

## **Title: Back to School Budget**

### **Brief Overview:**

These activities will allow the students to be able to make purchases, such as school supplies and clothing, within a prescribed budget. The students will compare prices, compute sales tax, and discounts of items when they make purchases. The students also will compile data and present findings on ledgers and on a circle graph.

### **NCTM 2000 Principles for School Mathematics:**

- **Equity:** *Excellence in mathematics education requires equity - high expectations and strong support for all students.*
- **Curriculum:** *A curriculum is more than a collection of activities: it must be coherent, focused on important mathematics, and well articulated across the grades.*
- **Teaching:** *Effective mathematics teaching requires understanding what students know and need to learn and then challenging and supporting them to learn it well.*
- **Learning:** *Students must learn mathematics with understanding, actively building new knowledge from experience and prior knowledge.*
- **Assessment:** *Assessment should support the learning of important mathematics and furnish useful information to both teachers and students.*
- **Technology:** *Technology is essential in teaching and learning mathematics; it influences the mathematics that is taught and enhances students' learning.*

### **Links to NCTM 2000 Standards:**

- **Content Standards**

#### **Number and Operations**

Students will work flexibly with fractions, decimals, and percents to solve problems; compare and order decimals, and percents efficiently; select appropriate methods and tools for computing with fractions and decimals from among mental computation, estimation, calculators, and paper and pencil, depending on the situation, and apply the selected methods; develop and use strategies to estimate the results of rational number computations and judge the reasonableness of the results; and develop, analyze, and explain methods for solving problems involving proportions, such as finding equivalent ratios.

#### **Measurement**

Students will use observations about differences between two or more samples to make conjectures about the populations from which the samples were taken.

#### **Data Analysis and Probability**

Students will create and use appropriate graphical representations of data; demonstrate their ability to collect, organize, and display data; and will interpret information obtained.

- **Process Standards**

**Mathematics as Problem Solving, Reasoning and Proof, Communication, Connections, and Representation**

These five process standards are threads that integrate throughout the unit, although they may not be specifically addressed in the unit. They emphasize the need to help students develop the processes that are the major means for doing mathematics, thinking about mathematics, understanding mathematics, and communicating mathematics.

**Link to MSDE Writing Learning Outcomes:**

- **Writing to Inform**

Students will demonstrate the ability to write effectively to inform by justifying their choices of stores selected to make certain purchases.

**Grade/Level:**

Grades 6-8, General Mathematics (Pre-Algebra/Algebra)

**Duration/Length:**

Four class periods/mods

**Prerequisite Knowledge:**

Students should have working knowledge of the following skills:

- Estimating, rounding, and place value
- Adding, subtracting, multiplying, and dividing decimals
- Finding the percent of a number
- Comparing decimals
- Converting ratios/fractions to percents
- Basic TI-73 calculator skills

**Student Outcomes:**

Students will:

- compare school supplies and clothing prices.
- find the unit and total price of items.
- calculate subtotals and tax.
- record and keep expenses within a budget.
- collect, organize, interpret, analyze, and graph data.
- share findings by means of discussions, activities, and ongoing assessments.
- write to inform.

## **Materials/Resources/Printed Materials:**

- Activity Sheets (I-IV) and transparency of each
- Ledger Sheets (1-2) and transparency of each
- Protractors
- Compasses
- Rulers
- Pencils and paper
- TI-73 graphing calculator
- Play money (optional)

## **Development/Procedures:**

This week the students will be planning for this school year. Using basic math skills, the students will find the best prices for school supplies and decide what clothing will be purchased. In addition, the students will be given a budget of \$400.00. (Using play money would enable students to see their \$400.00 decreasing.) Good luck and have fun!

### **Day 1 - "Shopping for School Supplies"**

Teacher will bring in several items on the supply list for demonstration of the lesson activities.

- Using calculators, students will calculate the unit price of school supplies from two different stores. (Activity I)
- Students will compare the unit prices from both stores and decide which unit price is more economical (least expensive).
- Document on "Ledger Sheet 1" the unit price of both stores and with a given quantity, calculate the total price, best price, subtotal, tax and total price.

### **Day 2 - "Budget for School Clothes"**

Teacher will make connections from yesterday's activity to today's activity through class discussion.

- Students will compare prices from the two different stores and use Ledger Sheet 2 to record items purchased with the prices (each and total), and deduct each item(s) from the balance from the Day 1 Ledger.
- Students are given Activity II Sheet and are asked to review the contents. This sheet provides two stores to shop for clothing. Students are to select as many items they feel are required for school.
- Students will record and calculate the subtotal, tax and total purchases also on Ledger Sheet 2 and provide the final balance, if any.

