

SESSION ONE

INTRODUCTION TO FRACTIONS, DECIMALS, AND PERCENTS

Outcomes

- To set a positive tone for the class by promoting conversation and establishing a welcoming atmosphere.
- To introduce participants to the topics for the class by drawing on their everyday experiences.
- To draw on participants' existing ability to use proportional reasoning.
- To introduce participants to NCTM's Learning Principle.

Overview

In the first session of Thinking About Fractions, Decimals, and Percents, it is important to deliberately set a positive and friendly tone that will be maintained throughout the rest of the course. The activities in this session are designed to engage participants in fun, non-threatening activities that promote conversation, activity, and mathematical thinking.

Time

- 10-15 minutes** The first part of the session allows participants to introduce themselves to one another and talk about their children.
- 40-50 minutes** Next participants work with a partner to fit tangram pieces into puzzles. Then they use mathematical reasoning to determine the value of each individual tangram piece if the total puzzle had a value of \$8.00. Participants demonstrate their reasoning using the overhead projector.
- 20-30 minutes** After the tangram activity, participants brainstorm ways they use fractions, decimals, and percents in their daily lives. They then look through papers and magazines for examples. These examples are posted on charts. The charts are used throughout the eight sessions.
- 3-5 minutes** NCTM's Learning Principle is introduced as a way to reinforce the approach of this course.
- 15-20 minutes** In the closing activity, parents think about how they learned mathematics and how it differs from the way that mathematics was taught in this first session.

Materials

Facilitator	Transparencies (English & Spanish)
<ul style="list-style-type: none"> • Tangram pieces (one set for the overhead projector) • A supply of newspapers and magazines • Three flip chart sheets (or a long strip of butcher paper, approximately 6 feet by 3 feet) 	<p><i>BLM 1: NCTM Learning Principle</i> <i>BLM 2: Math Class Web</i></p>
Participant	Handouts (English & Spanish)
<ul style="list-style-type: none"> • Tangram pieces (one set per participant to take home) • 5 x 8 index cards (one for each participant) • 3 x 5 Post-it® notes (one pad for each table) 	<p>One set per table <i>BLMs 3-8: Tangram Pattern Sheets 1-6</i></p> <p>One per participant for home <i>BLMs 3-8: Tangram Pattern Sheets 1-6</i> <i>BLM 9: Bringing Mathematics Home 1</i></p>

Activities

Preparation of Classroom	Notes
<p>Create Fraction-Decimal-Percent Charts. Use three flip chart sheets or a long strip of butcher paper divided into three sections. Label the sheets or sections Fractions, Decimals, and Percents. The charts will be used during the course and more information will be added to them in subsequent sessions.</p>	<p>At the conclusion of this class session, plan to roll or fold the charts in a way that preserves the items posted and bring them to the next class session.</p>
Getting to Know Each Other (10-15 minutes)	
<ol style="list-style-type: none"> 1. Introduce yourself and tell a little bit about your professional and personal background. If you have children be sure to talk about them. Parents will feel comfortable relating to you as a fellow parent. 2. Tell participants that this course is about fractions, decimals and percents and is designed to serve three purposes: <ul style="list-style-type: none"> • To expand their understanding of mathematics • To experience mathematical activities that can be used with their children at home • To have fun! 3. Tell participants that the course will be more enjoyable if we get to know one another and learn each other's names. <ul style="list-style-type: none"> • Give each participant an index card. • Ask each participant to fold the card to form a tent. • Ask them to write their name in large letters and to draw their children on the card. (See sample in the notes to the right.) 4. After the name cards are completed, ask participants to introduce themselves and talk about their children with others at their table. 	<p>Allowing time for personal introductions is important because it helps set a friendly, relaxed tone for the class.</p> <div data-bbox="976 884 1360 1003" data-label="Image"> </div> <p>The name cards should be collected at the end of each class and handed out at the beginning of each session.</p> <p>Encourage parents to talk about their children, telling their ages, personalities, etc. After all, their children are the reason they are here!</p>
Tangram Explorations (40-50 minutes)	
<p>Tangram Puzzles</p> <ol style="list-style-type: none"> 1. Distribute a set of Tangrams to each participant. Give Tangram Pattern Sheets 1-6 to each group. Explain that tangrams are commonly used in school mathematics. 2. Ask participants to work with a partner to try to use all seven pieces to form each of the shapes shown on the Tangram Pattern Sheets. Let them know that it is not necessary to solve all of the puzzles, but that they should try several of them. 	<p>By providing only one set of the Tangram Pattern Sheets 1-6 per table, the activity promotes interaction and conversation.</p> <p>Tangrams are believed to have originated as a puzzle in China around 1800 .</p>

