Title: Percents: What's the Use?

Brief Overview:

This activity focuses on the use of percents in situations involving discounts and tax with catalogues. The students will conduct an interview to discover the use of percents in different careers. They will then further their knowledge of percents with a cooperative learning exercise that involves catalogues, discounts, and taxes. In assessing their knowledge of percents, there is a writing activity and a project involving the construction of a menu.

Link to Standards:

- **Problem Solving** Students will demonstrate their ability to apply percents to everyday situations.

- **Communications** Students will demonstrate their ability to communicate mathematically by conducting interviews and formulating questions about percents.

- **Reasoning** Students will demonstrate their ability to reason mathematically by gathering data to make good consumer choices

- **Connections** Students will demonstrate their ability to connect mathematics with real-life problems.

- **Number Relationships** Students will apply percents (discounts/tax) with real-world applications. They will solve problems involving money and will determine if a solution is sensible.

Grade/Level:

Grades 6-8.

Duration/Length:

This activity will take 3 or 4 days. The activities may take longer then anticipated depending on class duration and students' prior knowledge.

Prerequisite Knowledge:

Students should have working knowledge of the following skills:

- Estimating, rounding and place value
- Gathering and organizing data
- Determining percentages
- Constructing and interpreting a graphic organizer
- Conducting a meaningful interview

Objectives:

Students will:

- work cooperatively in groups.
- collect and organize data from resources.
- conduct a personal interview to gather information.

- compare and contrast sale items to evaluate best buy and give appropriate support for their answer.
- display information on a graphic organizer/table.
- present information orally.
- construct menu with food items and prices.
- formulate meaningful percentage questions from menu.
- demonstrate understanding of percent in an answer key to menu questions.
- evaluate using a peer evaluation rubric.

Materials/Resources/Printed Materials:

- Pencils
- Paper
- Calculator
- Student worksheets
- Teacher Resources
- Catalogues (L.L.Bean, Sears, etc)
- Construction paper
- Menu from a restaurant

Development/Procedures:

- Have students gather catalogues several days before the lesson.

Create an Anticipatory Set for students:

- Discuss the interviewing process and pass out Interview Direction worksheet.
- Have students interview adults about how percents are used in their careers (or daily lives) using the Interview Direction worksheet.
- Have students create a poster, graphic organizer, table, or collage that reflects what they learned from their interview.

Make the Real-Life Connection:

- Have students give a brief oral presentation of their interview poster.
- Write key vocabulary words from presentation making a web on the chalkboard. Highlight "tax" and "discount."

Develop the Learning Environment:

- Introduce taking percent of a number using Buying Concert Tickets worksheets 1 and 2

Encouraging Interpersonal Skills:

- Conduct cooperative learning activity using Going Shopping worksheet.
- Set a specific amount that the students can spend.
- In groups of 2, students will look at catalogues to find items of interest.
- Students will buy 3 items and will compute total bill with tax.
- Next, students will buy 2 discounted items and will compute cost during the sale.

Independent Activity:

- Students will write a letter to their teacher or a friend demonstrating their knowledge through writing. See Writing Assessment worksheet. (If you keep math journals in class, students may do so in journal). Students may find it helpful to use a graphic organizer for this activity. For lower ability students, you may want to limit the number of items required to complete this assignment.

Evaluation:

Assessment Activity:

- Have students discuss characteristics of a menu. (Appetizers, main course, beverages, desserts)
- Show sample menus from local restaurants on overhead.
- Have class choose 2 or 3 items from the menu to buy. Teacher will guide students in computing 20% tip for the food items selected.
- Continue with 3 more items selected and students will independently compute a 15% tip for these food items.
- Distribute Creating a Menu worksheet . Review requirements for the project , include your scoring requirements.
- Brainstorm with students on how to include discounts and tips with their project. Hints: Senior Citizen discount, or Tuesday discount days.

Peer Evaluation Activity:

- Have students work out problems from other student's menu project.
- Have students critique another student's menu project using the Peer Evaluation form.

Extension/Follow Up:

1. Discuss other percent applications including credit card costs, banking, loans, interest, sales (mark up and commission), nutrition, income tax, and sports.
2. Find prices for menu given actual cost of food plus some percent of mark-up.

Authors:

Paula Dougher
Lindale/Brooklyn Park Middle School
Anne Arundel County, MD

Teresa Johnston
West Meade Elementary
Anne Arundel County, MD

Heather Jones
Chesapeake Bay Middle
Anne Arundel County, MD

Laurell Leith
Annapolis Area Christian
Anne Arundel County, MD

Interview Directions

Sample Interview
Name: Your Name
Person Interviewed: Bill Jones
Career: Health Club Manager
Career Description: Bill is in charge of the daily operation of a health club. This includes staffing, and giving tours to perspective new members. He frequently helps people during their workouts.

Percents used in career: Bill is in charge of calculating the percent of people who become members after he has given them a tour. He also calculates body composition.

Example 1:   Bill took 20 people on tour last week and 3 of them became members. What percent of them became members?
Example 2:   Bill calculated the body composition of one their members. He found that the 150 pound woman has 20% body fat. How much fat does she have?

