

SESSION SEVEN DEVELOPING PERCENT CONCEPTS

Outcomes

- To maintain a positive tone for the class by promoting communication and continued understanding of mathematical concepts.
- To use grids, number lines and color tiles as models for illustrating percent concepts.
- To build on participants' existing number sense with percent.
- To review and extend participants' understanding of **NCTM Number and Operation Standard** (introduced in Session 3).

Overview

Activities in the seventh session are designed to develop a conceptual understanding of percent by utilizing both area and length models. It is likely that parents have a working knowledge of percent based on personal experience with the many day-to-day applications of this topic. This session should deepen their understanding of the concept and enable them to extend their knowledge to new applications.

Time

- 20-25 minutes** The first part of the session allows participants to share about the experience of looking at web sites for parents and mathematics. They are also given the opportunity to share their solutions to the homework problem.
- 60-70 minutes** Next participants use grids, color tiles, and number lines to illustrate the concept of percent as it relates to one hundred.
- 3-5 minutes** A portion of **NCTM Number and Operation Standard** is then introduced as a way to reinforce the activities of the session.
- 15-20 minutes** In the closing activity parents compare their comfort level with fractions, decimals, and percents prior to taking this class with their comfort level as a result of taking this class.

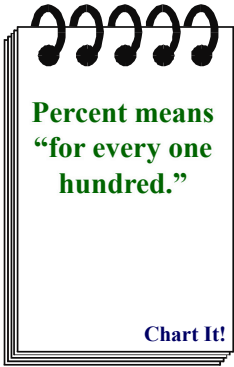
Materials

Facilitator	Transparencies (English & Spanish)
<ul style="list-style-type: none"> • Overhead color tile pieces • A five-foot strip of adding machine tape • Sticky dots in two colors 	<p><i>BLM 38: NCTM Number and Operation Standard</i></p> <p><i>BLM 15: NCTM Number and Operation Standard (session 3)</i></p> <p><i>BLM 39: Transparent Grid</i></p> <p><i>BLM 40: Percent Estimation</i></p>
Participant	Handouts (English & Spanish)
<ul style="list-style-type: none"> • A supply of color tiles for each participant-about 10 each of red, yellow, blue, green (participants should have the option to take these home) • Copy Transparent Grids onto a transparency and cut apart to form one transparent grid per participant. 	<p>One per participant for class</p> <p><i>BLM 39: Transparent Grids</i></p> <p><i>BLM 40: Percent Estimation</i></p> <p><i>BLM 41: Percents and Color Tiles</i></p> <p><i>BLM 42: Percent Grids</i></p> <p><i>BLM 43: Percent Number Lines</i></p> <p>One per participant for home</p> <p><i>BLM 44: Bringing Mathematics Home 7</i></p> <p><i>BLM 45: Top Ten Tips for Parents</i></p> <p><i>BLM 46: Percent Problems</i></p>

