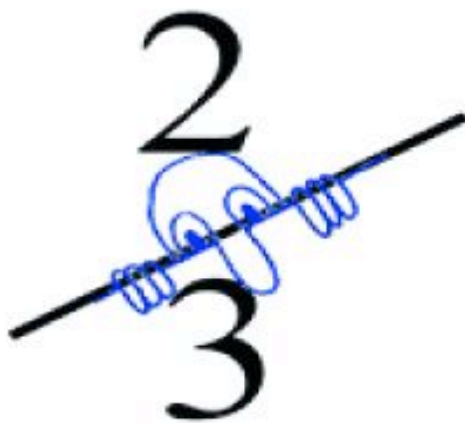


Math .pdf^{*}



(*percents, decimals, fractions)



14%

0.62



presented by

Dr. Karen Rhynard

Janet Palermo

MELL Conference 2008

Understanding Fractional Relationships

Complete the following problems.

1. Draw a figure that represents $\frac{3}{4}$.

2. Draw a figure that represents 0.5.

3. Draw a figure that represents 150%.

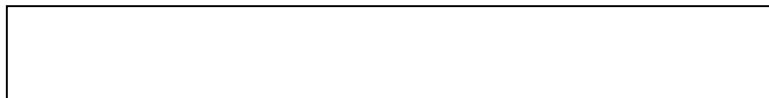
4. Label each figure as a percent, fraction, and decimal. These are ways to describe the same amount.

1. Fill in the table below. Let the orange rod represent 100%.


2.

<i>Rod Color</i>	<i>Percent</i>	<i>Fraction</i>	<i>Decimal</i>
Orange	100%		
Red			

Shade 30% of the bar. Label the fraction and decimal equivalents.



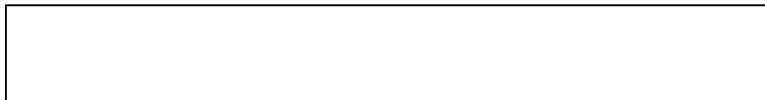
3. Shade 70% of the bar. Label the fraction and decimal equivalents.



4. Shade 150% of the bar. Label the fraction and decimal equivalents.



5. Label the bar below with 40%, 0.6, and $\frac{3}{4}$.



6. Put these numbers in order from least to greatest.

40%, 0.6, and $\frac{3}{4}$ _____

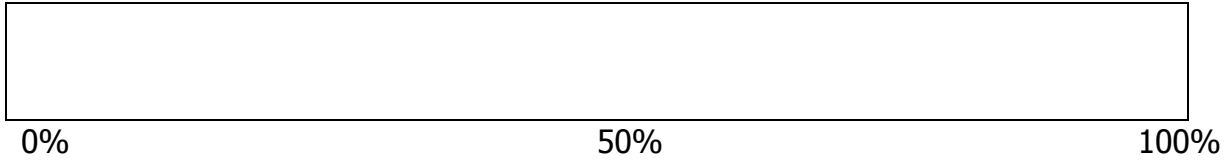
Let the brown rod represent 100%. Complete the table below for the other rod colors.

Rod Color	Percent	Fraction	Decimal
Brown	100%		
Purple			
Red			
White			
Orange			
Blue			

Estimating with Percent Bars

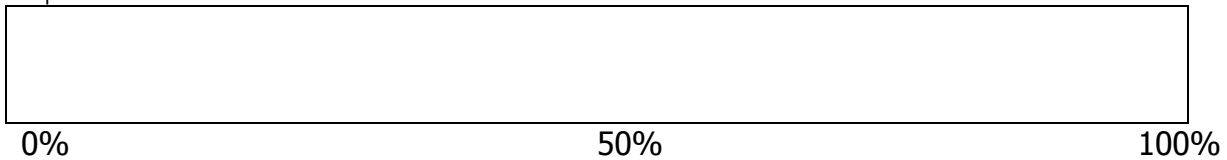
1. Phoebe shot 12 times during the basketball game. She made 9 shots. What percent of her shots did she make?

