Personal Loans

SUBMITTED BY:	Nina Hoe, University of Pennsylvania
SUBJECT(S):	Computation
GRADE LEVEL(S):	9, 10, 11, 12

☰ OVERVIEW:

This lesson begins with students discussing the concept of loans, and then specifically payday loans. Students compute different loan scenarios and critically analyze the fees and APR structures of payday loans. Finally, students discuss and reflect on payday loans in general and compare to other personal loans.

☰ NBEA STANDARD(S):

- Computation, I. Mathematical Foundations
- Computation, II. Number Relationships and Operations
- Computation, III. Patterns, Functions, and Algebra
- Computation, VI. Problem-Solving Applications

☰ RELATED ARTICLES:

- "Zina Kumok's Guide to Smart Student-loan Liftoff"
- "Zina Kumok: 'Getting My First Credit Card Was So Exciting'"
- "Two Young Women Share their Struggles and Successes with Student Loan Debt"
- "The Ins and Outs of Interest — from a Student Loan Survivor"
- "The Fed Revealed: The Dangers of Monetary Policy"
- "Talking Money: Students Reflect on a Year of Spending, Valuing and Socking It Away for College"
- "Student Essay: My Summer Working for a Payday Lender"

- "Olivia Mitchell on Why Young Consumers Should Just Say No to Spending"
- "Kiva: Improving People's Lives One Small Loan at a Time"
- "Getting Creative with Money"

Common Core Standard(s):

- A-SSE.1. Interpret expressions that represent a quantity in terms of its context
- A-CED.1. Create equations and inequalities in one variable and use them to solve problems. *Include equations arising from linear and quadratic functions, and simple rational and exponential functions.*

Objectives/Purposes: Students will understand the payday loans as a social practice and compute the true APRs associated with fee based loans.

Knowledge@Wharton Articles: "More Savings, Less Plastic: Consumer Credit after the Crisis"

Other Resources/Materials:

- Calculators
- Student Worksheet

Activity:

1. Whole Class Discussion: (10 mins)

Orient students to the idea of borrowing money, loans, and why people do these things.

1. Do you always have enough money to buy what you want to buy?
2. What do you do if want to make a purchase for something you do not have enough money for?
3. What are some examples of things that you, or any consumer, might want to buy and might not have enough money to buy outright?
4. How do people get access to money?
5. What is a loan?
6. What does it mean to loan someone money or to be a lender?
7. What does it mean to receive money from a lender or to be a borrower?

8. What are the incentives for banks or other entities to lend money to borrowers? (i.e. is this ever done for free?)

Use student definitions of a loan to articulate a succinct definition from which students can work.

Example: A **loan** is a type of debt, typically a sum of money that is borrowed and is expected to be paid back (in most cases) with **interest.** A loan involves a lender, who provides the money, and the borrower, who uses the money and then pays it back to the lender over a specified **term** or period of time. The initial amount of loaned from the lender to the borrower is the **principal**.

Banks or other entities DO NOT usually lend money for free. They charge **interest** on **loans**, which is how they generate **revenue**, or income. However, different types of loans are structured in different ways with different interest rates and payment plans. Generally, there are two types of loans – **secured** and **unsecured**. **Secured loans** mean that there is some sort of security for the lender, or collateral, in case the borrower does not pay the loan back. Examples of this are home loans or car loans, whereby if the borrower **defaults**, or fails to make appropriate payments, the lender could take the home or car and resell it to recover the money lent. There are also **unsecured loans**, where there is no collateral for the lender, so if the borrower fails to pay the loan or declares bankruptcy, then the lender may loose the money all together. Examples of this are credit card loans or personal loans. Generally, interest rates are *higher* for *unsecured loans* and *lower* for *secured loans*. Additionally, the **term**, or amount of time, the borrower will take to pay back the loan has an effect on the interest rate. Generally, *shorter term* loans will have *lower interest rates* than loans with *longer terms*. Also, a persons **credit rating**, may determine the interest rate s/he gets. A **credit rating** is an estimate of the ability of a person or organization to fulfill their financial commitments, based on previous dealings (i.e. do you have a history of not paying back loans?).

2. Personal Loans (10 mins)

Student Worksheet

A personal loan is a type of **unsecured loan**, granted for a short period of time (typically 1 – 5 years). The lender relies entirely on the word of the borrower that the loan will be paid back. Because this is a larger risk for a lender than one with collateral involved (such as a home or car loan), the interest rates are usually higher than for **secured loans**. Additionally, a person's individual credit profile or **credit rating** affects the interest rate. Personal loans usually have a set payment schedule, similar to a car or mortgage payment schedule, and there are sometimes penalties associated is the borrower wants to repay the loan earlier than schedule?

1. Why would a lender impose a fee if the borrower wanted to pay the loan back early? *(Banks/lenders make money off of interest – so if they are promised to a certain amount in interest and the borrower pays back early, they might not collect all of the interest they anticipated.)*
2. How do you think interest rates are determined for different people and different types of loans?
3. What are some things for which an individual or family might need a personal loan?

3. Small Group/Pair Activity: (15 mins)

(There are more problems than is feasible in 15 mins. Choose problems based on needs and interests of students.)

Below are interest rates quote from a US Bank in June of 2011.

