Hands on Fractions, Decimals and Percentages

Dr. Rena Gelb

Jewish Education Project

July 29, 2025

12 pm - 2 pm

Overview

The objective of the presentation is to demonstrate ways to use manipulatives to enhance learning of fractions, decimals and percentages.

1) Why use manipulatives?
2) Introduction to fractions
1) Using manipulatives to learn fraction equivalence, operations, simplification and comparisons
2) Introduction to decimals
3) Using manipulatives to learn decimal operations
4) Introduction to percentages
5) Using manipulatives to convert between fractions, decimals and percentages
6) Resources
7) Feedback survey

Why use manipulatives in teaching math?

Constructivist Educational Theory emphasizes that students actively build their own understanding of mathematical concepts, rather than passively receiving information.

- Engaging with problems
- Making connections to prior knowledge
- Developing own strategies for solving problems
- Hands-on Activities
- Mathematical Modeling
- Open-Ended Problems

Benefits:

- Deeper Understanding
- Increased Motivation
- Development of Problem-Solving Skills
- Preparation for Advanced Math

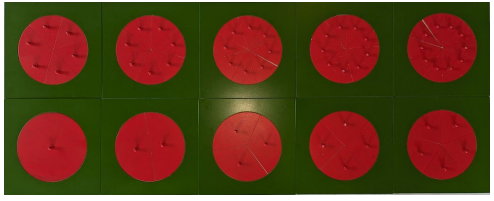
Introduction to the concept of a fraction

Source

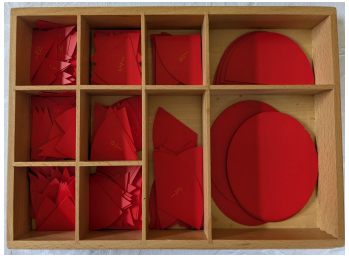
Learning objective: Students will be able to name and do operations with fractions

Materials

Fraction Insets



Fraction Circles



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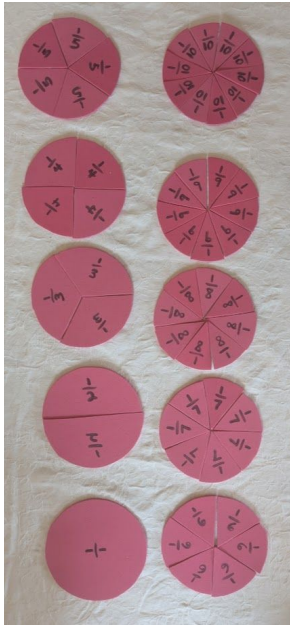


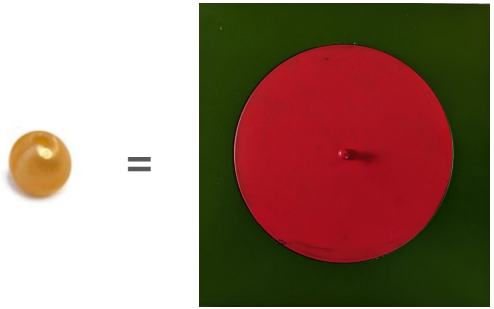
Materials:

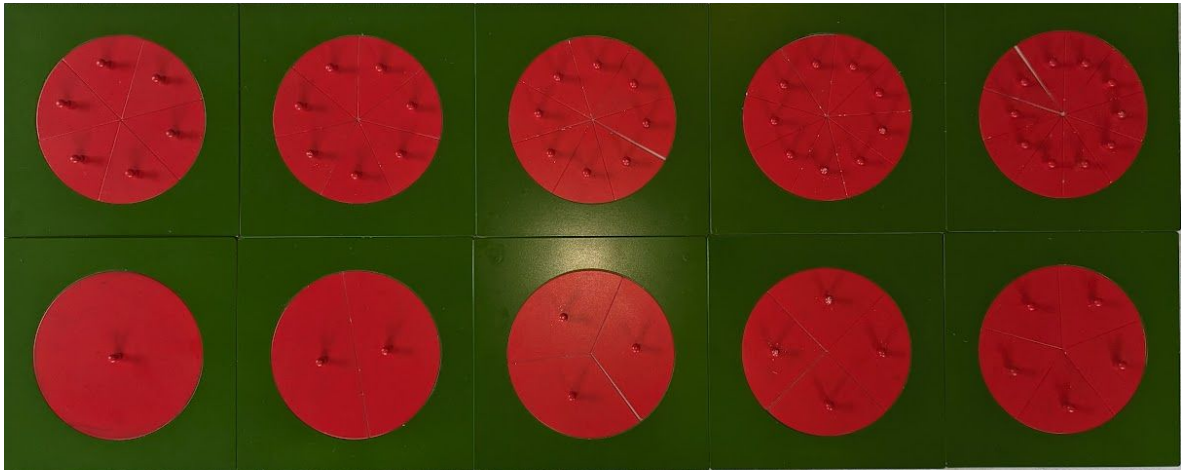
- Printable Fraction Circles
- Foam paper
- Paper clips
- Scissors
- Sharpie

Instructions:

1. Print fraction circles.
2. Attach page to foam sheet with paper clips.
3. Cut around outline of circle and label pieces.

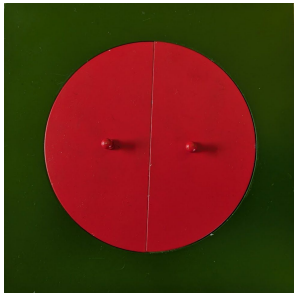
Learning Objective: Students will be able to name fractions





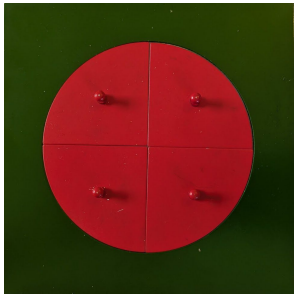
Learning Objective: Students will be able to name fractions

