



Earning Money and Spending it Wisely

Curriculum Unit 82.06.12

by Laretta J. Fox

Introduction

Although the structure of the American family has varied over the years, one factor has remained constant in every family situation—the need to earn money and to spend it wisely. If harmony is to be achieved and maintained, and if stress is to be avoided in family life, the fundamental needs of each member must be satisfied. To accomplish this, high school students must be prepared to step into the roles of worker and consumer.

As a worker, each person should be able to compute the amount of money that he has earned. As a consumer, each person should be able to purchase goods wisely. Experience in the classroom has shown that many students enrolled in basic mathematics classes are deficient in the areas of computation and concepts. They have great difficulty understanding and solving simple word problems that they encounter from day to day. For this reason, I have chosen to develop a unit of curriculum that will try to improve the students' understanding of basic arithmetic skills. In the unit, these skills are applied in the solution of worker and consumer related problems experienced by every family in their daily affairs.

The unit begins by describing the relation between the structure of the American family and the structure of the American work force. It then proceeds to methods of (1) computing wages earned by workers; (2) shopping wisely in the supermarket; and (3) taking advantage of discounts when goods are on sale. Each section is followed by a set of sample problems.

There are several basic objectives for this unit of study. Upon completion of the unit, the student will be able to:

- understand how the working conditions of American families have changed through the years.
- perform basic arithmetic operations with whole numbers, fractions, decimals, and percentages.
- compute regular and overtime wages.
- compare unit prices.
- know the value of coupons in grocery shopping.
- compute discounts allowed on goods being purchased.

The material developed here may be used at the following levels of instruction: 1) in seventh or eighth grade arithmetic classes; 2) in high school consumer mathematics or applied mathematics classes; 3) in adult basic education classes.

The Changing American Family

When the United States was largely a nation of farms and small towns, extended families were common. A man and his wife, their children, parents, and siblings resided in the household. Women and men worked together to produce nearly everything their families needed on the farm. Very few people worked outside the home, and very few products were purchased in stores. Family members were self-sufficient producers and consumers.

After the Civil War industrialization and urbanization increased. Young people moved from the farms to cities seeking employment outside the home wherever job opportunities were available. Many of them shifted from one job location to another every few years. This was accomplished easily when the family remained small. Thus, the nuclear family consisting of a husband, his wife, and their dependent children became more prevalent. Today, for a variety of reasons including death, divorce and illegitimacy, there are many one parent families in our society. The responsibility of supporting the family often must be assumed by one person.

The Worker

People work to earn a living. They put forth effort to produce goods or to provide services for which they will receive wages. They use the money earned to buy other goods and services that they need or want.

Throughout the nineteenth century and the beginning of the twentieth century, it was uncommon for middle and upper class women to work outside the home. Women who were hired to work as factory hands, domestic servants, sales clerks or school teachers usually were single or poor. At that time it was a status symbol for men to be able to keep their wives at home to care for the house and children. World War II changed all that. The shortage of manpower made it necessary for single and married women to enter the labor force as well as the service sector of the economy. Today most eligible family members work to obtain necessities as well as desired luxuries.

During the early days of industrialization people worked long hours and received low wages. Because of poor working conditions, factories were called “sweat shops”. As the years went by, workers joined together to improve their working conditions and to bargain for more pay. In 1938 Congress passed the *Fair Labor Standards Act*. This statute provides that persons working in interstate commerce or in industries producing goods for interstate commerce must be paid a minimum hourly wage. They cannot be employed for more than forty hours a week unless they are paid time-and-a-half for overtime. Employment of children under the age of fourteen is prohibited. Employment of children between the ages of fourteen and sixteen years of age is allowed only under specified conditions.

Exercises—Complete the following sentences.

1. An extended family includes _____.
2. A _____ family includes only a husband, wife, and their dependent children.
3. After the Civil War _____ and _____ caused people to move to cities to seek employment outside the home.

4. Money earned for producing goods or providing services is called _____.
5. In the nineteenth century women who worked outside the home were usually _____ or _____.
6. Women who worked outside the home were hired to work as _____, _____, _____ or _____.
7. Men wanted their wives to stay at home to _____ and to _____.
8. A shortage of manpower during _____ made it necessary for many women to enter the American labor force.
9. _____ is a statute that created a minimum wage, a forty hour week, and prohibited child labor.
10. Any person who works overtime must be paid _____ for each overtime hour.