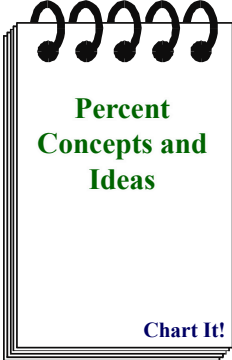
Activities

Preparation of Classroom	Notes
<ol style="list-style-type: none"> 1. Follow instructions from the materials section to create a transparent grid for each participant. 2. Prepare the five-foot strip of adding machine tape by marking it to show a continuum from 0 to 100. This strip will be used in the closure activity for this session. 3. Post the Fraction-Decimal-Percent Chart. 4. Set up the Chart It! 5. Place the name cards from last class near the front of the room where participants can easily find them. 	<p>There are 9 copies of the grid on the master sheet. Run enough copies on transparency film so that each participant can have one 10 x 10 grid.</p>
Discussion of Homework (20-25 minutes)	
<ol style="list-style-type: none"> 1. Invite participants to share about their experiences looking at websites from Bringing Mathematics Home 5 and Bringing Mathematics Home 6 with a partner. 2. Next, ask them to share their solutions to Decimal Problems II with the people at their table by discussing these questions: <ul style="list-style-type: none"> • What was the longest/shortest path you found? • What logic or method did you use to make sure you always moved to a larger value? <p>After everyone has had the opportunity to share with their group, you may ask one or two participants to share with the class</p>	
Percent Concepts (60-70 minutes)	
<p>Introduction to Percents Tell participants that they are going to focus on the concept of percent during the final two sessions of the class.</p> <ol style="list-style-type: none"> 1. Ask them to review the Fraction-Decimal-Percent Charts for percent applications. Point out that percent is an especially important concept for students to master because of its widespread use in common, day-to-day activities. 2. Show the following words on a transparency: Centipede, centimeter, century, cent. <ul style="list-style-type: none"> • Ask them to define each word. • Ask what all the words have in common. 	<p>It is likely that the percent portion of the charts has more examples than the fraction and decimal portions. Applications for percent were likely easier to find and more numerous than applications for fractions and decimals.</p> <p>Recall that a similar word list was used in session 5 when introducing decimals.</p> <p>Centipede: a creature with 100 legs Centimeter: one-hundredth of a meter Century: 100 years Cent: one-hundredth of a dollar</p>

Activities

Percent Concepts (60-70 minutes)	Notes
<ul style="list-style-type: none"> Tell them that the "cent" in percent is related to these words and also relates to 100. <p>3. Ask them to define the word "per."</p> <ul style="list-style-type: none"> Point out that when used in other contexts we might say "miles per hour," "cost per person," "participants per teacher." Per means "for each" or "for every." <p>4. Putting these definitions together we can say that percent means "for every one hundred." Tell them that it is useful to think of percent as making comparisons to 100. Chart It!</p> <p>Estimating Percents</p> <p>1. Hand out Percent Estimation and display transparency.</p> <ul style="list-style-type: none"> Explain that on this sheet there are squares with a portion shaded. Tell them to consider each square to be worth 100 percent. Ask participants to estimate the percent that is shaded and write their estimates below each square. Have participants discuss their thinking with the people at their table. <p>2. After participants have completed their estimates, explain that they will now check their estimates.</p> <ul style="list-style-type: none"> Hand each participant a transparent grid with 100 squares. This grid fits perfectly over the squares on Percent Estimation. Demonstrate how to use the transparent overlay to find the exact percent shaded by counting squares. Direct them to use it to check their percent estimates. <p>Finding Percents of Different Numbers</p> <p>Explain to participants that while percent means "out of 100," a collection need not have 100 items in order for percent to be applied. They will illustrate this with collections of color tiles.</p> <p>1. Hand out Percent and Color Tiles.</p> <ul style="list-style-type: none"> This sheet describes tile collections in which the proportion of each color is given as a percentage. 	<p>In Spanish: Centipede is centena Centimeter is centimetro Century is siglo Cent is centavo</p> <div style="text-align: center;">  <p>Percent means "for every one hundred."</p> <p>Chart It!</p> </div> <p>It is likely that many participants will have made very good estimates. Point out that this shows that they have good number sense about percent.</p> <p>Remind participants that they did an activity similar to this in session 3 when studying fractions.</p> <p>Some participants will be able to solve these without using tiles. Encourage them to build solutions for at least the first 5 problems. (Problems 6, 7 and 9 require more tiles than participants have and will need to be solved without actually building.)</p>

