

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

Lesson 4

Borrowing On Time (Installment Loans)

Instructions for Teachers

Overview of Contents

Lesson 4 contains three computer “hands-on” simulations designed to let students explore different types of Installment Loans, including auto loans, home mortgages, and personal loans. Since all Installment Loans specify a TIME frame for paying off the loan (DEBT) and a regular Monthly Payment, students are encouraged to experiment with and evaluate the effects of different loan amounts, Interest Rates, and TIME frames for repaying their loans.

- Simulation 1 asks students to compare Auto Loans for the purchase of a new car (larger amount borrowed but at a lower interest rate) versus a used car (smaller amount borrowed but at a higher interest rate) with payback periods between 36 and 60 months (3-5 years).
- Simulation 2 helps students explore options for taking out a Home Mortgage on either a condo or a small house with lower interest rates charged on a 15-year mortgage versus higher interest rates on a 30-year mortgage.
- Simulation 3 builds on previous simulations by challenging students to choose an Installment Loan of personal interest (for a personal item, auto or home loan), evaluate different payback strategies, identify a preferred repayment plan, and explain it. In addition, students are encouraged to incorporate the loan within the broader “real world” context of their personal finances, involving income, overall spending, and Savings GOALS.

MATERIALS

- Computer Simulation (available online at [http://www.clexchange.org/curriculum/dollarsandsense/Dollars and Sense II/ds2_lesson4.asp](http://www.clexchange.org/curriculum/dollarsandsense/Dollars%20and%20Sense%20II/ds2_lesson4.asp)).
- Four handouts (use as needed) to record plans and results.

Total Interest paid is determined by the length of time it takes for repayment and the Interest rate charged.

Regular monthly payments include Interest payments on the Unpaid Balance. The Interest portion of one's payment is largest at the start; as the unpaid balance falls, a greater share of the payment pays the outstanding debt.

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

Core Objectives For Lesson 4

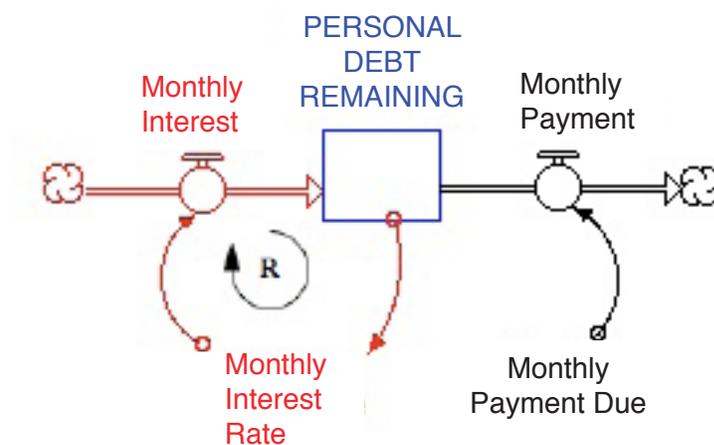
- (1) [Management of Installment Loans](#). The overall cost of an Installment Loan is based on the length of the payback period and the fact that interest is charged monthly on the unpaid balance. Understanding how the system works allows students to recognize the power of both TIME (in repaying the loan) and Interest Rates on the total amount of interest paid, to help them choose when and how to use loans wisely.
- (2) [How Compound Interest on Installment Loans Works](#). The core system for interest paid on Savings and charged on loans is identical: interest accrues on the total number of dollars in MY SAVINGS or the total number of dollars of unpaid DEBT. The key difference, of course, is perspective (specifically, who is paying and who is earning interest in each case). We want our SAVINGS to grow and our unpaid loan DEBT balance to drop. Systems thinking concepts and frameworks help illustrate how Monthly Payments are calculated and split between paying Interest versus the original amount borrowed to further help inform wise decision-making.
- (3) [Use of Models to Test Options](#). As with each simulation developed in this curricula, the open-ended and "hands-on" nature of the Installment Loan simulations are primarily designed to let students explore options and opportunities for evaluating different mental models, assumptions, or decisions. Ultimately, the simulations are used for identifying and subsequently explaining to others a preference for one choice over others.

At the core of the 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.

