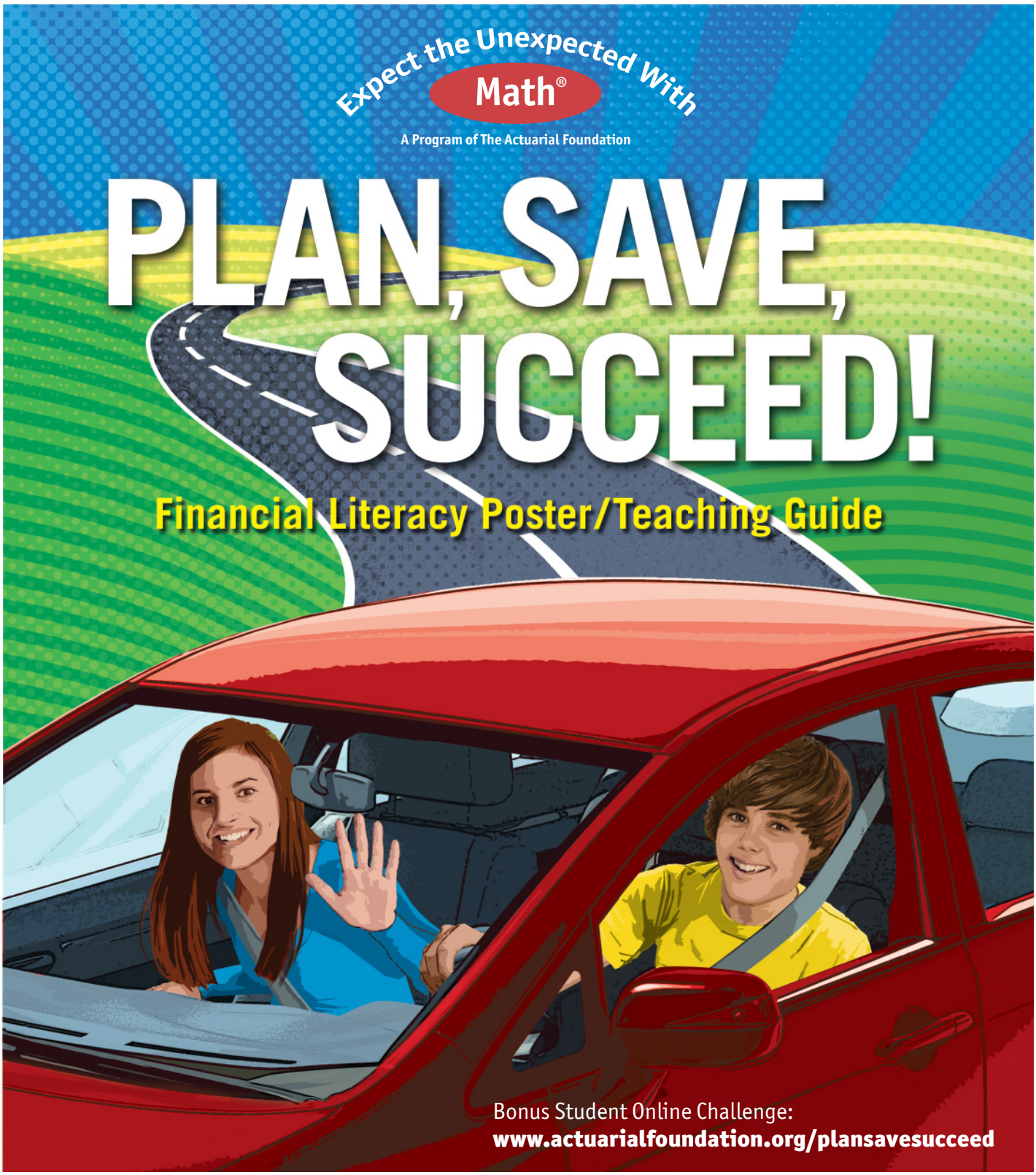
ALIGNS WITH NATIONAL AND COMMON CORE STATE STANDARDS

GRADES 6–8



WHAT IS AN ACTUARY? An actuary is an expert in statistics who works with businesses, governments, and organizations to help them plan for the future. Actuarial science is the discipline that applies math, economics, and statistical methods to assess risk.

