

Unit 5: It's In Your Best Interest

Time: 13 hours

Unit Description

Students investigate the features and conditions of credit cards, debit cards, and short-term loans. Using spreadsheet software, students examine the financial implications of delayed credit card payments and of personal loan features. The total interest paid is compared to the principal amount to determine advantages or disadvantages of borrowing options. Various payment alternatives are explored to help students make informed decisions regarding available loan features.

Strand(s) and Expectations

Strand(s): Saving, Investing, and Borrowing; Earning, Paying Taxes, and Purchasing

Overall Expectations

SIV.01 - calculate simple and compound interest;

SIV.03 - solve problems involving different ways of borrowing;

EPV.03 - solve problems involving the purchase of items.

Specific Expectations

SI1.01 - calculate interest earned and total amount in applications involving simple interest;

SI3.01 - describe the features of various credit cards and debit cards;

SI3.02 - demonstrate, through the use of technology, the effects of delayed payment on a credit card balance, using current rates;

SI3.03 - describe the features and conditions of various short-term loans (e.g., car loans, loans to consolidate debt, lines of credit);

SI3.04 - generate an amortization table for a personal loan whose features are described, using a given spreadsheet template;

SI3.05 - calculate the total amount of interest paid over the life of a personal loan, using a given spreadsheet template, and compare this amount with the original principal of the loan;

SI3.06 – compare the effects of various payment periods on the length of time needed to pay off loans, using a given spreadsheet template;

SI3.07 - explain the advantages and disadvantages of borrowing;

EP3.05 - identify various incentives to make purchases (e.g., Air Miles, coupons, stamps, interest-free loans), and explain their characteristics;

EP3.08 - identify, calculate, and compare the interest costs involved in making purchases under various plans (e.g., installment, layaway, credit card, credit line), using technology (e.g., spreadsheets, money-management software).

Activity Titles (Time + Sequence)

Activity 1	The ABCs of Borrowing (discovering terminology used throughout the unit and investigating debit cards)	75 minutes
Activity 2	Plastic Rules (investigating features of credit cards)	75 minutes
Activity 3	Deep in Debt (examining various payment methods for credit cards)	150 minutes
Activity 4	Give yourself some credit! (exploring different borrowing options)	150 minutes
Activity 5	Need for Speed (investigate how more frequent payments will affect the length of time to pay off a loan)	75 minutes
Activity 6	Summative Activity: Compare and Beware	150 minutes

* 105 minutes has been allotted for skill consolidation as needed throughout the unit.

Unit Planning Notes

- To allow students to focus on the concepts rather than some of the complicated calculations many of these investigations use spreadsheets. The teacher books a lab or ensures that computers are available to share.
- The teacher should gather information from banks, credit unions, and credit card companies to provide students with up-to-date information about policies and interest rates.
- Students create a Borrower's Guide and need a duo-tang or folder to record their discoveries.

Prior Knowledge Required

It is assumed that students have had some exposure to the concepts of simple and compound interest at this point (at least Unit 3), working with percents, and entering information into spreadsheets.

Teaching/Learning Strategies

- Although students are working through calculations, technology is used to assist this process in order to allow students to work with realistic data and to work more efficiently. As a result of this they should become informed and careful borrowers.
- Due to the diversity of student backgrounds, this unit requires flexibility of timing to accommodate a variety of skill levels.
- Teachers are encouraged to engage students in review throughout the unit in order to promote success prior to an activity.
- If a full computer lab is not available students could work in small groups or alternate between desk work and computer work during the period.
- If only one computer is available at times the teacher should do a demonstration on the overhead ensuring that students play an active part in the discussion and investigation.

Assessment and Evaluation

The assessment should reflect the activities completed during this unit. A focus on understanding the trends and knowledge of borrowing as a result of investigating a variety of calculations through the use of technology. Formative feedback should be provided early in the unit moving to more formal assessment towards the end. Students should be reminded that the Borrower's Guide will be a major part of the final evaluation for this unit and must be kept up-to-date.

Resources

Chilton, David. *The Wealthy Barber*. Toronto: Stoddart Publishing Co. Limited., 1989.

Fisher, Sarah, Susan Shelley, and James Gravelle. *Complete Idiot's Guide to Personal Finance in Your 20's and 30's for Canadians*. Scarborough: Prentice Hall Canada Inc., 1999.

Suggested websites:

www.visa.com (choose consumer tips)

www.canbus.com (A magazine with a variety of topics of current relevance. Proceed through the homepage).

www.strategis.ic.gc.ca - choose English, choose Consumer Information, choose Consumer Connection, now choose Credit Card Costs Calculator. Another helpful and interesting connection is from Consumer Connection choose Selecting a Financial Institution and choose CBC's Streetcents "Some tips.... money"

www.webmath.com (compound interest)

www.scotiabank.com (financial instruments)

www.royalbank.com (financial instruments)

www.bmo.com
www.canadatrust.com
www.cibc.com
www.preschoicefinancial.com
www.tdbank.ca

Online calculators:

www.seclonlogic.com/demo/planning.asp
www.ezdotcom.com/retire.htm
www.canadatrust.com/index.htm
www.nucleus.com/wealthnet/
www.imoney.com/index_home.html

Other suggestions:

Visit your local bank, trust company or credit union for pamphlets and up-to-date interest rates. Most banks will send a representative to your class to discuss the issue of choices related to money.

Activity 1: The ABCs of Borrowing

Time: 75 minutes

Description

Students explore the terms and vocabulary that relate to borrowing and begin working on A Borrower's Dictionary as part of their Borrower's Guide. Students investigate the different fees, which apply to debit cards and use reasoning to select a particular card for a user with a particular profile.

Strand(s) and Expectations

Strand(s): Saving, Investing and Borrowing

Overall Expectation(s)

SIV.03 - solve problems involving different ways of borrowing.

Specific Expectation(s)

SI3.01 - describe the features of various credit cards and debit cards.