Deepening Understanding For 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 Lesson 4, students can see the three “actions” that regularly repeat themselves. (1) Monthly Interest is charged on the outstanding Loan Balance, and then (2) the Monthly Interest is added to the remaining outstanding Loan Balance (DEBT). Finally, (3) each regular Monthly Payment has two components: one part goes to paying Interest; the second part goes to paying down the Principal (remaining DEBT).

Early on in the loan, when the Personal Debt Remaining is greatest, a larger share of one’s Monthly Payment goes to paying Interest. As the DEBT is repaid, the next month’s Interest is slightly reduced, and a higher share of the payment is allocated to the DEBT Remaining. The longer the repayment TIME, the longer an unpaid balance incurs Monthly Interest.



What follows are brief introductions to each of the three simulations, “annotated” versions of suggested student handouts to accompany each of the simulations, and

possible follow-up questions and activities for extended learning opportunities.

The simulation is preset to compare two specific loans. It can be customized:

- to look at Loans up to \$50,000;
- over a period up to 60 months;
- with Interest Rates up to 25%.

SIMULATION 1: Financing A Car: What Should I Do?

[http://www.clexchange.org/curriculum/dollarsandsense/Dollars and Sense II/ds2_lesson4.asp](http://www.clexchange.org/curriculum/dollarsandsense/Dollars%20and%20Sense%20II/ds2_lesson4.asp).

This exercise is designed to help students understand how an auto loan works, including the implications of different amounts borrowed, interest rates, and payback times on overall loan costs. Students discover quickly that longer payback times translate into higher payments based on total interest costs. Amounts borrowed and interest rates further impact total interest paid.

SIMULATION 1 HANDOUT with ANSWERS and GUIDES FOR TEACHERS

Financing A Car: What Should I Do?

1. Open the Simulation, read the Introduction, and describe your challenge below:

It is important that students understand (and can explain) the learning objective for using the simulation: The task is to explore different loan options for purchasing a new or used car.

2. Go to the Simulation Control Panel. Using a 60-month or 5-year loan (for the lowest monthly payments), compare strategies for buying a new or used car. Use the information below to define each scenario (in the yellow box).

	<u>New Car</u>	<u>Used Car</u>	<u>Other Option?</u>
\$ from SAVINGS:	\$3,000	\$2,000	_____
Amount of Loan:	\$12,000	\$8,000	_____
Interest Rate (%):	4	9	_____
Monthly Payment:	\$221.00	\$166.07	_____
INTEREST PAID:	\$1,259.90	\$1,964.01	_____

3. Next, reduce payments to 36 months to pay the loans off in 3 years.

# of Payments:	<u>36</u>	<u>36</u>	<u>36</u>
Monthly Payment:	\$354.29	\$254.40	_____
INTEREST PAID:	\$754.36	\$1158.32	_____

The purpose of this exercise is to make students aware of how the “system” works.

(a) Higher Interest rates increase loan costs: so that the Interest paid on borrowing \$8,000 for 60 months at 9% Interest (\$1,964.01) is more than 50% greater than borrowing \$12,000 at 4% (\$1,259.90). Thus, the additional payment of \$55.93 each month (\$221.00 versus \$166.07) buys \$4,000 “more” car.

(b) Longer-term loans generate greater Interest costs than shorter term loans: in both the new and used car illustrations, 60-month loans increase Interest costs by more than two-thirds (from \$754.36 to \$1,259.90 with the \$12,000 new car loan and from \$1158.32 to \$1,964.01 with the \$8,000 used car loan).

Obviously, both of these suggest that a shorter-term loan with the lowest Interest is the best option. But is it for everyone? While the reduced Interest costs are important, there is the issue of higher Monthly Payments. That’s an important trade-off, which may not fit everyone’s budget.

4. Assess your options, select the one that you like best and explain why.

Trade-offs will differ, depending on how much the size of the Monthly Payment matters versus how long one is willing to make Monthly Payments. And, in this illustration, there is also the issue of spending Savings or maintaining some or all of it for other needs. Again, there is no single right answer for everyone: it will depend upon priorities and trade-offs. The key, though, must be an awareness of what those trade-offs are, and a satisfaction that one has made the right choice for them personally.