Whole

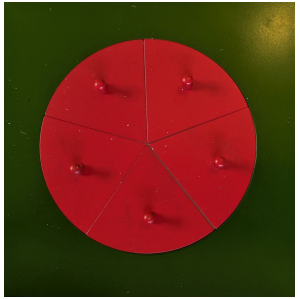


Halves

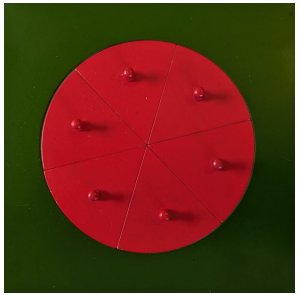
Thirds



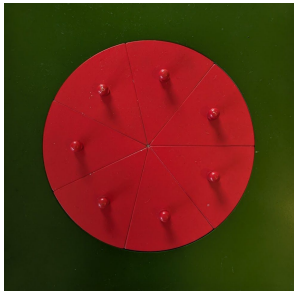
Fourths



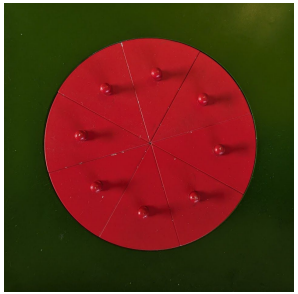
Fifths



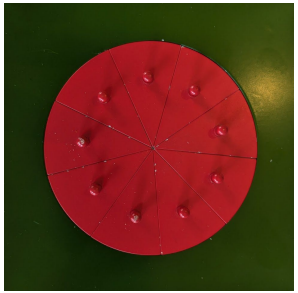
Sixths



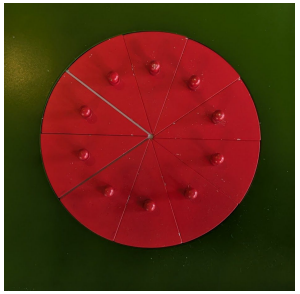
Sevenths



Eighths

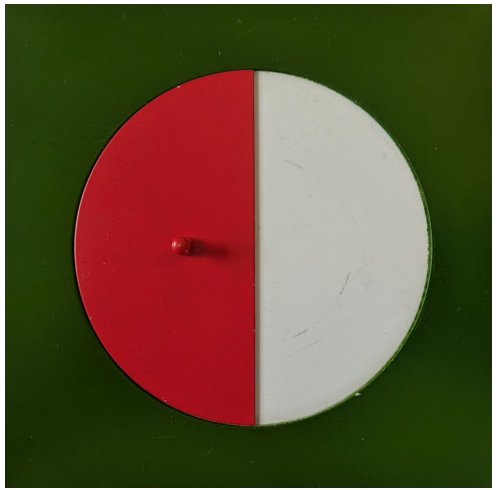


Ninths



Tenths

Learning Objective: Students will be able to name fraction equivalences

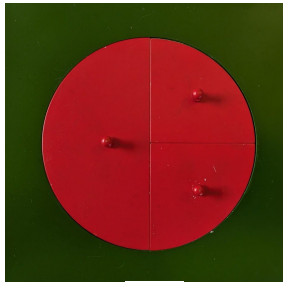


$\frac{1}{2}$

Learning Objective: Students will be able to name fraction equivalences

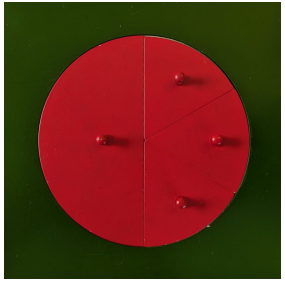
$\frac{1}{2}$

=



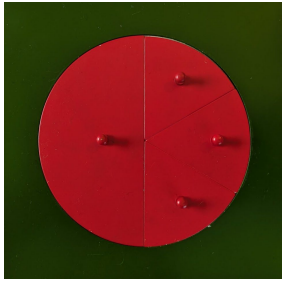
$\frac{2}{4}$

=



$\frac{3}{6}$

=



$\frac{4}{8}$

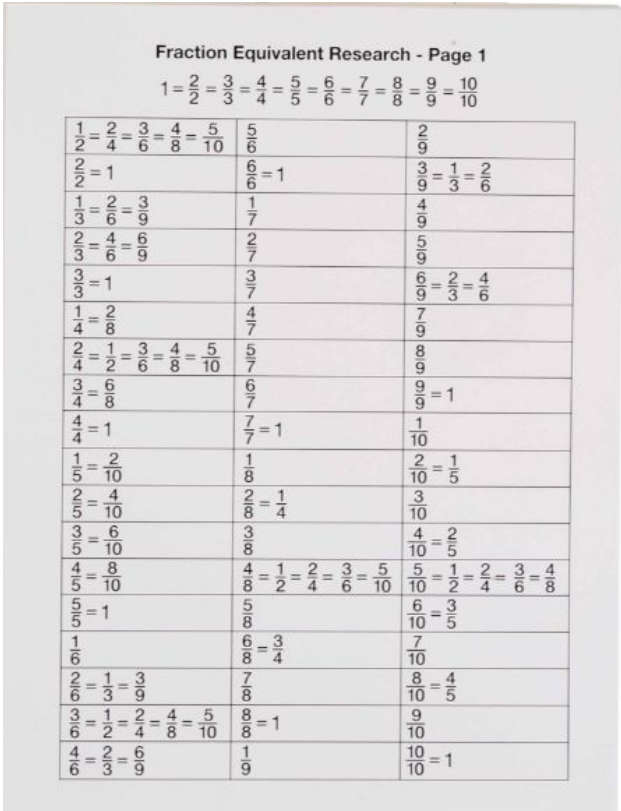
=

$\frac{5}{10}$

Example

Equivalences of 1/3

Learning Objective: Students will be able to name fraction equivalences

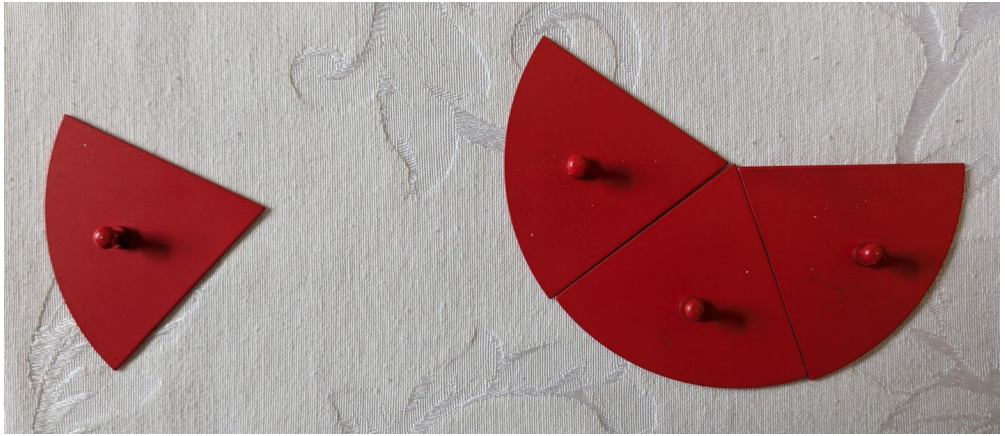


Fraction Equivalent Research - Page 1

$1 = \frac{2}{2} = \frac{3}{3} = \frac{4}{4} = \frac{5}{5} = \frac{6}{6} = \frac{7}{7} = \frac{8}{8} = \frac{9}{9} = \frac{10}{10}$

$\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8} = \frac{5}{10}$	$\frac{5}{6}$	$\frac{2}{9}$
$\frac{2}{2} = 1$	$\frac{6}{6} = 1$	$\frac{3}{9} = \frac{1}{3} = \frac{2}{6}$
$\frac{1}{3} = \frac{2}{6} = \frac{3}{9}$	$\frac{1}{7}$	$\frac{4}{9}$
$\frac{2}{3} = \frac{4}{6} = \frac{6}{9}$	$\frac{2}{7}$	$\frac{5}{9}$
$\frac{3}{3} = 1$	$\frac{3}{7}$	$\frac{6}{9} = \frac{2}{3} = \frac{4}{6}$
$\frac{1}{4} = \frac{2}{8}$	$\frac{4}{7}$	$\frac{7}{9}$