DEVELOPED WITH
THE ACTUARIAL FOUNDATION®
Preparing for tomorrow's possibilities® *through education*

DEAR TEACHER,

Welcome to *Plan, Save, Succeed!* a new program aligned with Jumpstart Coalition National Standards in K–12 Personal Finance Education, NCTM Standards, and Common Core Standards for Mathematical Practice. *Plan, Save, Succeed!* is designed to help students understand key financial literacy topics including budgeting, income, saving, and credit.

Developed by The Actuarial Foundation with Scholastic, the program's lessons and worksheets provide knowledge and skill-building activities designed to address important personal finance concepts in a real-world context that middle school students will find meaningful. We hope you enjoy this new program!

Sincerely,

The Actuarial Foundation

GETTING STARTED

This program is designed to support instruction of the following financial literacy topics:

- financial responsibility and decision making;
- planning and money management;
- saving and investing;
- income and careers; and
- credit and debt.

The materials are taught through this story line: Jason and Amy are two 14-year-old siblings who have decided to save money to purchase a used car when they turn 16. To get their income and expenses into balance, they construct a budget and make some tough cuts in spending. As they investigate ways to increase their income, they learn about earnings and deductions from a part-time job, interest that can be earned from saving, and the cost of credit when they actually are ready to purchase their car.

Three lesson plans teach basic financial literacy concepts, each with a corresponding **worksheet**; a **bonus worksheet** addresses the issue of credit and debt. A **classroom poster** reinforces the program's main themes of starting with a budget to help make financial goals a reality.

A **bonus online activity** challenges students to use financial literacy skills to save toward a financial goal.

More Free Math Programs:

- **www.actuarialfoundation.org/programs/youth_education.shtml**
- **www.scholastic.com/unexpectedmath**

LESSON 1

BUDGET BASICS

OBJECTIVES:

- Students will understand how a budget is created and how it can support good financial decision making. (financial literacy)
- Students will understand that mastery of fractions, decimals, and percentages can help address real-world situations. (financial literacy and math)
- Students will begin to consider the role saving plays in financial planning. (financial literacy)

Time Required: 20 minutes, plus additional time for worksheet

Materials: Worksheet 1 "Budget Basics"

DIRECTIONS:

1. Ask students how much money a middle school student needs to "live" each month. Record responses on the board. Ask students to identify how they spend money (answers may include clothing, entertainment, savings, etc.). Finally, ask students how they obtain the money they spend. Answers may include allowance from parents, chores, jobs, gifts, etc.

2. Write the following sample student monthly expense and income information on the board (examples can be modified as appropriate for your class):

Entertainment (one $10 movie/month plus $5 popcorn)	**$ 15**
Monthly Allowance	**$ 40**
Music/Game Downloads (16/month @ $1.25)	**$ 20**
Pay from walking neighbor's dog (four ten-minute walks per month)	**$ 10**
Snacks	**$ 10**

3. Ask if this student has enough money to meet the monthly expenses. (Yes.) Ask how this can be determined. (Identify and group together **income** items and **expense** items, calculate totals, and compare the totals.) Indicate that the student has income of $50 per month and expenses of $45. Indicate that the difference of $5 can be categorized as "savings."

4. Next rewrite the income and expense items in the form of a monthly **budget**:

INCOME	EXPENSES
Allowance $40	Entertainment $15
Dog Walking Pay $10	Music $20
	Snacks $10
Total Income $50	**Total Expenses $45**

5. Ask students how to show the $5 difference between income and expenses. (Show as "savings" under expenses and change "total expenses" to $50, equal to income.)

6. Indicate that this is called a **budget**. Ask students why it might be useful to keep a budget. (Answers might include: keeping track of expenses, making sure expenses don't exceed income, helping set financial goals, etc.) To demonstrate, ask the class how this student could increase monthly savings for a large purchase in the future. Answers will vary but should include increasing income and/or cutting expenses.

