



Grade 9 Math: Budgeting and Salary Lesson – Teacher Material

Timeframe: 90-120 minutes (all time listed are suggestions and are subject to the needs of your class)

Outcomes addressed: N03 Comparing and ordering numbers as well as operations with rational numbers

Goals of the activity: Connect learning of rational numbers and operations to the relevance in their lives
To introduce/improve understanding of net vs. gross income and how it is determined
To explore the actual cost of living and introduce fiscal responsibility

Modifications: This activity is designed to be scaled up or down in order to accommodate the needs of the students as well as time restrictions.
It can also be done over 1 to 2 full classes or broken down and done in sections over several days.

Adding complexity

- Students can research the information on deductions and percentage breakdowns themselves, as opposed to being given the website, or the exact percentage values
- For students with enrichment needs, they can complete the multiple section breakdown of the provincial income tax bracket calculations.
- Students can create a preliminary budget with categories they feel will be important to their lives before giving them the recommended breakdowns. Then do a compare and contrast between the two versions to see what they didn't account for

Reducing Complexity

- Give students the websites with all the deduction percentages and not require their research, or give them the calculation tables included in the student worksheet section.
- Instead of finding a future career, student may find information on possible part time jobs and their pay. From that they may create a budget on the current expenses teenagers may have.
- Remove the portion of the budgeting section to only require the recommended range, as opposed to what they might actually spend based on current pricing and availability in their area
- Adjust the tax calculations to cover only the portion of the highest tax bracket percentage as opposed to the proportion



<p>Materials:</p> <ul style="list-style-type: none"> • Computer with internet access • Pencil/scrap paper • Worksheets (included in package) • Calculators 	<p>Preparing the activity:</p> <ul style="list-style-type: none"> • Some review may need to be done prior to starting the activity on how to calculate the percentage of a number. • You may also want to have a preview of the Canada tax site to show students where to look for information • Students may also need some guidance on proper research methods and how to find information in their internet research.
<p>Unpacking the lesson:</p>	
<p>Introduction: 15 minutes</p> <p>Ask students what they know about jobs and careers. Do they know the difference between hourly rate and salary? What do they know about income tax? Have they heard of employment insurance? Have they heard of the Canada pension plan?</p>	<p>How this could look:</p> <p>List student ideas on the board Graphic organizers Oral discussion Jam board session on the LCD projector</p>
<p>Part 1: Finding your net income (30-45 minutes)</p> <p>Students will work to find their CPP, EI, and income tax deductions to calculate their net income of the dream job/career they might like to have, They must first find the average salary of that career in their area, a possible link is included on the student worksheet</p> <ul style="list-style-type: none"> • Hand out student worksheet on net salary 	<p>Resources:</p> <p>NS Tax brackets- https://tinyurl.com/52ne58rr Can Tax Brackets- http://surl.li/boiuo EI premiums - http://surl.li/boiuy CPP premiums - http://surl.li/boivp</p>
<p>Part 2: Budgeting (30-45 minutes)</p> <p>Students will calculate the recommended amounts to spend on each category of expenses as well as research local costs in their area to build a proposed functional budget based on their income.</p> <ul style="list-style-type: none"> • Hand out student worksheet on budget calculations 	
<p>Wrap up: (15 minutes)</p> <p>Ask students to review reflection questions and either write/discuss their thoughts on the process of budgeting and take-home pay.</p> <ul style="list-style-type: none"> • Hand out student reflection sheet 	



Name: _____

Class: _____

Date: _____

Grade 9 Math: Future Planning

You are now magically, an adult. Even more, you have had the good luck to have landed your dream career!

Find the most recent average salary for this career in Nova Scotia.
A possible resource for salary information can be found here.

<https://www.jobbank.gc.ca/wagereport/location/ns>

If you are not sure of which career you would prefer, you may choose from a list of possible careers in different sectors.

Then go to the Canada Revenue Agency website to research the different categories of Income tax brackets as well as Employment Insurance premiums and deductions for the Canada Pension Plan. Write down the percentages.