Hourly Wages

Many workers are paid an hourly wage. They receive a certain amount of money for each hour that they work. At the present time, the minimum hourly wage set by the Federal government is \$3.37. It is the lowest legal rate of pay per hour in most types of work. A person's total weekly wages are based on the number of hours that he works each week. The total amount of money earned is called *gross pay*. A formula that may be used to compute gross pay is:

Number of Hours Worked x Hourly Rate = Gross Pay

In some places of business a forty hour week is a regular work week. If a person works more than forty hours in any week, he must be paid time-and-a-half for each hour over forty. The hours over forty are called *overtime hours*. Time-and-a-half means 1.5 times the regular hourly rate of pay.

To compute total gross pay with overtime, use the following five steps:

1. $40 \times \text{Hourly Rate} = \text{Regular Pay}$
2. $\text{Total Hours Worked} - 40 = \text{Overtime Hours}$
3. $1.5 \times \text{Hourly Rate} = \text{Overtime Rate}$
4. $\text{Overtime Hours} \times \text{Overtime Rate} = \text{Overtime Pay}$
5. $\text{Regular Pay} + \text{Overtime Pay} = \text{Total Gross Pay}$

Example 1 : Mary Ford received \$3.50 per hour. Last week she worked 37 1/2 hours. What was her gross pay for the week?

Solution : No. of Hours Worked x Hourly Rate = Gross Pay

$$37.5 \times \$3.50 = \$131.25$$

Mary's gross pay was \$131.25.

Example 2 : Jim Jackson received \$4.75 per hour for a forty hour week. In one week he worked 48 hours. What was his gross pay?

Solution :

$$40 \times \$4.75 = \$190.00 \text{ Regular Pay}$$

$$48 \text{ } \bar{\text{D}} \text{ } 40 = 8 \text{ Overtime Hours}$$

$$1.5 \times \$4.75 = \$7.125 \text{ Overtime Rate}$$

$$8 \times \$7.125 = \$57.00 \text{ Overtime Pay}$$

$$\$190.00 + \$57.00 = \$247.00 \text{ Gross Pay}$$

Jim's gross pay was \$247.00.

Find the gross pay in each of the following problems. A forty hour week is a regular work week. Employees receive time-and-a-half for overtime work.

Hours Worked *Hourly Rate*

1. 38 \$3.37

2. 46 \$5.00

3. 52 1/4 \$6.42

4. 45 1/2 \$8.70

5. 51 \$4.85

6. 36 3/4 \$7.30

Employers often consider an eight hour day a regular work day. Workers receive time-and-a-half if they work more than eight hours in any one day, and they are paid *double time* for weekends and holidays. Double time means two times the regular hourly rate of pay.

Example : Jean Franklin works an eight hour day and earns \$4.20 per hour. She receives time-and-a-half for overtime on weekdays, and she receives double time on holidays and weekends. During the first week of January she worked the following hours:

(figure available in print form)

Find her gross pay for the week.

Solution:

(figure available in print form)

Jean Franklin's gross pay for the week was \$239.40.

For practice do the following exercise: John King works an eight hour day at the Brown Manufacturing Company. He receives \$5.68 per hour with time-and-a-half for overtime on weekdays. He receives double time on holidays and weekends. During the first week of July he worked the following hours:

(figure available in print form)

Compute his gross pay for the week.

Timecards

It is essential to keep accurate records of the hours a person works each week. A time clock and time cards are used for this purpose. The clock stamps each employee's card to show the time that he arrives and the time that he leaves each day.

In some places of business time is recorded in quarter hours. Fractional parts less than one quarter hour are not considered. If a person arrives late, his working time begins at the next quarter hour. If a person leaves early, his working time terminates at the previous quarter hour. No credit is given for arriving early or leaving after the scheduled closing time.

Example : Rose Black works an eight hour day, from 8 a.m. to 12 noon and from 1 p.m. to 5 p.m. The time card below shows the time that Rose worked during the week of May 10. Compute the number of hours that Rose worked each day. What were her total hours for the week?