### Day 3 - "Making a Circle Graph to Display Purchases and Balance"

Teacher informs students that today they will create a circle graph for the total amount spent on supplies, the total amount spent on clothes and your balance from the previous activities.

- Students are asked to refer to Ledgers 1 and 2 to perform today's activity. Pass out Activity Sheet III to record all data.
- Predict the percent of the total spent on school supplies, clothes and the amount saved
- Calculate the percent of the total amount given (total budget \$400) by dividing the amounts spent in each category by the total.
- Using the above percents, calculate the percent of a circle, measure of the angle for school supplies, clothes and savings (by multiplying the percent by  $360^\circ$ )
- Construct a 2" circle using the compass and label the center "H". Use circle H to construct angles with vertex H with given endpoints that lie on the circle. Measure an angle within the circle and calculate the percent of the angle.
- Label the given endpoints and label the regions with the percentages.

### Day 4 - "Writing to Inform "

Teacher informs students that today is the culminating activity for all of the activities performed during the week and will involve writing to inform, Activity IV. Students are asked to think about the activities they performed this week: items selected to purchase, choices in pricing, creating a budget, and constructing a graph.

- **The students are asked to write a letter to their parents or the person(s) that make their financial decisions to explain what the advantages and disadvantages were found when preparing a back to school budget. Be sure to include:**
  - the choice of purchases made, stores shopped, and amounts spent;
  - the values discovered regarding spending versus saving;
  - and, what plans you have for the money left (balance) in your budget.
- The students are reminded to use the correct writing process -- format, audience, topic and purpose. Grammar, capitalization, and punctuation also are important items to remember.
- Students will use lined paper for the exercise. Rough draft is done in pencil, final will be done in pen.
- A rubric will be given in order for the students to understand how they will be graded.

### Performance Assessment:

Student assessments will be based on the completion of the worksheets, ledgers, the graph, and the oral and written presentation using scoring rubrics included in the packet.

**Extension/Follow Up:**

Some extension activities may include:

- Students bringing in sales advertisements from neighborhood grocery stores to shop and making purchases within a budget to "host" a group luncheon.
- Mock car purchase including negotiating price of car, financing, discounts, and taxes.
- Explain how math (budgeting) is used in everyday life both oral and written.

**Authors:**

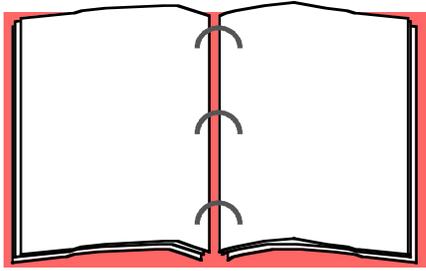
Deloris Evans  
Andrew Jackson MS  
Prince George's County, MD

Adegboyega Majolagbe  
Lord Baltimore MS  
Prince George's County, MD

Rachel Pachter  
Dwight D. Eisenhower MS  
Prince George's County, MD

Marcia Pritchard  
Andrew Jackson MS  
Prince George's County, MD

Donald Thompson  
Andrew Jackson MS  
Prince George's County, MD



## Back To School Budget

This week you will be planning for this school year. Using all of your basic math skills, you will find the best prices for your school supplies and decide what clothing you will purchase. In addition, you will be given a budget of **\$400.00** to spend.

*Good luck and have fun!*



Name \_\_\_\_\_ Date \_\_\_\_\_

Day I

**Activity I**  
**School Supply List**

**Directions:** Using the school supply list, compute the unit price on the following chart for each store. **Circle** the **lowest unit price** of the two stores and calculate the **total amount** spent given the quantity, which is the number of items that you *must purchase*.

You must purchase **4** packs of pencils, **2** packs of pens, **1** box of crayon, **2** packs of notebook paper, **2** writing journals, **5** spiral notebooks, **1** 3 -ring binder, **6** book covers, **1** calculator, **1** protractor, **1** compass, **1** ruler, **1** box of Kleenex, **1** back pack, and **2** glue sticks.

