

# Consumer Applications – Taxes, Tips, and Simple Interest

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- Strand:** Computation and Estimation
- Topic:** Compute the sales tax or tip and resulting total. Compute the simple interest and new balance earned in an investment or on a loan.
- Primary SOL:** 8.4 The student will solve practical problems involving consumer applications.
- Related SOL:** 8.1, 7.3

## Materials

- Rate It! vocabulary activity sheet (attached)
- Bar Model Representation (Template) (attached)

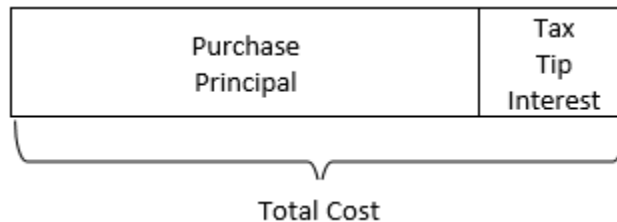
## Vocabulary

*discount, percent, sales tax, tip (earlier grades)*

*annual rate of interest, interest, loan, investment, principal (8.1)*

## Student/Teacher Actions: What should students be doing? What should teachers be doing?

1. Provide each student with the Rate It! vocabulary activity, read the three words (Tip, Tax, and Interest), and have students indicate their knowledge of each of the words. In pairs or small groups, have the students discuss the words and the reasoning for their ratings. Lead a class discussion of each word to develop a working definition of each.
  - Tax – a fee added to the purchase price of an item.
  - Tip – an amount of money added to a purchase for a person’s service.
  - Interest – an amount of money added to the principal (an initial amount) for a loan (using someone else’s money).Finally, see whether the students can see a similarity among these words. Mathematically, all three words refer to an amount added to an original amount.
2. Introduce a bar model for this type of problem.



Have the students work in pairs to read each of the scenarios and place the appropriate amounts on a blank bar model. Students are expected to justify the placement of each amount.

**Scenario 1:** A video was purchased at a store. The video costs \$19.99, and a 5.3 percent tax of \$1.05 was added, for a total of \$21.05.

**Scenario 2:** A family had pizza delivered to their house for dinner. The cost of the pizza was \$32.17. When the driver delivered the pizza, he was given a tip of \$6. Together, the pizza and tip cost \$38.17.

**Scenario 3:** New tires were needed for the car. A loan was needed to pay for them. \$160 was borrowed, and the store charged \$16 in interest. The new tires ended up costing \$176.

3. Present the students with the following problem and have them work in pairs to find the tax and total price. The emphasis of these examples is the problem-solving process, not computational skill, so allow students to use calculators.

A pair of jeans costs \$25.00, and the tax is 5 percent of the price.

- What is amount of the tax?
- What is the total price for the jeans?

4. Present the students with the following problem and have them work in pairs to find the tip and total cost.

Dinner at the restaurant was \$90. The server was tipped 15 percent of the cost of dinner.

- What is amount of the tip?
- What is the total cost for dinner?

5. Share with students the formula for calculating simple interest:  $I = prt$ . Model how to use the formula to calculate interest on a loan. In pairs, have students calculate the interest on a loan. Then have the students complete a calculation individually. Note, if time is given in months, convert it to years.

Principal	\$200	Annual Rate of Interest	3%	Time	5 years
Principal	\$100	Annual Rate of Interest	5%	Time	2 years
Principal	\$1,000	Annual Rate of Interest	8%	Time	18 months

6. Present the students with the following example and have them work in pairs to find the interest and the total amount of the loan.

Emma needed a loan of \$600 for repairs to her house. The bank loaned her the money at 10% interest for 2 years.

- What is the amount of interest?
- What is the total amount of the loan?

7. Have the students return to the Rate It! vocabulary activity sheet and see whether they have a better understanding of the three words. Students can pair to discuss new learning. Lead a class discussion of what was learned.

## Assessment

- **Questions**
  - Explain, using an example you create, how to calculate the interest on a loan and the total amount of the loan.
  - Your parents take you to dinner at your favorite restaurant for your birthday. The cost of the meal is \$50.
    - The restaurant adds a 10 percent tax to the meal.
      - Find the tax on the meal.
      - Find the total amount of the meal and tax.
    - Your parents want to leave a 20 percent tip. The tip is calculated on the total amount of the meal and tax.
      - Find the tip.
      - Find the total amount of the meal, tax, and tip.
    - Make sure that your work is neatly organized.
- **Journal/writing prompts**
  - Create a problem involving sales tax. Model the problem using a bar model. Solve the problem. Explain how the bar model is used to help solve the problem.
  - When calculating the tax or tip, there are two factors: the original amount and the percent of tax or tip. When calculating interest on a loan, there are three factors. What are the three factors, and what does each represent?
- **Other Assessments**
  - Provide students with mixed practice, including calculating tips, taxes, and interest.
  - Provide students with three problems, one of each type, with two of them solved correctly and one incorrectly. Have students determine which is solved incorrectly and show how to correctly solve the problem.

## Extensions and Connections

- Have students research a product that they are interested in purchasing. They should create a poster that contains a picture of the product and the cost of the product. On the poster, the student should indicate an anticipated tax rate (a percentage). On a separate piece of paper, find the total amount of the purchase. Attach the paper to the back of the poster. The posters can be used as additional problems in a gallery walk style.
- Have students complete discount problems where the discount is a percent of the cost of the item.

## Strategies for Differentiation

- Have students create a list of five items they would like to purchase. Have students calculate the cost at a 10 percent, 20 percent, 25 percent, and 50 percent discount.
- Review and preteach essential vocabulary for certain student before introducing the lesson.
- Ensure that each small group includes students of varying ability levels.

*Mathematics Instructional Plan – Grade 8*

- Have students bring in a store receipt and determine the tax rate.

**Note: The following pages are intended for classroom use for students as a visual aid to learning.**

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### Rate It!

You will be using these words as you work today. Do you know what they mean? Place an X in the column. Do not worry about the definitions yet.

You KNOW a word when you can define it and use it in your talking and writing.

You have a HUNCH about a word when you think you know what it means but you are not completely sure.

You are SOMEWHAT familiar with a word when you have seen it or heard it but do not know what it means.

You are NOT familiar if you have never seen or heard the word before.

Word	KNOW	HUNCH	SOMEWHAT	NOT	DEFINITION
Tax					
Tip					
Interest					

### Bar Model Representation (Template)

