

Representing Fractions, Decimals and Percents

Summary

Students will be able to represent fractions, decimals and percents using physical models, pictures, words and mathematical symbols.

Main Core Tie

Mathematics Grade 4

[Strand: NUMBER AND OPERATIONS - FRACTIONS \(4.NF\) Standard 4.NF.4](#)

Additional Core Ties

Mathematics Grade 4

[Strand: NUMBER AND OPERATIONS - FRACTIONS \(4.NF\) Standard 4.NF.5](#)

Mathematics Grade 4

[Strand: NUMBER AND OPERATIONS - FRACTIONS \(4.NF\) Standard 4.NF.6](#)

Materials

Foldable for each student

Worksheets: " [How Do We Represent Fractions](#)", " [How Much Is A Ten-thousandth?](#)", " [Visualizing Percents In Our World](#)", [Bingo Gameboard](#)

Manipulatives: counters, rulers, Color Tiles, Fraction Towers, paper plates, Geoboards and bands, Fraction Circles, Linker Cubes, [meter sticks](#), base-10 blocks, money packets for each group (include penny, nickel, dime, quarter, dollar in each packet).

Tools: scissors

Background for Teachers

Enduring Understanding (Big Ideas):

Rational numbers can be represented in multiple ways

Essential Questions:

Where do we see fractions, decimals, and percentages being used in our world?

How can physical models represent fractions, decimals and percents?

How do we represent fractions, decimals, and percents using words and symbols?

Skill Focus:

Identifying and representing and identifying fractional, decimal, and percentage amounts

Vocabulary Focus:

Fraction, decimal, percent, equivalent, names of manipulatives in the lesson.

Ways to Gain/Maintain Attention (Primacy): manipulatives, technology, cooperative groups, game, writing, Foldables

Instructional Procedures

Warm-Up:

Each of the following situations can be represented by a rational number in the form of a) a fraction, b) a decimal or c) a percent. Predict which form fraction, decimal or percent you would be most likely to see for the situation described. Have students predict, then discuss.

On a food label you can find the fat calories compared to the total calories. (percent)

You are using a meter stick to measure length. (decimal)

A recipe tells you how much sugar to add. (Fraction)

A sales ad tells you everything in the store is on sale. (percent)

Some data shows a baseball player's batting average. (decimal)

A sales receipt shows the amount money you paid. (decimal)

You are talking about how much time you spent doing homework. (fraction)

Launch: Where do we see fractions, decimals, and percentages used in the world?

Contest: Who can make the longest list for where we might see fractions, decimals and percents being used in our world? Students divide a paper into three columns labeling one column "Fractions", another "Decimals", and the third, "Percents". In small groups, students brainstorm situations and places where they might see each form and record ideas for three minutes. Students then mix around the room until teacher says, "Freeze." Student partners with the person closest to them sharing and adding to their lists. Do mix and freeze 3 times to enlarge list. Return to small group and share any new ideas. Have the team that had the longest lists read their's to the class. Then ask a student from each group to tell two or three situations that haven't been mentioned. Students record their finalized lists under the first flap of their Layered Foldable (see directions below).

Directions for a three flap layered Foldable: Stack two different colored sheets of paper in a vertical position so that the top of each page is about $\frac{5}{8}$ of an inch lower than the one beneath it. Turn the stack backwards and fold the top of the stack down giving you four flaps. Staple at the very top to keep the pages together. Clip the top 3 flaps as shown by the dotted lines below dividing these flaps on the Foldable into thirds.

Label the flaps as shown below.

Explore: How do we represent fractions, decimals and percentages?

Explore Part 1 Representing Fractions: [How Do We Represent Fractions Worksheet](#) and [Folding an Inch](#)

We can model fractions by counting and grouping part out of whole. Teacher reviews idea of part out of whole and models representing a fraction using counters, such as group $\frac{1}{2}$ of 12 counters, of 16 counters. Students complete #1 on "How Do We Represent Fractions". Have students sketch either 1a, 1b, or 1c from their worksheet as an example under the "Pictures" flap of their Foldable, write the appropriate words for that model under "Words", and write the appropriate symbols under the Symbols flap.