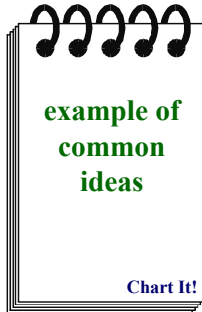
Activities

Tangram Explorations (continued)	Notes
<p>The Value of a Tangram Piece</p> <p>1. Tell participants that they will now do another activity with the tangram pieces. Say:</p> <ul style="list-style-type: none"> • <i>Imagine that a person could buy the whole set of tangrams for \$8.00, or just buy individual pieces. What would be the value of each of the individual pieces?</i> • <i>Assume that the value of a piece depends on its size (area) in comparison to the other pieces.</i> <p>2. Encourage participants to work with a partner so that they have the opportunity to talk about their thinking. If some groups complete the task quickly, see notes for extension questions.</p> <p>3. Solutions to tangram problems are provided on page 19.</p> <p>Processing</p> <p>1. Have several participants present the reasoning they used to determine each piece's value. Encourage them to use the overhead tangram pieces when demonstrating their reasoning. As participants share, record the mathematical language they are using. They might be using terms such as parts, half, twice as much, compared to, fraction of, percent, or ratio.</p> <p>2. It is important to validate every participant's contribution as they complete their sharing by pointing out the strategy that they used. After all the volunteers have presented, celebrate the variety of strategies that have been shared.</p> <p>3. If many groups solved the \$12, \$1.60, and \$1.00 problems.</p> <p>Ask:</p> <p><i>How did the solution to the \$8.00 problem help you to solve the other problems?</i></p> <p>4. After participants have shared, point out that the problem was solved in many ways, but in all cases they were using the ideas of fractions, decimals, and percents. Participants were considering the relationship of the parts to the whole and of the parts to each other. This kind of thinking and reasoning is basic for understanding fractions, decimals, and percents.</p>	<p>During group work, be sure to walk around and listen to the conversations in order to know what the participants are thinking.</p> <p>If some groups complete this task quickly, pose these additional challenges:</p> <ul style="list-style-type: none"> • <i>If the completed shape is worth \$12, what is the value of each piece?</i> • <i>If the completed shape is worth \$1.60, what is the value of each piece?</i> • <i>If the completed shape is worth \$1.00, what is the approximate value of each piece?</i> <p>Participants may be reluctant to come to the front of the room to share. Be sure to offer support and acknowledgement to those who volunteer. Allow partners to come to the overhead together and offer your assistance to them as they present.</p>

