning supports.
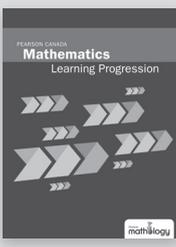
Classroom Resources

Opportunities for students to practise applying their knowledge and understanding of foundational concepts in mathematics.
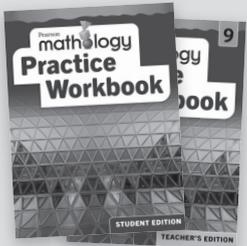
Practice Workbook (Grade 9)

Pearson Canada Mathematics Learning Progression

A mathematics learning progression at your fingertips.

Pearson mathology

www.mathology.ca

A flexible tool for teachers that facilitates activity search, lesson planning, differentiation, assessment, and next steps.

Just-in-time support and professional learning that scaffolds the classroom material.

Professional Learning Resources and Services

Print resources that address current topics in mathematics education.

Courses and workshops, in person and online, that help educators to deepen math content knowledge and enhance effective instructional skills and practice.

All components in the Mathology Grade 9 family work together to promote growth in mathematics among learners.

About Pearson mathology

Practice Workbook 9

What Is the Purpose of the Workbook?

For students

The Workbook supports students in their learning journey with independent or small-group practice opportunities for
- building on their understanding through a variety of questions, tasks, games, and challenges connecting foundational concepts;
- organizing and representing their thinking and understanding; and
- connecting math concepts to their lived experiences.

For teachers

The Workbook helps you support students by
- offering intentional independent and small-group practice ideas, aligned with your curriculum;
- providing additional assessment opportunities and ways to support learning; and
- allowing parents and caregivers an opportunity to see what their child is learning.

> Go to Mathology.ca for comprehensive lesson notes supporting a deep understanding of student thinking and assessment opportunities that help determine the best next steps for your learners.

How To Use the Workbook

After working through lessons with students
- Identify the practice units that correlate with the lessons you've taught.
- Use the Workbook flexibly, as in-class practice (small-group, collaborative, or independent work).
- Discuss the practice tasks and ensure clarity.
- Identify the open-ended tasks and discuss ways for students to represent their understanding.
- Debrief the tasks and ask students to share their strategies.
- Observe students' level of understanding and build on it through additional tasks.

Reaching All Learners (Differentiated Instruction)

Consider the variety of learners in your classroom and how the Workbook can best support them. Key questions to reflect on include:
- Are there certain questions that I want all students to complete?
- Do some students need accommodations?
- Which students might benefit from small-group conversations before starting tasks?
- How can I encourage the use of manipulatives and models?
- How can students use the Workbook to recognize their strengths and build a math identity (e.g., self-reflection)?

Curriculum Support

Go to www.pearson.com/ca/en/k-12-education/mathology.html for a detailed alignment of this resource with your curriculum.

How Is the Workbook Organized?

Each unit connects the learning across several lessons.
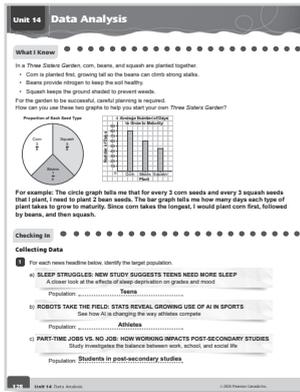
What I Know
- activates prior knowledge of major concepts
- provides pre-assessment of students' understanding and knowledge
- helps you identify students who may need additional support

Checking In
- provides opportunities for students to apply their knowledge and understanding of concepts, make connections to math in the real world, reflect and discuss their thinking and strategies, and show what they know
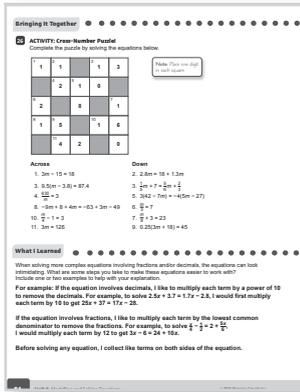
Bringing It Together
- allows students to work together to discuss thinking and strategies
- helps students show what they know
- presents many open-ended tasks or games
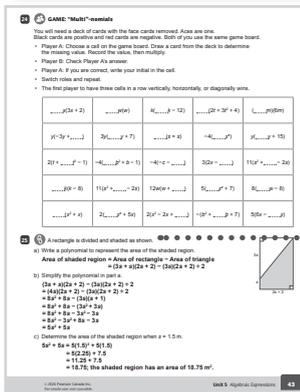
What I Learned
- allows students to reflect on what they have learned and record their understanding
- prompts students to focus on the major understandings and concepts
- provides a snapshot of students' learning