Planning Notes

- Prepare worksheet relating to borrowing terms and vocabulary (Worksheet 1).
- Each student will require a duo-tang or folder to create the Borrower's Guide.
- Make materials related to borrowing (flyers from banks, newspapers, magazine articles) available to students.
- Prepare worksheet on debit cards (Sample Worksheet 2).

Prior Knowledge Required

Some familiarity with banking terminology from Unit 3 is required.

Teaching/Learning Strategies

Student Activity

Students:

- work in groups to complete a vocabulary worksheet related to borrowing;
- begin a Borrower's Guide, a portfolio of student work meant to be a guide to potential borrowers;
- investigate different fee structures for debit cards and make choices based on real-life scenarios.

Teacher Facilitation

- Introduce the challenge to students of completing the ABC's of Borrowing (Worksheet 1).
- Offer an incentive for the group that is the first to correctly complete the greatest number of blanks
- Provide banking materials (flyers, pamphlets, newspapers) which allow students to search out terms which complete the "ABC" challenge.
- Ask the teams to pick their "Top 10" list of terms (either what they feel is most important or most challenging to them).
- Provide students with a folder or duo-tang to begin the on-going activity of creating a Borrower's Guide.
- Explain to students that the Borrower's Guide is an ongoing portfolio activity, which involves students creating a book with tips and information for the potential borrower. Remind students that this book will be a large part of their evaluation for this unit. Students place many different items and pieces of work into this book. Suggested headings for the Borrower's Guide are: Borrower's Dictionary, Credit Cards, Advertising, Borrowing Options, Trends, etc.
- Provide a guideline, which describes to students how the Borrower's Guide will be evaluated.
- Have students create a section in their Borrower's Guide entitled the Borrower's Dictionary.
- Instruct students to record the "top 10" list of terms and their definitions into this section.
- Provide students with handout on debit cards (Worksheet 2). Work through first part of handout as a class. The remainder of handout can be done in pairs.

Assessment/Evaluation Techniques

Assess work habits by assessing the organization of Borrower's Dictionary and credit card application assignment. Assess initiative by students' level of participation in seeking out terms in provided materials. Students could do a self-assessment for this. Evaluate Knowledge/Understanding by evaluating the correctness of the Borrower's Dictionary. Evaluate students' Thinking/Inquiry/Problem Solving by evaluating the debit card assignment for appropriate conclusions and completeness of justifications.

Accommodations

The teacher may wish to provide students with the first ten words (and even definitions) to be written in their Borrower's Dictionary instead of the students choosing them themselves. Gradually throughout the units, students can be expected to take more and more responsibility for the words entered into this glossary. Students who complete their work ahead of others may make up their own entries for various letters and share this with this class, e.g., for each letter in his or her name.

Resources

Pamphlets from banking institutions describing their fees for debit cards.

Sample Worksheet 1 The ABCs of Borrowing

Note: Omit the words in brackets () and insert blanks on the worksheet for students.

Suggestions to help students complete form:

- Mix up statements so they aren't in alphabetical order and provide the list of words for students to match

OR

- Provide students with word list with two or three word choices for each letter of the alphabet

1. Sometimes, getting some cash simply involves accessing your (account)
[Other "A" word suggestions: amortization, annual]
2. If you don't have enough money in your account, you might have to (borrow) it.
3. When you put all of your debt together into one loan, you are (consolidating) your debt.
[Other "C" word suggestions: cash, collateral]
4. Be sure to watch out for the fees associated with (debit cards) before you use ATM machines all of the time.
[Other "D" word suggestion: debt]
5. One of the conveniences of a debit card is that it is relatively (easy) to use.
6. There are ALWAYS (fees) associated with borrowing so do not be fooled by certain advertising.
7. Sometimes if individuals do not pay their bills, wages could be (garnisheed).
8. Be aware of (hidden) costs, which may result if you do not make a loan payment on time.
9. The (interest) rates on credit cards can sometimes exceed twenty percent!
10. A full time (job) is often seen by credit companies as an advantage when applying for a credit card.
11. (Knowing) your limitations is always best when it comes to spending money.
12. A (line of credit) may be a good option for you if you would like to have an amount of cash available to you for spending.
13. It will cost you a lot in interest if you continue to make only the (minimum payment) on your credit card.
[Other "M" word suggestion: monthly payment]
14. Try to borrow in cases of (need) instead of cases of WANT.
15. (Overdue) credit card payments can lead to a poor credit rating.
[Other "O" word suggestion: open loan]
16. It is important to have a working knowledge of (percent) when you are dealing with calculations related to borrowing.
17. A common (question) asked when applying for a loan is whether or not you can foresee any problems with making a particular loan payment.
18. It is becoming more common for credit cards to offer (rewards) for using them such as Air Miles or points for free merchandise.
19. Car loans, loans to consolidate debt, and lines of credit are all considered to be (short term) loans.
20. Spreadsheets are just one form of (technology) which help you to make interest calculations quickly and accurately.
[Other "T" word suggestion: term]
21. You are only able to (use) your credit card until you reach your allowed limit.
22. When making a borrowing decision, you will need to (weigh) your borrowing options.
24. When you fill out a loan or a credit application, don't forget to sign at the (X).
[Other "X" word suggestion: xanthus]
25. Another way for saying annual interest is the interest rate paid per (year).
26. You will not be charged interest on your credit card if you have a (zero) balance.

Sample Worksheet 2 – Debit Card Dilemma

The Piggy Bank offers the following debit card packages:

Package A	Package B	Package C
- \$1.00/usage for cash withdrawal at any machine	- \$1.50/usage for cash withdrawal at any non-Piggy machine	- \$20.00 flat fee for cash withdrawals, regardless of usage
- \$0.75/usage for interac purchases	- free cash withdrawals at any “Piggy” Bank cash machine no charge for interac purchases	- \$1.00/interac purchase
- free deposits	- free deposits	- free deposits

1. Jeff is a 28-year-old teacher who enjoys going out on the town. He tends to make frequent cash withdrawals because he doesn't want to carry a lot of cash at once. He tends to use the bank machine that is most convenient at the time. He uses his debit card to make purchases about a dozen times a week. What package would you suggest for Jeff? Justify your reasoning.

