Modeling with Exponential Functions

What am I making?

In this project, you'll plan a travel experience and compare different options to finance the costs by creating and using exponential and linear models.

Why am I making it?

You're doing this to learn how understanding these models can help you and others make informed financial decisions, based on the same models used by financial institutions.

How do I make it?

Individually you'll create a travel blog post about an experience you will plan by providing a realistic budget and an analysis of financing options. As a group, you'll use what you learned about interest and loans to create a PSA for your peers about avoiding the debt trap.

Driving Question

How can we use exponential models to plan an affordable and memorable travel experience while making informed financial decisions to avoid the Debt Trap?

The driving question identifies the purpose, product, and audience.

Mission

Did you know that nearly a third of young adults in the U.S. have credit cards, and many carry significant debt averaging over $4,000? Falling into a debt trap (where monthly payments barely cover the interest) can make it difficult to achieve financial freedom. Planning a dream trip often involves costs beyond what we've saved, and financing options like credit cards or loans can help, but they require careful management. Your mission is to design a budget-friendly travel experience, evaluate and compare financing options, and share what you've learned in a public service announcement (PSA). By doing so, you'll empower others to use credit responsibly, avoid debt pitfalls, and enjoy the benefits of financial planning for travel and beyond.

Requirements for Individual Product

Create a travel blog entry that includes:

- A budget for trip expenses, such as transportation, hotel or housing, meals, entry to ticketed events, spending money for souvenirs and incidental purchases.
- A comparison of total costs under two financing options. (Use the Mod 4: Project Spreadsheet to help with your calculations.)
    - A personal loan with fixed monthly payments and simple interest for at least two different loan terms
    - A credit card with monthly compound interest and only the 3% minimum monthly payment (payoff when the balance is below $25) and at least one example of a fixed monthly payment.
- Mathematical models (tables, graphs, and equations) for each financing option that
    - Show number of months for the debt to be paid off
    - The monthly payment, the total amount of interest accrued and the total amount paid back for each financing option.
- The pros and cons of each financing option.
- A recommendation for financing a large purchase and minimizing interest payments to avoid the debt trap.

Each project has an individual product and a group product.

The teams support the individuals throughout the sprints.

Requirements for Team Product

Develop a catchy Public Service Announcement (PSA), alerting peers to the dangers of compound interest and explaining how to avoid a debt trap. Your PSA should include:

- Strong opening to grab attention
- Key recommendations on how to avoid the debt trap, justified with math
- A choice of presentation type (social media, video–TikTok or YouTube, posters, pamphlets, etc.)

Badge

M104: Modeling with Exponential Functions

The team product is a culmination of the individuals' learning.

Learning Goals

Modeling with exponential functions helps you make smart decisions regarding loans (including credit cards) by showing how much interest is paid overall and how long it takes to be debt free. By understanding the different variables and how they impact a debt (or the growth of savings), your peers can avoid the crazy cost of a debt trap – and you can too!

In this project, we will learn to

- Collaborate in the modeling cycle (104a)
- Interpret expressions and exponential functions in terms of the situation they model -that is, the context. (104b and 104f)
- Analyze exponential functions using expressions, tables, graphs, and contextual information (104c)
- Build exponential functions that model relationships between two quantities (104d)
- Construct and compare linear and exponential models to solve problems and draw conclusions (104e)
- Summarize, represent, and interpret data on two quantitative variables for linear and exponential models fit, including patterns of association and the usefulness of the model in context (104g)
- Use models of exponential functions to determine values of interest in real world problems based on the relevance of the models (104h and 104i)

Each week, students identify when and how they have met the content expectations.

Content expectations are reinforced through the other activities (5mm, NOWS, Interrupters, ENDS) in the module.