(figure available in print form)

Solution : The hours that Rose worked are computed as follows:

(figure available in print form)

Rose worked 42 1/2 hours during the week of May 10.

Solve the following problems:

1. The Scott Company's regular hours are from 8 a.m. to 12 noon and from 1 p.m. to 5 p.m. Fractional parts less than one quarter hour are not counted. Determine the number of hours worked in each example.

(figure available in print form)

2. Find the amount earned by each of the following workers at the Scott Company.

(figure available in print form)

Salary and Commission

Not all workers are paid an hourly rate. Teachers, government employees, and many other workers receive an annual salary paid by their employers in equal amounts weekly, biweekly, monthly, or semimonthly. This is a guaranteed wage and does not depend upon the number of hours that they work.

Example 1 : Mr. Smith receives an annual salary of \$18,000. What amount does he earn each month?

Solution : Annual Salary \div 12 = Monthly Salary

$$\$18,000 \div 12 = \$1,500$$

Example 2 : Marie receives a salary of \$240 each week. What is her annual salary?

Solution: 52 x Weekly Salary = Annual Salary

$$52 \times \$240 = \$12,480$$

Many people are hired to sell goods produced by others. Pay received by salesmen is called *commission* . Sometimes the commission is a certain amount for each article sold. Other times it is a percentage of the dollar value of the sales. Frequently salesmen receive graduated commissions. This means that the rate of commission increases as the amount of merchandise sold increases. For example, the rate of commission may be 8% on all sales up to \$10,000 and 10% on all sales over \$10,000. In many cases a salesman receives a fixed salary plus a commission.

Example 3 : A salesman who works on a commission basis receives 15% of his sales. How much was his commission on a sale amounting to \$540?

Solution : $.15 \times \$540 = \81.00 Commission

Example 4 : Roy sells magazine subscriptions. He receives a weekly salary of \$85 plus a commission of \$.20 for each subscription that he sells. In one week he sold 350 subscriptions. How much did he earn?

Solution: $$.20 \times 350 = \70.00 Commission

$$\$85 + \$70 = \$155.00 \text{ Total Amount Earned}$$

Example 5 : Amy earned a 9% commission on the first \$850 of weekly sales, and a 12% commission on all sales over \$850. Last week her total sales were \$2,500. How much commission did she receive?

Solution:

$$.09 \times \$850 = \$76.50$$

$$\$2,500 - \$850 = \$1,650$$

$$.12 \times \$1,650 = \$198.00$$

$$\$76.50 + \$198.00 = \$274.50$$

Amy earned \$274.50 commission.

Solve the following set of problems.

1. Jack receives a monthly salary of \$672. What is his annual salary?

2. Ann receives an annual salary of \$8,580. How much does she earn each week?
3. Bill earns \$.15 for each calendar that he sells. Last week he sold 135 calendars. What was his commission?
4. A real estate agent receives a commission of 6% of the selling price of a house. If he sells a house for \$98,500 what is his commission?
5. A department store clerk earns a 7 1/2% commission on the first \$980 of weekly sales, and a 10% commission on all sales over \$980. Last month her total sales were \$1,524. How much commission did she receive?
6. A salesman receives a weekly salary of \$190 plus a commission of 5 1/4% on all sales above \$1,600. If his sales for two weeks were \$2,450 and \$2,180, find his total earnings from salary and commission for the two weeks.

Federal Income Tax Deductions

The total amount of money that a worker earns is called *gross pay* . The amount of money that he receives in his paycheck is called *net pay* . In most cases net pay is not the same as gross pay. Employers are required by law to deduct a specified amount from every worker's gross pay to send to the Federal government for income tax. The amount withheld from a person's paycheck is determined by the size of his income, his marital status, and the number of persons who depend on the worker for their support.

One method that may be used to calculate the amount of federal income tax to be withheld by an employer is the wage bracket method. A sample of a wage bracket table is shown below.

(figure available in print form)

Example : Margaret Blue is single and claims one dependent. She earns \$168 per week. How much is deducted from her salary each week for federal income tax?

Solution :

1. Read down the left column to find the bracket containing \$168.
2. Read across to the column headed 1.
3. The tax withheld each week is \$19.40.

