

Dollars and Sense II: Our Interest in Interest, Managing Savings, and Debt

Lesson 3

How Does A Credit Card Work?

Instructions for Teachers

Overview of Contents

Lesson 3 contains two computer “hands-on” simulations designed to introduce students to the basics of how credit card interest charges work. Relatively high interest charges (e.g., 12 – 25% annual rates, with higher rates for first-time student users) are assessed monthly on unpaid balances AND credit card companies encourage minimum or partial payments. In this lesson students will experience how the costs of credit card borrowing can quickly escalate, sometimes beyond their control! The simulations offer two simple yet “real world” situations.

- Simulation 1 allows students to explore the implications of using different payment plans (Minimum Payment Due versus other regular payments) to repay a single \$500 bill. The size of one’s monthly payment affects both overall Interest costs and repayment time frames.
- Simulation 2 focuses on ongoing use of a credit card. In addition to interest costs and repayment, students making regular monthly charges are presented with the possibility of ballooning debt, driven both by new charges and increasing interest costs.

In each case, students will observe the results of different credit card use and payment strategies, including total interest costs and repayment times, plotted out over time in GRAPHS and TABLES.

MATERIALS

- Computer Simulation (available online at [http://www.clexchange.org/curriculum/dollarsandsense/Dollars and Sense II/ds2_lesson3.asp](http://www.clexchange.org/curriculum/dollarsandsense/Dollars%20and%20Sense%20II/ds2_lesson3.asp)).
- Three handouts (use as needed) to record plans and results.

Using credit is borrowing someone else's money. After a month's grace period, interest accrues on any unpaid balance.

Total interest paid is determined by the size of one's monthly payment, the length of time it takes for repayment, and the interest rate charged.

These simulations offer no single right answer, just opportunities for students to explore and test different strategies to discover what works best for them.

Core Objectives for Lesson 3

(1) Managing a Credit Card. Lesson 3 has two core take-home messages. Students must understand that (1) credit in the form of credit cards is DEBT. They are borrowing the credit card company's money to pay their bills. Students must also understand that (2) CREDIT CARD DEBT (where not completely paid off each month) accrues INTEREST and that a "Minimum Payment Due" option is designed to maximize credit card company profits, at the students' expense!

(2) How Compounding Interest (on a Debt) Works. The system of compounding interest for loans is identical to that of SAVINGS, with one key difference: SAVINGS involve "my" money, while CREDIT CARD DEBT is the credit card company's money that I have borrowed. Hence, I earn interest on what is in my SAVINGS Account, while the credit card company earns interest (at a substantially higher rate than SAVINGS, it should be noted) on the UNPAID portion of my CREDIT CARD DEBT or loan.

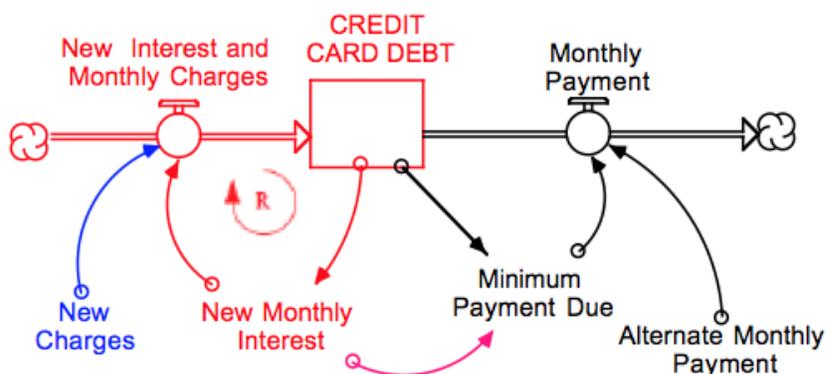
(3) Using Models to Test Options. The open-ended, hands-on focus on each simulation in Lesson 3 is designed to encourage students (1) to explore options and opportunities for evaluating different mental models, assumptions or decisions and (2) to identify and explain to others a preference for one choice over others. At the core of this process is an important recognition that there is no single right answer for everyone. Rather, there are options, trade-offs, and ultimately multiple pathways through which students can define and subsequently achieve personal financial goals.