0 shots



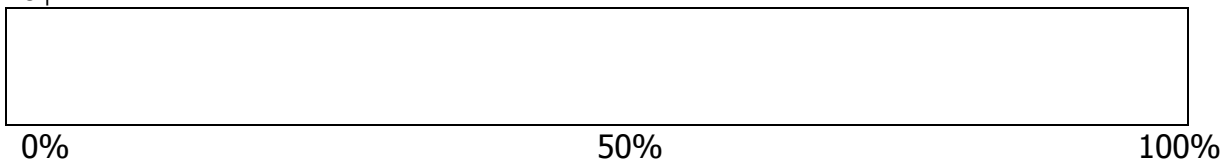
2. Caleb received a 30% discount on a DVD collection. If the regular price of the DVD collection was \$80.00, how much did Caleb pay for the DVD collection?

0\$

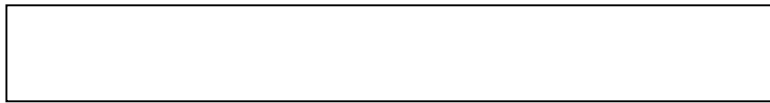
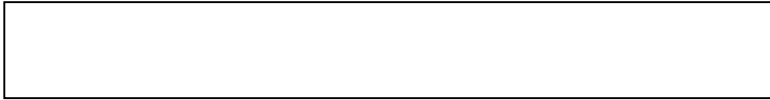
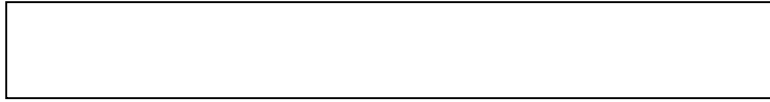


3. Jack bought tennis shoes that cost \$108. The shoe store sells the shoes at 120% of their cost. What did the shoes cost before the markup?

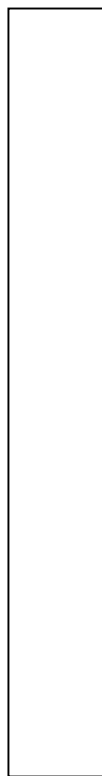
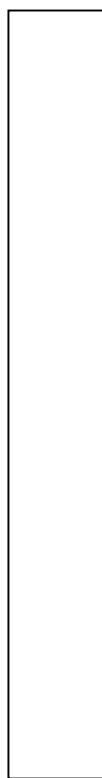
0\$



Bar Model



Bar Model



You need: Cuisenaire Rods

- Brown rod = 1. What is $\frac{1}{4}$?
- Orange = 1. What is $\frac{1}{2}$? What is $\frac{1}{5}$? What is $\frac{1}{10}$?
- Dark green = 1. What is $\frac{1}{3}$?
- Dark green = $\frac{3}{4}$. What is $\frac{1}{4}$? What is 1?
- Brown = $\frac{2}{3}$. What is $\frac{1}{3}$? What is 1?
- Green = $\frac{3}{5}$. What is $\frac{1}{5}$? What is 1?
- Blue = $\frac{3}{4}$. What is $\frac{1}{4}$? What is 1?

You need: Cuisenaire Rods

Orange + Red = 1

Find as many values as you can for:

- The orange rod
- The brown rod
- The purple rod
- The light green rod
- The red rod

Use a model to solve the problems below.

Charlie ate 25% of a cake.

John ate $\frac{3}{10}$ of a cake.

Wendy ate 0.2 of a cake.

Elaine ate the rest.

Who ate the most? How do you know?

Lyn made a quilt for Mrs. Malone's new baby.

$\frac{1}{4}$ of the quilt was yellow

$\frac{1}{3}$ of what was left was green

$\frac{2}{5}$ was pink

The rest was blue. What part of the quilt was blue? How do you know?