Provide students with other similar scenarios.

Activity 2: Plastic Rules

Time: 75 minutes

Description

An application for a credit card is completed, along with a review of various percentage problems related to credit. Students receive their first credit card bill and work through a treasure hunt activity to increase familiarity with bill features.

Strand(s) and Expectations

Strand(s): Saving, Investing and Borrowing, Earning, Paying Taxes, and Purchasing

Overall Expectations

SIV.03 - solve problems involving different ways of borrowing;

EPV.03 - solve problems involving the purchasing of items.

Specific Expectations

SI3.01 - describe the features of various credit cards and debit cards;

SI3.07 - explain the advantages and disadvantages of borrowing;

EP3.05 - identify various incentives to make purchases (e.g., Air Miles, coupons, stamps, interest-free loans), and explain their characteristics.

Planning Notes

- Credit card applications (genuine or teacher-modified) are required for each student.
- Prepare an overhead with profile information for the credit card application (income, other credit history, etc.).
- Prepare percentage exercises for students to review simple interest and percentage calculations. Questions may be presented in a fun format in conjunction with the credit card application. For example, students could be told that they are “skill testing questions” which need to be completed in order for their credit card application to be approved.

- Prepare credit card bill statements (see Resources). The back of the credit card bill statement need to be copied or modified from an actual credit card bill. The “fine print” information listed here should be drawn from in Sample Worksheet 1.
- Prepare Treasure Hunt for Gold (card) (Sample Worksheet 1).

Prior Knowledge

- Students require knowledge calculations involving percentages.

Teaching/Learning Strategies

Student Activity

Students:

- complete a credit card application given specific credit information;
- review math questions relating to percent;
- apply percent to simple interest questions;
- retrieve a sample piece of credit card literature featuring an incentive plan (mailer, advertisement, Internet ad);
- work through a treasure hunt activity on the features of a credit card bill (Worksheet 1).

Teaching Strategies

- Suggest to students that money may not always be readily available in their account; invite discussion as to the other options available to the consumer. Ensure that the concept of credit cards arises.
- Discuss the advantages and disadvantages of borrowing. Record the results of this discussion in chart form on the board or an overhead projector, have students record in their Borrower’s Guide and remind them to leave room for additions as they explore further.
- Provide each student with a blank credit card application.
- Assist students with completion of the credit profile information by providing all necessary information other than the students’ own name, address, phone number and birth date.
- Use the “skill testing question” concept at the end of the credit card application as a fun way to review percent questions and simple interest calculations.
- Instruct students to retrieve a piece of advertising relating to a credit card (suggestions: mailer, advertisement, printout of an Internet ad) featuring some sort of incentive program (e.g., Air Miles). This item is to be included in the advertising section of the Borrower’s Guide.
- Present each student with their credit card bill once they hand in an application.
- Provide each student with a Treasure Hunt for Gold(card) worksheet (Sample Worksheet 1)

Assessment/Evaluation Techniques

- Provide students with formative assessment.

Accommodations

Make a simplified credit card application available to students. ESL/ELD students would benefit from opportunities to hear and speak words and phrases related to credit card applications and transactions.

Resources

Aten, Jerry. *Math for the Real World*. Grand Rapids: Corel, 1997. (pp. 21-24)

Golomb, Kristen. *Economics and You*. United States: Mark Twain Publishing, 1996.
(p. 44, sample credit card application and statement)

Actual credit card bills (both front and back, with private information removed) are recommended to increase the validity of this activity.

Students can experiment with online credit card applications at: <http://credit-cards-online.com>

www.yourmoney.cba.ca (for credit information relevant to young people)
www.creditcardgoodies.com (lists credit cards that offer various incentives)
www.eyeoncredit.com (list credit cards with incentives)

Sample Worksheet 1 - Treasure Hunt for Gold (card) (must include a copy of a credit card bill-front and back)

1. Circle the date by which payment is due.
2. Put a box around the account number.
3. Put a smiley face next to the “fine print” section relating to how you are billed when you use your charge card in a foreign country.
4. Put a double underline under the minimum payment that is due.
5. Circle the number that you should call if your card is stolen.
6. Put a sad face next to the annual interest rate that you are being charged.
7. Write down the total credit limit that you have available: _____
8. Write down the total amount that has been charged over the last billing period: _____
9. Put a star beside the number that you should call if you have any questions about your bill.
10. Name three ways that you may make a payment on this bill.
_____, _____, _____
11. Is there interest charged on new purchases that appear on this bill if full payment is received by the due date? Yes No
12. Put a squiggly line under the two types of services to which interest is applied as soon as they are used. (Answer here is: cash advances, and credit card cheques)
13. What does it mean if your new balance has a CR after it?
14. Where did you eat on... (date appearing on credit card bill with a restaurant charge on it)
15. How many purchases did you make all together in the last month?
16. Draw an arrow pointing to the amount of interest accumulated over the last month.
17. How much credit is remaining on this credit card? _____
18. What is the section called that lists the details of each charged item?
19. On what date did you get gas from... (e.g., Petrocan)?
20. Put two squiggly lines under the balance that would have appeared on the last statement.

Activity 3: Deep in Debt

Time: 150 minutes

Description

Payment scenarios for credit cards are explored. The goal is to demonstrate the effect of delaying payment on the total amount of money paid. Individual credit purchases are made and students create credit card bills that accompany such purchases based on a prescribed credit limit and interest rate. Conclusions are drawn about the advantages and disadvantages of credit.