**Key: packs = pk**

<u>Supplies</u>	<u>Store A</u>	<u>Store B</u>
Pencils	1 pk for \$0.75	2 pk for \$1.30
Pens	2 pk for \$1.00	1 pk \$0.75
Crayons	\$1.95 each	\$1.59
Notebook paper	3 pk for \$1.00	\$ .40 each
Writing Journal	2 for \$1.00	\$ .30 each
Spiral Notebook	4 for \$1.00	\$ .20 each
3-Ring Binder (3 inch)	\$ 6.40 each	\$7.99 (20% disc.)
Book Covers	3 for \$1.00	4 for \$1.20
Calculators	\$25.00 (20% disc.)	\$21.00 (10% disc.)
Protractor	\$1.90 each	\$1.09 each
Compass	\$ 0.60 each	\$0.66 each
Rulers	2 for \$1.00	\$ .60 each
Kleenex	\$1.19 each	2 for \$2.10
Back Pack	\$25.00 (15% off)	\$19.00 each
Glue Stick	\$ 0.55 each	2 for \$1.19

Ledger Sheet 1

School Supplies	Quantity	Unit Price	Total Price	Unit Price	Total Price		Lowest
		Store A	Store A	Store B	Store B		Total Price
Pencils							
Pens							
Crayons							
Notebook paper							
Writing Journal							
Spiral Notebook							
3-Ring Binder							
Book Covers							
Calculators							
Protractor							
Compass							
Rulers							
Kleenex							
Back Pack							
Glue stick							
						Subtotal	
						+ 5% tax	
						Total Price	

## Day I

### Homework

1. Find the sales tax on a book that costs \$20 and write the total cost of the book including the sales tax. (Use 6% sales tax to determine the final cost of the book).
2. Find the original price of a chair that you paid \$50 for before a 15% discount was taken.
3. The original price of a shirt was \$25 but the shirt was sold for \$20.00, find the percent difference.
4. If a calculator costs \$100 last year, and the price of the same calculator is increased by 5%, how much will the calculator cost this year?
5. If your telephone call for five (5) minutes costs \$0.75, how much will you pay if you talk for 30 minutes?

Name \_\_\_\_\_ Date \_\_\_\_\_

**Day 2**

**Activity II**

Today, you will choose the clothing you will need for the school year. You have a choice of choosing designer brand clothing or no name brand clothing for each item. Make sure you do not exceed you budget.

<b><u>Clothing</u></b>	<b><u>Store A(No-name Brand)</u></b>	<b><u>Store B (Designer)</u></b>
Blue Jeans	\$19.99	\$29.99 (20% off)
Slacks	\$19.99	\$24.98
Pullover	\$19.99	\$15.99
T-shirts (sport-type)	\$10.00	\$11.99
Tennis Shoes	\$65.00	\$119.00 (25% off)
T-Shirts (undershirts)	3/pk for \$6.49	\$3/pk for \$6.49
Underwear	3/pk for \$3.99	3/pk for \$3.98
Socks	6/ \$5.00	\$1.19 ea.
Sweater (cardigan)	2 for \$30.00	\$19.98
Jacket	2 for \$45.00	\$24.99
Cap	\$10.00	\$15.00 (Buy 1 get 1 at 1/2 price)

Which store would you recommend to your friends for shopping? Explain your answer.

---

---

---

---

---



Ledger Sheet 2-1

Ledger Sheet 2-2

		Budget \$400
	Amount Spent	Amount Remaining
School Supplies		
Clothing		

## Day 2

### Homework

1. In a survey, 72 out of 100 people owned at least a car. Write the ratio as a percent.
2. In a class of 25 students, 15 students are girls. Write the ratio as a percent.
3. In question 2, write the ratio of number of boys as a percent.
4. If 40% of the students population in a school are boys and there are 750 students in the school, how many are boys?
5. How many students are girls?
6. Find the percent of girls in the school.

## **RUBRIC A - " ACTIVITIES I AND II"**

- 3: All calculations are correct. Students can communicate math ideas, processes and concepts. Student's written responses show clear and logical thinking.
- 2: Some calculations are correct. Students show some ability to communicate math ideas, processes and concepts. Student's written responses show some level of logical thinking.
- 1: No calculations are correct, but effort was demonstrated. Students show little to no ability to communicate ideas, processes and concepts. Student's written responses show little to no level of logical thinking.
- 0: Student did none of the calculations or showed any communication of ideas, processes and concepts. Student did not have a written response.



4. State the total amount spent on clothes.

- a. Calculate the percent of the total used on clothes. Show all of your calculations below.
  
- b. Convert your percent to degrees and then construct the angle. Show all of your calculations.