Find out how much tax you would pay as well as how much CPP and EI fees. (Show all your calculations on the back of this page)

Part 1 Finding your Net income:

Career: _____	Monthly	Annual
Gross income:		
Federal Tax:		
Provincial Tax:		
Employment Insurance:		
Canada Pension Plan:		
Total deductions:		
Net Income:		



Deductions calculation page:

NS Income tax:	Federal Income Tax:
EI premiums:	CPP Premiums:
Total deductions:	Annual Net (take home) Income:



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Date: _____

Part 2 Building your Budget:

After you have figured out what your take-home pay would be, you need to create a budget for all of the basic necessities of life and your social priorities.

You have to find:

1. A place to live and insurance protection
2. A method of transportation
3. Utilities
4. Food
5. Debts repayments (based on your chosen career and the average student loan debt associated with its training, if any)
6. Entertainment
7. Savings for the future / vacations
8. Any other expenses/necessities

Here are the percentages that are suggested for each category. Calculate how much is recommended range to pay for each section in your budget.

Once you know the recommended maximums and minimums, decide how much you would be interested in paying in your budget. Use actual prices and costs from your personal experience or research.

Keep in mind the total of all the maximum percentages is higher than 100% so you need to pick and choose what will get more and what will get less of the recommended portion to balance your budget overall.



You cannot have a negative balance at the end of the month, your goal is to have money left over: Take home Pay \$ _____

Category:	Recommended range of your take home pay:	Current Cost:
Accommodation: 25-35%		Where is it? House / apartment / mobile home Roommates / single / partner
Insurance: 10-20%		Housing: Transportation: Health:
Food: 10-15%		
Transportation: 10-15%		Car: Bus: Maintenance: Gas:
Utilities: 5-10%		Electricity: Water: oil / natural gas: Internet : Telephone: television / streaming apps:
Savings: 10-15%		
Fun (entertainment and leisure): 5-10%		
Clothing: 5%		
Personal: 5-10%		
Debt repayment:		
Total:		
What remains:		



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Analysis / Reflection:

Are there any expenses that are not included in this list? What are they?

Is it realistic to survive on your own with this budget? Why? Why not?

How would changes to the family structure or the addition of pets affect your budget?

Imagine you lose your job, and happily have found a new one rather quickly. It pays the minimum wage of \$ 13.35 / hour is it possible to continue with the plans you created?

How would you adjust your budget to accommodate your income change in the question above?



Deductions calculation page: Option 2

<p>EI premiums:</p> <p>Salary x 1.58% = premium up to a maximum of \$952.74</p>	<p>CPP Premiums:</p> <p>Salary x 5.70% = premium up to a maximum of \$3599.80</p>
<p>NS Income Tax:</p> $\text{Salary} - x * \text{income bracket \%} + y = \text{tax \$}$	<p>Federal Income Tax:</p> $(\text{Salary} - x) * \text{income bracket \%} + y = \text{tax \$}$



Federal income tax brackets:

Less than \$50,197 - Tax = 15% - X = 0.00 - Y = 0.00	\$50,197 - \$100,392 - Tax = 20.5% - X = 50,197.00 - Y = 7,529.55	\$100,392 – \$155,625 - Tax = 26% - X = 100,392.00 - Y = 17,819.53
\$155,625 – \$221,708 - Tax = 29% - X = 155,625.00 - Y = 32,180.11	Over \$221,708 - Tax = 33% - X = 221,708.00 - Y = 51,344.18	

NS Provincial income tax brackets:

Less than \$29,590 - Tax = 8.79% - X = 0.00 - Y = 0.00	\$29,590 - \$59,180 - Tax = 14.95% - X = 29,590 - Y = 2,600.96	\$59,180 – \$93,000 - Tax = 16.67% - X = 59,180 - Y = 7,024.67
\$93,000 – \$150,000 - Tax = 17.5% - X = 93,000 - Y = 12,662.46	Over \$150,000 - Tax = 21% - X = 150,000.00 - Y = 22,637.46	