Using Manipulatives (Echevarria, Vogt, and Short, 2000)

According to Echevarria, Vogt, and Short (2000), English language learners need opportunities to practice new knowledge and skills in highly contextualized ways which include the use of manipulatives. English language learners, like regular grade-level students, benefit from experimenting, constructing models, and manipulating objects. The key difference is that for English language learners, using manipulatives is a non-negotiable. English language learners need to experience knowledge and skills in a tangible way especially when at the lower stages of English language development.

What Makes This Strategy Good for ESL Students?

- Provides activities that are context-embedded
- Enables students to work at higher levels of cognition, more cognitively demanding
- Provides concrete evidence of learning and understanding
- Scaffolds students into the abstract
- Can be used for assessment
- Lowers the affective filter
- Provides opportunities for vocabulary development
- Cooperative activities provide opportunities for much needed interaction

Differentiation

What is Differentiation?

"Differentiation is simply a teacher attending to the learning needs of a particular student or small group of students, rather than teaching a class as though all individuals in it were basically alike."

Carol Ann Tomlinson - 2000 University of Virginia

"Differentiation is changing the pace, level or kind of instruction in response to learners' needs, styles, and/or interests."

Dianne Heacox 2002

Differentiation is ...

- Proactive
- More qualitative than quantitative
- Multiple approaches to content/process/product
- Blend of grouping techniques

Types of Differentiation

- Content (what is taught)
- Process (how it is taught)
- Product (shows what students have learned)

Content Differentiation:

- offer similar materials at various levels of difficulty

Process Differentiation:

- vary instructional techniques
- vary materials

Product Differentiation:

- products student created to show learning
- differentiated products according to students' characteristics --
- readiness, learning styles and interests (Dianne Heacox 2002)

Linear Model of Percents

Cuisenaire rods (concrete) → pictorial bar model → numbers (abstract)

- ❖ Begin the lesson by assessing student's knowledge of benchmark percents and fractions through questioning.
- ❖ Let the orange rod represent 100%
 - If the orange rod is 100%, which rod would represent 50%? How do you know?
 - What fraction is the yellow rod? What decimal?
 - Find the percents of all the other rods
- ❖ Relate percents, decimals and fractions
- ❖ Compare percents, decimals, and fractions
- ❖ Connect Cuisenaire rods to the number line
- ❖ Decompose percents
- ❖ Use another rod color to represent 100%, then find the percent of the other rod colors
- ❖ Represent percents on the pictorial bar model – use rods and centimeter ruler to determine percents
- ❖ Use a numerical value to represent 100% of the bar
- ❖ Use percent bars to model percent problems

Part-to-Whole Relationships

Decimals and fractions are two different symbol systems for the same part-to-whole relationships. Rather than approach percents as a new idea, children should see that percents are simply a different way to record ideas about fractions and decimals. Rather than a third numeration system, percents are essentially a third symbolism for operators.

The term percents are just another name for hundredths.

Use realistic percent problems and nice numbers.

- Limit the percents to familiar fraction (halves, thirds, fourths, fifths, and eighths) or easy percents ($\frac{1}{10}$, $\frac{1}{100}$) and use numbers compatible with these fractions. The focus of these exercises is the relationships involved not complex computational skills.
- Do not suggest any rules or procedures for different types of problems. Do not categorize or label problems types.
- Use the terms part, whole, and percent (or fraction). Fraction and Percent are interchangeable. Help students see these percent exercises as the same types of exercises they did with simple fractions.
- Require students to use models or drawings to explain their solutions. It is better to assign three problems requiring a drawing and an explanation than to give 15 problems requiring only computation and answers. Remember that the purpose is the exploration of relationships, not computational skill.
- Encourage mental computation.

The dark green rod is one whole (100%). What strip is two-thirds ($66\frac{2}{3}\%$)?

What strip is three-halves (150%)?



If this rectangle is three-fourths (75%), draw a shape that could be the whole (100%).



What fraction (percent) of the set is red?