5. In the space below, complete the following:

- Construct a circle with the radius of 2 inches and label the the center H.
- Construct an angle inside circle H with the measure calculated for school supplies in **(3b)** with vertex H and endpoints M and A that lie on the circle.
- Construct an angle in the same circle with the measure calculated for clothes in **(4b)** with vertex H and endpoints A and T that lie on circle H.
- Measure angle MHT and calculate the percent of the angle.
- Title for your graph, label all sections of your graph with the proper title and percentage.

6. How does your prediction from question number (1) compare to you actual results displayed in the graph above?

## Day 3

### Homework

1. If you have \$250 in your saving account and you buy a pair of shoes for \$40, a brown belt for \$10, a cap for \$15 and a calculator for \$25, how much money do you have left in your savings account after you have paid for these four items?
2. Find the percent of cost of each item using total amount.
3. Express each percent in decimal.
4. Express each percent as a fraction.

## **RUBRIC B - "CIRCLE GRAPH"**

- 3: No computational errors. All calculations are correct. Students can communicate math ideas, processes and concepts. Student's written responses show clear and logical thinking. All regions labeled with the correct percentages and title on the graph.
  
- 2: Minimal computational errors. Students show some ability to communicate math ideas, processes and concepts. Student's written responses show some level of logical thinking. Missing the label and title on graph.
  
- 1: Major computational errors. No calculations are correct, but effort was demonstrated. Students show little to no ability to communicate ideas, processes and concepts. Student's written responses show little to no level of logical thinking.
  
- 0: Student did none of the calculations or showed any communication of ideas, processes and concepts. Student did not have a written response.

## Day 4

### Activity IV Writing to Inform

- **Write a letter to your parents or the person(s) that make your financial decisions to explain what advantages and disadvantages were found when you chose your back to school expenses. Be sure to include:**
  - **the choice of purchases made, stores shopped, and amounts spent;**
  - **the values discovered regarding spending versus saving;**
  - **what plans you have for the money left (balance) in your budget.**
- Remember to use the correct writing process; format, audience, topic and purpose. Grammar, capitalization, and punctuation are also important items to remember.
- Use lined paper for the exercise. The rough draft should be done in pencil and the final copy completed in pen.
- A rubric is given.

### **RUBRIC C - "WRITING TO INFORM"**

- 3: All questions were answered completely with written explanations. All items were included for the writing process. All guidelines were followed.
  
- 2: 2-3 of the questions had explanations written. Some of the items of the writing process were included. Most of the guidelines were followed.
  
- 1: 1-2 questions were answered with written explanations. Very few items of the writing process were included. Very few guidelines were followed.
  
- 0: None of the questions were answered with any written explanations. None of the items of the writing process were included. None of the guidelines were followed.

**Ledger Sheet 1 Key**

School Supplies	Quantity	Unit Price	Total Price	Unit Price	Total Price		Lowest
		Store A	Store A	Store B	Store B		Total Price
Pencils	4	\$0.75	\$3.00	\$0.65	\$2.60		\$2.60
Pens	2	\$0.50	\$1.00	\$0.75	\$1.50		\$1.00
Crayons	1	\$1.95	\$1.95	\$1.59	\$1.59		\$1.59
Notebook paper	2	\$0.33	\$0.66	\$0.40	\$0.80		\$0.66
Writing Journal	2	\$0.50	\$1.00	\$0.30	\$0.60		\$0.60
Spiral Notebook	5	\$0.25	\$1.25	\$0.20	\$1.00		\$1.00
3-Ring Binder	1	\$6.40	\$6.40	\$6.39	\$6.39		\$6.39
Book Covers	6	\$0.33	\$1.98	\$0.30	\$1.80		\$1.80
Calculators	1	\$20.00	\$20.00	\$18.90	\$18.90		\$18.90
Protractor	1	\$1.90	\$1.90	\$1.09	\$1.09		\$1.09
Compass	1	\$0.60	\$0.60	\$0.66	\$0.66		\$0.60
Rulers	1	\$0.50	\$0.50	\$0.60	\$0.60		\$0.50
Kleenex	1	\$1.19	\$1.19	\$1.05	\$1.05		\$1.05
Back Pack	1	\$21.25	\$21.25	\$19.00	\$19.00		\$19.00
Glue stick	2	\$0.55	\$1.10	\$0.60	\$1.20		\$1.10
						Subtotal	\$57.88
						+ 5% tax	\$2.89
						Total Price	\$60.77