$\frac{2}{4} = \frac{1}{2} = \frac{3}{6} = \frac{4}{8} = \frac{5}{10}$	$\frac{5}{7}$	$\frac{8}{9}$
$\frac{3}{4} = \frac{6}{8}$	$\frac{6}{7}$	$\frac{9}{9} = 1$
$\frac{4}{4} = 1$	$\frac{7}{7} = 1$	$\frac{1}{10}$
$\frac{1}{5} = \frac{2}{10}$	$\frac{1}{8}$	$\frac{2}{10} = \frac{1}{5}$
$\frac{2}{5} = \frac{4}{10}$	$\frac{2}{8} = \frac{1}{4}$	$\frac{3}{10}$
$\frac{3}{5} = \frac{6}{10}$	$\frac{3}{8}$	$\frac{4}{10} = \frac{2}{5}$
$\frac{4}{5} = \frac{8}{10}$	$\frac{4}{8} = \frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{5}{10}$	$\frac{5}{10} = \frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8}$
$\frac{5}{5} = 1$	$\frac{5}{8}$	$\frac{6}{10} = \frac{3}{5}$
$\frac{1}{6}$	$\frac{6}{8} = \frac{3}{4}$	$\frac{7}{10}$
$\frac{2}{6} = \frac{1}{3} = \frac{3}{9}$	$\frac{7}{8}$	$\frac{8}{10} = \frac{4}{5}$
$\frac{3}{6} = \frac{1}{2} = \frac{2}{4} = \frac{4}{8} = \frac{5}{10}$	$\frac{8}{8} = 1$	$\frac{9}{10}$
$\frac{4}{6} = \frac{2}{3} = \frac{6}{9}$	$\frac{1}{9}$	$\frac{10}{10} = 1$

Learning Objective: Students will be able to add fractions with the same denominator



$\frac{1}{5}$ + $\frac{3}{5}$

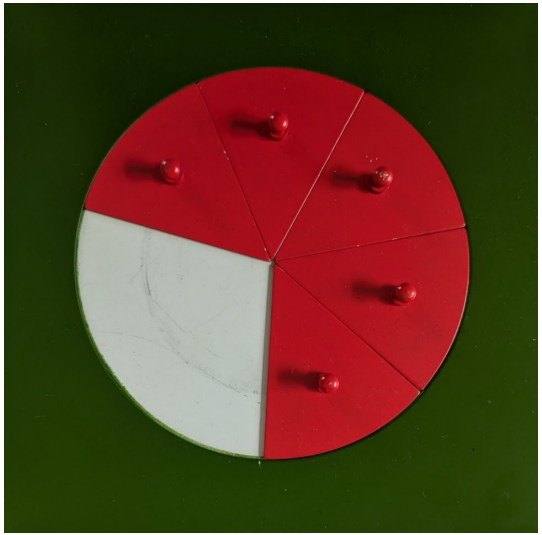
Learning Objective: Students will be able to add fractions with the same denominator

$$\frac{1}{5} + \frac{3}{5} = \frac{4}{5}$$

Example

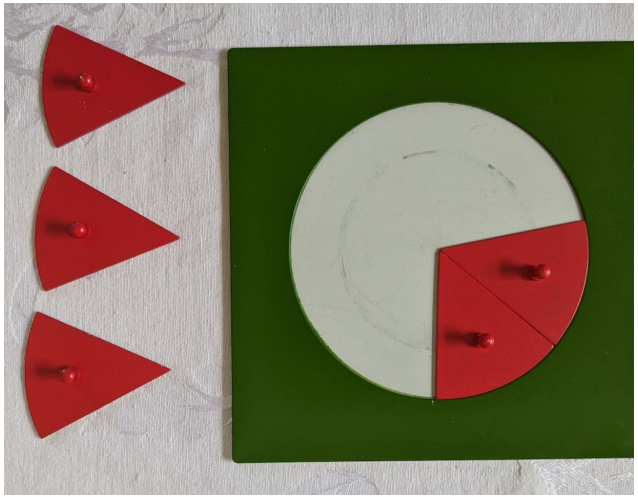
2/7 + 3/7 =

Learning Objective: Students will be able to subtract fractions with the same denominator



$$\frac{5}{7} - \frac{3}{7}$$

Learning Objective: Students will be able to subtract fractions with the same denominator