Deeper Understanding of How the “System” Works

The conceptual tools of systems thinking help to visualize the dynamic process that unfolds over time. In the illustration of the actual model underlying each of the simulations in this lesson, students can see the following:

1. If their monthly payment is LESS than their total outstanding CREDIT CARD DEBT, the unpaid portion of the debt will incur a “New Monthly Interest” charge;
2. A Minimum Payment Due, calculated to equal the amount of “New Monthly Interest” and 1% of the existing CREDIT CARD DEBT, is designed to maximize the profits of the credit card company; and
3. Where Minimum Payment(s) Due are being made, additional new charges added monthly have the potential for growing CREDIT CARD DEBT.

Interest charged by the credit card company on the unpaid balance of a CREDIT CARD DEBT reflects the fact that one’s use of a credit card involves “borrowing” the company’s money to pay a bill. In choosing to make the Minimum Payment Due, the outstanding debt is subject to repeated monthly interest charges, all designed to maximize the company’s profits.



Introductions To Each Simulation

Following are brief introductions to each of the simulations, annotated versions of suggested student handouts, and possible follow-up questions and activities for extended learning opportunities.

The simulation is preset to explore the repayment of an outstanding \$500 CREDIT CARD DEBT.

It can be customized:

- to look at debt up to \$750;
- with Interest Rates from 5% to 30%;
- to make Minimum Payments; or
- to make a Set Monthly Payment up to \$100.

SIMULATION 1: Can I Recreate Past Spending?

[http://www.clexchange.org/curriculum/dollarsandsense/Dollars and Sense II/ds2_lesson3.asp](http://www.clexchange.org/curriculum/dollarsandsense/Dollars%20and%20Sense%20II/ds2_lesson3.asp)

Simulation 1 is designed to get students to see just how long it takes to pay back a credit card debt when making minimum payments. For many, the shock of a large credit card bill (“Did I really spend that much?”) is tempered by the company’s reassuring option to make a relatively small payment. This exercise offers students the opportunity to discover how that option generates the greatest amount of interest payments benefiting the credit card company and playing to the advantage of the lender rather than the user. In offering alternative options, students can see how larger payments significantly reduce interest charges.

SIMULATION 1 HANDOUT with ANSWERS and GUIDES FOR TEACHERS

Managing My First Credit Card

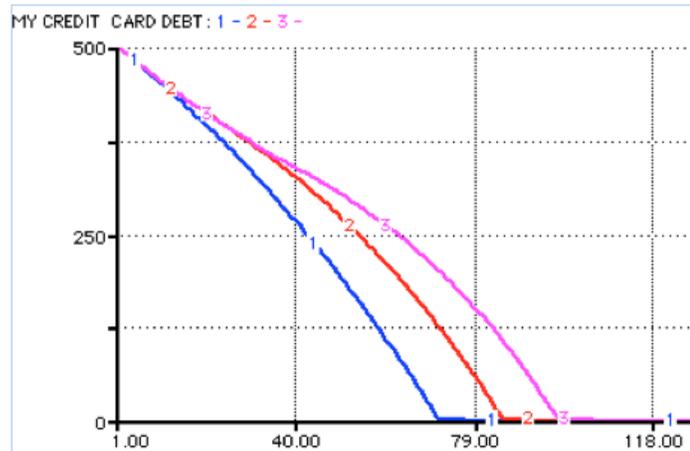
1. Open the Simulation, read the Introduction, and summarize your task below.

It is important that students understand (and can explain) the learning objective for using Simulation 1: the task is to explore different repayment options for paying back a \$500 CREDIT CARD DEBT (or bill).

2. Go next to the CONTROL PANEL to consider the credit card company’s generous Minimum Payment Due option, which involves paying only \$10 a month. Define your Initial CREDIT CARD DEBT as \$500, and run the simulation three times, assuming the different credit card Interest Rates below. Record the results.