Grade 9 Math: Grocery Shopping with a Plan Lesson – Teacher Material

Timeframe: 90-120 minutes (all time listed are suggestions and are subject to the needs of your class)	
Outcomes addressed: N03 Comparing and ordering numbers as well as operations with rational numbers	
Goals of the activity: <ul style="list-style-type: none"> • To explore unit pricing, and product packaging. • To compare pricing and marketing of different grocery companies • To explore the balance between less expensive vs more expensive options for the optimal outcome 	
Modifications: <ul style="list-style-type: none"> ▪ This activity is designed to be scaled up or down in order to accommodate the needs of the students as well as time restrictions. ▪ It can also be done over 1 to 2 full classes or broken down and done in sections over several days. <p>Adding complexity</p> <ul style="list-style-type: none"> • Students can research an entire week of meals for added difficulty • Students can compare additional stores in the local area for deeper exploration of their options <p>Reducing Complexity</p> <ul style="list-style-type: none"> • Have students create meal plans for fewer days • Have students do a comparison with less stores, or for one store on multiple brands available within the same store 	
Materials: <ul style="list-style-type: none"> • Computer with internet access • Pencil/scrap paper • Worksheets (included in package) • Calculators 	Preparing the activity: <ul style="list-style-type: none"> • Some review may need to be done prior to starting the activity on how to calculate the unit price of an item. • Students may also need some guidance on proper research methods and how to find information in their internet research.



Name: _____

Class: _____

Date: _____

Unpacking the lesson:

Introduction: 15 minutes

Hand out or project on the LCD information on the importance of making healthy choices for food intake and have a discussion on the price differential of healthy organic foods vs. processed high fat low nutrition foods, and why that may be.

How this could look:

- List student ideas on the board
- Graphic organizers
- Oral discussion
- Jam board session on the LCD projector

Part 1: Planning your meal (30-45 minutes)

Students will work to create a meal plan for 10 people for a dinner party following Canada's food guide recommendations.

Have students reference the CFG for food portions and different types of food groups for a well-balanced meal. Once the meal plan is done have students go through their plan and create a grocery list of items that are needed to make them. Make sure they take into consideration how much of each ingredient they would need for 10 people. Discuss how that may affect their choice on which product/brand/package size they would buy

- Hand out student worksheet meal planning & creating a grocery list

Resources:

Canada's Food guide:

<https://food-guide.canada.ca/en/>

Canada's Food Guide For First Nations, Inuit, and Métis

<https://www.canada.ca/en/health-canada/services/food-nutrition/reports-publications/eating-well-canada-food-guide-first-nations-inuit-metis.html>

Part 2: Budgeting (30-45 minutes)

Students will research through flyers and local grocery store websites to price out the items on their grocery lists. Once they have priced out the grocery lists from at least 2 sources, they will do a cost analysis on which store would be the better option for their needs.

- Hand out student worksheet store pricing and comparison

Wrap up: (15 minutes)

Ask students to review reflection questions and either write/discuss their thoughts on the process of choosing where to source their groceries and the importance of critical analysis when making repeated purchases for essential goods.

- Hand out student reflection sheet



Grade 9 Math: Grocery Shopping With a Plan

You are on a budget, and are planning a dinner party for yourself and 9 other family/friends.

Using Canada’s food guide recommendations to help to plan and create a well-balanced meal, create a menu for an appetizer, entrée, and desert for your party. Will you include drinks, snacks? Will you make any extra?

	dishes planned	1 serving Size	10 servings
Appetizer			
Entrée			
Desert			
Snacks/Beverages			

Now that you have your meals planned, write up a grocery list of all the foods you will need to make these dishes, and how much you will need of each. (If you need more spaces, you can continue the list on a separate page)

- | | | |
|----------|-----------|-----------|
| 1. _____ | 6. _____ | 11. _____ |
| 2. _____ | 7. _____ | 12. _____ |
| 3. _____ | 8. _____ | 13. _____ |
| 4. _____ | 9. _____ | 14. _____ |
| 5. _____ | 10. _____ | 15. _____ |



Part 2: Shopping Around

Now that you know what you want to buy, it's time to find out the best place to go to get the most for your money.