A second method that may be used to calculate the federal income tax to be withheld by an employer is the *percentage method* . To figure withholding tax by the percentage method use the following steps:

1. Multiply \$19.23 by the number of dependents claimed.
2. Subtract the answer in step 1 from the employee's wages.
3. Using the answer in step 2, determine the amount to be withheld from the following table:

(figure available in print form)

Example : Bob Morse is single and claims two dependents. He earns \$300 per week. Use the percentage method to determine the amount of federal income tax to be withheld from his paycheck each week.

Solution :

$$\begin{aligned}
 2 \times \$19.23 &= \$38.46 \\
 \$300.00 \text{ } \ominus \text{ } \$38.46 &= \$261.54 \\
 \$26.11 + .24 (\$261.54 \text{ } \ominus \text{ } \$181.00) & \\
 \$26.11 + .24 (\$80.54) & \\
 \$26.11 + \$19.33 &= \$45.44
 \end{aligned}$$

The amount of federal income tax to be withheld each week is \$45.44.

For practice do the following exercises:

1. Use the wage bracket method to compute the amount of federal income tax to be withheld from the following wages:

(figure available in print form)

2. Use the percentage method to find the amount of federal income tax to be withheld from the following wages:

(figure available in print form)

Social Security Deductions

In 1935 Congress passed the *Federal Insurance Contributions Act* , more commonly known as the *Social*

Security Act . It states that a person must pay a Social Security Tax during the years that he works. The money withheld from his paycheck for Social Security is used to provide (1) a retirement income; (2) benefits for dependents of a worker who dies; (3) income for persons disabled because of illness or injury; and (4) medical costs for persons covered by Medicare.

The law provides that an employer must pay one dollar of his own for each dollar that the worker pays. Deductions must be made from that part of a person's earnings that is \$31,800 or less during one year. If the earnings are less than \$31,800 then 6.7% of his total earnings will be deducted during the entire year. If the earnings are more than \$31,800, then the tax will be deducted only until his earnings reach 31,800. No Social Security payments will be deducted for the remainder of the year.

Example 1 : Jane earns \$375 per week. What amount is deducted from her earnings for Social Security tax?

Solution : $.067 \times \$375 = \25.125 or \$25.13 S. S. tax

Example 2 : Helen earns \$172 each week. She is single and claims one dependent. (a) Use the wage bracket table to determine the amount of federal income tax to be withheld. (b) Compute the amount of Social Security tax to be withheld. (c) Find her net pay for one week.

Solution :

a. The amount of federal income tax to be withheld is \$ 21.30.

b. $.067 \times \$ 172 = \$ 11.524$ or \$ 11.52

The amount of Social Security tax to be withheld is \$ 11.52.

c. $\$ 21.30 + 11.52 = \32.82 Total Deductions $\$172.00 - \$ 32.82 = \139.18

Helen's net pay for one week is \$139.18.

Complete the following table:

(figure available in print form)

Unit Pricing

Family members are consumers as well as workers. They spend a considerable amount of money to purchase food and other items that they need or desire. To obtain the maximum value for their money it is important to shop wisely. One way to stretch a dollar in the supermarket is to compare *unit prices* of items. A unit price is the amount charged for a single unit of measure such as one ounce or one pound. The unit price of an item is frequently printed on a price label along with the total cost of the item. If two items are of the same quality, it is worthwhile to buy the item that is a cent or two less per unit. Small savings repeated many times add up to big savings. The following formula may be used to compute the unit price of an item:

Unit Price = (Price of Item) ÷ (Weight of Item)

Example 1 : If a ten pound bag of potatoes costs \$1.25, what is the price per pound of the potatoes?

Solution : Price per pound $\$1.25 \div 10 = \$.125$

The unit price is approximately 13 cents per lb.

Example 2 : Is it better to buy a 2 pound jar of jelly for \$1.18 or a 3 pound jar of the same jelly for \$1.68?

Solution :

$\$1.18 \div 2 = \$.59$ per pound

$\$1.68 \div 3 = \$.56$ per pound

The 3 pound jar for \$1.68 is the better buy.

