BUILDING BLOCKS TEACHER GUIDE

Paying for a science expedition using credit

Students play a game to explore how borrowing affects the total cost of purchases.

Learning goals

Big idea

Borrowing money instead of paying cash for items can increase the total amount paid.

Essential questions

- How can borrowing money to buy items increase the total amount you spend?
- How do you calculate the cost of a purchase, including interest?

Objectives

- Calculate the total cost of items using an oversimplified interest formula
- Reflect on how borrowing affects the overall cost of an item

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:

- Financial habits and norms
- Financial knowledge and decision-making skills

Grade level: Middle school (6–8)

Age range: 11–14

Topic: Borrow (Managing credit)

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

Teaching strategy: Cooperative learning, Gamification

Bloom's Taxonomy level: Apply, Evaluate

Activity duration: 75–90 minutes

National Standards for Personal Financial Education, 2021
Saving: 8-4
Managing credit: 4-1, 4-2, 8-2, 8-3, 8-4

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

- Play a game to calculate the costs of borrowing money to buy supplies for an imaginary science expedition.
- Discuss how borrowing money can increase the total cost of something over time because of the interest rate on the loan.

Preparing for this activity

☐ While it's not necessary, completing the "Getting a credit card and using it wisely" activity first may make this one more meaningful.

☐ Print the game boards in this guide and cut them apart.

☐ Make sure students have access to calculators.

☐ Students will be divided into four groups. Obtain four dice – one for each group – or make sure each group has access to virtual dice on a computer or tablet.

What you'll need

THIS TEACHER GUIDE

- **Paying for a science expedition using credit** (guide) cfpb_building_block_activities_paying-science-expedition-using-credit_guide.pdf

STUDENT MATERIALS

- **Science expedition game boards** (in this guide)
- **Calculators**
- **Dice or digital versions on a computer or tablet**

Exploring key financial concepts

When a person uses a credit card, they're charged interest on the amount of money they spend. Credit card companies make money by charging this interest. If a person doesn't pay the entire amount they owe each month, the interest rate will determine how much they pay for their credit card purchases.

It's important to know the real cost of buying things with borrowed money. To calculate the actual cost and determine

TIP

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

monthly payments, we can use an oversimplified formula where you multiply the principal x interest rate x term (how long it will take to pay back). This simple interest formula is often written as I = P × R × T.

- I = the amount of simple interest
- P = the principal, which is the original amount borrowed
- R = the interest rate of the loan
- T = the amount of time it takes to pay back the borrowed money

The lower those numbers are, the better the outcome for you:

- Lower principal = less money you borrow and therefore less money you will repay
- Lower interest rate = less interest you'll be charged to borrow money
- Shorter term = fewer total payments you'll have to make

Teaching this activity

Whole-class introduction

- Ask students to share what they know about borrowing money and interest rates.
- Be sure students understand key vocabulary:
  - **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.
  - **Interest rate:** A percentage of a sum borrowed that is charged by a lender or merchant for letting you use its money.
  - **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).

TIP

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

- Tell students that the principal, interest rate, and term are factors that affect the total amount that will need to be paid back.
- Explain that when people take out a loan or charge something to their credit card, they must pay back the initial principal plus the interest on that principal.
  - The amount of interest can be calculated by using the equation I=PxRxT, where I equals interest, P equals principal, R equals rate, and T equals time.
  - By multiplying the principal, rate, and time together, you can find the amount of interest.

Group work

- Introduce the game scenario:
  - Ask students to imagine that their class has been winning lots of science awards. As a result of their hard work, a team of scientists invited them to join them on two scientific expeditions – one in a few weeks and one six months from now – where they'll study a newly discovered animal species found in nature about an hour from their school.
  - The students will camp out for four days on each expedition.
  - The students will be divided into four groups. Each group is responsible for buying a different category of supplies needed for the trip. They'll buy all their supplies for both trips at one time. The four categories are:
    - Clothing and outdoor gear (boots, rain jackets, etc.)
    - Tents and other camping supplies (sleeping bags, camp stove, lighting, etc.)
    - Food (meals, water, drinks, snacks)
    - Research equipment (microscope, collection tubes, slides, etc.)
  - The scientists receive money each month to pay for their research project. They offered each group a project credit card to cover their costs. (The scientists will use their project funds for the monthly credit card payments.)
  - After the expeditions, the class will help the scientists with ongoing research and report writing.
- As you explain the scenario, be sure students understand that they're using the scientists' project credit card to buy supplies and that the scientists will make the monthly payments that are due.
  - Explain that monthly payments on any type of loan, including a credit card, are determined by the amount of the principal, the interest rate, and the length of time they have to pay it off.
- Divide the class into four groups.
  - Each group will calculate the costs for one category of supplies.
- Describe the rules of the game to students.
  - First, they'll figure out the principal (the amount of money they'll initially borrow) by rolling a single die and multiplying the number rolled by 100.
  - Then they'll calculate the credit card interest rate:

        - Roll the die to get a base number to calculate the interest rate.
        - Multiply the number rolled by 3 to get the interest rate. For example: A roll of 3 would be 3 x 3 = 9%.
        - Write the percentage as a decimal by dividing it by 100. For example: 9% = .09.
    - Next, they'll identify the term (length of time they'll take to pay back what they've borrowed).
        - Roll the die and multiply the number rolled by 2 to get the number of months they'll take to pay off the credit card charge. For example, a roll of 2 (multiplied by 2) tells us they'll take 4 months to pay off this debt.
    - Then they'll figure out the total interest that will be paid by multiplying the principal (P) by interest rate (R) by the term (T).
    - Next, they'll add the total interest paid and the principal to find the total cost of the supplies.
- Give each group one game board, where they'll record their calculations.
- Give each group a die or a way to generate random numbers from 1 to 6.
    - Alternatively, roll for everyone using virtual die on a computer or tablet (this works well if you use a projector or smartboard).
    - To find virtual dice, enter "roll a die" into an online search engine.
- Instruct students to take turns and work together to complete the calculations for their category.

Wrap-up

- Once all the groups are finished, have them share their results.
    - Invite each group to present how much the original price of their category was and how much the scientists actually ended up paying for it with interest.
- Ask students to apply what they've learned by exploring some reasons why they may want to borrow less, pay back credit card charges quickly, or only use credit cards with a low interest rate when they're old enough to have a credit card of their own.

Suggested next steps

Consider searching for other CFPB activities that address the topic of borrowing, such as managing credit. Suggested activities include "Understanding minimum payments" and "Avoiding debt."

Measuring student learning

Students' answers during discussion can give you a sense of their understanding.

Keep in mind that students' answers may vary. The important thing is for students to have reasonable justification for their answers.

Science expedition game boards

Print the game board pages and cut apart each board.

Clothing and outdoor gear game board

(Boots, rain jackets, etc.)

Principal (P)	Interest rate (R)	Term (T)	Total interest you'll pay (I)	Total cost
▪ Roll the die ▪ Multiply the number rolled by 100 to get the principal (the price of the supplies)	▪ Roll the die ▪ Multiply the number rolled by 3 to get the interest rate (as a percentage) ▪ Write as a decimal (by dividing it by 100)	▪ Roll the die ▪ Multiply the number rolled by 2 to get the term (the number of months to pay for the supplies)	▪ Multiply the principal (P) by interest rate (R) by the term (T) to get the interest **I=PxRxT**	▪ Add the principal (P) and the interest to get your total cost for the supplies

Camping supplies game board

(Tents, sleeping bags, camp stove, lighting, etc.)

Principal (P)	Interest rate (R)	Term (T)	Total interest you'll pay (I)	Total cost
▪ Roll the die ▪ Multiply the number rolled by 100 to get the principal (the price of the supplies)	▪ Roll the die ▪ Multiply the number rolled by 3 to get the interest rate (as a percentage) ▪ Write as a decimal (by dividing it by 100)	▪ Roll the die ▪ Multiply the number rolled by 2 to get the term (the number of months to pay for the supplies)	▪ Multiply the principal (P) by interest rate (R) by the term (T) to get the interest **I=PxRxT**	▪ Add the principal (P) and the interest to get your total cost for the supplies

Science expedition game boards

Print the game board pages and cut apart each board.

Food game board

(Meals, water, drinks, snacks)

Principal (P)	Interest rate (R)	Term (T)	Total interest you'll pay (I)	Total cost
▪ Roll the die ▪ Multiply the number rolled by 100 to get the principal (the price of the supplies)	▪ Roll the die ▪ Multiply the number rolled by 3 to get the interest rate (as a percentage) ▪ Write as a decimal (by dividing it by 100)	▪ Roll the die ▪ Multiply the number rolled by 2 to get the term (the number of months to pay for the supplies)	▪ Multiply the principal (P) by interest rate (R) by the term (T) to get the interest **I=PxRxT**	▪ Add the principal (P) and the interest to get your total cost for the supplies

Research equipment game board

(Microscope, collection tubes, slides, etc.)

Principal (P)	Interest rate (R)	Term (T)	Total interest you'll pay (I)	Total cost
▪ Roll the die ▪ Multiply the number rolled by 100 to get the principal (the price of the supplies)	▪ Roll the die ▪ Multiply the number rolled by 3 to get the interest rate (as a percentage) ▪ Write as a decimal (by dividing it by 100)	▪ Roll the die ▪ Multiply the number rolled by 2 to get the term (the number of months to pay for the supplies)	▪ Multiply the principal (P) by interest rate (R) by the term (T) to get the interest **I=PxRxT**	▪ Add the principal (P) and the interest to get your total cost for the supplies