Using flyers or online store websites, find prices for each of the items on your list, don't forget to record the amount of the grocery item you are getting for the price.

Grocery Item	Store 1		Store 2		Store 3	
	Price/vol.	Unit Price	Price/vol.	Unit Price	Price/vol.	Unit Price
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
Total:						



Name: _____

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Date: _____

Once all the pricing information is collected, it's time to break it down on which store gives you the best deal.

Determine the total for each store and analyse which one would be the best option to purchase your groceries?

Analysis/Reflection:

1. Which store would you choose to go to for your everyday grocery needs?

2. What consideration did you take if the store that had the best value for your money was the furthest away from where you live, or was a big box store versus a local store or farmers' co-op? Would the distance or source of the products make a difference to you decision?

3. Were you able to get all the products in the brand you were looking for? How might the packaging or brand name effect your grocery item choices?

4. What may be a reason to go to the store that does not necessarily have the lowest price?

5. What effect might the size/volume of the item you are buying have on your decision making process?



Grade 9 Math: Buying a New Car Lesson – Teacher Material

<p>Timeframe: 90-120 minutes (all time listed are suggestions and are subject to the needs of your class)</p>	
<p>Outcomes addressed: This task is recommended to be completed after the completion of Unit 2 and unit 4, and while working through unit 6.</p> <ul style="list-style-type: none"> • N03 Comparing and ordering numbers as well as operations with rational numbers • N04 Order of operations including exponents with and without technology • PR02 graph and analyse linear relations & interpolate and extrapolate to solve problems 	
<p>Goals of the activity:</p> <ul style="list-style-type: none"> • Connect learning of linear relationships to financial situations • To introduce/improve understanding of sticker price vs. actual cost • To introduce the concept of the cost of a loan 	
<p>Modifications:</p> <ul style="list-style-type: none"> ▪ This activity is designed to be scaled up or down in order to accommodate the needs of the students as well as time restrictions. ▪ It can also be done over 1 to 2 full classes or broken down and done in sections over several days. <p>Adding complexity</p> <ul style="list-style-type: none"> • Students could explore the effect of using different down payments to the total cost of a new vehicle in addition to the different loan term lengths • Students could explore the effect of different interest rates in conjunction with different term durations <p>Reducing Complexity</p> <ul style="list-style-type: none"> • Students could already be given the monthly payments for a set down payment for each loan duration. • To assist students the teacher could model how to complete 1 term of for students to have a reference. • Students could compare only 2 durations instead of 4 	
<p>Materials:</p> <ul style="list-style-type: none"> • Computer with internet access • Pencil/scrap paper • Worksheets (included in package) • Calculators 	<p>Preparing the activity:</p> <ul style="list-style-type: none"> • Some review may needed to be done prior to starting the activity on how to calculate interest as well as how to set up a proper graph with scales and titles. • Students may also need some guidance on proper research methods and how to find information in their internet research.