Connections question
- enables students to create their own notes on connections made visible in the moment
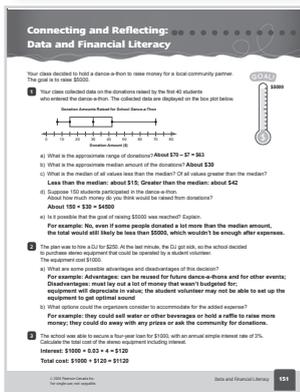
Connecting and Reflecting
- connects the learning across a practice cluster with students' lived experiences

Sample student answers are included throughout the resource.

What I Know

Ava is going to be taking public transit to college.
There are three options available.
Which is the best buy? Explain your thinking.

**For example: For Option B, one ride
would cost $29.05 ÷ 10 = $2.91, which is
a lot cheaper than the single fare.
The monthly pass has unlimited rides,
and costs about 3 times as much as Option B.
So, if they take more than 10 rides × 3,
or 30 rides per month, Option C is the best buy.**

Fare Options

Option A	Single fare (per ride)	**$3.25**
Option B	10-Ride Pass	**$29.05**
Option C	Monthly Pass	**$90.30**

To purchase either pass, would you suggest they use cash/debit card or a credit card? Why?

**For example: I would suggest they use a credit card and be sure to pay the bill on time
and in full. They would be able to earn rewards on a credit card, and it would be easy to
track their spending at the end of the month.**

Checking In

Analyzing Interest Rates

The **simple interest formula** is
$I = Prt$, where:
I = Interest
P = Principal
r = Annual interest rate (as a decimal)
t = Time, in years

1 a) Complete the table below to show the effect of changing variables on simple interest.

Principal (P)	Interest Rate (r)	Time in Years (t)	Interest (I)
$10 000	4%	5	**$2000**
$10 000	7%	5	**$3500**
$10 000	4%	8	**$3200**
$10 000	7%	10	**$7000**

b) Complete the table below to show the effect of changing variables on compound interest.
You may use a compound interest calculator.

Principal (P)	Interest Rate (r)	Time in Years (t)	Compounding Period (n)	Interest (I)
$10 000	4%	5	Yearly	**$2166.53**
$10 000	4%	5	Monthly	**$2209.97**
$10 000	4%	10	Yearly	**$4802.44**
$10 000	4%	10	Monthly	**$4908.33**
$10 000	7%	5	Yearly	**$4025.52**
$10 000	7%	10	Monthly	**$10 096.61**

c) Use the tables in parts a and b. Place a checkmark beside your preference each time.

  i) When investing:

.... simple interest   Or   ..✓.. compound interest

..✓.. higher interest rate   Or   .... lower interest rate

..✓.. more compounding periods   Or   .... fewer compounding periods

..✓.. longer time frame   Or   .... shorter time frame

  ii) When borrowing:

..✓.. simple interest   Or   .... compound interest

.... higher interest rate   Or   ..✓.. lower interest rate

.... more compounding periods   Or   ..✓.. fewer compounding periods

.... longer time frame   Or   ..✓.. shorter time frame

2   a) Complete the bank statement below.

★ BEST BANK

Statement for:
Jane Doe,
122 King St.,
Anywhere, Canada

For Nov. 1 to Nov. 30
Account Number: 12345678
Branch Number: 6543

Date	Description	Withdrawals ($)	Deposits ($)	Balance ($)
Nov. 1	Opening Balance			745.18
Nov. 5	ATM Withdrawal	50.00		**695.18**
Nov. 7	Interac® Purchase: Bob's Burgers	12.45		**682.73**
Nov. 8	Bill Payment: Cellphone	**52.42**		630.31
Nov. 12	Bill Payment: Streaming Service	13.99		**616.32**
Nov. 15	Payroll Deposit		326.19	**942.51**
Nov. 18	Interac Purchase: **Concert Ticket**	85.75		856.76
Nov. 20	e-Transfer®		100.00	**956.76**
Nov. 23	ATM Withdrawal	75.00		**881.76**
Nov. 28	Interac Purchase: Video Game	**63.15**		818.61
Nov. 30	Payroll Deposit		**281.59**	1100.20
	Closing Balance			**1100.20**

b) Use the statement to answer these questions.