Strand(s) and Expectations

Strands: Saving, Investing, and Borrowing

Overall Expectations

SIV.03 - solve problems involving different ways of borrowing.

Specific Expectations

SI3.01 - describe the features of various credit cards and debit cards;

SI3.02 - demonstrate, through the use of technology, the effects of delayed payment on a credit card balance, using current rates.

Planning Notes

- Prepare overhead with framework for extended calculations from credit card bill (see Sample Worksheet 1)
- Provide chart paper to display group work results.
- Prepare handout/overhead with chart for ease of student calculation (see Sample Worksheet 1).
- Prepare blank credit card bill statements (see resources).
- Prepare cards with varying credit limit, interest rate and salary scenarios on them. Suggested ranges are annual interest rate (between 6.5% and 24%), credit limit (between \$4000 -10 000) and monthly take-home salary (between \$1800 and \$4000).
- Provide flyers and advertisements for students to “shop” with.
- Prepare additional copies of Sample Worksheet 1 (or adaptation) for students to communicate proposed payment schedule.

Prior Knowledge Required

Students require knowledge of calculations involving percentages.

Teacher/Learning Strategies

Student Activity

Students:

- follow teacher-led examples on calculating credit card bill balances and plan payments;
- work in groups using calculators and/or spreadsheets to determine the effect of a particular payment schedule on the total amount paid and compare these figures with those of differing payment schedules;
- make purchases on a credit card with a prescribed rate and limit;
- complete a credit card bill statement that reflects these purchases;
- make “payments” on this bill within certain limitations;
- propose a plan related to the repayment of this bill.

Teacher Facilitation

- Calculations of credit card charges are quite complicated. The teacher may wish to use a spreadsheet (Sample Worksheet 2) or credit software (see Resources).

Part 1: Teacher-led discussion

- Work through one example with students which shows how interest is calculated from the date of purchase. For example:

balance carried forward:			\$1250
purchase	June 10	Crazy Harry's	\$45.30
purchase	June 16	Super Gas	\$25.00

The bill is due on July 3 and the person pays \$30. Show how interest will be calculated for the entire month for the balance carried forward and from the date of the purchase for the other items and explain that the \$30 payment is applied to the previous balance. Refer to the back of the credit card statement from Activity 2 to point out these terms. Use the daily interest rate provided on the bill.

- Work through a payment scenario with the class for this month, based on the information above and using the information from the back of last days bill. Then show students how long it will take to pay off the bill if the minimum payment is made each month without making any other purchases. A spreadsheet will help students see the slow progression in paying off the bill.

Part 2: Group activity

- Divide students into groups of four or five and provide each group with a different payment scenario. For example: Group A pays \$100/month, group B pays \$175, etc. The groups predict the outstanding balance after a year. (Use Sample Worksheet 1, a chart for each month) Students may choose to do this on a spreadsheet if available.
- **Have students start from the balance you have calculated for August so that they don't have to get caught up in the complications of calculating interest from the purchase date.**
- Provide chart paper so that students can present data to the class.
- Lead a class discussion, which relates the information provided by the groups, and draws conclusions regarding the advantages and disadvantages of credit.

Part 3: Individual

- When students work through this portion of the activity allow them to calculate the interest for the entire month instead of to the exact purchase date. This will allow students to understand the effects of purchasing on credit without getting caught up in the calculations.
- Allow each student to randomly draw their interest rate card (between 6.5% and 24%), credit limit cards (between \$4000 - 10 000) and monthly take-home salary cards (between \$1800 and \$4000).
- Distribute blank credit card bill Sample Worksheet 1.
- Provide current local flyers and advertisements so that students may “shop” and select items for purchase.
- Instruct students to make a minimum of two purchases per month for two months (minimum of \$800/month total).
- Instruct students to create complete credit card bills, which reflect these transactions. Dates and particulars of purchase should be included. Payments should also be recorded and are up to the discretion of the student. However, students should be reminded that they should plan on being able to pay no more than ten percent of their monthly salary on credit card balances. They must always make at least the minimum payment.
- Suggest that students make no further purchases after four months, but devise a schedule to allow for the bill to be completely paid within the next 8 - 12 months (again with the limitation that no more than 10% of their salary be used). Sample Worksheet 1 or modification of Sample Worksheet 1 may again be used to display this information.

- Some students may not be able to pay off their bill. This should be discussed. For example, ask “Will credit card companies give you credit limits higher than you can realistically deal with?”
- Have students include a chart in their Borrower’s Guide, which highlights the advantages and disadvantages of credit (to be included in the credit section).

Assessment/Evaluation Techniques

Assess students’ teamwork as they work in their groups. Assess work habits while working on the final “shopping” activity. Assess students’ Problem Solving by evaluating the final “shopping” activity and assess Application by examining students’ advantages/disadvantages chart in their Borrower’s Guide.

Accommodations

If spreadsheet technology is available, teachers may wish to work through the calculations featured in Worksheet 1 on spreadsheet software. The teacher may wish to develop the “advantages/disadvantages to credit” chart as a class.

Resources

Actual credit card bills (both front and back, with private information removed) are recommended to increase the validity of this activity.

Aten, Jerry. *Math for the Real World*. Grand Rapids: Corel, 1997. (pp. 21-24)

Golomb, Kristen. *Economics and You*. USA: Mark Twain Media, 1996. (pp. 43-45) - (for simplified credit card application and statement)

www.creditnet.com/cc.software.html – (this site has free software called Credit Card Math that demonstrates the problem with making minimum payments only, although it is a DOS program it does show the pitfalls of credit cards in a clear step-by-step manner – teachers may wish to use it as a class demonstration).

www.studentmarket.com/studentmarket/shopping-for-credit-cards.html – (provides student focused information on what to consider when choosing a credit card).

Sample Worksheet 1

This chart enables students to organize information when making credit card purchases. A page, which features several of these charts, allows students to make repeated calculations over several months. This activity is meant to provide students with an estimate of their credit charges, it will not be exact as they are not calculating interest from the date of purchase.