Activities

Tangram Explorations (continued)	Notes
<p>5. Take a few minutes to explain the use of manipulatives in today's classroom. It might be appropriate to bring in a sampling of the manipulatives that will be used during this course. Research has shown that manipulatives can be a very effective aid in learning mathematics.</p> <p>6. Let them know that in the next few classes they will continue to use manipulatives and problems to help illuminate more ideas about fractions, decimals, and percents.</p> <ul style="list-style-type: none"> • Sessions 2 – 4 will focus on fractions, • Sessions 5 – 6 will focus on decimals, • Sessions 7 – 8 will focus on percents. 	<p>This is an appropriate time to take a short break, if desired.</p>
Fractions, Decimals and Percents in Daily Life (20-30 minutes)	
<p>Applications in daily life</p> <p>1. Remind participants that this course is focused on the mathematical ways we represent parts of things using fractions, decimals, and percents. These topics are heavily represented at the elementary and middle school level. Explain that one reason for this emphasis is the practical usefulness of fractions, decimals, and percents in daily life. Say:</p> <p style="padding-left: 40px;"><i>The object of this next activity is to brainstorm lots of everyday uses for fractions, decimals, and percents</i></p> <p>2. Ask for volunteers to share places they use fractions, decimals, and percents at work or at home. After a few examples have been shared, ask participants to generate a short list of additional examples at their table. Say:</p> <p style="padding-left: 40px;"><i>We will be sharing our ideas soon, but before we do, let's expand our lists by looking through some magazines and newspapers for more ideas.</i></p> <p>Newspaper Search</p> <p>1. Hand out newspapers and magazines and allow participants to cut out additional fraction, decimal, and percent examples.</p> <p>2. If their list contains additional examples that are not found in the paper, they may write each idea on a Post-it®.</p> <p>3. Have participants work in groups to collect examples.</p>	<p>This section will be using the Fraction, Decimal, and Percent charts that you set up before class.</p> <p>Encourage participants to consider the things they see as they drive, watch TV, read the newspaper, go shopping, banking, or do chores at home.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Interest rates • Sports statistics • Shopping advertisements, surveys or graphs • Radio station call numbers • Stock market changes • Cooking • Shopping prices <p>Ask participants to use markers rather than pens or pencils when writing on the Post-it® notes and to write large enough for it to be seen from a distance.</p> <p>Possible entries for the Fraction-Decimal-Percent charts are listed on page 8. The chart made by each class should reflect participants' ideas. It will not be necessary to include all the items listed on page 8.</p>

Activities

Fractions, Decimals and Percents in Daily Life (continued)	Notes
<p>Sharing ideas</p> <p>1. After 5 minutes, have each group post their examples on the Fraction-Decimal-Percent Charts, while sharing what they have found. If an idea has already been shared, ask them to state it again and post the clipping or Post-it® note <u>on top</u> of the others with the same idea. This will indicate which uses of fractions, decimals and percents are the most common.</p> <p>2. Once all items have been posted, ask participants to look for ideas that are common to the three lists. For example, many examples will likely have to do with making comparisons, measurement, and money. Ask:</p> <p style="padding-left: 40px;"><i>Why do you suppose that fractions, decimals and percent are often taught together?</i></p>	<div data-bbox="1133 302 1333 611" style="border: 1px solid black; padding: 10px; text-align: center;">  <p style="color: green; font-weight: bold; margin: 0;">example of common ideas</p> <p style="color: blue; font-size: small; margin: 0;">Chart It!</p> </div> <p>Some reasons might include:</p> <ul style="list-style-type: none"> • They are used in similar ways as the fraction-decimal-percent chart shows • They are used to express a part-whole relationship • They can be interchanged ($0.5 = 50\% = 1/2$).
<p>National Standards (3-5 minutes)</p>	
<p>1. Display NCTM Learning Principle transparency. Say:</p> <ul style="list-style-type: none"> • <i>The activities of this session provide an illustration of the direction of mathematics instruction today.</i> • <i>The National Council of Teachers of Mathematics (NCTM) has published a document called Principles and Standards for School Mathematics.</i> <p>2. Tell them that one of the six principles described in the document is the Learning Principle.</p> <p style="padding-left: 40px;"><i>Participants must learn mathematics with understanding, actively building new knowledge from experience and prior knowledge.</i></p> <p>3. Ask participants to share ways that this class session relates to this principle.</p>	<p>Since this is the first class, participants may be reluctant to share ideas with the whole class. If this is the case, ask them to share with a partner first and then share with the large group.</p> <p>They might point out the fact that they were actively engaged in the learning and that this session built upon their own prior knowledge of fractions, decimals, and percents.</p>
<p>Math Class Web (15-20 minutes)</p>	
<p>1. Display Math Class Web transparency. Now the class will analyze the activities of this session in light of the NCTM's guidelines.</p>	<p>Possible responses to the Math Class Web are shown on page 9.</p>