  i) What period does the statement cover? **Nov. 1 to Nov. 30**

  ii) What is the account number? **12345678**

  iii) What was the total amount withdrawn from the account? **$352.76**

  iv) What was the total of all deposits? **$707.78**

  v) Was Jane able to save money over this period? How do you know?
  Yes, because the deposits are greater than the withdrawals.

  vi) How often is Jane paid?
  Twice a month (about every two weeks)

3 Ezra is looking to purchase a car for $16 000. They have been offered the two loan options shown below. Which option do you recommend they take? Explain.

Option A	
Summary Information	
Purchase Price	$16 000
Down Payment	$1000
Principal	$15 000
Annual Interest Rate	4.00%
Loan Duration (in years)	5
Number of Payments per Year	12
Total Number of Payments	60
Payment per Period	**−$276.25**
Sum of Payments	$16 574.87
Interest Cost	$1574.87
Total Costs (Loan + Interest + Down Payment)	$17 574.87

Option B	
Summary Information	
Purchase Price	$16 000
Down Payment	$0
Principal	$16 000
Annual Interest Rate	6.00%
Loan Duration (in years)	6
Number of Payments per Year	12
Total Number of Payments	72
Payment per Period	**−$276.74**
Sum of Payments	$19 925.21
Interest Cost	$3925.21
Total Costs (Loan + Interest + Down Payment)	$19 925.21

For example: Initially, Option B looks more attractive, because there is no down payment and the monthly payments are about the same. However, Option B costs more ($19 925.21 – $17 574.87 = $2350.34) because it has a higher interest rate and more monthly payments. Even if Ezra does have to save for a down payment, I recommend they choose Option A, because it costs less.

Appreciation and Depreciation

4 Each item below is shown with its original value. Circle whether you think the item will **appreciate** (increase in value) or **depreciate** (decrease in value) over time.
Then use the given percent to calculate the item's value for the next 3 years.

A new bicycle: $650   Collectable sneakers: $200   A new laptop: $900

10% per year   24% per year   20% per year

Appreciate   (Depreciate)   (Appreciate)   Depreciate   Appreciate   (Depreciate)

- Value next year:
  $650 × 0.9 = $585
- Value in 2 years:
  $585 × 0.9 = $526.50
- Value in 3 years:
  $526.50 × 0.9 = $473.85

- Value next year:
  $200 × 1.24 = $248
- Value in 2 years:
  $248 × 1.24 = $307.52
- Value in 3 years:
  $307.52 × 1.24 = $381.32

- Value next year:
  $900 × 0.8 = $720
- Value in 2 years:
  $720 × 0.8 = $576
- Value in 3 years:
  $576 × 0.8 = $460.80

5 This graph shows the value of two cell phones: the J-Phone and the K-Phone. Use the graph to answer the questions below.

Value of Phones over Time
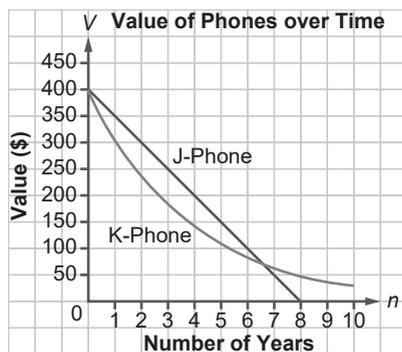
a) Does the value of the phones appreciate or depreciate? How do you know?

They depreciate as the graphs go down to the right.

b) How are the graphs alike? How are they different?

For example: Alike: Both graphs start at the same value, $400; they both decrease. Different: The graph for the J-Phone is linear and the graph for the K-Phone is non-linear.

c) How long does it take for the value of the J-Phone to decrease to half its original value?

4 years

d) How long does it take for the value of the K-Phone to decrease to half its original value?

About 2 years 8 months

e) What does the point of intersection tell you?

This is when the phones have the same value.

f) Which phone would you buy? Why?

For example: I would buy the K-Phone because even though it depreciates faster in the first few years, it tapers off and still has some value after 10 years. The value of the J-Phone is $0 after 8 years.