Previous balance		
Interest for month		+
Daily rate ? balance ? number of days in month		
Purchases (+)	Date	Amount
		+
		+
		+
Total credits (payments) (-)		-
New balance (this balance goes on next month’s sheet)		

Sample Completed Chart

Previous balance	\$1250	
Interest for month		+\$19.10
Daily rate ? balance ? number of days in month		
Purchases (+)	Date	Amount
Jacket	Sept. 12	+ \$86.50
CD	Sept. 21	+ \$16.45
		+
Total credits (payments) (-)		- \$120
New balance (this balance goes on next month's sheet)	\$1252.05	

Sample Worksheet 2 - Spreadsheet

This spreadsheet is set up to be used only from the point that no further purchases are being made.

	A	B	C	D	E
1	Starting Balance				
2	Annual Rate				
3	Daily Rate				
4					
5					
6	Month	No. of Days	Payment	Interest	Remaining Balance
7				=B1*B3*B7	=B1+D7-C7
8				=E7*\$B\$3*B8	=E7+D8-C8
9					

Activity 4: Give yourself some credit!

Time: 150 minutes

Description

Students explore various features of short-term loans, lines of credit, and consolidation loans. Advantages and disadvantages of each are compared. The conditions required for such loans are investigated and students incorporate methods of developing a good credit rating as a young borrower. Spreadsheets are utilized to create amortization tables which demonstrate relationships between the principal, payment period, interest rate, and the amount of loan payment being applied to the principal and to the interest owing.

Strand(s) and Expectations

Strand: Saving, Investing and Borrowing

Overall Expectations

SIV.01 - calculate simple and compound interest;

SIV.03 - solve problems involving different ways of borrowing.

Specific Expectations

SI1.01 - calculate interest earned and total amount in applications involving simple interest;

SI3.03 - describe the features and conditions of various short-term loans (e.g. car loans, loans to consolidate debt, lines of credit);

SI3.04 - generate an amortization table for a personal loan whose features are described, using a given spreadsheet template.

Planning Notes

- Assemble literature from various financial institutions outlining details of loans and credit lines. This should provide a base to work from since various lenders will have varying policies.
- Ensure students have their Borrower's Guide so that they can include portions of this activity's exercises.
- Create Personal History cards to be used in the mock interviews of loan applicants. Include such information as occupation, job history, credit history, items relating to character, etc. Vary the cards to reflect a range of borrowers, from the highly qualified, to those that likely will not qualify. A minimum of five cards will be necessary.
- Spreadsheet templates should be created. (See Sample Spreadsheet 1(monthly payments) and Sample Spreadsheet 2 (credit line borrowing) for examples.)
- Spreadsheet software will be required, either as a demonstration using a TV screen or data projector, or as an individual student activity, if computers are available. A minimum of three computers is desirable for the completion of the activity.

Prior Knowledge Required

Students require prior knowledge with simple interest and calculations involving percentages.

Teaching/Learning Strategies

Student Activity

Students:

- add to their Borrower's Dictionary terms and definitions which are used in loan documents. For example: prime rate, variable rate, term, consolidation, line of credit, payment frequency, collateral, credit history, principal;
- write sentences using these terms which demonstrate an understanding of the terms;
- use teacher-provided resources to make a table which compares short term loans, lines of credit, and consolidation loans;
- insert their completed table into their Borrower's Guide under the heading of Short Term Loan Options;
- brainstorm, in pairs or groups, the criteria a person would have to meet before they would lend them money, and share their results with the class;
- use the results of their brainstorming to propose five interview questions for a potential loan applicant;
- participate in, or observe, some interviews conducted by the teacher and/or students to simulate a loan application; submit a written summary of the features of a "good borrower", along with suggestions on how a person could become one;
- use simple interest calculations to verify the values in the interest column in a given amortization table;
- use simple interest calculations to complete a spreadsheet amortization table that has already been started;
- list any patterns they notice from the sample calculations completed with the spreadsheet;
- begin a Trends page in a section of the Borrower's Guide.

Teacher Facilitation

- Provide students with resources in the form of bank information and pamphlets (particularly features of loans and lines of credit), Internet websites, and dictionaries (for completion of Borrower's Dictionary).
- Facilitate creation of a chart which compares short term loans, lines of credit and consolidation loans on a number of different features. For example:

Features	Short Term Loan	Line of Credit	Consolidation Loan
INTEREST	- fixed rate - lower than consolidation loan	- prime + a percentage - lower than consolidation loan	- interest rates usually highest of three
	- all charge borrower interest	- all charge borrower interest	- all charge borrower interest
FLEXIBILITY	- must make payment established by loan company or bank	- sometimes allows for minimum payment option	- must make payment established by loan company or bank
QUALIFICATION	- all require person to qualify	- all require person to qualify	- all require person to qualify

- Have students create a Loans section in their Borrower's Guide and include this chart in it.
- Facilitate discussion regarding the profile of a good loan candidate. Discuss when and who would use each of these types of loans.
- Provide opportunities for groups of students to brainstorm and share their ideas.
- Create (along with the class) a list of interview questions for loan applicants.
- Pose as a loan officer and recruit a student from the class to play the role of applicant.
- Provide a "personal history" card to the student and conduct a mock interview in front of the class.
- Encourage analysis from class members after the interview is completed.
- Provide opportunity for other students to participate in mock interviews; either in front of the class or in small groups. Distribute "personal history" cards as needed.
- Lead a discussion of the results of the interviews.
- Instruct students to submit a written summary (must include at least five points) of what they feel a lender would require, and what a borrower must do to be accepted for a loan, based on their observations of the interview process.
- Summarize, (after collection of written assignment) the factors covering the requirements for borrowing in the form of the 4 Cs:
 - Capacity (to pay): includes a person's income, expenses, etc.
 - Credit History
 - Character: what kind of character does the person have, and would they likely pay you back?
 - Collateral: what can be sacrificed if the loan is not repaid? This includes a cosigner.