Borrower	Personal Loan Rate
Excellent Credit Profile	10.99%
Good Credit Profile	14.75%
Fair Credit Profile	17.75%
Credit Profile Needs Improvement	17.75%

Recall the formula for **simple interest**

$$I = P * r * t$$

where, I is the interest owed

P is the principal amount outstanding

r is the interest rate

t is the time in years.

Note: to express 1 month in terms of years, divide by 12, so that to calculate the interest over a period of 1 month, t = 1/12

Recall the general form for **compound interest** (an **exponential growth model**) is the equation:

$$A = P(1+\frac{r}{n})^{nt}$$

where, P is the principal amount, or the original amount of money before any growth occurs

r is the annual nominal interest rate or the **growth rate** in decimal form

n is the number of times the interest is compounded per year

t is the number of years, and A is the new amount.

Formula for Interest Compounded Monthly:

$$A = P(1+\frac{r}{12})^{12t}$$

The formula for calculating mortgage payments:

$$MP = P * \frac{\frac{r}{n}(1+\frac{r}{n})^{nt}}{(1+\frac{r}{n})^{nt}-1}$$

where, MP is the monthly payment

P is the principal amount, or the loan amount

r is the annual nominal interest rate or the **growth rate** in decimal form

n is the number of times the interest is compounded per year

t is the number of years

This is a very complicated formula, but has a lot of similar components to the compound interest formula. It is more complicated because each month, as you make payments, the proportion of the monthly payment that goes towards interest vs. principal changes.

1. You are an Excellent Credit Profile borrower.
    - Calculate the monthly payments for a 1-year loan repayment for a $1,500 (use the last formula above)
    - What is the total amount you will pay in interest over a 1-year period?
2. Use the table below to track the percentage of each payment that goes towards the loan balance.

Loan Amount = $_____

Interest Rate = _____%

Monthly Payment = $_____

Month	Balance (P)	Payment	Interest on Balance	Principal	Percentage of Payment to Principal
1	*1st:* *Original Balance/Loan Amount* *(Answer to #4)*	*(Answer to 1)*	*2nd:*	*3rd:* *Payment – Interest (I)*	*4th"* *Principal =* *Payment* _____%
2	*5th:* *Previous Balance – Principal*	*(Answer to 1)*	*6th:* *I = (new P from this row) * r * t*	*7th:* *Payment – I (this row)*	
3		*(Answer to 1)*			

This sequence of calculations shows that for the first month, you owe interest on the original amount borrowed. However, you are only paying a certain amount in payment each month. In the beginning, the majority of the monthly payment goes towards the interest and only a small portion goes towards the principal. Each month, while the monthly payment stays the same, the interest is calculated based upon the new balance (in the same row). The new principal is calculated by subtracting the appropriate interest payment from the monthly payment.

Month	Balance	Payment	Interest on Balance	Principal	Percentage of Payment to Principal
1					
2					
3					

4					
5					
6					
7					
8					
9					
10					
11					
12					
Total	—				—

- What is your current balance?
- How much have you paid in interest so far?
- What happens to the percentage of the payment going towards the principal throughout the term?
  - i. What is the range?
- How would paying more than your monthly payment affect your mortgage schedule and interest owed each month?
- What would have happened if after the 4th month you had paid back the entire loan? How much money would you have "saved" in interest/how much money would the bank have "lost" in revenue?3. You are still an Excellent Credit Profile borrower.
  - Calculate the monthly payments for a 5-year loan repayment for a $10,000 (use the last formula above).
  - What is the total amount you will pay in interest over a 5-year period?

4. Compare the total amount of interest paid to a bank over a 1-year period and a 5-year period. What do you notice?

5. How do borrowers make decisions about the term of the loan?

6. Do you think that lenders prefer longer or shorter-term loans?

7. You are a Fair Credit Profile borrower.

- Calculate the monthly payments for a 1-year loan repayment for a $10,000 (use the last formula above).
- What is the total amount you will pay in interest over a 1-year period?

8. Use the table below to track the percentage of each payment that goes towards the loan balance.

Loan Amount = $_____

Interest Rate = _____%

Monthly Payment = $_____

Month	Balance	Payment	Interest on Balance	Principal	Percentage of Payment to Principal
1					
2					
3					
4					
5					
6					
7					
8					

9				
10				
11				
12				
Total	—			

- What is your current balance?
- How much have you paid in interest so far?
- What happens to the percentage of the payment going towards the principal throughout the term?
  - i. What is the range?
- How would paying more than your monthly payment affect your mortgage schedule and interest owed each month?
- What would have happened if after the 4th month you had paid back the entire loan? How much money would you have "saved" in interest/how much money would the bank have "lost" in revenue?9. You are still a Fair Credit Profile borrower.
  - Calculate the monthly payments for a 5-year loan repayment for a $10,000 (use the last formula above).
  - What is the total amount you will pay in interest over a 5-year period?

10. Compare the total amount of interest paid to a bank over a 1-year period and a 5-year period. What do you notice?

11. How do borrowers make decisions about the term of the loan?

12. Do you think that lenders prefer longer or shorter-term loans?

Tying It All Together:

Whole Class Discussion (*10 mins*)

1. Have students compare their answers.
2. Do they have any questions?

3. Is taking out a personal loan a good or a bad idea?

4. What are ways that you can reduce the amount of interest you pay?

Practice Outside of the Classroom: Look out for banks advertising interest rates. What do you consider a low interest rate? Compare what you see.