6 The Professional Women's Hockey League (PWHL) was established in 2023. The league had these six teams in its inaugural season:

Boston Fleet   Minnesota Frost   Montréal Victoire
New York Sirens   Ottawa Charge   Toronto Sceptres

In 2024, Harper purchased a jersey for $275 at the opening game. They had it signed by the team captains. Harper hopes that the jersey will appreciate at a rate of 12% per year. How much does Harper anticipate the jersey will be worth if they hold onto it for 10 years?

**For example: $275 × 1.12 × 1.12 × 1.12 × 1.12 × 1.12 × 1.12 × 1.12 × 1.12 × 1.12 × 1.12 = $854.11
Harper anticipates that the jersey will be worth $854.11 after 10 years.**

Making Financial Plans

7 You have been tasked with planning a school dance, with a goal of raising $1000 for your school. You need to come up with a budget.

a) i) Sort the items below as possible income or expenses. Record them in the table below. An item may occur in both places.

Decorations	Bottled Water
Rental of Sound Equipment	Rental of a Smoke Machine
Food (snacks)	Prizes
Tickets	DJ

ii) Assign one of the dollar amounts below to each item. You can use the amounts more than once.

$50 $100 $250 $500 $700 **For example:**

Expenses	Amount	Income	Amount
Decorations	**$50**	**Bottled Water**	**$250**
Prizes	**$50**	**Food (snacks)**	**$500**
Bottled Water	**$100**	**Tickets (admission)**	**$700**
Sound Equipment	**$100**	**Tickets (raffle)**	**$250**
Food (snacks)	**$100**		
Smoke Machine	**$50**		
DJ	**$250**		
Total	**$700**	Total	**$1700**

b) How profitable was your fundraiser? Did you raise at least $1000?

For example: I raised exactly $1000.
Total income − Total expenses: $1700 − $700 = $1000.

c) Suppose the budget does not show the dance making enough money. What are two adjustments you could make? Explain.

For example: I could go out into the community and try to get companies to donate prizes for the raffle. That would save $50 in expenses.
The greatest expense is the DJ. Maybe we could create a playlist on a laptop and ask a parent or teacher to manage it for us. That would save another $250.

8 **TRUE OR FALSE?**

a) Before creating a budget, you should translate general goals into specific goals that can be measured. **True**

b) Good personal records are unnecessary for financial planning. **False**

c) An example of a variable expense is eating out, which can be adjusted quite easily. **True**

d) Financial planning is an ongoing process. As your financial situation and position in life change, the plan changes. **True**

9 Financial decisions can be very difficult to make.
Pick one of the **Would You Rather** scenarios below and share the reasoning for your decision.

Scenario A

> **Would You Rather**
>
> • Put all your money, $1500, into a locked investment that earns 4% per year, but that can't be touched for 5 years
>
> OR
>
> • Put a portion of your earnings from your part-time job each month into a savings account that earns 1% per year?

Scenario B

> **Would You Rather**
>
> • Take out a 3-year loan to buy a new laptop today
>
> OR
>
> • Wait one year until you have saved enough money to buy one?

For example: Scenario A: If I am saving for college or university, I won't need the money for 4 or 5 years, so I would rather lock it away and earn a lot more interest.
Scenario B: I would rather wait for a year until I have saved enough money. By taking 3 years to pay it off, I would be paying interest, which would add to the total cost of the laptop.

10 This is the budget for a family of 2 adults and 2 children.
How could the family adjust their budget for each situation below?

a) They want to save more money so they can visit family out of the country next year.

For example: They could cut their entertainment costs by 5% and if the 15% on food includes eating out, they could eat out less often.

A Family Budget

Savings 2%
Other 5%
Entertainment 10%
Housing 35%
Gas/Insurance 15%
Medical Costs 3%
Food 15%
Utilities 10%
Debt Repayment 5%

b) The cost of transportation has increased due to a rise in gas prices.

For example: They could save money on gas by taking public transit. They may also be able to save on car insurance if they don't drive to work.

c) One of the adults has lost their job, so the family income has decreased by 40%.