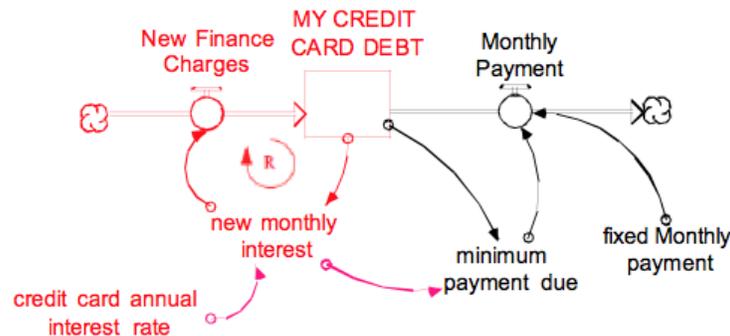
Annual Interest Rates Charged	12%	18%	24%
Months To Pay Off Bill	71	85	97
Total Interest Paid	\$196.16	\$364.97	\$553.88

What should be clear in each case from the GRAPH page is that INTEREST matters! Even a credit card with a relatively low interest rate (12%) tacks on almost 40% interest premium for “borrowing” credit card company money and involves making payments for almost 6 years. But where that rate is doubled (24%)—not at all unusual for cards given to 18 year olds—interest payments EXCEED the amount borrowed, and lock in payments for 8 years!



How is this possible? The TABLE tells the story: for every month that there is an UNPAID balance, interest charges are added. Thus, at the beginning when the unpaid balance is the highest, a significant portion of the monthly payment goes toward paying new interest. This obviously benefits the credit card company!

A powerful way for students to visualize what is happening is to think in terms of SYSTEMS. As the illustration indicates, ongoing (or current) CREDIT CARD DEBT is influenced both by payments (which reduce or potentially eliminate the debt), followed by finance charges involving the INTEREST charged on the remaining UNPAID debt (balance). And since interest is charged monthly, it follows that less interest will accrue where payments exceed the minimum. This concept is explored in Simulation 2.



3. Next, using the 18% annual interest rate (common for student credit cards), increase your monthly payments by increments of \$10 a month and record the results below.

Fixed Monthly Payment Set at	\$20	\$30	\$40
Months To Pay Off Bill	34	21	15
Total Interest Paid	\$130.92	\$79.12	\$57.14

In contrast to the 85 months and \$364.97 in interest generated by choosing the \$10 Minimum Payment Due option, adding a relatively small sum of \$10 extra (creating a total payment of \$20) cuts time and interest paid by almost two-thirds; lesser (but not insignificant) benefits further accrue with additional \$10 increments. The point: it may not be necessary to pay the ENTIRE bill to reap major benefits over the Minimum Payment Due option. Have the students think about this option!

Of the monthly repayment options you've considered (for a credit card charging 18% interest), which is your FAVORITE? Why?

In asking students to identify a favorite, we are asking them to think about what matters most to them: Is it the size of the monthly payment? Total repayment time? It is likely that students will make different choices, based on different trade-offs. This concept is a positive because it challenges them to be clear in their explanations about what matters most to them.

4. What are the key "take-home" messages you've learned about credit cards?

The goal in this basic exercise is to make clear that credit card borrowing is DEBT, and unpaid DEBT (in this case, each month) generates INTEREST CHARGES. Beyond that concept, the ingenious nature of the Minimum Payment Due option needs to be understood as maximizing the interests (and interest!) of credit card companies. Selecting other payment options does make a significant difference!

The simulation is preset to explore the repayment of credit card debt based on \$50 regular monthly use and a \$1,000 credit card limit. It can be customized:

- to look at a limit up to \$1,500;
- with Interest Rates from 5% to 25%;
- with Monthly Charges up to \$100;
- to make Minimum Payments or
- to make a Set Monthly Payment up to \$100.

SIMULATION 2: Managing Ongoing Use of a Credit Card

[http://www.clexchange.org/curriculum/dollarsandsense/Dollars and Sense II/ds2_lesson3.asp](http://www.clexchange.org/curriculum/dollarsandsense/Dollars%20and%20Sense%20II/ds2_lesson3.asp)

As a follow-up to Simulation 1, Simulation 2 seeks to extend students' appreciation of the further complications and potential dangers in making minimum or small payments while incurring ongoing new monthly charges. While the underlying compounding system behind interest charges reflects the basic logic of a Savings Account, this simulation illustrates how the potential exists for increased debt, translating into still higher interest charges, and the very real possibility of piling up credit card bills to the credit card limit.

