Unit 4: Percentages

Content Area: **Mathematics**
Course(s): **Mathematics**
Time Period: **Week 16**
Length: **4 weeks**
Status: **Published**

Unit Overview

In this unit, students will learn how percentages are used in the real world. The unit will begin with students receiving basic knowledge of percentages. The students will learn that you can represent a percentage as a fraction and also as a decimal. During this time, students will understand that it is possible to have percentages greater than 100 and less than 1. Next, students will learn the process on how to calculate the percent of a given number (this will be achieved by teaching students both the percent proportion and the percent equation). Once students are proficient in the use of the percent equation they will learn about the idea of interest. Students will explore this concept through real world examples. Once students can apply the idea of interest to real world situations, students will learn how to calculate the percent of change. This is an important concept for students to master because it ties directly into the final part of the unit which is applying percentages to taxes, tips, discounts, etc. The culmination of this unit is when students are able to apply their knowledge of percentages and calculate the final price of an item after a given markup or discount.

Standards

MA.7.RP.A.3	Use proportional relationships to solve multistep ratio and percent problems.
MA.7.NS.A.3	Solve real-world and mathematical problems involving the four operations with rational numbers.
MA.7.EE.A.2	Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related.
MA.7.EE.B.3	Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.
MA.7.EE.B.4	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.

Essential Questions

- How will our previous knowledge of converting fractions and decimals help us with percents?
- In what ways in our everyday lives do we encounter percents?
- Why is it imperative to have a strong foundation in proportions when dealing with percents?
- What are some advantages or disadvantages for using the percent proportion/equation?

Application of Knowledge: Students will know that...

- Commission represents "part" of the amount sold. This is not added on to the final cost.
- Discounts are subtracted from the original amount.
- In order to change a decimal to a fraction, you begin by saying the decimal aloud and writing the fraction as you day it.
- In order to change a fraction to a decimal you divide the numerator by the denominator (drop the top).
- It is easier to solve a proportion by simplifying all fractions first.
- Percentages are always out of 100.
- Simple interest is interest based on the principle amount.
- Tax, tip, and percent increase are all markups and are added onto the original cost.
- The percent equation is: part = % * whole.
- The percent proportion is: is/of = %/100.
- The proportion: part/whole = %/100 can be used to help solve word problems
- When converting a decimal to a percent, you move the decimal point 2 places to the right (multiply by 100)
- When converting a percent to a decimal, you move the decimal point 2 places to the left (divide by 100).

Application of Skills: Students will be able to...

- Calculate the commission earned from selling an item worth a given amount of money.
- Calculate the simple interest earned on an initial deposit.
- Calculate the tax, tip, or discount for a given situation and determine the new price.
- Compare and contrast the pros and cons using either the percent proportion or the percent equation.
- Convert between fractions, decimals, and percentages.
- Create proportions/equations to model word problems
- Solve percent problems using either the percent proportion or equation.
- Utilize their knowledge of the percent proportion or equation to solve real world problems.

Assessments

- Do Now's: Will be used to check for prior knowledge and to determine mastery of particular topics. If needed the teacher will remediate the previous lesson before continuing.
- Tickets to leave: Will be used to measure student understanding of the lesson and assist in determining whether remediation is needed for the topic.
- Communicator Practice: Will be used as a quick whole-class assessment tool to check for complete comprehension.
- Unit Quiz: focusing only on converting percents and percent problems.
- Unit test: focusing on all concepts covered within the "Percentages" unit specifically percent

application problems.

- 4 person shopping activity: Students are split into groups of 4 in which each of them is assigned a particular store and are given index cards of items and it's their job to determine which store has the best deal for each item.
- Information from this unit will be included on a locally developed, mid-year or end of year benchmark assessment that may take the form of a test, performance based project, or other summative assessment. From this unit, students will be asked to remember how to use percentages to solve real world problems.

Suggested Activities

- Digits launch activities (Topic 7-8).
- Review games using communicators.
- Student centered SMART Board lessons: store lesson in which students click on a store which links to a specific item for sale that they must calculate the new price of.
- Percent Poster Project: students will be asked to come up with a store that is going out of business where everything is a certain percentage off.
- Clue "walk-around" activity to review the concept of percentages. Topics covered in this review will be: converting, real world problem solving, and generic percent problems. Students will complete review problems that are posted around the room on topics from this unit. The theme of the gallery walk is based off of the board game "Clue". Each problem will rule out possibilities for the suspect, weapon, and location. Once all of the problems are completed correctly, students will be left with the suspect, weapon, and location for the fictional crime.
- Commission "Car" Activity: students will be asked to research different cars. They will then pretend to be a salesperson and told how much commission they will receive for the car that they chose.
- My Wish List: Teacher-generated activity provides students with the opportunity to go on an imaginary shopping spree with an unlimited budget. Students are given a list of items, and they will be required to purchase at least five from the list. Students will calculate the tax and the shipping on their items utilizing the percent proportion.
- Stocks Project: ongoing project in which students choose 5 stocks and research their price at different times of the year to calculate their stocks percent of change.

Activities to Differentiate Instruction

Differentiation for special education:

- General modifications may include:
    - Modifications & accommodations as listed in the student's IEP
    - Assign a peer to help keep student on task
    - Modified or reduced assignments
    - Reduce length of assignment for different mode of delivery
    - Increase one-to-one time
    - Working contract between you and student at risk
    - Position student near helping peer or have quick access to teacher
    - Break tests down in smaller increments

- **Content specific modifications may include:**
    - Personal handout for remembering integer rules (can be taped to desk).
    - Graphic organizer for remembering integer rules.
    - Provide completed examples for practice work and homework.
    - Calculator to assist with calculations.
    - Modify assignments to give percent problems that will result in an integer answer.

Differentiation for ELL's:

- General modifications may include:
    - Strategy groups
    - Teacher conferences
    - Graphic organizers
    - Modification plan
- **Content specific vocabulary important for ELL students to understand include:**
    - Percent, conversion, proportion, tax, tip, discount, markup, percent increase/decrease, commission

Differentiation to extend learning for gifted students may include:

- Give more decimal percentages to work with rather than integer problems.
- Focus more on "double" percent application problems (have students calculate the price after a discount AND tax).

Technology Integration

- iPads or Chromebooks as appropriate to the activity.
- Online learning components including use of the Digits digital textbook and resources.
- Teacher integration of the SMART board to facilitate active student engagement throughout the course of the lesson.
- Software or online programs that teachers may use to create students materials or generate problems such as Kuta software.
- Additional practice provided through the use of IXL.

Integrated/Cross-Disciplinary Instruction

ELA: Practice formulating complete and grammatically correct responses to open-ended questions.

Economics: Students go on imaginary shopping trips to determine which store has the best deal, and/or the amount of money saved by shopping at a particular store.

Economics: Students create a pretend stock portfolio to calculate the percent by which they have gained or lost money.

Business: Students construct a creative display, enticing people to shop at their store. Students write a paragraph describing why people should shop at their store and not at others.

Resources

Digits teacher materials and support: www.pearsonrealize.com

Digits student access and support: www.mymathuniverse.com

IXL practice: www.ixl.com

Digits video examples

SMART Board lessons

Kuta software generated worksheets

IPads to research stock prices and to choose cars for their commission activity

21st Century Skills

CRP.K-12.CRP1	Act as a responsible and contributing citizen and employee.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP5	Consider the environmental, social and economic impacts of decisions.
CRP.K-12.CRP11	Use technology to enhance productivity.