Unpacking the lesson:	
<p>Introduction: 15 minutes</p> <p>Ask students if they plan on getting their drivers licence when they turn 16. Ask how they get around, do they have their parents take them where they need to go? Or will they take public transit? Is transit an option where they live?</p> <p>Have a conversation about what all goes into buying a car, how the the price tag on the commercial or in the ad isn't the actual price you have to pay. Before moving on, have students decide on what car they would be interested in buying if they were buying right now.</p>	<p>How this could look:</p> <ul style="list-style-type: none"> • List student ideas on the board • Graphic organizers (word webs etc.) • Oral discussion • Jam board session on the LCD projector
<p>Part 1: Finding your monthly Payment (30-45 minutes)</p> <p>Students will work to find the list price of the car they are looking to buy. They will then use the car loan repayment tool to determine the monthly payment required to pay for their car. They will research the average car loan interest rate and determine the monthly payment for a 4 year, 5 year, 6 year, and 7 year repayment term.</p> <ul style="list-style-type: none"> • Hand out student worksheet on car loan repayment calculator 	<p>Resources:</p> <p>Scotia Bank Auto Loan payment calculator: https://tinyurl.com/nn4hr2mc</p>
<p>Part 2: Finding your true cost (30-45 minutes)</p> <p>Once students know the monthly payments for the 4 different repayment periods, they will graph the actual cost of purchasing the car to determine the full cost of financing the car. All 4 graphs will go on the same graph, to be able to compare and contrast them.</p> <ul style="list-style-type: none"> • Hand out student worksheet 	
<p>Wrap up: (15 minutes)</p> <p>Ask students to review reflection questions and either write/discuss their thoughts on the process of buying a car, and how to go about making the best choice at the time and circumstances.</p> <ul style="list-style-type: none"> • Hand out student reflection sheet 	



Name: _____

Class: _____

Date: _____

Grade 9 Math: The Real Cost of Buying a Car

Many students dream of their first car and getting their licences. You are in the market for buying your dream car to find out the real costs of buying a car. New cars only, no pre owned, used, or private sales. Select the make and model of the car you would like to buy, and go to the site of the dealership that sells that vehicle.

Make and model of your vehicle: _____

Part 1: Finding your monthly payment

You can use the car loan payment calculator tool to help you in your work:

<https://tinyurl.com/nn4hr2mc>

	4 year term	5 year term	6 year term	7 year term
Price of vehicle				
Tax (15%)				
Down Payment				
Balance to finance				
Interest (%)				
Number of payments	48	60	72	84
Monthly Payment				

Using any of the strategies already covered in class, create a linear equation to represent the total cost of the car for each of the repayment periods.

