

Loan Project I: Student Life

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SUBJECT(S): Computation

GRADE LEVEL(S): 9, 10, 11, 12

≡ OVERVIEW:

In this lesson, students think about how to best manage student and credit card loans while in college. Students are broken up into five or six small groups and are each given a sample student. Equipped with several pieces of information about each sample student, they are asked to design a loan and repayment strategy through four years of college.

≡ RELATED ARTICLES:

- [“Zina Kumok’s Guide to Smart Student-loan Liftoff”](#)
- [“When It Comes to Student Loans, It Pays to Finish Your Degree”](#)
- [“Two Young Women Share their Struggles and Successes with Student Loan Debt”](#)
- [“The Rising Costs of a U.S. College Education”](#)
- [“The Fed Revealed: The Dangers of Monetary Policy”](#)
- [“The College Investment: Will It Pay Off?”](#)
- [“Preparing Students for the Hard Reality of Post-college Debt”](#)
- [“Paying for College: Why the Money Issue Is a ‘Big, Big Deal’”](#)
- [“One House, Three Seniors and Lots of College Essays”](#)
- [“Olivia Mitchell on Why Young Consumers Should Just Say No to Spending”](#)
- [“Kiva: Improving People’s Lives One Small Loan at a Time”](#)
- [“International Student Athletes Learn How to Compete at U.S. Colleges”](#)
- [“Educator Toolkit: Paying for College”](#)
- [“College Students Going Hungry? Sara Goldrick-Rab Shares This and Other Campus Realities”](#)
- [“College Decisions Sometimes Require Sacrifice”](#)

- “3 Financial Priorities to Get You Ready for College”

Standards:**NBEA Standard(s):**

- Mathematical Foundations
- Number Relationships
- Patterns, Functions, and Algebra
- Problem Solving

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 compute compounding interest, monthly loan payments and critically analyze STUDENTS’ expenses, and desires.

Knowledge@Wharton Article:

“More Savings, Less Plastic: Consumer Credit after the Crisis”

Other Resources/Materials:

Calculators

Whole Class Discussion:

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 lose 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 person's **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?).

(5 mins)

1. How do students go about deciding how to manage money while in college?
2. How much money should they borrow in loans?
3. Should they get credit cards?

4. What factors should be taken into account?

Small Group/Pair Activity: (20 – 25 mins)

Student Worksheet

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:

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

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:

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

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.

Divide students into small groups, and have them come up with loan repayment strategies for the following individuals. Assume that all students are **independents**, meaning that they are not receiving any help or support from their parents. Assume that the tuition and fees listed already reflect grants and scholarships awarded. The “Credit card offering” is the APR of a credit card advertised to this student. Use the resources from the “credit card loan” and “student loan” lessons.

1. STUDENT A:

Yearly tuition and fees: \$25,000/year

Financial need/eligibility: Low-income

Projected spending money needed: \$60/week (entertainment, eating out, recreation, travel)

Other major expenses: travel home twice per year, plane tickets approx. = \$350

Work ability: can work for \$8.50/hour, 10 hours a week throughout the year. Can make \$2500 from summer work.

Credit Card offering: APR 8.9%

Determine a comprehensive loan and repayment strategy for this student.

1. Make recommendations about which type(s) of loan(s) this student should take out.
2. Can/should this student make interest payments while in school (if applicable)?
3. What, if anything, should this student charge to a credit card?
4. What will this student's debt be upon graduation?
5. What will this student's loan repayments be after graduation (for the standard 10-year repayment period)?

2. STUDENT B:

Yearly tuition and fees: \$7,500/year

Financial need/eligibility: Not low-income

Projected spending money needed: \$45/week (entertainment, eating out, recreation, travel)

Other major expenses: car insurance for own car = \$30/month

Work ability: does not plan to work, would like to travel in the summer

Credit Card offering: APR 15.7%

Determine a comprehensive loan and repayment strategy for this student.