We can model fractions using length. Work with students to complete the "Folding an Inch" activity described below. (A template page has been included).

Folding An Inch

Ask students if they have seen the movie, "Honey I Shrunk The Kids" where a scientist accidentally shrinks his children. Tell them they have been shrunk so small that an inch actually looks very large to them. Give them an 11" template for an inch (see below). Looking at this inch that has been magnified as this one has, we can discover the fractions of the inch. Have students fold the paper in half, count the sections and label $\frac{0}{2}$, $\frac{1}{2}$ and $\frac{2}{2}$ in appropriate places leaving room below their labels to write five other fractions. Have them refold the halves, then fold in half again, count the sections and label $\frac{0}{4}$, $\frac{1}{4}$, $\frac{2}{4}$, $\frac{3}{4}$, and $\frac{4}{4}$ in the appropriate places. Have them fold making eighths and label. Then fold again to get the sixteen sections and label. As the equivalent fractions are listed below each other, the columns of symbols look very much like the marks on an inch. Next, tell students they have been restored to their own size. Give the students a ruler and ask them to compare the marks on an inch.

Have students complete #2-3 on the worksheet. Have students select one drawing from #3 to represent with pictures, words, and symbols on the Foldable.

We can model fractions using an area model. Teacher demonstrates using color tiles to represent an area such as a 2x5 rectangle with $\frac{2}{5}$ red and $\frac{3}{5}$ blue. Students work with partners to complete # 4-8 on the worksheet, "How Do We Represent Fractions". After completing # 4-8, they switch partners to help each other find errors or edit. They return to their partner and compare for accuracy. Teacher circulates during this fixing time to assess and suggest corrections. Students then choose two of their

models to record on their Foldable (picture, words, symbols)

Explore Part II Representing Decimals and Percents: ([How much is a Ten-Thousandth](#), [Meter Sticks](#), Base-Ten Blocks and Money, Decimals and Percents)

Meter Sticks, Base-ten Blocks and Money: Have students compare their meter stick, base-10 blocks and money. They prepare posters. Have a gallery walk to see the different posters. They should take notes on their gallery walk. These notes then help them in the large group discussion. After the large group discussion, students should write their own individual commentary. Teachers, invite input as to what would make a quality commentary, (knowledge, presentation, pictures, numbers, connections, real life examples, etc). Use the rubrics to assess the student commentaries. Work with students to complete the "Meter Sticks, Money, and Base-ten Blocks" investigation worksheet.

To help students visualize decimals, work together to do the "How Much Is A Ten-Thousandth?" (below) activity having students cut, sketch, and record symbols on their paper.

Meter sticks, money, and the 100 flat for the Base-10 Blocks all have fractional parts that are 100ths. When folding the paper for the ten-thousandths, we saw what 100th looked like. Whenever we use 100ths as our fraction or as our decimal, we are working with percent. Percent means "*per hundred*". Each one-hundredth is one percent. So 5 centimeters on the meter stick would be $5/100$ or 5% of the meter stick. 10 units on the Base-10 blocks would be $10/100$ or 10% of a flat. 75 cents would be 0.75 or 75% of \$1.00.

Have students complete " [Visualizing Percents In Our World](#)". Do Paper pass where each person on a team completes one problem on the "Visualizing Percents In Our World" worksheet without letting others see what they have shaded. The team leader then says, "Pass Please". All team members pass their paper to around to the next person to compare. The team then discusses similarities and differences in their shadings, and then passes the paper back to the owner. All members then complete the second problem on the worksheet, pass to compare again, etc.

Have students complete the [Bingo Game Board](#) as described at the end of this lesson. Play Bingo with the class.

After completing these decimal and percent activities, have students complete the decimal and percent flaps of their Foldable by sketch pictures, writing words, and showing correct symbols. They may use examples from the activity worksheets or make up their own. The Foldable can be kept in a math journal to refer to on quizzes and assignments.

Summarize: Have student show and explain their Foldable to their group or team.

Assessment Plan

Performance tasks, observation, game board.

Bibliography

This lesson plan was created by Linda Bolin.

Authors

[Utah LessonPlans](#)