4 year: _____

6 year: _____

5 year: _____

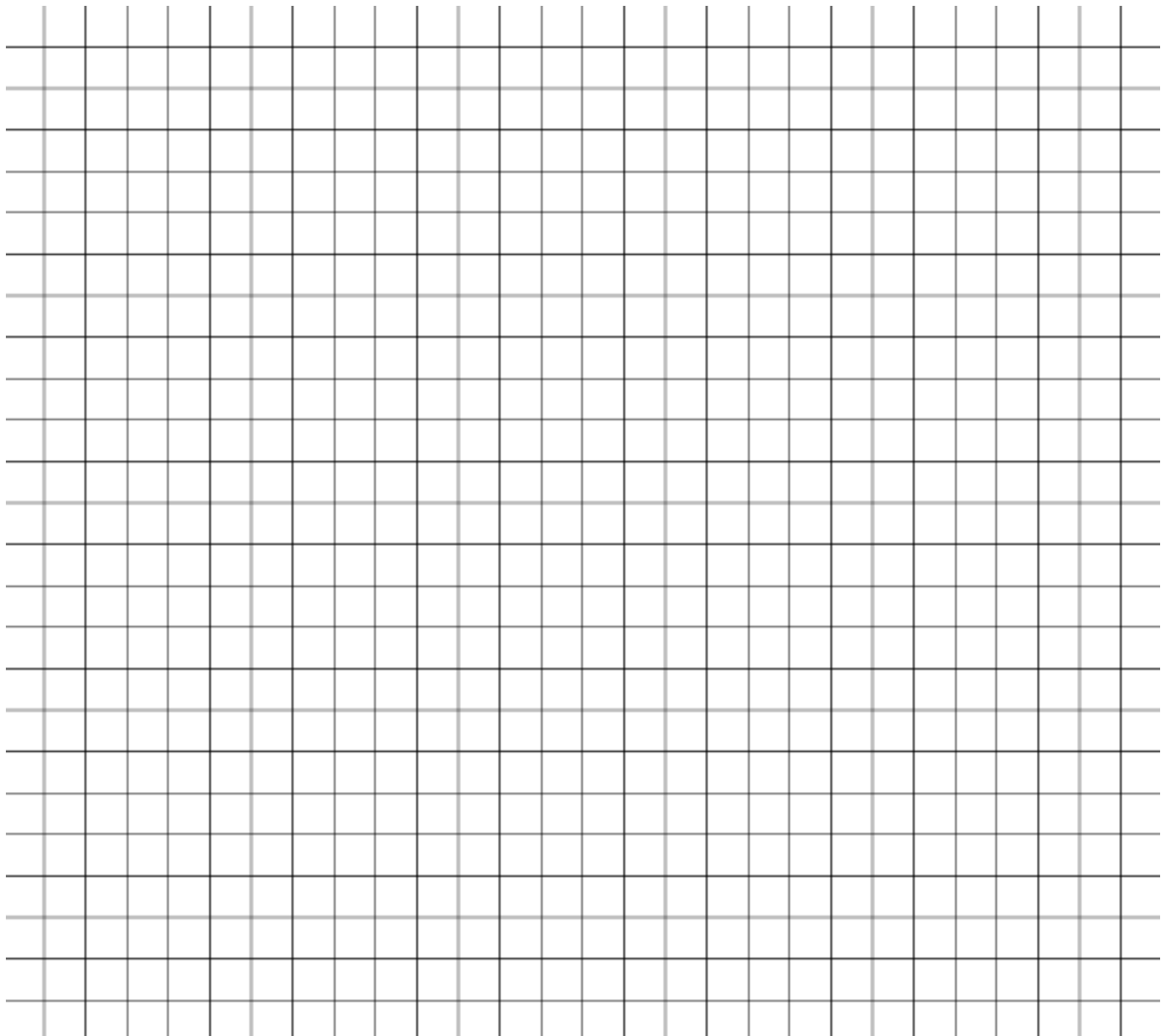
7 year: _____



Part 2: Finding your true cost

Now that you have an equation that represents each repayment term, graph each of the repayment terms on the same graph to compare them to each other. Don't forget to label each one so as to not confuse your data. Once all 4 repayment terms are graphed, add an equation for if you were to buy the vehicle outright for cash, and not to finance it.

Title: _____





Name: _____

Class: _____

Date: _____

Analysis/Reflection:

1. What is the effect of lengthening the repayment term on a car loan? On shortening it?

2. If you were to adjust your down payment, what effect would that have on your total costs?

3. What would be the best option to choose in your repayment terms? Why?

4. Why might someone choose a repayment term that would cost them more money in the end of the repayment term?

5. What has going through this process taught you about the cost of borrowing money?



Grade 9 Math: Starting a Small Business Lesson – Teacher Material

Timeframe: 90-120 minutes (all time listed are suggestions and are subject to the needs of your class)	
Outcomes addressed: PR02 graph and analyse linear relations & interpolate and extrapolate to solve problems	
Goals of the activity: <ul style="list-style-type: none"> • Connect learning of linear relationships to financial situations • To introduce/improve understanding of profit and expenses in small business 	
Modifications: <ul style="list-style-type: none"> ▪ This activity is designed to be scaled up or down in order to accommodate the needs of the students as well as time restrictions. ▪ It can also be done over 1 to 2 full classes or broken down and done in sections over several days. <p>Adding complexity</p> <ul style="list-style-type: none"> • Have students incorporate more aspects to business models by researching costs associated to running/starting a business • Incorporate inequalities by setting up an inequalities expression for sales vs. expenses <p>Reducing Complexity</p> <ul style="list-style-type: none"> • Give students the average costs for rented commercial space, business insurance, etc. for the fixed costs • Set up how to create an equation for the students and have them fill in the missing portions 	
Materials: <ul style="list-style-type: none"> • Computer with internet access • Pencil/scrap paper/graph paper • Worksheets (included in package) • Calculators 	Preparing the activity: <ul style="list-style-type: none"> • Some review may needed to be done prior to starting the activity on how to create an equation from a given pattern. • Students may also need some guidance on proper research methods and how to find information in their internet research.