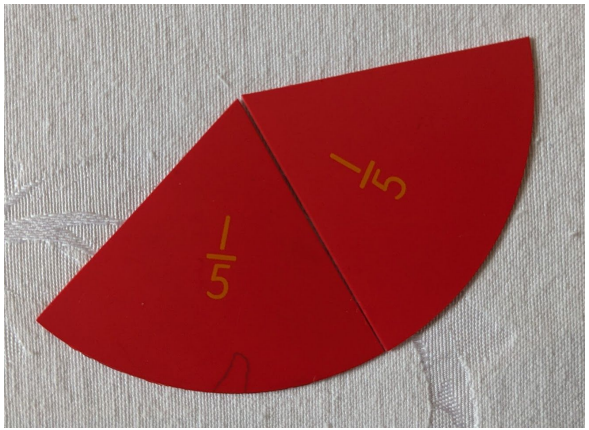


$$\frac{5}{7} - \frac{3}{7} = \frac{2}{7}$$

Example

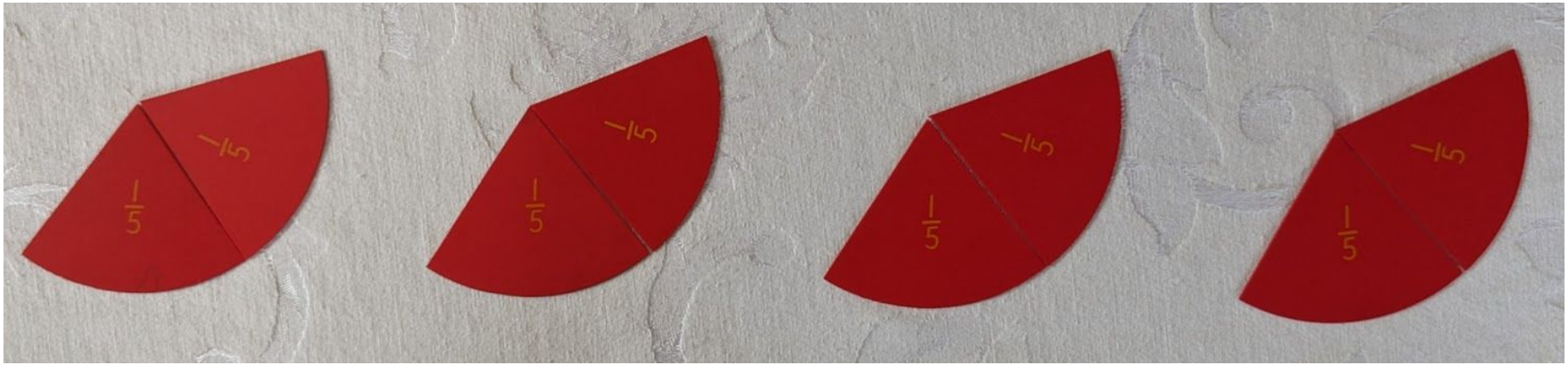
9/10 - 3/10

Learning Objective: Students will be able to multiply a fraction by a whole number



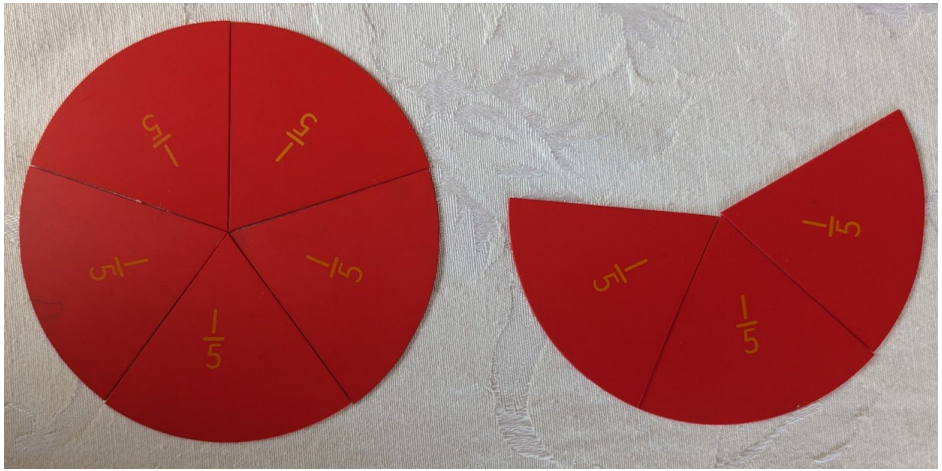
x 4

Learning Objective: Students will be able to multiply a fraction by a whole number



$$\frac{2}{5} \times 4 = \frac{8}{5}$$

Learning Objective: Students will be able to multiply a fraction by a whole number



$$\frac{8}{5} = 1\frac{3}{5}$$

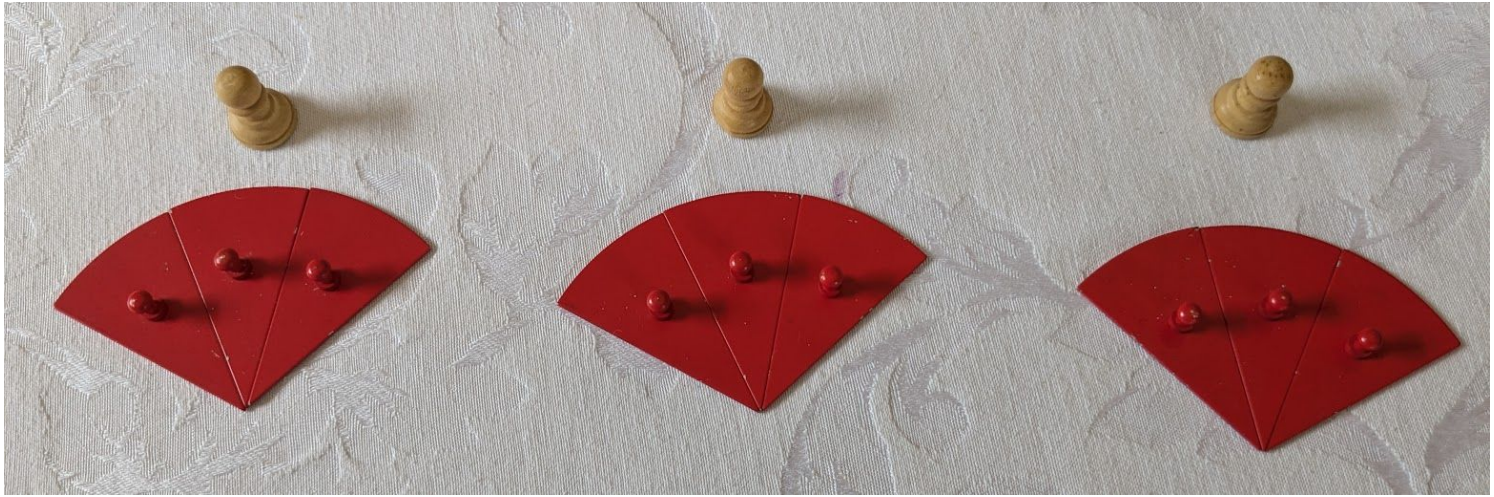
Example

⅔ x 5

Learning Objective: Students will be able to divide a fraction by a whole number

$$\frac{9}{10} \div 3$$

Learning Objective: Students will be able to divide a fraction by a whole number

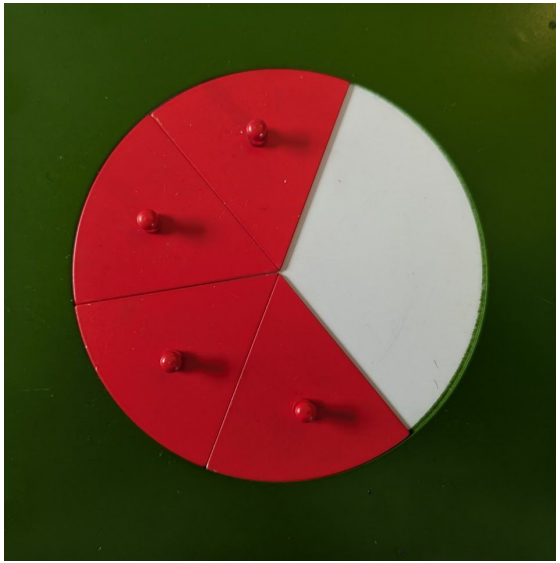


$$\frac{9}{10} \div 3 = \frac{3}{10}$$

Example

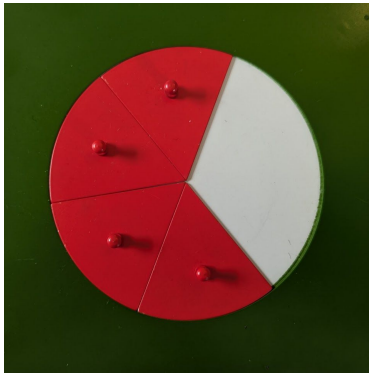
4/10 ➗ 2

Learning Objective: Students will be able to write fractions in simplest terms



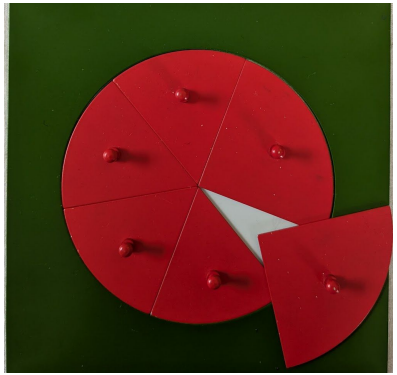
$\frac{2}{6}$ =

Learning Objective: Students will be able to write fractions in simplest terms



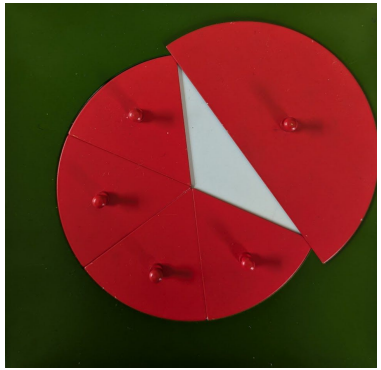
$\frac{2}{6}$ =

Fifths do not fit



Fourths do not fit

$\frac{1}{3}$



Halves do not fit

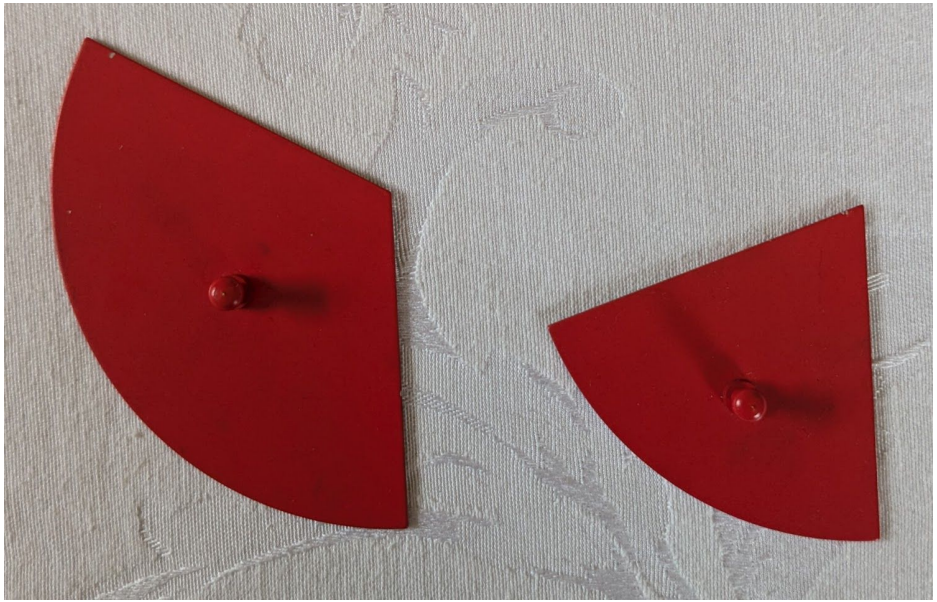
Learning Objective: Students will be able to write fractions in simplest terms

Printable

$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{1}{5}$	$\frac{1}{6}$	$\frac{1}{7}$	$\frac{1}{8}$	$\frac{1}{9}$	$\frac{1}{10}$
$\frac{2}{2}$	$\frac{2}{3}$	$\frac{2}{4}$	$\frac{2}{5}$	$\frac{2}{6}$	$\frac{2}{7}$	$\frac{2}{8}$	$\frac{2}{9}$	$\frac{2}{10}$
	$\frac{3}{3}$	$\frac{3}{4}$	$\frac{3}{5}$	$\frac{3}{6}$	$\frac{3}{7}$	$\frac{3}{8}$	$\frac{3}{9}$	$\frac{3}{10}$
		$\frac{4}{4}$	$\frac{4}{5}$	$\frac{4}{6}$	$\frac{4}{7}$	$\frac{4}{8}$	$\frac{4}{9}$	$\frac{4}{10}$
			$\frac{5}{5}$	$\frac{5}{6}$	$\frac{5}{7}$	$\frac{5}{8}$	$\frac{5}{9}$	$\frac{5}{10}$
				$\frac{6}{6}$	$\frac{6}{7}$	$\frac{6}{8}$	$\frac{6}{9}$	$\frac{6}{10}$
					$\frac{7}{7}$	$\frac{7}{8}$	$\frac{7}{9}$	$\frac{7}{10}$
						$\frac{8}{8}$	$\frac{8}{9}$	$\frac{8}{10}$
							$\frac{9}{9}$	$\frac{9}{10}$
								$\frac{10}{10}$

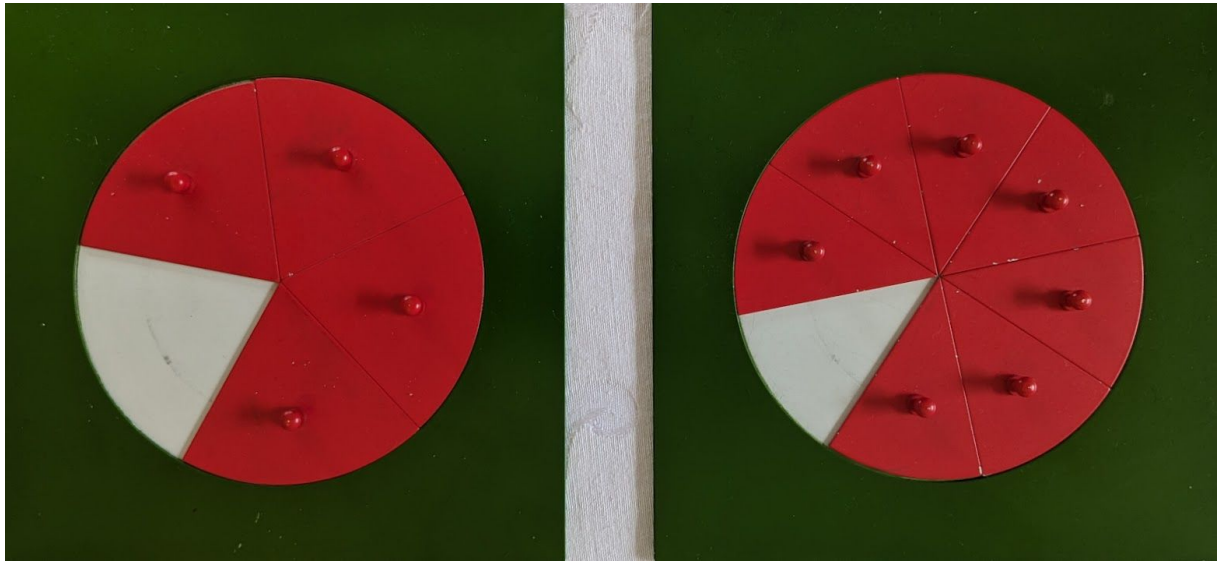
Reductions of Fractions to Their Lowest Terms

Learning Objective: Students will be able to compare fractions



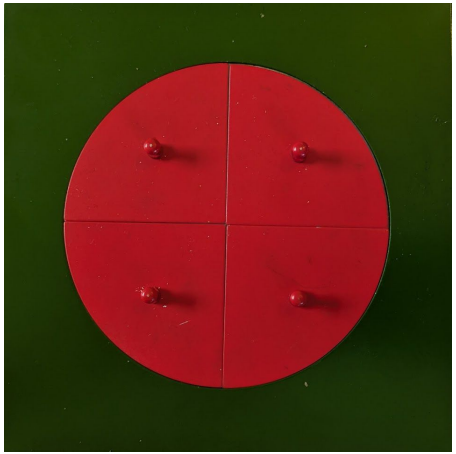
$\frac{1}{3}$ $\frac{1}{5}$

Learning Objective: Students will be able to compare fractions

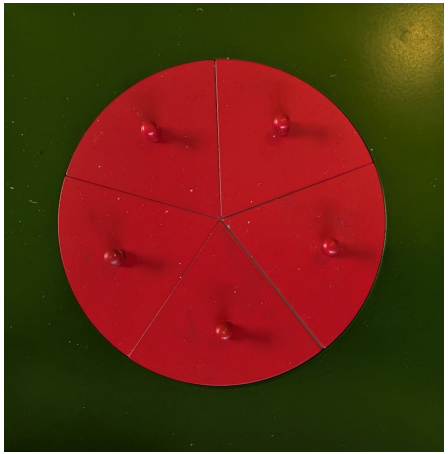


$\frac{4}{5}$ $\frac{7}{8}$

Learning Objective: Students will be able to compare fractions



$\frac{4}{4}$

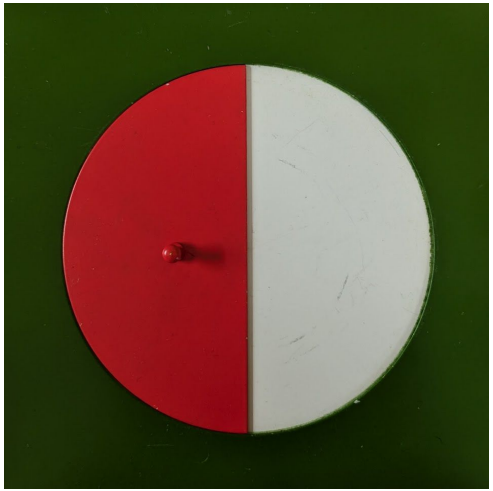


$\frac{5}{5}$

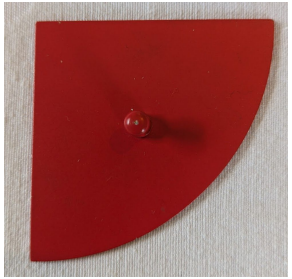
Learning Objective: Students will be able to compare fractions

$\frac{3}{7}$ $\frac{6}{10}$

Learning Objective: Students will be able to divide a fraction by a fraction



$\div$



$\frac{1}{2}$ $\frac{1}{4}$

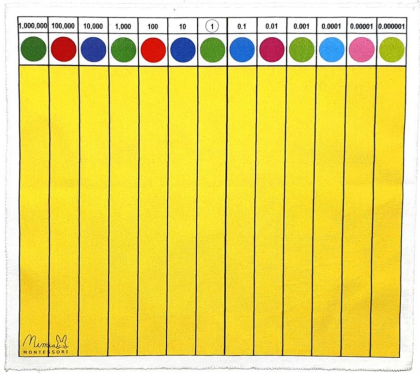
Example

$$\frac{1}{2} \div \frac{1}{4} = 2$$

Learning objectives: Students will be able to name and do operations with decimal fractions

Materials

Decimal Board



Place value chart (Printable)

Decimal Place Value Chart

Ten Thousands	Thousands	Hundreds	Tens	Ones	Decimal Point	Tenths	Hundredths	Thousandths	Ten Thousandths
10000	1000	100	10	1	.	0.1	0.01	0.001	0.0001
10000	1000	100	10	1	.	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$	$\frac{1}{10000}$

Please visit our site for worksheets and charts https://whatistheurl.com/

Decimal Cards (Printable)

1	0.1	0.01	0.001
2	0.2	0.02	0.002
3	0.3	0.03	0.003
4	0.4	0.04	0.004
5	0.5	0.05	0.005
6	0.6	0.06	0.006
7	0.7	0.07	0.007
8	0.8	0.08	0.008
9	0.9	0.09	0.009

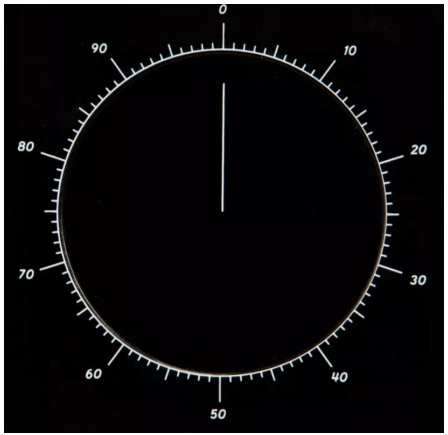
Decimals

Materials

Beads

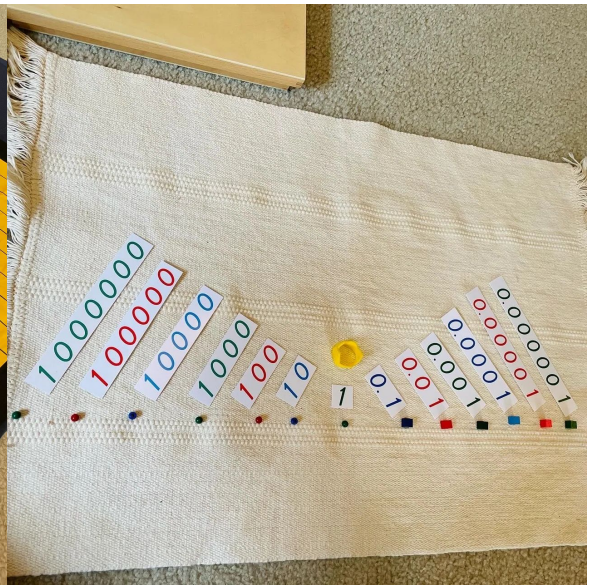
DIY: Pony Beads

Centesimal frame



Printable

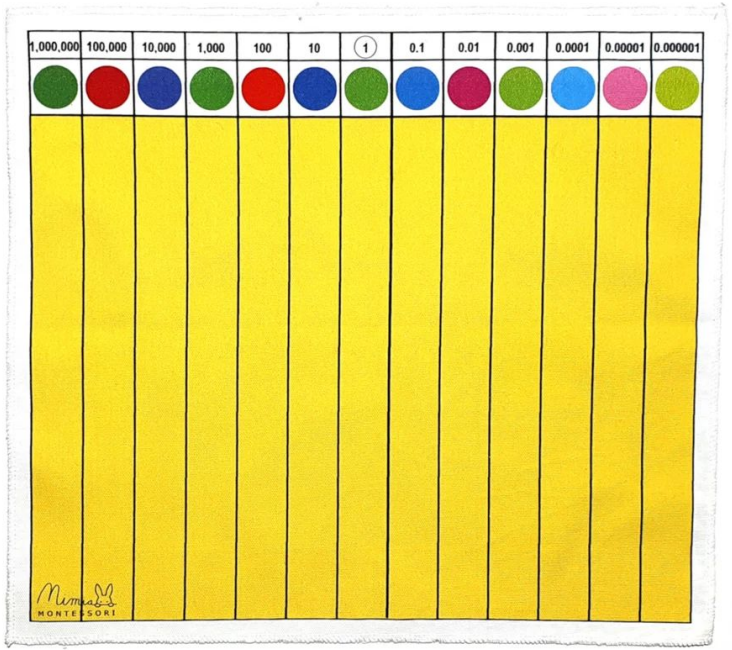
Introduction to Decimal Fractions



[Source]

Learning objective: Students will be able to count by thousandths

Count by .003



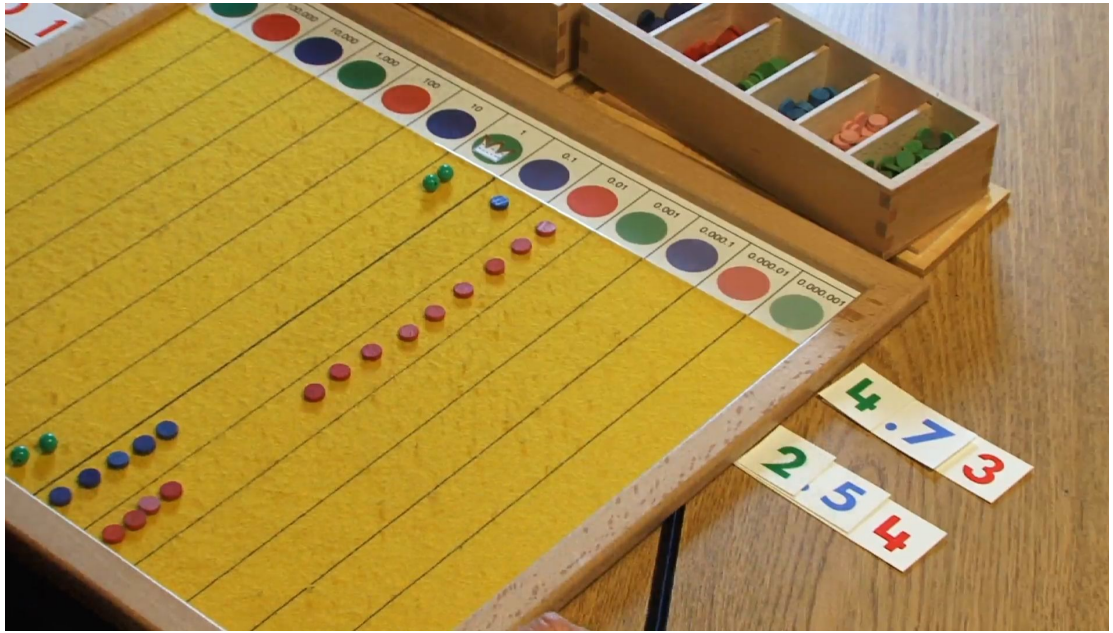
Learning objective: Students will be able to add decimal fraction

Source

Example

.314+.231

Learning objective: Students will be able to subtract decimal fraction

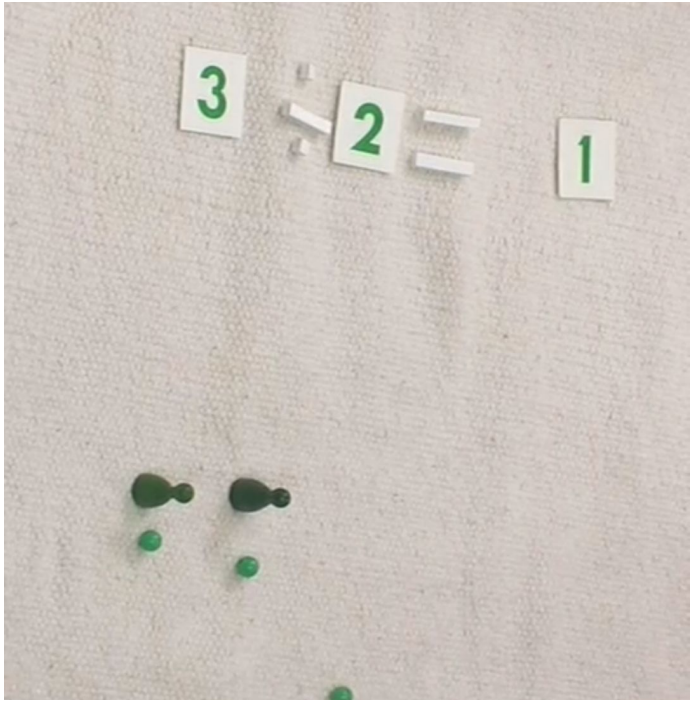


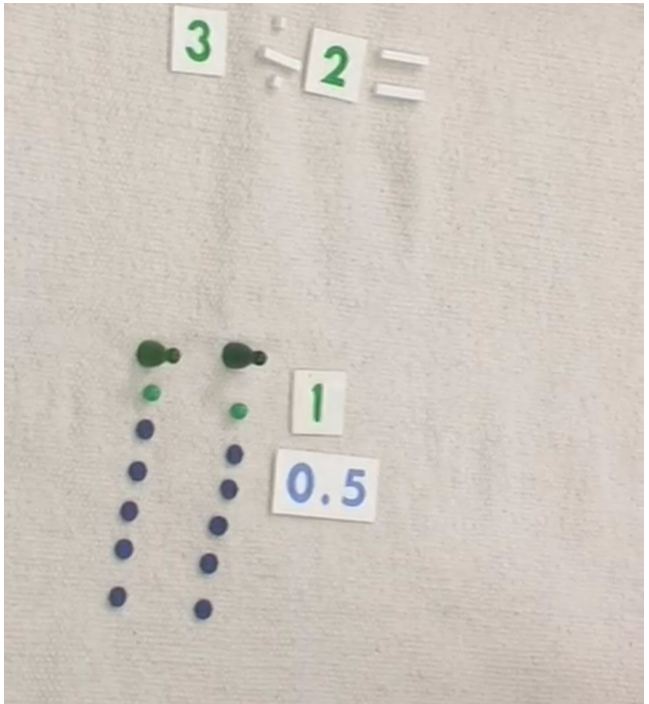
Source

Example

.413 - .321

Learning objective: Students will be able to divide a whole number by a whole number resulting in a decimal fraction





Example

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Learning objective: Students will be able to convert from a fraction to a decimal fraction

Introduction to Percentages

Meaning of word Percent

Learning objective: Students will be able to convert between a decimal fraction, a fraction and a percentage

Decimal fraction	Fraction	Percentage

Resources

Shop DOE website

- Foam Sheets, School Specialty Foam Sheet, 5-1/2 X 8-1/2 in, Assorted Color, Pack of 40, Item Number: 312476116
- Pony Beads, Sulyn Pony Beads, Set of 2300, Item Number: 317333631

Questions

Thank you and contact information

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Feedback

Rena Gelb Post Session Survey

https://forms.office.com/r/7LdgayKP0r