

Calculating loan payments

Using a case study, students explore how the amount borrowed, interest rates, and the term of a loan can increase or decrease the amount of loan payments.

Learning goals

Big idea

The amount of an installment loan payment is the result of several factors.

Essential questions

- How do principal, interest rate, and loan term affect loan payments?
- What criteria do you use to compare loan offers to get the best deal?

Objectives

- Make informed choices about credit offers
- Calculate monthly payments for loans based on principal, interest rate, and loan term

NOTE

Please remember to consider your students' accommodations and special needs to ensure that all students are able to participate in a meaningful way.

KEY INFORMATION

Building block:

-  Executive function
-  Financial knowledge and decision-making skills

Grade level: High school (9-12)

Age range: 13-19

Topic: Borrow (Getting loans, Managing credit)

School subject: CTE (Career and technical education), Math

Teaching strategy: Cooperative learning, Simulation

Bloom's Taxonomy level: Apply

Activity duration: 75-90 minutes

National Standards for Personal Financial Education, 2021

Managing credit: 8-3, 12-1, 12-10, 12-12

These standards are cumulative, and topics are not repeated in each grade level. This activity may include information students need to understand before exploring this topic in more detail.

What students will do

- Calculate and analyze how monthly payments on a loan change based on the loan's principal, interest rate, and term.
- Compare borrowing options to identify the best deal.
- Reflect on ways to reduce the amount owed on a loan.

Preparing for this activity

- Print copies of all student materials for each student, or prepare for students to access them electronically.
- Make sure students have access to calculators.

What you'll need

THIS TEACHER GUIDE

- **Calculating loan payments (guide)**
[cfpb_building_block_activities_calculating-loan-payments_guide.pdf](#)

STUDENT MATERIALS

- **Calculating loan payments (worksheet)**
[cfpb_building_block_activities_calculating-loan-payments_worksheet.pdf](#)
- **Calculators**

Exploring key financial concepts

Principal, interest rate, and loan term are used to determine the monthly payment made when repaying a loan. Principal is the money you originally agreed to pay back on a loan. It is often referred to as the amount of money you borrowed. The interest rate is the cost you pay each year to borrow the money, expressed as a percentage rate. It does not reflect fees or any other charges you may have to pay for the loan. You'll often see interest rates for a loan expressed as an APR (annual percentage rate). APR is a broader measure of the cost to you of borrowing money, also expressed as a percentage rate. In general, APR reflects not only the interest rate but also fees and other charges that you pay to get the loan. For that reason, your APR is usually higher than your interest rate.

TIP

Because financial products, terms, and laws change, students should be encouraged to always look for the most up-to-date information.

The rate charged is often affected by prevailing interest rates, the rates charged by competing lending institutions, and a borrower's risk level (their documented credit history). A borrower's income and the amount of any down payment also can affect the interest rate that is offered. Term refers to the length of the loan.

The lower the loan numbers are, the better the outcome for you.

- ✓ Lower principal = less money you borrow and therefore less money you repay
- ✓ Lower interest rate = less interest you are charged to borrow money
- ✓ Shorter term = fewer total payments you have to make

It's important to know that you can always pay more than your required monthly payment on the loan. This is called a prepayment. When you pay more, your principal is reduced faster and you'll end up paying less interest over the life of the loan.

Teaching this activity

Whole-class introduction

- Ask students if they know someone who makes monthly payments on a loan.
 - If they do, ask for volunteers to share what type of loan it is. Examples may include student loans, a car loan, or a mortgage.
- Read the "Exploring key financial concepts" section to students to explain how monthly payments are determined.
- Be sure students understand key vocabulary:
 - **APR (Annual Percentage Rate):** The cost of borrowing money on a yearly basis, expressed as a percentage rate.
 - **Down payment:** Initial cash payment made when something is bought on credit, such as a home or vehicle. The down payment reduces the amount of money that is borrowed.
 - **Interest:** A fee charged by a lender, and paid by a borrower, for the use of money. A bank or credit union may also pay you interest if you deposit money in certain types of accounts.
 - **Interest rate:** A percentage of a sum borrowed that is charged by a lender or merchant for letting you use its money. A bank or credit union may also pay you an interest rate if you deposit money in certain types of accounts.