SIMULATION 2 HANDOUT with ANSWERS and GUIDES FOR TEACHERS

How Do I Manage Ongoing Credit Card Use?

1. Open the Simulation, read the Introduction, and summarize your task below.

It is important that students understand (and can explain) the learning objective for using Simulation 2. The task is to explore different repayment options (Minimum Payment Due or a larger Fixed Amount) when regularly using a credit card to charge \$50 each month.

2. Go to the CONTROL PANEL and set the Average Monthly Charges at \$50 (leave the other two sliders where they are). What do you expect will happen if you pay only the Minimum Payment Due?

Asking students to predict what will happen requires them to identify their assumptions and share their “mental models.” This is always useful when subjecting their assumptions to careful scrutiny.

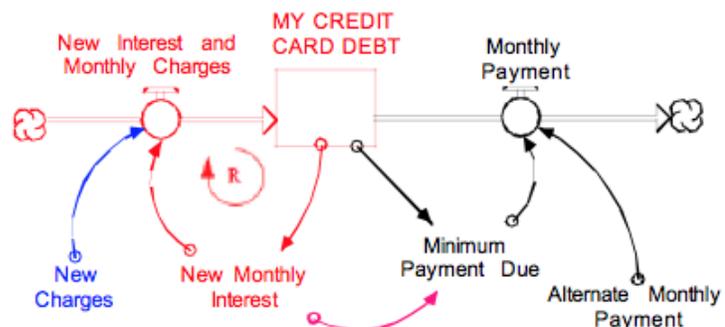
Run the simulation. Were you right? Explain why or why not.

Where credit card use is ongoing AND a minimum payment is LESS than the additional \$50 being added to the card debt each month, that DEBT will grow until it reaches one's CREDIT LIMIT (in this case, after 22 months).

Here again, it may be useful for the students to visualize what is happening in the system: minimum payments do NOT take into consideration next month's INCOMING charges—they are solely based on the interest calculated on the previous month's balance PLUS 1% of that balance.

Any new charges must be factored into one's monthly payment to guarantee that one's DEBT does not grow. Having one's credit card use DENIED (for lack of available credit, i.e., exceeding the credit limit) may be embarrassing the first time it happens. But if it happens repeatedly and the credit card company chooses to SUSPEND your card's use and also insist that you repay your debt in full, you have a much greater problem.

And failure to repay the credit card company may jeopardize future options for obtaining any kind of credit (for education, an auto, a home, etc.).



3. Explore options for using one of two alternative payment plans.

- A. Pay the Minimum Payment Due PLUS an additional sum of ___ each month; or
- B. Pay a set alternative sum of ___ each month.

Try different options. Run the simulation multiple times until you have at least 2 successful plans. Identify each below, then select your favorite and explain why.

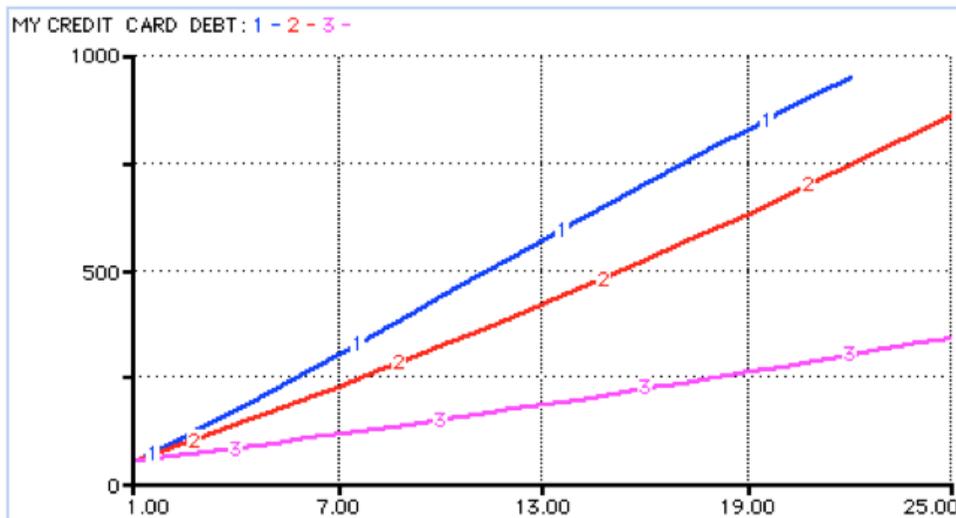
Payment Plan 1: Minimum + \$_____ OR alternative sum of \$_____ a month

Payment Plan 2: Minimum + \$_____ OR alternative sum of \$_____ a month

Select your favorite plan & explain why it is your favorite.