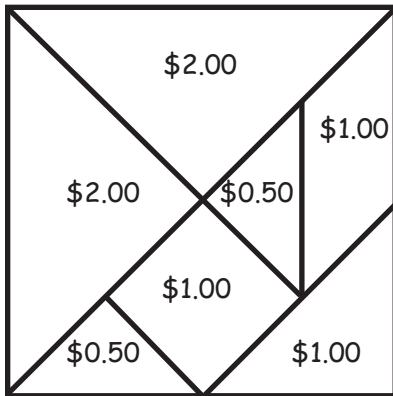
Activities

Math Class Web (continued)	Notes
<p>2. Ask participants to think about three questions regarding the learning situation in this class:</p> <ul style="list-style-type: none"> • <i>What was the teacher doing?</i> • <i>What were the participants doing?</i> • <i>How did you feel as the learner?</i> <p>3. Ask for responses as you fill in the Math Class Web transparency. Say:</p> <p style="padding-left: 20px;"><i>Now picture what your math class looked like when you were in school.</i></p> <p>Ask:</p> <ul style="list-style-type: none"> • <i>What was the teacher doing?</i> • <i>What were the participants doing?</i> • <i>How did you feel as the learner?</i> <p>4. Record responses on the same Math Class Web transparency using a different color pen.</p> <p>5. Tell participants that one goal of this class is to provide them with many experiences that reflect the current approach to teaching and learning mathematics. Through these experiences they will be better able to assist their children in learning mathematics.</p>	<p>It may be necessary to acknowledge that in their own children's experience they may not find this approach reflected at all times. However, this is the goal set out by educational experts (NCTM).</p>
Take Home Activities (5 minutes)	
<p>1. There are two items for participants to take home: Bringing Mathematics Home 1 and a personal copy of Tangram Pattern Sheets 1-6.</p> <p>2. Participants will need to take a set of Tangrams home in order to complete the Bringing Mathematics Home 1 activities.</p> <p>3. Encourage participants to try at least one of the activities listed either with their children, their spouse or on their own.</p>	
Preparation for the Next Session (5 minutes)	
<p>1. Collect name cards for use in the next sessions.</p> <p>2. Fold or roll the Fraction-Decimal-Percent charts in a way that preserves the items posted on it and bring it to the next class.</p> <p>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.</p>	

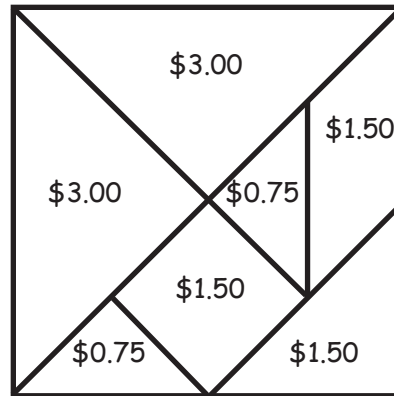
Facilitator Notes

Solutions to Tangram Problems

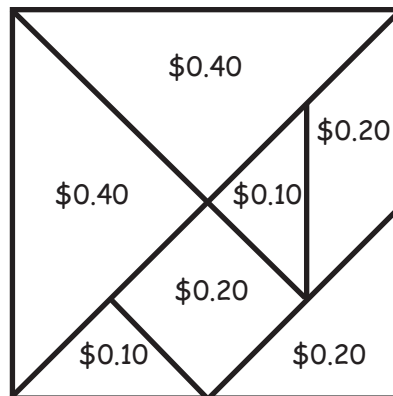
If the set is worth \$8.00



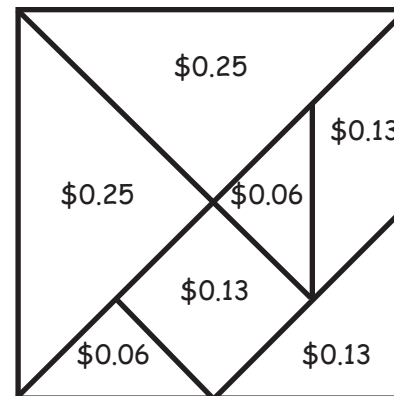
If the set is worth \$12.00



If the set is worth \$1.60



If the set is worth \$1.00
(rounded)