For example: They might consider renting out their basement if they live in a house, or taking in a boarder, or even moving. If the adult thinks they can find another job fairly soon, they will have to cut back on as many budget categories as possible in the meantime, and/or dip into their savings.
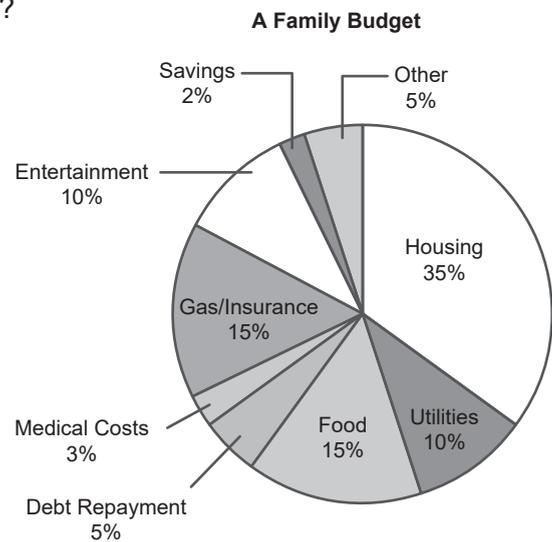
Coding

11 A bank is offering an account that pays 6.0% simple interest per year.
Asha writes Python code to determine the value of the account after 10 years,
if they make an initial deposit of $5000.

a) Which of the code samples below accurately represents this scenario?

Code A

principal = 5000
 rate = 0.040
 time = 0
 	
 for **i** in range (0,10):
      time = **time** + 1
      amount = (**principal** * **rate** * **time**) + **principal**
      print (**time**, '\t\t', **amount**)

Code B

principal = 3000
 rate = 0.060
 time = 0
 	
 for **i** in range (0,10):
      time = **time** + 1
      amount = (**principal** * **rate** * **time**) + **principal**
      print (**time**, '\t\t', **amount**)

Code C

principal = 5000
 rate = 0.060
 time = 0
 	
 for **i** in range (0,10):
      time = **time** + 1
      amount = (**principal** * **rate** * **time**) + **principal**
      print (**time**, '\t\t', **amount**)

Answer: C

b) Explain why the other code examples do not represent the given scenario.

Code A has an interest rate of 4% rather than 6%.
Code B has a principal value of $3000 rather than $5000.

c) How much will the account be worth after 10 years?

$8000; 5000 × 0.06 × 10 + 5000 = 8000

Bringing It Together

12 **ACTIVITY: Financial Decisions for Your Coffee Shop**
You are the proud owner of a local coffee shop.
Last week's sales are shown at the right.

Last Week's Sales		
Item	Cost	Number Purchased
Coffee	$5	400
Pastry	$4	375
Catering	$125	4

a) You have told the staff that $500 is missing and that there must be an error in the entries. You have three theories:

Theory A: 100 coffee transactions were entered as pastries.
Theory B: All catering payments are missing.
Theory C: 100 pastry sales weren't recorded.

Which theory is correct? How do you know?

Theory B, as 4 × $125 = $500. Theory A would account for $100, and Theory C would account for $400. It is possible that both Theory A and Theory C are correct as together they would total $500.

b) You want to focus on increasing your profits. You are considering these options:
   • Increase prices by 10%
   • Reduce staff hours
   • Source cheaper products
   • Invest some of your profits at a rate of 4% per year

Assuming you purchase the same quantities of supplies month to month, what impact might these changes have on your profit? Explain.

For example: Increasing prices by 10% might drive customers away. They may look for a different coffee shop. Reducing staff hours might result in longer wait times, and staff may quit and look for other jobs. Sourcing cheaper products might affect the quality of the products sold, potentially driving customers away. Investing some of the profits would definitely increase profits as I would get an additional $40 a year for every $1000 invested.

c) You made a profit of $32 000. Would you rather invest that money at a simple interest rate of 6% for 5 years or at 4% compounded semi-annually for 5 years? Explain.

**For example: Simple interest: I = ($32 000)(0.06)(5) = $9600
Using a compound interest calculator, the interest from the compounding investment would be $7007.82. I would rather invest at the simple interest rate.**

What I Learned

What is the most important thing you learned about budgets or financial planning? Defend your answer.

For example: The most important thing I learned about budgets is that when you have created a budget, you should be prepared to adjust it when unexpected events occur. For example, when the washing machine breaks down, you might have to adjust the budget to purchase a new one or to pay for repairs.