

GRADE: 8

UNIT (S): Number

TOPIC: Whole Numbers, Fractions, and Decimal Tenths

DATE: September 29 – October 3, 2025 (1 week)

STANDARDS:

(Number) Develop a strong understanding of different representations of numbers (whole, fractional, decimal) and convert between them.

GENERAL OBJECTIVES:

- Solidify the conceptual understanding of whole numbers, fractions, and decimals as parts of a whole.
- Develop fluency in converting between mixed numbers and improper fractions.
- Understand the relationship between fractions with a denominator of 10 and decimal tenths.

SPECIFIC OBJECTIVES:

By the end of the week, students should be able to:

1. Define and identify whole numbers, proper fractions, improper fractions, and mixed numbers.
2. Convert a mixed number to an improper fraction.
3. Convert an improper fraction to a mixed number or whole number.
4. Explain the meaning of each digit in a decimal number (tenths place).
5. Convert a proper fraction or mixed number with a denominator of 10 into a decimal (tenths).
6. Convert a decimal number (tenths) into a proper fraction or mixed number.

KEY VOCABULARY

- Whole Number
- Fraction
- Numerator
- Denominator
- Proper Fraction
- Improper Fraction
- Mixed Number
- Decimal

- Decimal Point
- Tenths

KEY SKILLS

- Identifying and classifying types of numbers.
- Converting between mixed numbers and improper fractions.
- Interpreting place value to the right of the decimal point.
- Converting between fractional and decimal forms (tenths).

RESOURCES

- Whiteboard/Projector
- Fraction circles or bars
- Base-ten blocks (flats and longs)
- Grid paper (10x10 for hundredths visual)
- Index cards for matching games
- Worksheets for guided and independent practice
- Online interactive math manipulatives (e.g., digital fractions/decimals)

PRIOR KNOWLEDGE

Students will already be able to:

- Identify basic fractions ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{3}$) and understand the parts of a fraction.
- Understand place value for whole numbers (ones, tens, hundreds).
- Perform basic multiplication and division.

CONTENT

- A **whole number** represents a complete set (e.g., 0, 1, 2, 3...).
- A **proper fraction** has a numerator smaller than its denominator (e.g., $\frac{3}{4}$).
- An **improper fraction** has a numerator greater than or equal to its denominator (e.g., $\frac{5}{4}$, $\frac{4}{4}$).
- A **mixed number** combines a whole number and a proper fraction (e.g., $1\frac{1}{4}$).
- The first place to the right of the **decimal point** is the **tenths** place.

- A fraction with a denominator of 10 (e.g., $3/10$) can be written as a decimal (0.3), representing 3 tenths.

TEACHING / LEARNING ACTIVITIES

ENGAGE

Students will be given a set of number cards (these can be written on the board as well) (e.g., 5, $1/2$, $5/4$, $1\frac{3}{4}$, 0.7, 2.0). In small groups, they will be asked to sort them into categories of their own choosing and justify their reasoning. This will activate prior knowledge and reveal initial understandings.

The teacher will display a visual of $7/4$ of a pizza and ask, "How many whole pizzas is this, and how much is left over?" Students discuss and share, introducing the need for mixed numbers.

EXPLORE

In pairs, students will use fraction circles or bars to build improper fractions like $5/4$, $7/3$, and $8/2$. They will be tasked with repackaging these into whole numbers and leftover pieces, recording their findings as both an improper fraction and a mixed number (e.g., $5/4 = 1\frac{1}{4}$).

Students will be given 10x10 grid paper. They will be asked to shade grids to represent fractions like $3/10$, $25/10$, and $7/10$, and then write the corresponding decimal (e.g., 0.3, 2.5, 0.7).

EXPLAIN

The teacher will lead a discussion to formalize the definitions and procedures discovered in the explore phase.

Formal Definitions: Whole number, proper/improper fraction, and mixed number will be defined. The special case of improper fractions equal to 1 (e.g., $4/4$) will be addressed.

Conversion Algorithms:

- **Mixed to Improper:** "Multiply the whole number by the denominator, add the numerator, and place that over the original denominator." (e.g., $2\frac{3}{5} = (2 \times 5) + 3 / 5 = 13/5$)
- **Improper to Mixed:** "Divide the numerator by the denominator. The quotient is the whole number, the remainder is the new numerator, and the denominator stays the same." (e.g., $13/5 = 2\text{ R}3 = 2\frac{3}{5}$)

Place Value Connection: The teacher will explicitly connect the denominator of 10 to the tenths place in decimals, using base-ten blocks (where a 'long' represents one tenth of a 'flat').

ELABORATE / EXTEND

Students will be asked to work in teams. The teacher will call out a number in one form (e.g., "2 $\frac{7}{10}$ ", " $\frac{17}{5}$ ", "3.4") and teams will race to write it in the two other forms on their whiteboards.

Students will be given word problems that require conversions. For example: "A recipe calls for $\frac{15}{4}$ cups of flour. How many whole cups and additional quarter cups is that?" or "If a snake is 2.7 meters long, express this length as a mixed number."

EVALUATE

- Students will be presented with a two-part assessment:
 1. **Worksheet:** Students will answer questions on defining terms, classifying numbers, converting between mixed numbers and improper fractions, and converting between fractions (denominator 10) and decimals (tenths).
 2. **Assignment - "My Number, My Way":** Students will choose a number greater than 1 (e.g., 3.6, $\frac{12}{5}$, $2\frac{8}{10}$). They will create a small poster showing their number in all its forms: as an improper fraction, a mixed number, and a decimal (if applicable). They must include a visual model (drawing or shaded grid) that accurately represents their number.

LINKS TO OTHER SUBJECTS

- **Science:** Students will be shown how measurements in experiments (length, mass, volume) are often recorded using decimals.
- **Financial Literacy:** A connection will be made to money, where \$2.50 is 2 whole dollars and 5 tenths (or $\frac{1}{2}$) of a dollar.
- **Geography:** Students will be shown how altitudes and depths on maps (e.g., 1.5 km, 0.3 miles) use decimal notation.

ASSESSMENT

- Observation of group work and participation in games and activities.
- Completed exploration sheets and worksheets.
- Accuracy and clarity in the "My Number, My Way" mini-project.
- Final worksheet and quiz results to gauge individual mastery.