Instruct students to rank these 4 Cs by importance.

- Compare students' results with the reality in the banking world: most lenders will place Credit History first, Capacity second, and Collateral last, since they never want the situation to get this far. They would rather insure the borrower is reliable than rely on recovering their losses. Students will likely rank Collateral much higher.
- Provide the required spreadsheet templates and enough computers for the class, or allow for demonstration of the spreadsheets allowing students to copy results.
- Review calculations of interest and walk-through the calculations being made in a given amortization table. (See Sample Spreadsheet 1 for a model)
- If only one computer is available, provide students with an amortization table (hard copy) to be completed.

- Ensure that students are aware of how to perform required calculations. The interest rate as a decimal needs to be determined for each payment period, and they should round this to four decimal places.
- Group students at computer stations so that they can perform calculations while varying only one feature. One station varies only the interest rate, one varies only the size of the principal, etc. For example, given a loan for \$3500, with monthly payments paid over 4 years, what happens as the interest rate increases or decreases? Only one thing should be changed at a time, and students should explore changes that occur. Students should move from station to station. This investigation provides students with practice in using the spreadsheet templates as well as noticing patterns created with varying loan features.
- Explain to students that the same spreadsheet can be used for both short term and consolidation loans. The only difference would be that the interest rate for consolidation loans is usually slightly higher (1-2%) and the term is shorter (usually a maximum of three years).

Sample Spreadsheet 1

The amortization spreadsheet for monthly payments could be set up as follows

	A	B	C	D	E	F
1	Principal (original amount borrowed)				(student's enter info)	
2	Interest Rate per Period (as a decimal)				(student's enter info)	
3	Number of Interest Periods				(student's enter info)	
4	Monthly Payment				$=($E$1*E$2)/(1-(1/(1+E$2)^E$3))$	
5						
6	Payment	Payment	Interest	Principal	Principal	
7	Number	Amount	Paid	Paid	Owing	
8						
9	1	$=E$4$	$=E$1*E2	$=B9-C9$	$=E1-D9$	
10	2	$=E$4$	$=E9*E$2$	$=B10-C10$	$=E9-D10$	
11	3	$=E$4$	$=E10*E$2$	$=B11-C11$	$=E10-D11$	

Note: Each column could be copied using the Fill Down command to continue the calculations. Teachers have the option of using longer columns, or repeating this information using another five rows side by side to fit on a piece of paper in landscape format. A table for five years (60 months) could be set up in this manner on one piece of paper.

- The weekly amortization table is set up exactly as the table above, except it will require many more rows for a five-year table. This may not be printable on one piece of paper, but the students can compare calculations and possibly print out only a summary of the results.
- As students rotate through the stations, they record information relating to the general trends they've observed. For example, as interest rate (increases or decreases), the amount of interest paid each time (increases or decreases).
- The same format can be set-up for students to explore the features of the credit line. The credit line spreadsheet (see sample spreadsheet 2) is more lengthy for a long time period due to the fact that interest is calculated on the daily balance. A sample is shown below which may be used for a one month time period, or expanded over a few months. Either way, students have the option of entering any purchases or payments into the table, and the updated interest and principal calculations are done automatically. At the end of each month, students should calculate the payment required which may be a 3% minimum, or just the interest from the previous month, both of which are common requirements at many financial institutions. Remember when extending this table to consecutive months, the first principal amount should include the last principal from the previous month along with any purchases, less any payments. Because we only need to know the final principal for this carry-over, we do not need to total up all purchases.

Sample Spreadsheet 2

	A	B	C	D	E
1	Interest Rate (as a decimal)				
2					
3		Purchases	Payments	Total	Daily
4	Day	Made	Made	Principal	Interest
5	1	(Students enter data in these cells as needed)		=B5-C5	=D5*\$C\$1/365
6	2			=D5+B6-C6	=D6*\$C\$1/365
:	Etc.				
35	Totals	=sum(B5:B34)	=sum(C5:C34)		=sum(E5:E34)

Assessment/Evaluation Techniques

Assess Communication on the basis of written submission and/or mock interview. Evaluate Application from written submission and the comparison of spreadsheet results when a single item is changed. Evaluate Thinking/Inquiry/Problem Solving by students ability to draw conclusions and summarize trends related to changes in individual loan features.

A Level 3 performance would show an ability to compare changes in a loan when a feature is changed. A Level 4 performance would show that the student can determine other factors that may affect the duration of a loan, and will place emphasis on the total interest paid when comparing features and their effects. Assess students' work habits by regular review of their Borrower's Guide.

Accommodations

Terms to be included in the Borrower's Dictionary may be provided by the teacher, but students should be encouraged to research the definitions themselves. Emphasis throughout this unit is on increasing the level of student independence when making entries.

Resources

Pamphlets from bank outlining features of loans and lines of credit
Bank websites

Activity 5: Need for Speed

Time: 75 minutes

Description

Students use spreadsheets to explore the effects of making more frequent loan payments on the length of time required to pay off the loan.

Strand(s) and Expectations

Strand: Saving, Investing and Borrowing

Overall Expectations

SIV.03 - solve problems involving different ways of borrowing.

Specific Expectations

SI3.05 - calculate the total amount of interest paid over the life of a personal loan, using a given spreadsheet template, and compare this amount with the original principal of the loan;

SI3.06 - compare the effects of various payment periods on the length of time needed to pay off loans, using a given spreadsheet template.