For practice do the following examples:

1. Complete the table below.

(figure available in print form)

2. In each of the following examples, determine which is the better buy.

a. Three one pound jars of peanut butter at \$1.59 each or one three pound jar of peanut butter for \$4.29.

b. Twelve apples at 2 for \$.25 or one dozen apples for \$1.25.

c. Three eight ounce packages of cream cheese at \$.79 each or eight three ounce packages of cream cheese at \$.29 each.

d. Ten pencils at 2 for \$.35 or ten pencils at \$.15 each.

Coupons

Another way to save money in the supermarket is to use coupons provided by manufacturers and stores. Coupons are part of a printed advertisement that may be cut out and presented to the cashier in the supermarket. They allow the shopper to receive a reduction in price when purchasing food or health and beauty items. Many consumers actively look for coupons in magazines and newspapers. If coupon items are not priced higher than non-coupon items, it is easy to see the saving if one compares the regular price of any purchase with the actual price paid when coupons are used.

To find the actual amount paid for goods when redeeming manufacturers' coupons, use the following formula:

Regular Price—Coupon Saving = Actual Price Paid

Example : Find the regular price, the total amount of coupon saving, and the actual price paid for the following items:

(figure available in print form)

The regular price is \$7.10. The coupon saving is \$1.20. The actual price paid is \$5.90.

For practice do the following exercises:

1. Find the regular price, the amount of coupon saving, and the actual price that Mary paid for the following items:

(figure available in print form)

2. Last week the Shopwell Supermarket advertised “double off” the value of all manufacturers’ coupons. Find the regular price, the amount of coupon saving, and the actual price paid for the following items:

(figure available in print form)

Discount

A good way to save money is to shop when merchandise is on sale. In January, many stores reduce the prices of toys, furniture and other household items. In late February and March winter clothing usually is sold at reduced prices. After the fourth of July there are reductions on summer items.

The amount that an item is reduced in price is called a *discount* . The rate of discount is the percent that is taken off the original price of the item. The original price of the item is known as the *list price* or *marked price* , while the amount for which the item sells after the discount has been subtracted from the list price is the *net price* or *sale price* .

To find the net price of an article which is being sold at a discount, first multiply the rate of discount by the marked price to obtain the discount, then subtract the discount from the marked price to obtain the net price. To find the rate of discount divide the discount by the list price, and multiply the result by one hundred.

Example 1 : Helen bought a dress which usually sells for \$32 at 15% off. What did she pay for the dress?

Solution : $.15 \times \$32 = \4.80 Discount

$$\$32.00 - \$4.80 = \$27.20 \text{ Net Price}$$

Helen paid \$27.20 for the dress.

Example 2 : A coat marked \$60.00 was on sale for \$48.00. Find the rate of discount.

Solution: $\$60.00 - \$48.00 = \$12.00$ Discount

$$\$12.00 \div 60 = .20 \text{ or } 20\%$$

The rate of discount is 20%.

Solve the following set of problems:

1. After Thanksgiving, a department store advertised 30% off all merchandise. What was the sale price of a television set that originally cost \$450?
2. A jewelry store offers 10% to 40% reductions on all items. If a ring marked \$80 sells for \$60, what is the rate of discount?
3. During the month of May, a retailer is selling china at a 15% discount. On Memorial Day he is offering an additional 10% off the reduced price. What is the sale price of a place setting of china with both discounts if the price was \$132.50 before the May sale?
4. One store offered a 20% discount on all blouses. Another store reduced the prices of all blouses by five dollars. Which was the better buy on a blouse marked \$20? How much better was it?

Bibliography for Teachers

Bolster, L. Carey, et al. *Consumer and Career Mathematics* . Glenview, Illinois: Scott Foresman and Company, 1978.

A fine textbook for a high school course in consumer mathematics. It includes many photographs and charts to show real-world situations in which mathematical skills are needed. At the end of each chapter there is a review that contains exercises similar to those explained in the lessons throughout the chapter.

Caplovitz, David. *The Poor Pay More* . New York: The Free Press, 1967.

The author describes in vivid detail the economic facts of existence for a group of low-income families in New York City housing projects.

Cole, William R., and Miller, Charles H. *Social Problems A Sociological Interpretation* . New York: David McKay Company, Incorporated, 1965.

The authors present in-depth discussions about the theoretical aspects of social problems, then study major resource changes and problems. They conclude with a discussion of specific types of social problems.