TIP

Visit CFPB's financial education glossary at consumerfinance.gov/financial-education-glossary/.

- **Lender:** An organization or person that lends money with the expectation that it will be repaid, generally with interest.
- **Loan:** Money that needs to be repaid by the borrower, generally with interest.
- **Principal:** In the lending context, principal is the amount of money that you originally received from the lender and agreed to pay back on the loan with interest.
- **Term:** A fixed or limited period of time for which something lasts or is intended to last (for example, a five-year loan, a three-year certificate of deposit, a one-year insurance policy, a 30-year mortgage).

Individual and group work

- Distribute the “Calculating loan payments” worksheet to students.
- Tell students that they’ll calculate monthly payments on different loan options.
- Explain that before they can calculate a loan’s monthly payments, they’ll first need to calculate a loan’s total interest.
- Tell students they’ll use a simplified interest formula of Principal x Rate x Time to calculate total interest on the loan. This formula is often written as $I = P \times R \times T$:
 - I = the amount of simple interest
 - P = the principal (amount borrowed)
 - R = the interest rate of the loan
 - T = time, or the outstanding term in years from the date of disbursement to date of repayment, with periods less than 1 year computed on the basis of 365 days/year
- Explain that they’ll add the total interest to the principal and then divide that amount by the number of months in the loan’s term to find out what the monthly payment is.
- The worksheet gives the answers to Option 1; use that option to show students how to do the calculations.
- Have students work in pairs to review the case study on the worksheet and figure out the amount of interest, total amount due, and the monthly payments for the other options.
- Students should answer the reflection questions on their own.

NOTE

This is a simplified approach to determining total interest. The actual math will likely be more complicated.

Wrap-up

- Ask students to share which credit offer they chose and discuss possible outcomes as a class.
- If time allows, ask students to share their answers to the reflection questions.

Suggested next steps

Consider searching for other [CFPB activities](#) that address the topic of borrowing, including getting loans and managing credit. Suggested activities include [“Determining how down payments affect loans”](#) and [“Qualifying for loans”](#).

Measuring student learning

Students’ answers on their worksheets and during discussion can give you a sense of their understanding.

The answer guide on the next page provides possible answers for the “Calculating loan payments” worksheet. **Keep in mind that students’ answers may vary.** The important thing is for students to have reasonable justification for their answers.

Answer guide

For purposes of explaining how interest can add to the cost of an original purchase amount, this activity uses a simplified formula for calculating interest, and answers in this guide reflect the use of this formula. It is important to note that this is a simplified example and that actual interest calculations may be more complicated for a loan of multiple periods.

The answers below represent the results of the suggested mathematical calculations.

COMPARE OPTIONS 1, 2, AND 3

| | Principal | Rate | Term | Interest charged | Total amount paid | Monthly payment |
|----------|--|------|---|------------------|-------------------|-----------------|
| Option 1 | \$1,500 | 9.5% | 2 years (24 months) | \$285 | \$1,785 | \$74.38 |
| Option 2 | \$1,350 (represents a 10% discount) | 12% | 2 years (24 months) | \$324 | \$1,674 | \$69.75 |
| Option 3 | \$1,500 | 22% | 2 years - 1 year (12 months) interest free | \$330 | \$1,830 | \$76.25 |

How do the different principal amounts and the different interest rates affect the loan?

- **The lower interest rate of Option 1 makes it the lowest in the “interest charged” column.**
- **The lower principal offered in Option 2 decreases the “total amount paid” column, making it the lowest repayment option.**

What is the benefit of the “zero interest” offer that goes with the new credit card? What happens when the “zero interest” period ends?

- **The zero interest offer means that she pays no interest for one year. After that time, the interest rate is 22% for one year. While paying no interest for one year may sound as if you’re saving money, the new card’s higher interest rate makes this the most expensive option.**

Reflection questions

Answers will vary.