Name: _____

Class: _____

Date: _____



Unpacking the lesson:

Introduction: 15 minutes

Ask students what they know about small businesses. Discuss overhead, expenses, profit margins, and break even. These vocabulary terms are common in the business sector, and many students are already venturing into the realm small business with different products and services. Before moving on, have students decide on what product they will sell/provide.

How this could look:

- List student ideas on the board
- Graphic organizers (word webs etc.)
- Oral discussion
- Jam board session on the LCD projector

Part 1: Finding your Business Expenses (30-45 minutes)

Students will work to find their expenses for the small business they would like to have. They should include aspects such as rent, materials, salary, equipment, web hosting services etc. Once they know the start-up (one-time costs), they should determine their unit expenses. With both pieces of information, they will then create a linear equation to represent the costs associated with their business, and then graph it. It should be set up as total costs vs. units sold

- Hand out student worksheet on business expenses

Resources:

Commercial rental property is generally rented by the square foot, and average costs run from 7-30\$/sq.ft. based on location

Average insurance costs: 83-250\$/month

Part 2: Budgeting (30-45 minutes)

Students will determine through research and comparison the price they will charge for their product/service. If it is more than the average they must have a reason, likewise if they choose to charge less, there must be a reason. Once their pricing has been determined, they will create a linear equation to represent their profits. It must be graphed on the same graph as their business expenses.

- Hand out student worksheet on product profits

Wrap up: (15 minutes)

Ask students to review reflection questions and either write/discuss their thoughts on the process of running a small business and what it takes to be successful.

- Hand out student reflection sheet



Grade 9 Math: Starting a Small Business

You are going into business! You've got a great idea for a product or a service that you can provide for the people in your area. You are researching what it will take to set up your business, and how to go about making a profit.

Find/come up with a product or service you would be interested in selling. Is it a tangible object or is it a service you would provide? Are you going to have a physical store/office for customers to come to you or will you work from home and primarily online? What might it cost for equipment and materials? Are they one-time costs or do you need to replenish them?

Part 1: Business Expenses

Product/service offered: _____

Typical Small business costs:		Type of cost (check one)	
Item:	Cost:	One time Cost	Variable Costs
Office space			
Equipment			
Communications			
Utilities			
Licenses and permits			
Insurance			
Staff			
Inventory			
Personal salary			
Advertising and marketing			
Market research			
Printed marketing materials			
Making a website			
Total:			



Based on the one-time costs and the variable cost per unit of product, create a linear equation that represents your business expenses for a given month.