Activities

Percent Concepts (continued)	Notes
<ul style="list-style-type: none"> • Their job is to form a collection that fit each description, though the collection need not have 100 tiles. • Do one or two problems together to make sure all understand the task. • It is not necessary for each participant to complete each problem. Encourage those who do not finish, to try the remaining problems at home with their children! • Ask some participants to demonstrate their solutions and their reasoning by using the overhead color tiles. <p>2. Point out to participants that the kind of logic and strategies they used to solve the color tile problems can be applied to other percent models.</p> <p>3. Hand out Percent Grids and Percent Number Lines.</p> <ul style="list-style-type: none"> • These set of problems asks them to answer percent questions about grids that do not have 100 squares and about number lines. • Encourage participants to work with partners and discuss each one. • It is not necessary for each participant to complete each problem. Encourage those who do not finish, to try the remaining problems at home with their children! <p>Assign each group one of the problems to present to the class. Place an overhead transparency of the sheet on the projector and ask each group to talk about how they solved one of the problems.</p> <p>4. Ask participants to reflect on the percent concepts and ideas they have worked with in this session using grids, color tiles, and number lines. Direct them to share these with the class. Chart It!</p>	<p>Be sure to point out the variety of strategies used and the benefit to the class of hearing how others thought about the problem. It is important to validate every participant’s contribution.</p> <p>Point out to participants that when looking at the number lines in part 4, some lines do not show a 0 point. They should not assume that the start of the line is 0. The last number line is purposely ambiguous. There is no way to know where 100% belongs because there is no other point given as reference</p> <p>As much as possible, record the terminology as used by participants. They might suggest ideas such as:</p> <ul style="list-style-type: none"> • Percent is used to show a portion out of 100. • Percent can also be applied to collections that do not contain 100 items by using logic and proportional reasoning. <p>Relating percents to fractions and decimals can solve percent problems!</p> <div style="text-align: center;">  <p>Percent Concepts and Ideas</p> <p>Chart It!</p> </div>

Activities

Connections to National Standards (3-5 minutes)	Notes
<p>1. Remind participants that in Session 3 they looked at a portion of the NCTM Number and Operation Standard that mentioned fraction and decimal representations.</p> <p>2. Tell them that today they will look at a portion of the same Standard for grades 6-8. Display NCTM Number and Operation Standard from the NCTM Principles and Standards:</p> <ul style="list-style-type: none"> • In the middle grades, students should become facile in working with fractions, decimals, and percents. • Students can develop a deep understanding of rational numbers through experiences with a variety of models such as fraction strips, number lines, 10 x 10 grids, area models, and objects. <p>3. Ask participants to discuss how the activities of this and previous class sessions promote this standard.</p>	<p>If desired, review the previous excerpt of this Standard by displaying NCTM Number and Operation Standard from Session 3.</p>
Closure (15-20 minutes)	
<p>Percents: 0 to 100</p> <p>1. Post the five-foot strip of adding machine tape marked to show a continuum 0 to 100.</p> <p>2. Hand each participant two sticky dots, one in each color (let's say green and yellow).</p> <p>3. Ask participants to write their initials on each dot then place them on the number line in this manner:</p> <ul style="list-style-type: none"> • Place the green dot to show their confidence with fractions, decimals, and percent PRIOR to taking this class. • Place the yellow dot to show their confidence with fractions, decimals, and percent AS A RESULT of taking this class. • Encourage a few participants whose dots show a great increase in confidence to share what aspects of the class have contributed to this growth. <p>Reminder Remind participants to bring their fraction and decimal strips from Session 6 to class for Session 8.</p>	

Activities

Take Home Activities (5 minutes)	
<ol style="list-style-type: none"> 1. There are three items for participants to take home: <ul style="list-style-type: none"> • Bringing Mathematics Home 7 • Top Ten tips for Parents • Percent Problems 2. Bringing Mathematics Home 7 offers a list of suggestions for supporting their children in mathematics. Ask them to choose one or two that they will implement this week. 3. Ask participants to complete the three problems on Percent Problems using color tiles, grids, or pictures. 	<p>Participants may want to take a set of color tiles home to complete these take home activities.</p>
Preparation for the Next Session (5 minutes)	
<ol style="list-style-type: none"> 1. Collect name cards for use in the next sessions. 2. Fold or roll the Fraction-Decimal-Percent Charts in a way that preserves the items posted on them and bring them to the next class. 3. Save the Chart It! and bring it to the next class. If desired, you may have the log typed and distributed to participants at the next class. 	