Having run the second simulation, students should be encouraged to think about what they have learned. Balancing the credit card account each month means that monthly payments must equal the \$50 they are spending. That means they will need to pay an **ALTERNATIVE SET MONTHLY PAYMENT** of \$50. In this case, the simulation will “flat line” at zero.

But they do have a \$1,000 credit limit; which means that if their regular monthly payments total at least \$22, they will accumulate debt but, after 24 months, still be within their credit limit (with \$863 in CREDIT CARD DEBT). Do they desire to be “on the edge?” Or perhaps, with a payment of \$40 a month, they can comfortably keep interest payments at a minimum. That’s their decision!



- Run 1 Minimum Payment Due (\$10/month – exceed \$1,000 limit in Month 22)
- Run 2 (\$22 Monthly Payment - \$863 Debt after 24 months), paid \$141 in interest)
- Run 3 (\$40 Monthly Payment - \$343 Debt after 24 months, paid \$50 in interest)

4. Reset the Interest Rate at 25% and repeat #3.

- A. Pay the Minimum Payment Due PLUS an additional sum of ___ each month; or
- B. Pay a set alternative sum of ___ each month.

Try different options. Run the simulation multiple times until you have at least 2 successful plans. Identify each below, then select your favorite and explain why.

Payment Plan 1: Minimum + \$_____ OR alternative sum of \$_____ a month

Payment Plan 2: Minimum + \$_____ OR alternative sum of \$_____ a month

Select your favorite plan & explain why it is your favorite.

The basic dynamics remain the same here. What changes is the minimum amount the student must pay each month to PREVENT CREDIT CARD DEBT from reaching the \$1000 limit: a \$22 monthly payment no longer works. Now they must make a minimum \$25 monthly payment. This illustrates the power of compounding interest on the unpaid balance!

5. What is the most important lesson you've learned about credit card interest?

Interest Rates matter a lot. But so do monthly payments, since the difference between payments and new charges/interest leads to a GROWING debt. And whereas the repayment of a single debt is guaranteed each month to reduce one's total debt, the addition of new monthly charges changes that completely. Care must be taken to balance payments with new charges and interest, so that a growing stock of DEBT (their money, not yours) will not generate high INTEREST CHARGES (for you, not them).

SUMMARY CHALLENGE

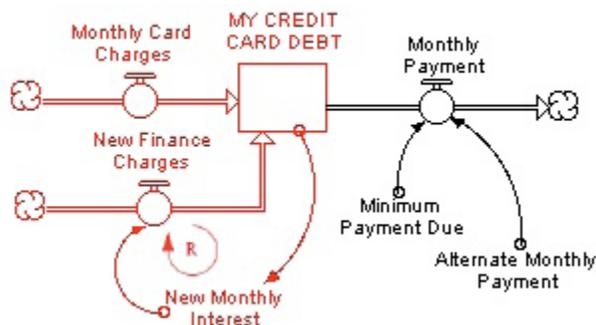
Students are encouraged, after completing each of the simulations, to apply what they have learned to explain how either they or others they know can use credit cards without incurring unexpected interest charges. (Suggested written options are included with the handouts.) This challenge requires students to ground their understanding of how the system of credit card interest works with realistic decisions regarding where, when, and how they can responsibly use and enjoy the benefits of credit cards (convenience, building a credit record). Sharing their credit card plan engages others in constructive discussion of options and choices.

SUMMARY CHALLENGE HANDOUT with GUIDES FOR TEACHERS

Summary Challenge (after completing the lesson)

Pick #1 or #2 and write your answer in the space below (attach a graph or table, if desired).