## Day 1

### Homework Answer Sheet

1. Cost of Book	=	\$20.00
Sales Tax	=	- 1.20
<hr/>		
Final Cost for Book		\$18.80

2. Cost of chair	\$50.00
15% discount	+ 7.50
<hr/>	
	\$57.50

3. Price of shirt	\$25.00
Sold for	- \$20.00
<hr/>	
Difference	\$ 5.00

$$\text{Percent Difference} = \frac{5}{25} * \frac{100}{1} = \frac{500}{25} = 20\%$$

4. Price of calculator last year	\$100.00
5% increase this year	+ 5.00
<hr/>	
Price paid this year	\$105.00

5. 5 min. telephone call = \$0.75  
One minute telephone call costs \$0.15 per minute; therefore 30 minutes will be  $30 * 15$  cents per minute, which equals \$4.50.

## Day 2

### Homework Answer Sheet

1.  $72/100 = 72/100 * 100/1$

$$= 7200/100$$

$$= \frac{7200}{100} \cdot \frac{100}{100}$$

$$= 72\%$$

2. Total number of students in class = 25

Total number of girls in class = 15

Total number of boys in class is  $25 - 15 = 10$

3. Ratio of boys =  $10/25 = 2/5 = 0.40$

The percent of boys in the class is 40% ( $0.40 * 100 = 40\%$ )

4. Total number of students in the school = 750

Percent of boys = 40 or 0.40

40 % of 750 =  $0.40 * 750$

$$= 300$$

There are 300 boys in the school.

5. Number of girls in the school =  $750 - 300$

$$= 450$$

6. Percent of girls in the school =  $450/750 * 100$

$$= 45,000/750$$

$$= 60\%$$

## Day 3

### Homework Answer Sheet

1.	<u>ITEM</u>	<u>COST</u>
	A pair of shoes	\$40.00
	Brown Belt	\$10.00
	A Cap	\$15.00
	Calculator	<u>\$25.00</u>
	Total Amount Spent	<u>\$90.00</u>

Initial amount in the bank = \$250.00  
Amount left in the bank - amount spent = \$250 - \$90 = \$160

2. Percent of the cost of each item = (Cost of each item / Total cost of all items) \* 100/1

$$\begin{aligned}\text{Percent of cost for shoes} &= 40/90 * 100/1 \\ &= 4000/90\% \\ &= 44.4\%\end{aligned}$$

$$\begin{aligned}\text{Percent of belt} &= 10/90 * 100/1 = 1000/90 \\ &= 11.1\%\end{aligned}$$

$$\begin{aligned}\text{Percent of cap} &= 15/90 * 100/1 \\ &= 1500/90 \\ &= 16.70\%\end{aligned}$$

$$\begin{aligned}\text{Percent of calculator} &= 25/90 * 100/1 \\ &= 2500/90 \\ &= 27.80\%\end{aligned}$$

3. Express each percent as a decimal.

$$\begin{aligned}\text{Percent of shoes to decimal} &= 44.4 \\ &= 44.4/100 \\ &= 0.444\end{aligned}$$

$$\begin{aligned}\text{Percent of belt to decimal} &= 11.1 \\ &= 11.1/100 \\ &= 0.111\end{aligned}$$

$$\begin{aligned}\text{Percent of cap to decimal} &= 16.7 \\ &= 16.7/100 \\ &= 0.167\end{aligned}$$

$$\begin{aligned}\text{Percent of calculator to decimal} &= 27.8 \\ &= 27.8/100 \\ &= 0.278\end{aligned}$$

4. Expressing each percent as a fraction.

$$\begin{aligned}\text{Percent of shoes to fraction} &= 44.4 \\ &= 44.4 * 10/1000 * 10 \\ &= 444/1000 \text{ (divide by 4)} \\ &= 111/250\end{aligned}$$

$$\begin{aligned}\text{Percent of cost of belt to fraction} &= 11.1\% &= 11.1/100 \text{ (multiply both by 10)} \\ & &= 111/1000\end{aligned}$$

$$\begin{aligned}\text{Percent of cost of cap to fraction} &= 16.7\% &= 16.7/100 \\ & &= 167 \text{ (multiply by 10)} \\ & &= 167/1000\end{aligned}$$

$$\begin{aligned}\text{Percent of cost of calculator to fraction} &= 27.8\% &= 27.8/100 \\ & &= 278 \text{ (multiply by 10)} \\ & &= 278/1000 \text{ (simplify)} \\ & &= 139/500\end{aligned}$$