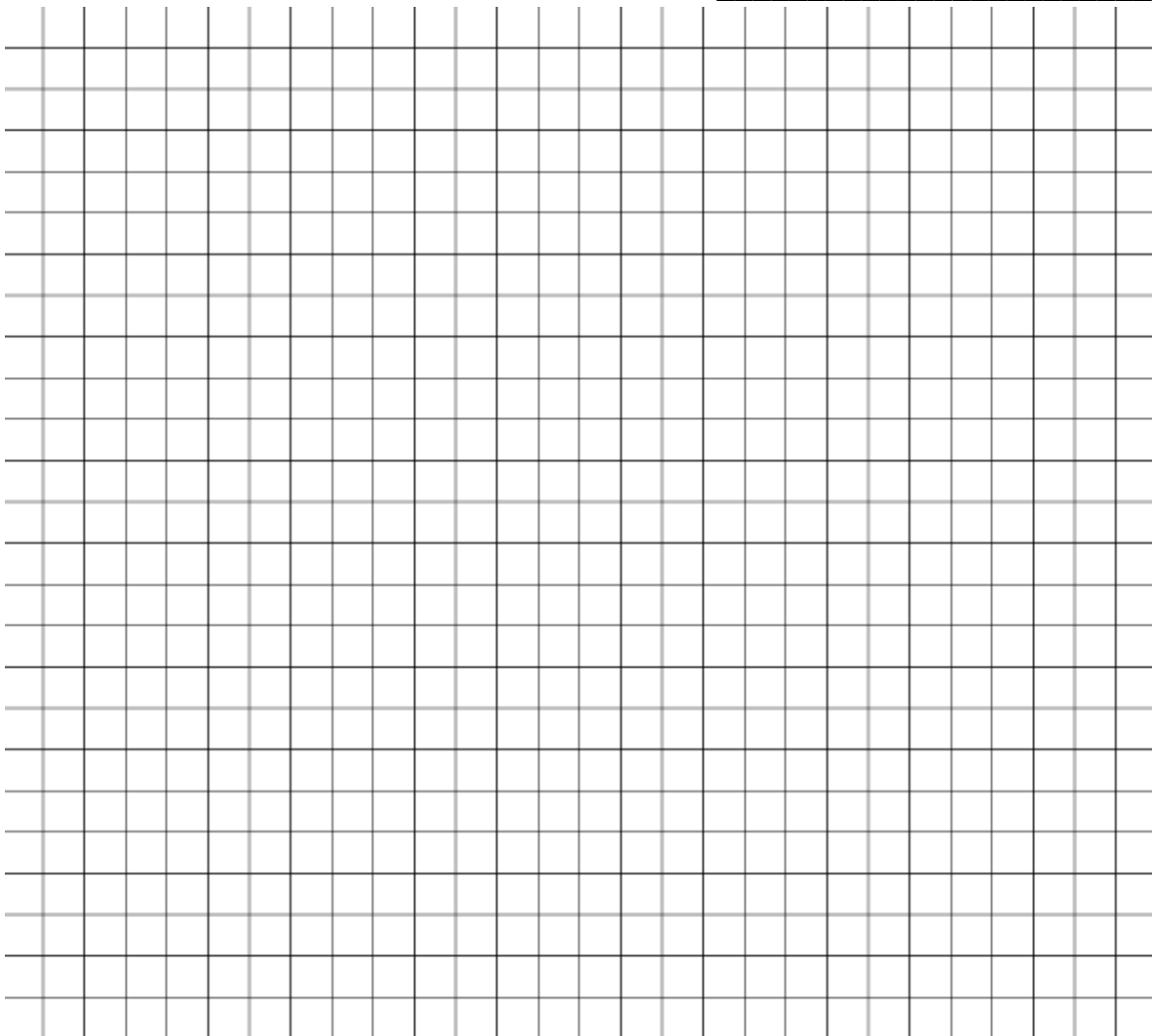
Equation to represent costs for your business: _____

Now that you have an equation to represent your business costs, graph the expenses for your first month in operation on the grid below. Consider this as the first month in operation as there are costs associated to start up that are not required later on.

Keep in mind what your variables are for your product (cost amounts vs product sales in a one month time period).

If you are performing a service, hours worked may be your x axis, if you are selling a product, then product units sold would be on your x axis. (Don't forget to label your axes, give a legend for your scales, and a title for your graph)

Title: _____





Part 2: Business Profits

Now that you know what it will cost to run your business, it's time to determine what you will charge for your product/service.

Do some market research for similar products/services available near you, what are those companies charging? Will you charge the same? More? Less? Why?

Price per unit of goods/service: _____

Reason for price: _____

What is the Linear equation that would represent the sales for your small business?

Equation: _____

Graph the potential profits for your product/service in a month on the same graph as the expenses in part 1.

1. How many units of goods/services do you need to sell to break even?

2. If this were not the first month your business was opened, what effect would that have on your break even?

3. How do you know you're have made enough to cover all your costs? You can use your graph or your equation to solve.

4. How many sales do you have to make in order to make a livable wage?



Name: _____

Class: _____

Date: _____

Analysis/Reflection:

1. Are there other items on the suggested small business cost list that were/were not included? Why might that be the case?

2. Are you planning on hiring staff? How will that effect your break-even point?

3. Why might it be important to have help/staff?

4. What hours of operation will you have for your business?

5. What has going through this process made you realize about going into business for yourself?