1. You will most certainly, if you haven't already, be inundated with offers for a "free" credit card. Based upon what you've learned in this lesson, describe where, when, and how you will accept one or more offers and use the card(s) to work for you. Include concerns you might have about how you'll manage your credit needs.



2. Do you know anyone who either has had problems or might have problems managing their credit? Based on what you've learned, how might you help or advise them? Explain clearly how and why they will listen to you.

In this final exercise, students are challenged to apply what they've learned, either in identifying how they personally or others they know can effectively manage a credit card.

Credit cards offer tremendous convenience for making purchases. But that convenience must be balanced with a core recognition that unpaid credit card balances constitute personal debt. Convenience too often obscures the reality that credit cards are poor instruments for carrying long-term debt, given their normally high interest rates. Too often, credit card users realize this after they have incurred sizeable balances, based on large and/or frequent purchases.

Everyone can and should be able to understand that credit card companies offer minimum payments to support their bottom line (maximizing interest payments). Students should be able to explain this to others and apply it themselves.

Managing My First Credit Card

1. Open the Simulation, read the Introduction, and summarize your task below.
2. Go next to the CONTROL PANEL to consider the credit card company's generous Minimum Payment Due option, which involves paying only \$10 a month. Define your Initial CREDIT CARD DEBT as \$500, and run the simulation three times, assuming the different credit card Interest Rates below. Record the results.

Annual Interest Rates Charged	12%	18%	24%
Months To Pay Off Bill	_____	_____	_____
Total Interest Paid	_____	_____	_____

3. Next, using the 18% annual interest rate (common for student credit cards), increase your monthly payments by increments of \$10 a month and record results below.

Fixed Monthly Payment Set at	\$20	\$30	\$40
Months To Pay Off Bill	_____	_____	_____
Total Interest Paid	_____	_____	_____

Of the monthly repayment options you've considered (for a credit card charging 18% interest), which is your FAVORITE? Why?

4. What are the key "take-home" messages you've learned about credit cards?

How Do I Manage Ongoing Credit Card Use?

1. Open the Simulation, read the Introduction, and summarize your task below.
2. Go to the CONTROL PANEL and set the Average Monthly Charges at \$50 (Leave the other two sliders where they are). What do you expect will happen if you pay only the Minimum Payment Due?

Run the simulation. Were you right? Explain why or why not.

3. Explore options for using one of two alternative payment plans.
 - A. Pay the Minimum Payment Due PLUS an additional sum of ___ each month; or
 - B. Pay a set alternative sum of ___ each month.

Try different options. Run the simulation multiple times until you have at least 2 successful plans. Identify each below, then select your favorite and explain why.

Payment Plan 1: Minimum + \$_____ OR alternative sum of \$_____ a month

Payment Plan 2: Minimum + \$_____ OR alternative sum of \$_____ a month

Select your favorite plan & explain why it is your favorite.

4. Reset the Interest Rate at 25% and repeat #3.
 - A. Pay the Minimum Payment Due PLUS an additional sum of ___ each month; or
 - B. Pay a set alternative sum of ___ each month.

Try different options. Run the simulation multiple times until you have at least 2 successful plans. Identify each below, then select your favorite and explain why.

Payment Plan 1: Minimum + \$_____ OR alternative sum of \$_____ a month

Payment Plan 2: Minimum + \$_____ OR alternative sum of \$_____ a month

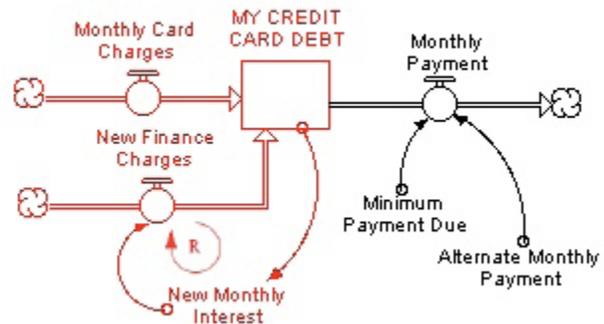
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1. You will most certainly, if you haven't already, be inundated with offers for a "free" credit card. Based upon what you've learned in this lesson, describe where, when, and how you will accept one or more offers and use the card(s) to work for you. Include concerns you might have about how you'll manage your credit needs.