Feel free to explore different scenarios!

Students are encouraged to try other scenarios of personal interest here.

The simulation is preset for a particular comparative mortgage scenario. It can be customized:

- to look at mortgages up to \$1 million;
- over a period up to 360 months;
- with Interest Rates up to 20%.

SIMULATION 2: Financing A Mortgage: What Should I Do?

http://www.clexchange.org/curriculum/dollarsandsense/Dollars and Sense II/ds2_lesson4.asp.

While a mortgage is similar to an auto loan, the amount borrowed is typically far greater, as is the payback period (typically 15 to 30 years). That combination generates significant total Interest paid on the original loan (DEBT). Students comparing loan sizes, interest rates, and 15-year versus 30-year paybacks will discover tremendous variations in total Interest payments. In offering an option to make a relatively small additional payment each month, which goes directly to paying off the unpaid portion of the loan, students will see how the length of a mortgage can be significantly reduced along with total Interest.

SIMULATION 2 HANDOUT with ANSWERS and GUIDES FOR TEACHERS

Financing a Home: What Should I Do?

1. Open the Simulation, read the Introduction, and describe your challenge below:

It is important that students understand (and can explain) the learning objective for using the simulation: The task is to explore different loan options for purchasing a condominium or home.

2. Go to the Simulation Control Panel. Using the information below to define the Installment Loan Variables (yellow box), compare costs for a 30-year mortgage (360 month, 5.5% interest rate) on the Condo (\$157,500) versus the House (\$225,000 with the same TIME and Interest Rate). Fill in Columns 1 and 2; then compare this with a 15-year mortgage with a lower interest rate.

	<u>30-YR Mortgage</u>		<u>15-YR Mortgage</u>	
Down payment:	\$17,500	\$25,000	\$17,500	\$25,000
Amount of Loan:	\$157,500	\$225,000	\$157,500	\$225,000
# Monthly Payments:	360	360	180	180
Interest Rate (%):	5.5	5.5	4.0	4.0
Monthly Payment:	\$894.27	\$1,277.53	\$1,165.01	\$1,664.30
INTEREST PAID:	\$164,436	\$234,909	\$52,201.00	\$74,573.00

Which plan works best for you and why?

By recognizing that the core system of a mortgage works in the same fashion as an auto loan, this exercise helps students see the following:

(a) Longer-term loans generate greater total Interest costs than shorter-term loans. Thirty-year mortgages – the most common – generate (at 5.5% Interest) interest in excess of the amount originally borrowed (\$164,436 on a \$157,500 condo loan; \$234,909 on a \$225,000 small house). And, where Interest is higher (say, 9%, a rate that was quite common in the 1990s and early 2000s), the amount of Interest can be more than double the amount of the original loan.

(b) 15-year mortgages generate significantly less Interest because the number of months that Interest is added on the unpaid balance are far fewer. And with the added bonus of lower Interest rates charged on 15-year loans, total Interest paid (at 4%) can be less than one-third that of a 30-year loan.

(c) Admittedly, there is a trade-off, and that involves a higher Monthly Payment for a 15- versus a 30-year mortgage. So, while reduced Interest costs are important, a higher Monthly Payment may not fit with everyone’s budget. But it is important to recognize the lower payment translates into a far slower rate of building equity (owning part of) one’s home.

3. Rerun your favorite plan. Now, make an Additional Payment of \$100 to your monthly mortgage payment and record results below.

Monthly Payment (\$) _____ Total Interest Paid (\$) _____
Time To Pay Off Mortgage (months): _____

Additional payments have a significant impact because virtually every dollar goes toward reducing the remaining unpaid loan. This is particularly important, early on in the loan, where the vast majority of each Month’s Payment pays off accruing Interest.

The results are striking in the case of a 30-year loan. In the default illustration of the \$157,500 condo loan (at 5.5% Interest), the additional \$100 each month (roughly 11% more than the \$894 Monthly Payment due) reduces the length of the loan by more than 6 years and total Interest by \$40,000 + (more than 20%). Paying more than the minimum due may not fit with everyone’s budget, but it can make a significant difference on the interest costs in obtaining a mortgage.

4. Do results for #3 change your original thinking? Explain why or why not.

Americans have traditionally placed a premium on owning property, and a long-term home mortgage loan is the standard means for them to do so. Understanding one’s options, and weighing trade-offs (in making larger payments, for instance, over a shorter term) helps in making informed decisions. There is no right answer for everyone, other than their choice reflects a conscious decision to do what’s wisest and best for them.

The simulation can be customized:

- to look at loans up to \$1 million;
- over a period up to 360 months;
- with Interest Rates up to 20%; and
- additional monthly payments up to \$10,000.

These loans are incorporated into larger personal finance plans involving:

- existing Savings, monthly income and monthly spending, each up to \$100,000;
- with a savings interest rate up to 20%.

SIMULATION 3: Choose Your Own Personal Plan

[http://www.clexchange.org/curriculum/dollarsandsense/Dollars and Sense II/ds2_lesson4.asp](http://www.clexchange.org/curriculum/dollarsandsense/Dollars%20and%20Sense%20II/ds2_lesson4.asp).

Students may identify a personal Installment Loan to purchase an expensive but necessary (or desirable) item. In addition to selecting the size of the loan, interest rate, and repayment time, students may also explore the implications of different loans on their overall personal finances by factoring the cost of the loan with income, other spending, and Savings. This expanded horizon encourages insights and better questions in managing Installment Loans, which enhance overall financial GOALS rather than raise potential problems.

SIMULATION 3 HANDOUT with ANSWERS and GUIDES FOR TEACHERS

Choose Your Own Personal Plan

The purpose of this exercise is to encourage students to take what they've learned from the auto loan and home mortgage exercises and apply it to a particular large purchase of personal preference. That could conceivably be a different type of vehicle or home, or it could be to finance one's education, venture, or large purchase.

The key here is that they "see" how loans work, with an understanding of the roles played by the amount borrowed, the rate of Interest charged, and, most importantly, the TIME frame within which the loan is repaid. It is always seductive to focus only on the lowest Monthly Payment, yet the total costs can and do accumulate. Recognizing trade-offs (paying now or paying later) is part of making an informed decision.

- 1. Identify a personal Installment Loan you expect to need at some stage in your life, to purchase an expensive but necessary (or desirable) item.**

Define the Amount (\$): _____

The simulation permits a student to borrow up to \$1 million, at 0 to 20% interest, for up to 360 months (30 years), with the potential of making additional payments of up to \$10,000 a month. That offers quite a range of possible scenarios to explore!

2. Next, explore different scenarios, changing only one of the three elements (# Planned Payments; Interest Rate % change; Additional Payment) at a time.

The key to learning rests in exploring **OPTIONS**. It is critically important that students explore several; however, it is equally important that they change only one variable from their original plan at a time. That affords them, for instance, to evaluate a different length loan or Interest or additional payment. Seeing the bottom-line impact of each allows them to ask better questions and make wiser decisions.

	Plan 1	Plan 2	Plan 3	Plan 4	Plan 5
# Planned Payments:	_____	_____	_____	_____	_____
Interest Rate (%):	_____	_____	_____	_____	_____
Additional Payment:	_____	_____	_____	_____	_____
-----RECORD RESULTS BELOW -----					
Monthly Payment:	_____	_____	_____	_____	_____
Total Interest:	_____	_____	_____	_____	_____
Actual # Payments:	_____	_____	_____	_____	_____

3. Pick your favorite plan and explain your choice below.

Choosing and—more importantly—explaining one’s choice opens the door for others to ask questions: Are there options that have been overlooked? Does the decision fully incorporate an appreciation of trade-offs and costs? Through questions like these and others, students will help one another see that loans can work for them rather than for their creditors.

4. **NOTE:** You may also incorporate Savings, Income, and Other Spending to evaluate how well the loan “fits” with your overall personal financial planning. Are you satisfied with your Savings? When you have paid off your loan, will the value of your purchase enhance your personal financial well-being? Explain below.

An important trade-off, ultimately, in borrowing money, involves not having that money to put away in savings, grow interest, and use at a later time. In allowing students to incorporate loans into their larger income and spending habits, this part of the simulation (when activated) shows the impact of the loan on overall Savings. An important consideration here – which can be followed up in discussion – involves the value of the item (paid for with a loan) at the end of that loan. Assuming it retains value (say, in the case of a home), it then supplements one’s Savings (as an asset). Again, that opens up a potentially rich conversation around the wisdom of using loans to obtain assets.

SUMMARY CHALLENGE

Students are encouraged, after completing each of the simulations, to apply what they’ve learned to explain either how they or others they know can constructively use Installment Loans to make a purchase they might not otherwise be able to afford with a repayment plan that minimizes interest. (Suggested written options are included with the handouts.) This challenge obliges students to ground their understanding of how the system of Installment Loan interest works with realistic decisions regarding where, when, and how they can responsibly use and enjoy the benefits of these loans. Sharing their plan engages others in constructive discussion of options and choices.

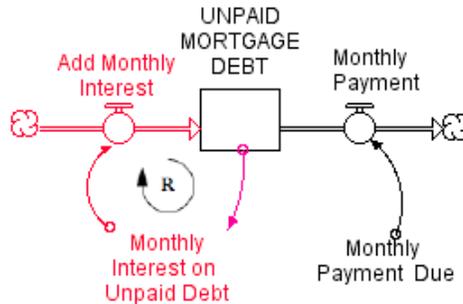
SUMMARY CHALLENGE HANDOUT with GUIDES FOR TEACHERS

Summary Challenge (after completing the lesson)

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

1. Identify a loan that you personally expect you will take out in the next five years. Based upon what you’ve learned in this lesson, describe the conditions of the loan and explain WHY you’ve chosen them over other options.

2. Do you know anyone who either has had problems or might have problems with an installment loan? 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 set up and use an installment loan to make a large purchase.

Installment Loans need to balance the opportunity to acquire something and pay over time with other personal financial interests. Because interest payments constitute a larger portion of each monthly payment early on, and because total interest is calculated both on the interest rate and the time needed to repay the loan, one must exercise care in choosing what to pay for over time and how to insure that the additional costs in securing the loan are in one's best interests (what are the overall costs, including "opportunity costs," or what one might have done with some or all of the money tied up in the loan?).

It is likely students will, on many occasions in their lifetimes, use installment loans to make large purchases (cars, homes, education, appliances) which they might not otherwise be able to afford. Knowing when and how to manage loans involves factoring in interest to the total cost of the loan, and minimizing the overall amount of interest to the degree it is possible.

Simulation 1. Financing A Car: What Should I Do?

1. Open the Simulation, read the Introduction, then describe your challenge below:
2. Go to the Simulation Control Panel. Using a 60-month or 5-year loan (for the lowest monthly payments), compare strategies for buying a new or used car. Use the information below to define each scenario (in the yellow box):

	<u>New Car</u>	<u>Used Car</u>	<u>Other Option?</u>
Down Payment \$:	\$3,000	\$2,000	_____
Initial Loan \$:	\$12,000	\$8,000	_____
Interest Rate (%):	4	9	_____

Run the Simulation for each scenario and record:

Monthly Payment:	_____	_____	_____
INTEREST PAID:	_____	_____	_____

3. Next, reduce payments to 36 months to pay the loans off in 3 years.

Total # of Payments:	36	36	36
Monthly Payment:	_____	_____	_____
INTEREST PAID:	_____	_____	_____

4. Assess your options, select the one that you like best and explain why.

Feel free to use the simulation to explore different scenarios!

Simulation 2. Financing a Home: What Should I Do?

1. Open the Simulation, read the Introduction, then describe your challenge below:

2. Go to the Simulation Control Panel. Using the information below to define the "Installment Loan Variables (yellow box), compare costs for a 30-year mortgage (360 month, 5.5% interest rate) on the Condo (\$157,500) versus the House (\$225,000) with the same TIME and Interest Rate. Fill in Columns 1 and 2; then compare this with a 15-year mortgage with a lower interest rate.

	30-YR Mortgage		15-YR Mortgage	
Down Payment:	\$17,500	\$25,000	\$17,500	\$25,000
Initial Mortgage:	\$157,500	\$225,000	\$157,500	\$225,000
Total # Payments:	360	360	180	180
Interest Rate (%):	5.5	5.5	4.0	4.0

Run the Simulation for each scenario and record:

Monthly Payment (\$) _____

INTEREST PAID (\$) _____

Explain below which plan works best for you and why.

3. Rerun your favorite plan. Now, make an Additional Payment of \$100 to your monthly mortgage payment and record results below.

Monthly Payment (\$) _____ Total Interest Paid (\$) _____

Time To Pay Off Mortgage (months): _____

4. Do results for #3 change your original thinking? Explain why or why not.

Simulation 3: Choose Your Own Personal Plan

1. Identify a personal Installment Loan you expect to need at some stage in your life, to purchase an expensive but necessary (or desirable) item.

Loan for _____ Amount of Loan (\$): _____

2. Next, open the Simulation, and explore different scenarios, **changing only one** of the three elements in the "My Personal Loan" yellow box (Total # Payments; Interest Rate % charged; Additional Monthly Payment) at a time.

	Plan 1	Plan 2	Plan 3	Plan 4	Plan 5
Total # Payments:	_____	_____	_____	_____	_____
Annual Interest Rate (%):	_____	_____	_____	_____	_____
Additional Monthly Payment:	_____	_____	_____	_____	_____

-----RECORD RESULTS BELOW -----

Monthly Payment:	_____	_____	_____	_____	_____
Total Interest:	_____	_____	_____	_____	_____
Actual # Payments:	_____	_____	_____	_____	_____

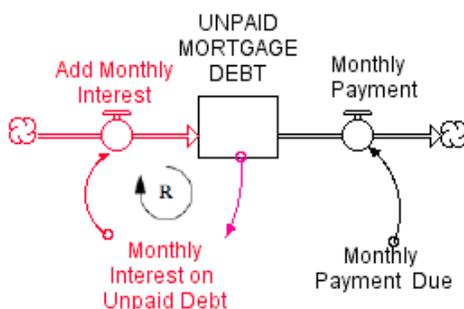
3. Pick your favorite plan and explain your choice below.

4. NOTE: You may also incorporate Savings, Income, and Other Spending to evaluate how well the loan "fits" with your overall personal Savings. (Use the second yellow box.) When you have paid off your loan, will the value of your purchase enhance your personal financial well-being? Explain below.

Summary Challenge (after completing the lesson)

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

1. Identify a loan that you personally expect you will take out in the next five years. Based upon what you've learned in this lesson, describe the conditions of the loan and explain WHY you've chosen them over other options.
2. Do you know anyone who either has had problems or might have problems with an installment loan? 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 4: Borrowing on Time (Installment Loans)

Dollars and Sense II, Lesson 6: Compounding Questions for Installment Loans

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 4 and 6 of the *Dollars and Sense II* series provide a platform for understanding installment loans and how to manage the use of such debt in the context of wider savings and spending goals.

Installment loans are typically used to purchase items that we cannot easily save for, such as a car or house. Although interest rates are likely to be lower than those charged for credit card debt, the time period is usually medium to long-term. This provides an opportunity for interest costs to be a significant cost of the overall loan. The simulations of Lessons 4 and 6 can be used to illustrate the financial benefits (lower overall interest costs) of sacrificing short-term “wants” to take on a higher monthly loan payment or allocate additional payments in order to pay down the long-term debt in less time.

To get students thinking about how to squeeze more money from consumer spending in the short term to repay debt, the following ideas may be helpful:

1. Ask students to track their spending for two weeks and then categorize their purchases into “needs” and “wants.” (As a class, it may be helpful to agree on the definitions of “needs” and “wants” so everyone is on the same page.)
2. Have students run the simulation using the money they spent on “wants” as an input to the simulation to repay the debt faster. Ask them to record and reflect on the amount of interest they saved. In the case of a mortgage, the savings will be significant.
3. Ask students to reflect on the role of advertising in our society. This could be a class discussion or a more involved project tracking ads on the Internet when browsing. Encourage them to articulate under what circumstances they personally feel pressure to buy something they don’t really need.

Resource(s)

A number of free financial management resources for middle and high school students are available on MoneySkill: <http://www.moneyskill.org/>