Guthrie, Mearl R., and Selden, William. *Today's Business Mathematics* . New York: Pitman Publishing Company, 1967.

A text-workbook containing teaching material and problems which, when mastered, should give high school students the skill to work the arithmetic essential for consumer and personal needs.

Lewis, Harry. *Mathematics for Daily Use* . New York and Cincinnati: McCormick-Mathers Publishing Company, 1975.

A consumer-oriented mathematics textbook relevant to high school students' current needs and their anticipated future needs.

McNeal, James U. *Dimensions of Consumer Behavior* . New York: Appleton-Century-Crofts, 1965.

The author provides interesting material that may be used in studying consumer behavior.

Peck Ira and Krieger Larry S. *Scholastic Sociology The Search for Social Patterns* . New York: Scholastic Book Services, 1980.

A textbook designed to turn the study of abstract sociological concepts into concrete learning experiences. It helps high school students understand that the study of sociology is practical and useful on an everyday level.

Piper, Edwin B., and Gruber, Joseph. *Applied Business Mathematics* . Eighth Edition. Cincinnati: South-Western Publishing Company, 1965.

This book was designed to have value for consumer use as well as for business use. It develops the fundamental principles and operations through a study of problems faced by every individual daily. Optional topics have been included to challenge the faster or more capable students.

Rosenberg, R. Robert. *Business Mathematics Principles and Practice* . Fourth Edition. Chicago: McGraw-Hill Book Company, Incorporated, 1953.

A comprehensive text on commercial arithmetic. Practice is provided in all important topics of fundamental arithmetic with emphasis on the arithmetic of business. Its major purpose is to equip the student with a working knowledge of the basic principles of business mathematics that will play a significant part in his adult activities.

Shaw, Bryce R., et al. *Mathematics Plus* . Boston: Houghton-Mifflin Company, 1979.

A textbook for secondary level students who will terminate their formal education at the end of high school. It contains many exercises in basic skill as well as consumer applications, business applications and technical applications.

Thompson, Linda L. *Consumer Mathematics* . Encino, California: Glencoe Publishing Company, Incorporated, 1978.

An excellent book to help the high school student recognize what is involved in being a good consumer and to develop the mathematical skills needed to solve consumer problems.

Troutman, Andria P., et al. *Laidlaw Mathematics Gold Book* . River Forest Illinois: Laidlaw Brothers, 1979.

One in a series of books that range in level from kindergarten through eighth grade. It is written to help eighth grade students develop skills, understanding, and mathematical insight that are needed in everyday life. It stresses understanding followed by practice, problem solving and application.

Student Reading List

Bitzinger, Marvin L., et al. *Mathematics for Consumer Survival* . Lexington, Massachusetts: D. C. Heath and Company, 1981.

A textbook written to help high school students acquire basic mathematical skills and to apply these skills to consumer related problems.

Klein, David. *Supershopper* . New York, et al: Praeger Publishers, 1971.

The author gives many helpful hints on how to develop careful shopping habits.

Kravitz, Wallace W., and Brant, Vincent. *Consumer Related Mathematics* . New York: Holt, Rinehart and Winston, 1976.

A nicely illustrated book for high school students enrolled in consumer mathematics courses. It endeavors to develop, apply, and maintain mathematical skills. Included are descriptions of occupations using these skills and a glossary of terms used throughout the book.

Lankford, Francis Jr. *Consumer Mathematics* . Boston, et al: Allyn and Bacon, Incorporated, 1981.

This book is written to help the consumer make wise decisions when purchasing and using goods and services. Essentials of family living discussed in the book include transportation, food, clothing, shelter, banking, and other investments.

Linder, Bertram L. *Economics for Young Adults* . New York: W. H. Sadlier, Incorporated, 1973.

Exercises are included to help the students improve concrete skills to apply these skills to concepts that have been studied and to form generalizations. There is emphasis on making the subject matter relevant to the student by relating economic concepts to everyday experiences.

———, and Selzer, Edwin. *Your Work and Your Career* . New York: William H. Sadlier, Incorporated, 1975.

A nicely illustrated book that introduces students to the world of work. It presents basic requirements for various careers, and describes how high schools and colleges help individuals meet these requirements. It also discusses the problems of employers and workers.

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