Interview Notes:
Your Name:_____

Person Interviewed:_____

Career:_____

Career Description:_____

_____

How does your interviewee use percents in their career?_____

_____

Example 1:_____

Example 2:_____

Poster Requirements:
Using your interview notes, create a poster, collage, or graphic organizer to display your information. Be creative and make it appealing.

Buying Concert Tickets

Your favorite group is coming to town for a concert next month. At the door, the cost of one ticket is $30 plus 5% tax.

1. What will it cost for 2 tickets including tax?

2. What will 15 tickets cost, including tax?

3. When you buy advance tickets, you get a 12% discount.
    What will 15 tickets cost, including tax, if you buy them in advance?

4. Which is the better buy, buying 10 tickets at the door or buying 12 tickets in advance? Justify your answer.

Your favorite group is coming to town for a concert next month. At the door, the cost of one ticket is $30 plus 5% tax.

1. What will it cost for 2 tickets including tax?
   $30*2=$60
   $60*.05=$3.00
   $60+$3.00=$63.00

2. What will 15 tickets cost, including tax?
   $30*15=$450
   $450*.05=$22.50
   $450+$22.50=$472.50

3. When you buy advance tickets, you get a 12% discount.
   What will 15 tickets cost, including tax, if you buy them in advance?
   $30*15=$450
   $450*.12=$54.00
   $450-$54.00=$396.00
   $396*.15=$19.80
   $396+$19.80=$415.80

4. Which is the better buy, buying 10 tickets at the door or buying 12 tickets in advance? Justify your answer.
   10*$30=$300
   $300*.05=$15
   $300+$15=$315

   12*$30=$360
   $360*.12=$43.20
   $360-$43.20=$316.80
   $316.80*.05=$15.84
   $316.80+$15.84=$332.64

Going Shopping

For your birthday, you may choose any 3 items from this catalogue.
Select 3 items from the catalogue, and fill in the order form below.
Calculate total price including tax.

Item	Quantity	Price
TOTAL		
5% Sales tax		
Shipping & handling		$ 4.50
Total amount due		

Now choose 2 items from the catalogue, and compute a 15% discount.
Complete the order form below. Calculate the total price including tax.

Item	Quantity	Price	Sale Price
TOTAL			
5% Sales tax			
Shipping & handling			$ 4.50
Total amount due			

Writing about your results:
Explain in your own words how to find the amount of tax for your total purchase.

Compare and contrast the process for calculating discounts and tax.

Writing Assessment

Directions: Write a letter to me or a friend. Your letter needs to be in
                    appropriate friendly letter form. Address each of the items listed
                    below.

• Explain what a percent is using mathematical vocabulary

• Discuss 2 or 3 real-life situations where percents are found and used.

• Explain how to find the percent of a number. Justify your knowledge with an
  example problem.

• Discuss approach used to determine the best buy of an item

• Evaluate percents by answering the following questions:
        What did you like best?
        What did you like least?
        If you were the teacher, what would you have done differently?

Creating A Menu

Your final project is to construct a menu. It must meet the following guidelines:

• It must be original.

• It must be based on a theme.

• It must be named appropriately.

• It must contain a selection of twenty food and beverage choices that include:
        15% being beverages
        25% being appetizers
        40% being entrees
        20% being desserts

You must turn in five written questions with your menu. Four of these questions must involve percents. You must include an answer key on a separate piece of paper. The questions should show variety and should be neatly written and well organized.

Sample Question:
Choose one item from each category.   What will your total cost be if you include 5% sales tax and a 15% tip?

Peer Evaluation
Menu Review Sheet

Name of Menu:_____   Evaluators:_____

Constructed By:_____   _____

Rate the menu you are reviewing in each of the following areas. Use a scale of 1 (low)
to 4 (high).

Menu was appealing and creative	1	2	3	4
Food items were appropriate	1	2	3	4
Questions were understandable	1	2	3	4
Overall neatness and organization	1	2	3	4
Menu and questions complete (If not, what's missing?)	1	2	3	4

What suggestions would you make to the constructor to improve their menu.

Scoring Rubric
Letter Writing Exercise

2   Letter is well developed and provides more than enough information to information to inform the reader about percents. Explanation is extended by utilizing specific details and by using a clearly stated problem. Letter is will organized and addresses the proper audience.

1   Letter provides little development and has minimal amount of information. Explanation does not clearly explain percents and the example is vague or inaccurate. An organizational plan is minimally established or not maintained. The writer may not address the intended audience.

0   Blank, No letter
            Off topic, off task
            Unscorable letter or incomprehensible

Final Project Rubric
Menu Assessment

Scale	Organization of Data	Formulating Appropriate Questions	Understanding of the Problem and Accuracy of Answer Key
3	Well Organized Display is visually appealing Contains adequate solutions	Provides complete, well developed extended questions Utilizes a variety of questioning techniques Provides all relevant questions	Responses are clearly developed,complete, and accurate Shows an understanding of math ideas and processes
2	Organized Adequately displayed Contains selections	Provides complete, developed questions Provides some relevant questions	Responses are partially developed, fairly complete and accurate Shows a general understanding of math ideas and processes Includes some strategy and computational errors
1	Ineffectively organized Ineffectively displayed Selections did meet guidelines	Questions do not meet guidelines Provides irrelevant questions	Responses are attempted but may be incomplete and may be muddled Shows little understanding of math ideas and processes Includes major strategy and computational errors