Planning Notes

- Book a computer lab or have computers available for students to work in pairs or threes, if necessary. If computer access is not available students can use the finance functions of the graphing calculator but this does not allow them to “see” the effects as clearly. The teacher may still want to use a spreadsheet to demonstrate at the front of the class.
- Prepare Sample Worksheet 1.
- Set up Sample Spreadsheets 1, 2 and 3 and distribute to student computers.
- This activity involves changing monthly payments into bi-weekly and weekly payments. This is not done by multiplying by 12 and dividing by 26 (or 52) but rather as a bank would do with a mortgage payment dividing by 2 or 4. It will be difficult for students to see any significant effect without doing their calculations this way.
- The teacher may wish to download a program provided by many of the banks to assist in these calculations.

Prior Knowledge

Students require prior knowledge of compound interest, using spreadsheets or graphing calculators to obtain loan information

Teaching/Learning Strategies

Student Activity

Part 1: Monthly

Students:

- use Sample Spreadsheet 1 to enter a loan amount, an annual interest rate and the length of the loan (use lengths of 20 or 25 years to get a noticeable effect);
- record the loan amount, the interest rate, the length of the loan, and the payment calculated by the spreadsheet on their record sheet;
- calculate the total interest paid by using the summation icon (SIGMA) while the cursor is at the bottom of the interest column. Record this value in their chart;
- repeat this five times varying the loan amount, interest rate;

Part 2: Bi-Weekly

Students:

- open Sample Spreadsheet 2;
- enter the first loan amount and interest rate from their record sheet;
- calculate the bi-weekly payment amount by dividing the monthly payment by 2 (as banks do with mortgage payments);
- enter this payment amount in Spreadsheet 2 (cell B5) and on their record sheet;

NOTE: Students should NOT calculate effective interest rate – simply explain to them that this is the bi-weekly rate that is equivalent to the monthly rate from before;

- FILL DOWN columns B, C, D, E until the principal remaining is zero or less than zero;
- FILL SERIES column A until the row where the balance is zero or below zero;
- convert the number of pay periods into number of years (by dividing by 26);
- record this time under bi-weekly payments;
- use the SIGMA icon to total the interest paid and record;
- repeat for the remaining 4 loan amounts.

Part 3: Weekly

Students:

- open Sample Spreadsheet 3;
- enter the first loan amount and interest rate from their record sheet;

- calculate the weekly payment amount by dividing the monthly payment by 4 (as a bank would do with mortgage payments);
- enter this payment amount in Sample Spreadsheet 3 (cell B5) and on their record sheet;
- continue as done with bi-weekly;
- convert the number of pay periods into number of years (by dividing by 52);
- record in their Borrower's Guide the trend they have found regarding frequency of payments and time to pay off loan.

Teacher Facilitation

- Set up a spreadsheet to calculate a monthly loan payment and show the amortization schedule. The teacher may choose to have the students convert the annual interest rate into a monthly interest rate and calculate the number of payment periods, or can input these formulas into the spreadsheet.
- Circulate while students are working through investigation and pose questions to ensure they are seeing the effects. For example: When you make payments weekly, what is happening to the length of time it takes to pay your loan? Can you think of reasons why this is happening?
- The mathematics behind this expectation can become quite complicated. We have simplified it by starting with monthly payments with interest compounded monthly. Although there are many other possible scenarios this activity should help students see the effects without getting caught up in the complicated financial mathematics.
- Discuss with the entire class what they have found in their investigation.

Using calculators:

Students can use the finance function of the calculator to calculate the monthly payment and the length of time to pay off a loan.

- To find monthly payment, have students enter: the number of payments (at 12 payments per year), the interest rate (compounded monthly), and the loan amount and solve for the amount of the monthly payment.
- Once students have this value they can manually calculate the bi-weekly and weekly payment by dividing the monthly amount by 2 and 4 respectively. Then they can calculate the number of payments required by entering: the interest rate, the loan amount, the payment amount and frequency of payments and then solve for the total number of payments required. Remind students to change the number of payments into number of years.

Assessment/Evaluation Techniques

Communication can be assessed for clarity by examining the trends recorded or during the class discussion. Knowledge/Understanding can be evaluated with the student's record sheet. In this activity, the assessment should focus on recognizing the effect of more frequent payments rather than the ability to use the spreadsheet.

Accommodations

Pair students up with those more comfortable with the technology. Work through the spreadsheet entries with students using a projector.

Sample Worksheet 1 - Record Sheet

		Monthly	Payment s		Bi- Weekly	Payment s		Weekly	Payment s	
Loan Amount	Annual Interes t Rate	Payment Amount	Time (years)	Total Interes t	Payment Amount	Time (years)	Total Interes t	Payment Amount	Time (years)	Total Interes t

--	--	--	--	--	--	--	--	--	--	--

Sample Spreadsheet 1

The lighter shaded cells are the ones that students should be entering information into.

	A	B	C	D	E
1	Loan Amount	5000			
2	Annual Interest Rate	0.12	Monthly Interest Rate	=B2/12	
3	Length of Loan (years)	5	No. Of Payment Periods	=12*B3	
4	Monthly Payment	=(B1*D2)/(1-(1+D2)^ - D3)			
5					
6	Pay Period	Payment	Interest	Principal Paid	Principal Remaining
7	1	=\$B\$4	=B1*D2	=B7-C7	=B1-D7
8	2	=\$B\$4	=E7*\$D\$2	=B8-C8	=E7-D8
9	3	=\$B\$4	=E8*\$D\$2	=B9-C9	=E8-D9

Sample Spreadsheet 2

The lighter shaded cells are the cells in which students should enter their information.

	A	B	C	D	E
1	Bi-weekly amount				
2					
3	Loan Amount	5000			
4	Annual Interest Rate	0.12	Monthly Interest Rate	=B4/12	
5	Payment Amount		Effective Interest Rate	=((1 + D4)^12)^(1/26) - 1	
6					
7					
8	Payment Periods	Payment Amount	Interest	Principal Paid	Principal Remaining
9	1	=\$B\$5	=B3*D5	=B9-C9	=B3-D9
10	2	=\$B\$5	=E9*\$D\$5	=B10-C10	=E9-D10

Spreadsheet 3

Same as Spreadsheet 2 except cell D5. The formula for effective interest rate should be
 $= ((1+D4)^{12})^{(1/52)} - 1$

Activity 6: Summative Activity: Compare and Beware

Time: 150 minutes

Description

A shopping budget is given to groups of students for purchasing fictitious gifts. Students decide on purchases and each individual in the group investigates a different borrowing method (credit card, short

term loan, consolidation loan, and line of credit) that could be used for payment. Students determine how the total interest paid compares to the original principal. Information is shared with other group members and comparisons are made. Comparisons and conclusions are entered into their Borrower's Guide.