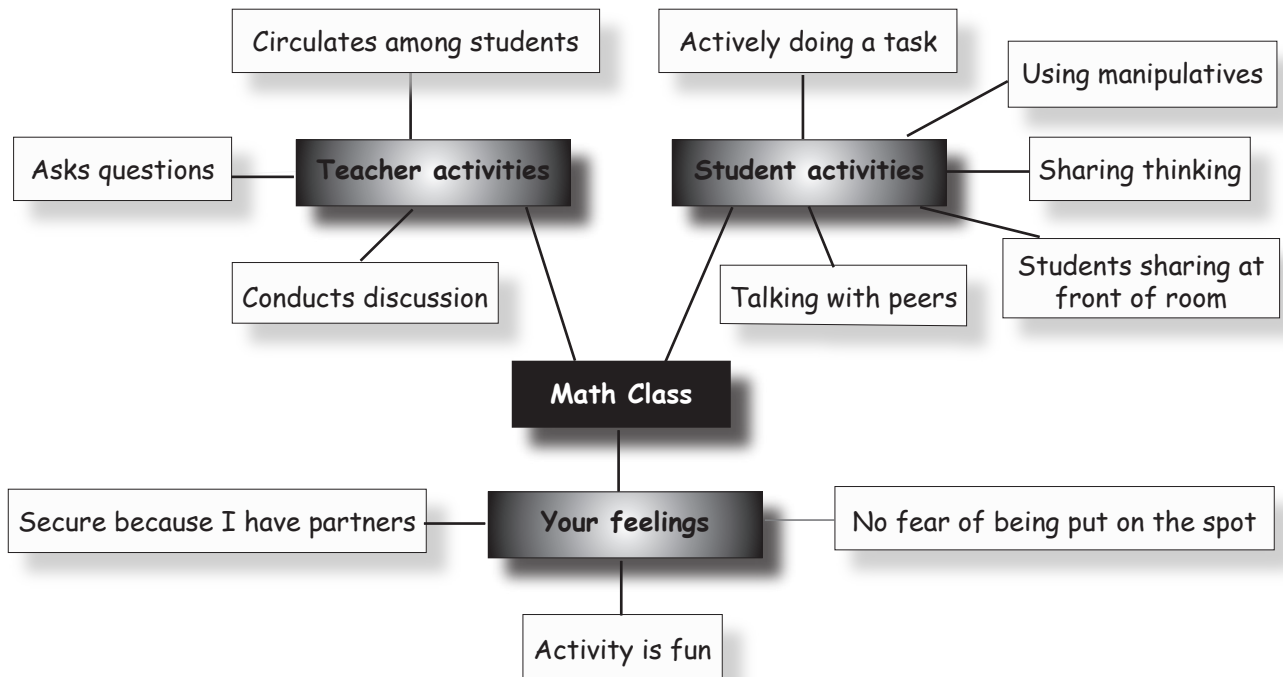
Facilitator Notes**Possible Entries to Fraction-Decimal-Percent Charts**

Fraction Chart	Decimal Chart	Percent Chart
<ul style="list-style-type: none"> • Measuring cups • Measuring spoons • Recipes • Customary measurement (inches, feet, yds., lbs., gal., etc.) • Some tool sizes • Stock price changes (until 2001) • Age of a child • Shoe size • Remainder in a division problem • Sharing something (like a cookie or pie) • Sports periods (quarters or halves) • Telling time (e.g. half past, a quarter till) • Describing how full/empty a gas tank is • Describing how far you have gone or how much work has been done (e.g. "We're three-quarters of the way there.") 	<ul style="list-style-type: none"> • Money • Metric measurement (cm, meter, liter, grams, etc.) • Unit prices on grocery store shelf tags • Time for a race (like 4.3 sec) • FM radio station identification numbers • Taking someone's temperature • Some averages (e.g. An average family has 2.3 children) • The answer to a division problem done on a calculator (sometimes) • Dosage of medicine • Stock price changes (starting 2001) • Odometer readings (on some cars) • Gas pump register 	<ul style="list-style-type: none"> • Sales tax • Interest on credit cards • Interest on bank accounts • Chance of something happening (like in a weather report) • Humidity • Nutrition labels on food • Participants' grades • Income tax • Sports statistics (like a freethrow percentage) • Data in a pie graph • Opinion polls

Possible Responses to Math Class Web

Facilitator Notes

Possible Responses to Math Class Web Related to *This Class Session*



Possible Responses to Math Class Web Related to *Math Class Experiences*