7. Ask students what percentage of monthly expenses is savings (5/50 = 10%). Demonstrate how to calculate percentage if necessary. Ask the percentage of expenses for snacks (20%), music (40%), and entertainment (30%). Demonstrate to students that the expense categories add up to 100%.

8. Ask the class whether or not the dog walking income is money the student can count on. (No, the family might go on vacation, decide to walk the dog themselves, etc.) Then ask what would happen if the family paying for the dog walking moved away and there was now no dog walking income? (Answers might include: find another family that wants its dog walked, cut expenses, etc.) What would happen if a second family wanted its dog walked and dog walking pay increased to $20? (Answers might include that the student could spend and/or save more.)

9. Distribute worksheet to students, then review answers with class.

10. Point out the **poster front**. Discuss with students what types of decisions involving money can help a person "plan, save, and succeed."

▶ LESSON 2

GROSS AND NET PAY

OBJECTIVES:

- Students will understand how taxes and other deductions account for the difference between gross and net pay. (financial literacy)
- Students will understand the difference between voluntary and involuntary deductions. (financial literacy)
- Students will calculate the dollar amount of deductions by applying the relevant percentage to gross pay. (financial literacy and math)

Time Required: 20 minutes plus additional time for worksheet

Materials: Worksheet 2 "Where Did the Money Go?"

DIRECTIONS:

1. Ask students where they've heard of taxes in real-life situations. Possible responses include sales, income (federal and state), and property taxes. Since most students are familiar with sales tax, mention that sales tax is added to the cost of an item to arrive at the final cost of a purchase.

2. Demonstrate how percentages are applied when calculating sales tax. Use the example of a $740 laptop computer in a state with 5% sales tax. First, show how 5% is converted to the decimal .05 and multiplied by $740 to arrive at a sales tax of $37. Adding the price of the laptop ($740) and the sales tax ($37) results in the total cost of $777.

3. While sales tax is added to the starting amount of a purchase price, some taxes represent deductions from an amount a person earns. For example, in the case of Social Security, wages are taxed at 4.2% (through year 2012). So a person making $1,200 per week will have $50.40 (.042 x $1,200) deducted from his/her weekly gross pay.

4. Distribute worksheet to students, then review answers with class.

5. As you review the answers, make sure that students understand the difference between voluntary deductions like charity and savings, and involuntary deductions like taxes. To make it easier for employees to save, buy insurance, invest in retirement plans, and/or give to others, many employers offer to automatically deduct money from an employee's gross pay and deposit it directly into the employee's bank account or send it directly to charities. If time allows, explain what Social Security and Medicare are. Also explain that some states and municipalities require other involuntary deductions like city tax, contributions to state disability or unemployment funds, etc.

▶ LESSON 3

INTEREST AND BANK ACCOUNTS

OBJECTIVES:

- Students will understand the importance of saving and the differences (advantages and disadvantages) between certificates of deposit (CDs), checking, and savings accounts. (financial literacy)
- Students will understand the difference between simple and compound interest. (financial literacy and math)
- Students will use fractions, decimals, and percentages to calculate interest. (financial literacy and math)

Time Required: 20 minutes plus additional time for worksheet

Materials: Worksheet 3 "Making Money While You Sleep"

DIRECTIONS:

1. Ask students if there are ways for kids to make money other than work, allowance, or gifts. Explain that banks and other financial institutions pay interest on certain accounts as an incentive to get people to deposit their money with them. They then use this money to make loans to companies and individuals. Banks make money from the interest they charge on the loans.

2. Indicate that financial institutions offer a number of different types of accounts:

WORKSHEET 1

BUDGET BASICS

Jason and Amy Hunter, 14-year-old twins, couldn't believe it! Their parents had agreed to let them look for a car that they could purchase in two years when they both got their licenses at 16. The only catch was they had to save enough over two years to buy the car themselves, and to also pay for costs like gas, repairs, and insurance.