1. Make recommendations about which type(s) of loan(s) this student should take out.
2. Can/should this student make interest payments while in school (if applicable)?
3. What, if anything, should this student charge to a credit card?
4. How much money can/should this student allot to summer travel?
5. What will this student's debt be upon graduation?
6. What will this student's loan repayments be after graduation (for the standard 10-year repayment period)?

3. STUDENT C:

Yearly tuition and fees: \$6,000/year

Financial need/eligibility: Low-income

Projected spending money needed: \$40/week (entertainment, eating out, recreation, travel)

Other major expenses: none

Work ability: can work for \$10.50/hour, 10 hours a week throughout the year. Can make \$2,000 from summer work.

Credit Card offering: APR 12.9%

Determine a comprehensive loan and repayment strategy for this student.

1. Make recommendations about which type(s) of loan(s) this student should take out.
2. Can/should this student make interest payments while in school (if applicable)?
3. What, if anything, should this student charge to a credit card?
4. What will this student's debt be upon graduation?
5. What will this student's loan repayments be after graduation (for the standard 10-year repayment period)?

4. STUDENT D:

Yearly tuition and fees: \$38,000/year

Financial need/eligibility: Not low-income

Projected spending money needed: \$75/week

Other major expenses: travel home twice per year, plan tickets approx. = \$350

Work ability: : told not to work by school for first two years. For 3rd and 4th year can expect to make \$10/hour 10 hours per week. Will make \$3,500 each summer.

Credit Card offering: APR 14.2%

Determine a comprehensive loan and repayment strategy for this student.

1. Make recommendations about which type(s) of loan(s) this student should take out.
2. Can/should this student make interest payments while in school (if applicable)?
3. What, if anything, should this student charge to a credit card?
4. What will this student's debt be upon graduation?
5. What will this student's loan repayments be after graduation (for the standard 10-year repayment period)?

5. STUDENT E:

Yearly tuition and fees: \$17,000/year

Financial need/eligibility: Not low-income

Projected spending money needed: \$50/week (entertainment, eating out, recreation, travel)

Other major expenses: Dog food – \$30/month

Work ability: can work for \$9.00/hour, 10 hours a week throughout the year. Can make \$3,000 from summer work.

Credit Card offering: APR 9.6%

Determine a comprehensive loan and repayment strategy for this student.

1. Make recommendations about which type(s) of loan(s) this student should take out.
2. Can/should this student make interest payments while in school (if applicable)?
3. What, if anything, should this student charge to a credit card?
4. What will this student's debt be upon graduation?
5. What will this student's loan repayments be after graduation (for the standard 10-year repayment period)?

6. STUDENT F:

Yearly tuition and fees: \$3,000/year

Financial need/eligibility: Low-income

Projected spending money needed: \$30/week (entertainment, eating out, recreation, travel)

Other major expenses:

Work ability: can work for \$10.50/hour, 20 hours a week throughout the year. 40 hours per week in the summer (June, July Aug)

Credit Card offering: APR 11.3%

Determine a comprehensive loan and repayment strategy for this student.

1. Make recommendations about which type(s) of loan(s) this student should take out.
2. Can/should this student make interest payments while in school (if applicable)?
3. What, if anything, should this student charge to a credit card?
4. What will this student's debt be upon graduation?
5. What will this student's loan repayments be after graduation (for the standard 10-year repayment period)?

Tying It All Together:

Whole Class Discussion: (10 – 15 mins)

1. Have student groups present their loan and repayment strategies for their STUDENTS.
2. Review each questions a – d. What factors were considered to make these decisions?
3. Have students be critical of one another's strategies. What was over looked?
4. What other questions do students have about student loans and credit card loans?
5. Did students take the "Paycheck Breakdown" article into account when calculating the STUDENTS' potential earnings for the year? How can this discrepancy be accounted for?

Practice Outside of the Classroom: Talk to friends or family members about how they made these decisions while in college.

What Worked and What I Would Do Differently:

