Digging Up Improper Fractions: Converting Improper Fractions to Mixed Numbers for "Dig It" Game

GRADE: 3-5
PERIODS: 1

STANDARDS:

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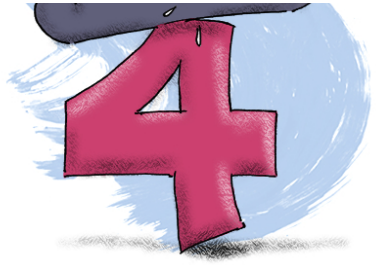
This lesson provides a hands-on approach to converting improper fractions to mixed numbers. In addition, students locate improper fractions on a number line. Students use number cards and counters as manipulatives while exploring the relationship between improper fractions and mixed numbers. Students reinforce their skills while playing a modified version of Calculation Nation's "Dig It."

Instructional Plan | Objectives + Standards | Materials | Assessments + Extensions | Questions + Reflection | Related Resources | Print All

Group students in pairs. Provide each group with number cards, counters, and toothpicks. Explain to the class that in this lesson they will convert improper fractions to mixed numbers. Define the terms *improper fraction* and *mixed number*. Explain that an improper fraction is a fraction with a numerator that is greater than its denominator (ex: $\frac{8}{3}$), and a mixed number is a number that includes both a whole number and a fraction ($2\frac{2}{3}$).

Have students take out the “9” and the “4” number cards. Ask them to create a fraction with the numbers by placing a toothpick horizontally on the table. Tell them to place the 9 above the toothpick to represent the numerator, and the 4 below the toothpick to represent the denominator. Write $\frac{9}{4}$ on the board. Ask students, “What kind of fraction is this and how do you know?” [It is an improper fraction; the numerator is greater than the denominator.]



Point to the numerator, and ask what a *numerator* represents. [The numerator tells how many parts of the whole are in the problem.] Point to the *denominator*, and ask what the denominator represents. [The denominator tells how many parts are in, or represent, the whole.] Ask students how many parts represent a whole in the fraction $\frac{9}{4}$. [4.]

Have students take out the number of counters that represent the number of individual parts in $\frac{9}{4}$ (which would be 9 counters). Observe and make an informal assessment of the students who comprehend and the students who don’t comprehend the parts to a fraction.

Model counting out nine counters and explain that these counters represent the numerator, the individual parts, in $\frac{9}{4}$. Say to students, “I am going to divide these nine parts into groups of four.” Ask students to explain why the nine counters need to be placed into groups of four. [The denominator is four, so a whole is made up of four parts.]

Demonstrate moving the nine counters into groups of four. Have students do the same. Say to students, “Instead of nine individual parts, I now have two groups of four with one counter left over. How many wholes do we have?” [2.] “How do you know?” [There are two groups of counters that each represents a whole, each group has four parts in a set of four, $\frac{4}{4}$].

Ask students how many individual pieces are left. [1.] Ask students what part of the whole this one piece represents. [$\frac{1}{4}$]. On the board write $\frac{4}{4} + \frac{4}{4} + \frac{1}{4}$. Say to students, “Since $\frac{4}{4}$ represents one whole, I can simplify the equation.” On the board write $1 + 1 + \frac{1}{4}$. Explain that the expression can be further simplified. The whole numbers can be added together for a sum of two. And the fraction can be added to the whole number for

a sum of $2\frac{1}{4}$.

$$\frac{9}{4} = \frac{4}{4} + \frac{4}{4} + \frac{1}{4}$$

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

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

Explain that when you ask students to show their work, you want to see each step of how they convert from an improper fraction to its mixed number.

Digging Up Improper Fractions Activity Sheet

Provide students with the Digging Up Improper Fractions Activity Sheet. Point to the problem you just completed together. Explain that to find an improper fraction on a number line, one strategy you can use is to convert the improper fraction to a mixed number. Demonstrate moving to the two on the number line. Say to students, “The denominator tells us that a whole is divided into four parts.” Demonstrate dividing the space between the 2 and 3 into fourths. Say to students, “The numerator tells us how many fourths we move on the number line. We are at one of the fourths on the number line. Demonstrate placing a dot on $2\frac{1}{4}$. Have students find $2\frac{1}{4}$ on their number line.

Next, have a student volunteer to draw two cards from the deck. With the two cards, have the student create a new improper fraction. Write the new fraction on the board, and have students write it on their Activity Sheet. Then have each pair convert the improper fraction to a mixed number using counters. Have students show the steps they took to convert the improper fraction to an equivalent mixed number on their Activity Sheet.

As students work, check for understanding. Ask for a student volunteer to share the steps needed to convert the improper fraction to a mixed number and show how to locate the number on the number line.

Have students work with their partner to create four additional improper fractions using the number cards. Check their work. Students that seem to have an understanding of the objectives can move to the next step in the lesson. Work in small groups with students who seem to be struggling with the concept.

 Calculation Nation

Next, have students log on to Calculation Nation, Dig It. Explain that in the game they are provided with five random numbers. Tell students that you want them to use the numbers to make improper fractions that will allow them to get as many jewels as possible. After they have dragged the numbers to create the fraction, have them write the fraction on their Digging Up Improper Fractions Activity Sheet. Have students show their work to find the equivalent mixed number, and then locate it on the number line. Allow students to use counters as they work. Then, have students locate the improper fraction on the game's number line to continue their turn.

Have students continue playing Calculation Nation, Dig It converting improper fractions to mixed numbers and locating them on the number line. Explain that when they play this game on their own, they can also make proper fractions, but for the purpose of this lesson they are only making improper fractions.

At the end of the lesson, have students explain how to convert improper fractions to mixed numbers. Listen for terms like *numerator*, *denominator*, *whole*, *part*, *improper fraction*, and *mixed number*. Discuss strategies students used to determine the two numbers they wanted to use to get as many jewels as possible.