Jason and Amy decided to "window shop" for cars at Friendly Fred's Autorama. Friendly Fred himself helped them find a reasonably priced car for $6,000, an amount that they thought they could afford. "Remember," said Fred, "You won't be buying the car for two years, and with inflation, a similar car will probably cost about 5% more, or $6,300. When you're ready, Friendly Fred will be here to help you!"

"Now that we know what we want, how can we possibly come up with $6,300?" wondered Jason. Amy had an idea: "Let's figure out where we stand and make a budget—an estimate of our expected income and expenses. Then we can make adjustments to make sure we can save $6,300 over the next two years." Jason and Amy got down to work and made a list of the money they expected to receive and spend each month.

QUESTIONS

Use the chart on the right. Show your work on separate paper.

1. Prepare a monthly budget (a listing of expected income and expenses) for Amy and one for Jason.
   - a. How do their expenses compare to their incomes?
   - b. After two years, will they have enough to buy the car?
   - c. How much more money does each sibling need to save each month to afford to buy the car?
   - d. What would you suggest they do to make sure they save enough for the car?
2. Jason and Amy are budgeting to make sure they save enough to buy the car. They also have to consider the expenses they will face to operate the car after they buy it. What kinds of operating expenses should they include?

Monthly Income or Expense Item	Jason	Amy
Allowance	$40	$40
Video Games	$10	$0
Babysitting Earnings	$0	$20 (2 jobs per month for 2 hours each at $5 per hour)
Snacks	$14	$0
Art Supplies	$0	$44
Donation to Animal Shelter	$0	$5
Batting Cage Rentals	$16	$0

NOW TRY THIS!

Make a list of the income you receive and the expenses you have each month and prepare a budget for yourself. If your income and expenses are equal, you aren't saving anything. Do you think this is a problem? Explain your thinking.

DEFINITIONS:

- **Budget:** An estimate of expected income and expenses for a future period of time.
- **Income:** Money received during a period of time from wages, interest, and other sources.
- **Expenses:** Money spent during a period of time to pay for goods or services.

WORKSHEET 2

WHERE DID THE MONEY GO?

Amy and Jason made some hard decisions to reduce their spending. Jason cut out snacks ($14) and video games ($10) to increase his monthly savings to $24. Amy reduced her spending on art supplies from $44 to $34 to increase her monthly savings from $11 to $21.

Realizing they each needed to increase income, they decided to ask their neighbor Meredith for suggestions. She had an idea: "If you have a strong wrist and can stand the wacky flavors, I know they need part-time workers at Cuckoo Cones. They pay $8 an hour." After getting a work permit at school, Amy and Jason were hired for the seven-hour Saturday shift. "Wow!" exclaimed Jason. "That's $56 each week, more than enough to save for the car *and* buy snacks again *and* save a little more."

After a week of dishing out an untold number of ham ripple, strawberry-spinach surprise, and caramel-rhubarb cones, the twins received their first paychecks. After excitedly opening their pay envelopes, their jaws dropped. "We've been robbed!" cried Jason.

Meredith explained where their money went: "You are required to pay the taxes and you chose to donate $1 to charity every week and put $35 directly into the bank so you would have enough to buy the car in two years. After all that, you still have over $11 each week to save or spend as you please."

DEFINITIONS:

- **Gross Pay:** An employee's pay before being reduced by taxes and other deductions.
- **Net Pay:** Gross pay minus taxes and other deductions (voluntary and involuntary).

CUCKOO CONES — Earnings Statement

EMPLOYEE NO.	EMPLOYEE NAME	SOCIAL SECURITY NO	PERIOD BEG.	PERIOD END	CHECK DATE
02147	JASON HUNTER	XXX-XX-9865	10/15/2012	10/22/2012	10/25/2012

EARNINGS	HOURS	RATE	CURRENT AMOUNT	WITHHOLDINGS/DEDUCTIONS	CURRENT AMOUNT	YEAR TO DATE
GROSS PAY	7.00	8.00/HR.	56.00	STATE TAX WITHHOLDING	1.60	1.60
				SOCIAL SECURITY TAX	2.35	2.35
				FEDERAL TAX WITHHOLDING	3.68	3.68
				MEDICARE TAX	.81	.81
				SAVINGS DEPOSIT	35.00	35.00
				CHARITY DONATION	1.00	1.00

CURRENT AMOUNT	CURRENT DEDUCTIONS	NET PAY	YTD EARNINGS	YTD DEDUCTIONS	YTD NET PAY	CHECK NO.
56.00	44.44	11.56	56.00	44.44	11.56	69854

QUESTIONS

Show your work on separate paper.

1. What percentage of Jason's gross pay goes for taxes?
2. What percentage of his gross pay is used for voluntary deductions (deductions he chooses to make)?
3. What is the Medicare tax rate percentage?

NOW TRY THIS!

1. The way a person allocates the funds from his or her paycheck has been described by some as "saving, giving, and living." How do you think this expression applies to Jason and how he assigns available funds?
2. If you received income from a part-time job, why do you think it would be important to "save, give, and live"?

WORKSHEET 3

MAKING MONEY WHILE YOU SLEEP

Three months after setting up their budget, cutting their expenses, and working part-time jobs, Jason and Amy have each saved about $450. Up until now, they have had Cuckoo Cones directly deposit funds into a savings account. They felt great about the progress they were making toward their goal of saving enough to buy a new car. Then they had a conversation with their friend Aaron, treasurer of their 8th-grade class. Aaron told them that they could make even more money by looking into an account that paid higher interest. Of course their money was safe (savings accounts are insured by the FDIC [Federal Deposit Insurance Corporation]), but banks offer many types of interest-bearing accounts and certificates of deposit that are also government insured.

Jason and Amy decided to check it out. They researched different accounts online and were confronted with an overwhelming number of offers. (See chart at right.)

ACCOUNT TYPE	DESCRIPTION
CHECKING AND SAVINGS ACCOUNTS	Checking accounts with no interest: $2 service charge per month
	Savings accounts with 1% annual interest
CERTIFICATES OF DEPOSIT	One-year certificate of deposit (CD) with 1.5% interest
	Two-year CD with 2% interest, compounded annually
	Five-year CD with 3% interest, compounded annually

QUESTIONS

Show your work on separate paper.

1. How much interest would Amy earn if she deposited $400 in the savings account example after two years?
2. What would be the value of the checking account if Jason deposited $400 and kept it there for one year and nine months?
3. How much more interest would Amy earn if she invested $500 in the two-year CD option versus a savings account?

NOW TRY THIS!

Suppose you won $500 in an essay contest and decided to save it at a bank. Would you open a savings account, checking account, or CD? Consider the higher rates of longer-term CDs as well as the easier access to your funds found with a checking or savings account. Include your calculations in your answer.

DEFINITIONS:

- **Interest:** The charge for borrowing or using money, calculated as a percentage of the amount borrowed.
- **Formula for interest compounded annually:** $A = P(1 + r)^t$ where A is the ending amount, P is the amount deposited (principal), r is the interest rate, and t is the number of years.

BONUS WORKSHEET

CASH OR CREDIT?

Jason and Amy's big day had finally arrived! After blowing out the candles on their sixteenth birthday cake, they went with their parents to the State Department of Motor Vehicles where they both passed their drivers' tests!

Next, they returned with their parents to Friendly Fred's Autorama. With Fred's expert help, they were able to find a used red two-door car for $6,300 (which included tax, title, and license). It was the amount they had managed to save over the past two years!

"Congratulations, I know you kids have worked hard to save for the car," Fred began. "But you might want to consider a loan so you can hold on to your little nest egg. I can get you a loan at 11.9% interest for no money down and 60 monthly payments of only $143.02."

Their parents said they could think about it. "If we take out a loan, we won't have to touch our savings," declared Amy. "We could use our income from Cuckoo Cones to pay off the loan and use our savings to pay for gas, repairs, insurance, and other expenses." "Before we agree" said Jason, "we ought to figure out what the loan will really cost us."

QUESTIONS

Show your work on separate paper.

1. How much will Jason and Amy pay in total if they take out the loan?
2. How much interest will Jason and Amy pay over the life of the loan? (Hint: Compare the total cost of the loan payments to the cost of the vehicle.)
3. Do you think Jason and Amy should take out a loan or use their savings to buy the car? Explain your thinking.

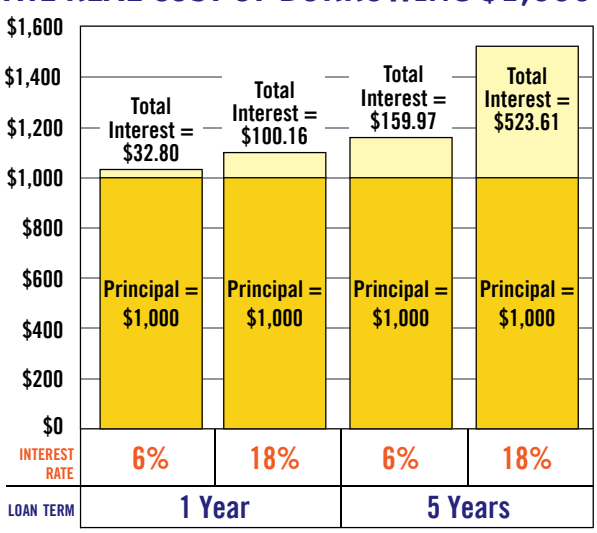
NOW TRY THIS!

1. Use an Internet search engine to find an online credit calculator. Assume you owe a $1,000 balance on a credit card. Now compare the following credit card deals. Which one has the lowest monthly payment? Which one has the lowest total cost (total cost equals the number of payments times the monthly payment amount)?
   a. 20% interest paid back in 24 months
   b. 12% interest paid back in 36 months
   c. 13.9% interest paid back in 30 months
   d. 18% interest paid back in 12 months
2. **Additional Challenge:** Choose a period of one year for each of the four loans, and display the info in a bar graph.

DEFINITIONS:

- **Loan:** A legal arrangement in which a lender gives money to a borrower who agrees to repay the amount, usually within a set period of time. Most loans require the borrower to pay the lender **interest** in addition to the amount of money borrowed (the **principal**).
- **Credit Card:** A plastic card, usually issued by a bank or store, that enables consumers to make purchases and pay off the balance later. If you pay off your entire balance on time, you won't be charged interest.

THE REAL COST OF BORROWING $1,000



LESSON 3 (CONTINUED)

Checking accounts give individuals the easiest access to their funds via checks, but pay little or no interest. Indicate that most banks require students of middle school age to have a parent as a cosigner when opening a checking account. Individuals also have access to their funds via their debit cards.

Savings accounts provide some interest but require the individual to visit a bank branch, use a debit card at an ATM, or go online to have access to his or her funds.

Certificates of deposit (CDs) have the advantage of offering higher interest rates than savings accounts, but have tighter restrictions on access to funds. Individuals purchasing a CD must commit to holding it for a period of time, generally ranging from six months to five years or more. Selecting the term of a CD involves some risk. When a long-term CD is purchased and interest rates later go up, the purchaser only receives the interest rate stated at the time of purchase. If it turns out that interest rates go down, the purchaser will be happy to have locked in a favorable rate.

People make decisions about the kind of account to open partly based on the amount of interest they'll earn, but also on how easily they can have access to their funds.