2. Do you know anyone who either has had problems or might have problems managing their credit? Based on what you've learned, how might you help or advise them? Explain clearly how and why they will listen to you.

Lesson Title(s):

Dollars and Sense II, Lesson 3: How Does a Credit Card Work?

Dollars and Sense II, Lesson 5: Managing Credit with Savings and Spending

Overview:

The simulations in *Dollars and Sense II* introduce 6th – 12th grade students to the terminology and basic structures of *compound interest* and how it relates to saving and spending. Later simulations in this series also include *interest payments* on debt. Students become aware of the influence of time in the calculation of interest, both as it helps (in the case of savings) and hurts (in the case of debt).

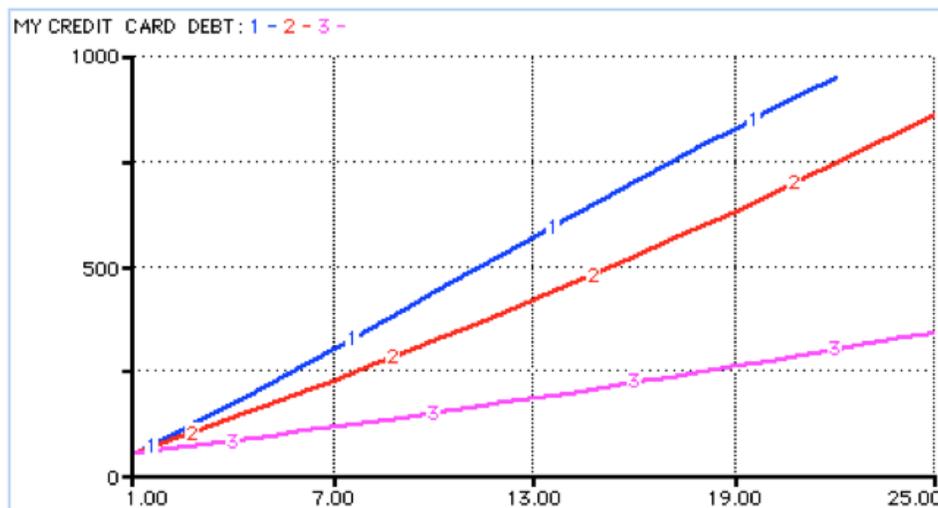
Related Characteristic(s) of Complex Systems:

Conflicts arise between short-term and long-term goals.

Ideas and Examples for Connecting to the Characteristic:

Lessons 3 and 5 of the *Dollars and Sense II* series provide a platform for understanding credit card use as a form of borrowing (debt) and how to manage the use of such debt in the context of wider savings and spending goals.

Time is an important element in the repayment of debt because interest is charged on the outstanding balance. It is important for students to understand that current consumption paid via debt will *lower future discretionary spending*. This graph (also shown in Lesson 3) illustrates the growth of credit card debt:



The scenario assumes an on-going monthly credit card charge of \$50 and presents three possible repayment options:

- Run 1 Minimum Payment Due (\$10/month – exceed \$1,000 limit in Month 22)
- Run 2 (\$22 Monthly Payment - \$863 Debt after 24 months), paid \$141 in interest)
- Run 3 (\$40 Monthly Payment - \$343 Debt after 24 months, paid \$50 in interest)

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All three choices lead to increasing debt, although Run 3 is considerably better than Run 1. Ask students to think through the “logic” of using a credit card to finance purchases they otherwise could not afford:

1. Assuming income does not increase over the two years of simulation time, is the “person” depicted in this graph better or worse off having bought “stuff” and carrying a debt load of \$300 - \$1,000? Why or why not?
2. If the simulation time were to double to 48 months, would the person be debt-free by that time using any of these simulation runs? Why or why not?
3. If a person wants to spend *above* their means for a period of time, what must happen in the future for him/her to be debt-free again?
4. Why do you think credit card debt is sometimes referred to as a “revolving door of debt?” What do credit card companies do to keep people trapped in debt?

Resource(s)

For older students, this resource offers more detailed information about credit cards:

http://moneytalks4teens.ucdavis.edu/newsltr_keys_to_credit.pdf