Strand(s) and Expectations

Strand(s): Saving, Investing and Borrowing

Overall Expectations

SIV.03 - solve problems involving different ways of borrowing.

Specific Expectations

SI3.05 - calculate the total amount of interest paid over the life of a personal loan, using a given spreadsheet template, and compare this amount with the original principal of the loan.

Planning Notes

- Provide catalogues, newspaper ads, etc. so that students may go “shopping” for various “big” items.
- Prepare a “shopping envelope” for each group which contains:
 - a dollar value (preferably values in the thousands of dollars to justify the need for loans) written on the front. This will be the maximum amount the group may spend;
 - “borrowing option” cards inside the envelope for each student in the group. Each group of students needs a credit card option, short term loan, consolidation loan, and line of credit. In each case, give enough information (interest, term, payment frequency, etc.) so that the only missing piece of information is the principal, i.e., total cost of purchases.
- Provide computers/spreadsheets or graphing calculators, with the required templates for the students to make calculations regarding their borrowing option.

Teaching/Learning Strategies

Student Activity

Students:

- assemble in groups of four (the core group) and collect a “shopping envelope” which will determine the maximum amount of money the group can spend;
- determine the budget allotment for each group member and/or work co-operatively to determine which purchases they will make;
- use catalogues, newspaper ads, etc. to purchase the items of their choice ensuring they remain under the maximum determined above;
- determine the total price of all purchases (including taxes) for the group. Each group member will use this same total for the next step of the activity;
- randomly select their own “borrowing option” from inside the “shopping envelope”;
- gather information related to this particular option and use spreadsheet templates or graphing calculator to make calculations. Students determine payment amount, the time to pay off principal, and most importantly compare the total interest paid to the original principal;
- use the jigsaw approach – they work with others in the class who have selected the same borrowing option. Although specific principals will vary, students can help each other to find information and make calculations; they then reassemble in their core group and discuss with each other the results of their options; record the items to be purchased (either as a list, or by including the ad if possible), the results of each option and a summary of the results of their comparisons in their Borrower's Guide;
- make general conclusions regarding their results;
- put finishing touches on their Borrower's Guide to be handed in for final evaluation.

Teacher Facilitation

- Assemble students into core groups of four and distribute “borrowing envelopes”.

- Provide students with catalogues, newspapers, etc. for shopping.
- Explain to students that the purpose of the activity is to explore various borrowing options and select the best way to pay for their shopping excursion. **Note:** be sure to explain to students that a consolidation loan is not usually used in this manner. It is used to combine debt from other sources. The student exploring the consolidation loan option should consider the exercise as if they are combining the balances from different credit cards.
- Ensure that each group member has drawn a different borrowing option from the envelope.
- Facilitate the jigsaw approach, making sure that each group member reassembles with other students exploring the same borrowing method.
- Provide spreadsheet software (and pre-made spreadsheets: see Activity 3) for student use. The teacher may wish to divide the available computers into three or four each for: credit lines, credit cards, short-term loans, and consolidation loans so that as the groups disperse from the core group, those with a common borrowing option may work together.
- Encourage discussion as students return to their core groups with their results.
- Have students submit their conclusion as to which borrowing option they would choose and why.
- Explain to students that some general conclusions are to be drawn and entered into the Trends section. The following types of conclusions are suggested:
 - The more frequently you pay interest, the _____ total interest you pay.
 - The longer the term of a loan, the _____ total interest you pay.
 - The _____ the interest rate, the _____ total interest you pay.
 - To minimize the interest you pay in a credit line, you might _____
 - A consolidation loan usually has _____ interest than a _____ but lower interest than a _____.

Assessment/Evaluation Techniques

Assess students' Work Habits based on how they have recorded information from the group into their own Borrower's Guide. Evaluate students' Knowledge/Understanding by examining the accuracy of their calculations (see Resources: sample rubric for evaluation of spreadsheets). Evaluate Problem Solving by examining the level of reasoning students use and the appropriateness of their conclusions.

Accommodations

The teacher may choose to produce hard copies of spreadsheets ahead of time which depict the particulars of each borrowing option provided in each "shopping envelope". More structure can be provided to students by providing them with a worksheet that asks specific questions regarding their borrowing option.

Resources

Catalogues, flyers, newspaper advertisements.

Sample Rubric

	Level 1 (50-59%)	Level 2 (60-69%)	Level 3 (70-79%)	Level 4 (80-100%)
Knowledge/ Understanding - determines total expenses and values required for calculations	- with limited accuracy	- with some accuracy	- with considerable accuracy	- efficiently and accurately
Communication - summarizes results of comparison of borrowing options	- with limited clarity and limited justification in determining the best method	- with some clarity and some justification in determining the best method	- with considerable clarity using specific factors in justifying the best method	- with a high degree of clarity and full justification of reasoning for determining the best method
Application	- show limited ability to apply spreadsheet template or uses correct template leading to limited conclusions for the borrowing option	- applies appropriate spreadsheet template to explore borrowing option with some accuracy	- applies appropriate spreadsheet template to explore borrowing option accurately and recognizes other factors affecting the decision but may not explore them fully	- applies appropriate spreadsheet template to explore borrowing option and recognizes and explores other factors affecting the decision

Note: A student whose achievement is below level 1 (50%) has not met the expectations for this assignment or activity.