3. Indicate that **interest** is sometimes calculated as *simple interest* but is more frequently calculated as *compound interest*. Provide an example of each, explaining each formula:

   - The simple interest formula is $I = PRT$, where I is the amount of interest earned, P is the amount deposited (principal), R is the rate of interest, and T is the number of years. So if you deposited $100 for two years with an interest rate of 3½%, you would earn $100 x .035 x 2 or $7. (If necessary, explain how 3½% is converted to .035 in the calculation.)
   - The compound interest rate formula is $A = P(1 + r/n)^{nt}$, where A is the ending amount, P is the amount deposited (principal), r is the interest rate, n is the number of compounding periods per year, and t is the number of years. The amount of interest earned is the ending amount minus the principal invested (A – P). Give an example of annual compounding. If you deposit $100 for two years at 3½% interest, you would end up with $100 \times (1 + .035)^2$ or $107.12, representing the initial deposit plus interest. If appropriate for your class, use the same example but have the interest compounded quarterly ($100 \times (1 + .035/4)^{2 \times 4}$ or $107.22 (rounded to the nearest cent) representing the initial deposit plus interest. Note how quarterly compounding results in higher interest income.

4. Distribute Worksheet 3 to students, then review answers with the class.

BONUS WORKSHEET

CASH OR CREDIT?

As an extension to the lessons, distribute the bonus worksheet to students.

WORKSHEET ANSWER KEY

WORKSHEET 1: "BUDGET BASICS"

Jason's Monthly Budget	
INCOME	**EXPENSES**
Allowance $40	Video games $10
	Snacks $14
	Batting cage $16
Total Income $40	**Total Expenses $40**
Amy's Monthly Budget	
INCOME	**EXPENSES**
Allowance $40	Art supplies $44
Babysitting $20	Charity $5
Total Income $60	**Total Expenses $49**

a. Amy saves $11 per month and Jason saves nothing.

b. No, after two years, their savings will only total $264 (24 months x Amy's savings of $11 per month).

c. Each sibling needs to save $131.25 per month ($6,000 cost of the car ÷ 2 twins ÷ 24 months). Since Amy already saves $11 per month, she needs to save an additional $120.25 per month.

d. Answers will vary but should include increasing income (e.g., more babysitting hours for Amy, getting part-time jobs, etc.), and/or cutting expenses.

NOW TRY THIS! Individual budgets will vary according to the economic circumstances of each student. Budgets should include sections for income and expenses. The concept of saving will be new to many middle school students so this will be an opportunity to introduce the idea. If they want to purchase a big ticket item in the future, savings will help make it possible. They may also want to put some money aside for a rainy day. Through discussion, ensure that students understand the need for a reserve fund.

WORKSHEET 2: "WHERE DID THE MONEY GO?"

1. 15.07% (rounded to four decimal places) ($3.68 + $2.35 + $0.81 + $1.60)/$56)
2. 64.29% ($36/$56)
3. 1.45% ($0.81/$56)

NOW TRY THIS!

1. Jason saves $35 per week through direct deposit. He gives $1 per week through payroll deduction to charity and he has $11.56 to spend (or save or give if he so chooses).
2. Answers will vary, but the importance of saving and giving should be emphasized as part of the class discussion.

WORKSHEET 3: "MAKING MONEY WHILE YOU SLEEP"

1. $8.04 (1st year's interest of $400 x .01 + second year's interest of $404 x .01)
2. $358 ($400 - $2 x 21)
3. $10.15 [Savings account interest = $10.05 ($500 x .01 + $505 x .01) CD interest = $20.20 ($500 x (1 + .02)2 -$500] The difference is $20.20 - $10.05 = $10.15

NOW TRY THIS! Answers will vary, but should consider the trade-offs between higher interest rates and ease of access to funds.

BONUS WORKSHEET: "CASH OR CREDIT?"

1. $8,581.20 (60 x $143.02)
2. $2,281.20 ($8,581.20 – $6,300)
3. Answers will vary, but should indicate that the interest cost is a significant portion of the total cost. If they use their savings, they will pay nothing in interest expense.

NOW TRY THIS! An online calculator will compute the following: a) $50.90 monthly; $1,221.16 total; b) $33.21 monthly; $1,195.56 total; c) $39.65 monthly; $1,189.50 total; d) $91.68 monthly; $1,100.16 total. (**Note:** Answers may differ slightly due to rounding methods of different online calculators.) The 12% interest loan (option b) has the lowest monthly payment; the 18% loan (option d) has the lowest total payment.