

Grade 4 Fraction Tasks

Empowering Learners in 4.NF: Students learn about decimals and build on their understanding of fraction equivalence. They apply their knowledge to compare fractions, and add and subtract fractions.

For each task, you will find:

Task Description: How does the task represent grade-level understanding?

Standard(s) alignment: To which standard(s) does the task align?

Source: From what source did the task come?

Students show what they know: Examples of student work or thinking that can be helpful within a larger formative assessment process and/or help illuminate different ways that students view a task.

Fostering agency, identity, and belonging: Questions designed to help position students as intellectual leaders, to help students know that the knowledge they are bringing to any particular task counts, and to reflect ideas, grounded in learning rather than correctness, of a mathematical community. Note: some of these questions are generic and can be used to help educators understand what knowledge a student is bringing to the particular task.

Standards addressed: (in order of appearance in the tasks below)

- 4.NF.A.2
- 4.NF.B.3.b
- 4.NF.B.4.a
- 4.NF.B.4
- 4.NF.B.3.c
- 4.NF.C.7
- 4.NF.C.6

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Entry Task: Common numerator

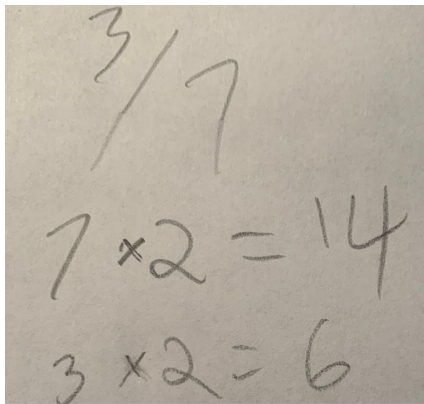
This task shows the uptick from grade 3 (students compare fractions with like numerators or like denominators) to grade 4 (students compare fractions with unlike numerators *and* unlike denominators). Students draw on their grade 3 work of generating equivalent fractions to make either the numerators or denominators the same -- with this specific task lending itself more to a common numerator approach. Common numerators encourage students to continue to think about how the whole is partitioned based on its denominator and what that means about the relative size of any particular fraction.

Which fraction is bigger: $\frac{3}{7}$ or $\frac{6}{13}$?

Standard(s) Alignment: 4.NF.A.2

Source: Created by Student Achievement Partners

Students Show What They Know



[Video](#): Listen and watch a student reason through their answer to the problem.

Fostering Identity, Agency, and Belonging

- What can you tell me about the two fractions?
- What do you want to find out first in this problem?
- Can you show your understanding in words or pictures?
- Explain your thinking to a partner, a small group, or the class.

Resources

- Explore the full grade 4 Number and Operations - Fractions domain on the [Coherence Map](#).
- [Human-Sized Number Lines: Let's Compare Fractions](#). A fun lesson connecting the number line in grade 4 to the work of measurement.
- [Comparing Fractions Using Benchmarks Game](#). Use this game to provide students an opportunity to reason about the size of fractions.
- [Fraction Number Talks](#) (PDF and directions)
- [Fraction Talks](#) (website)

Task: Decomposing a fraction into a sum of fractions

This task builds on earlier elementary work of whole-number decomposition; we can decompose fractions just as we did whole numbers. Students decompose a fraction into a sum of fractions with the same denominator in more than one way. In providing a range of numbers (e.g., numbers 1–9), students reason with and have flexibility to create two different sums.

Example Stem: Drag numbers to the numerators of the fractions to show **two different** correct equations.

$$\frac{7}{8} = \frac{\square}{8} + \frac{\square}{8} + \frac{\square}{8} \qquad \frac{7}{8} = \frac{\square}{8} + \frac{\square}{8} + \frac{\square}{8}$$

1 2 3 4 5 6 7 8 9

Standard(s) Alignment: 4.NF.B.3.b

Source: [Smarter Balanced](#)

Students Show What They Know

Example Stem: Drag numbers to the numerators of the fractions to show **two different** correct equations.

$\frac{7}{8} = \frac{1}{8} + \frac{2}{8} + \frac{4}{8}$ $\frac{7}{8} = \frac{3}{8} + \frac{4}{8} + \frac{1}{8}$

1 2 3 4 5 6 7 8 9

This task provides students with choice as they can create two different possibilities of addition equations to reach the given sum. The task asks for multiple ways to decompose $\frac{7}{8}$ into three addends. This

student recognizes that four, two, and one must be numerators in order to reach the sum; other students may select three completely different addends, but neither approach is more correct than the other.

Fostering Identity, Agency, and Belonging

- What do you think this problem is asking you to do?
- In what ways are the two equations you created similar? In what ways are they different?
- Looks like there are two correct answers. Did that change how you solved the problem?

Resources

- Video: [Fraction equivalence](#)
- Video: [Fractions Progression - Introduction](#) (Illustrative Mathematics)

Task: Understand a fraction a/b as a multiple of $1/b$

The standards consistently use the unit fraction as a way for students to understand fractions as numbers and to develop understanding and flexibility with fraction operations. These two tasks are clustered together as they both require students to understand a fraction a/b as a multiple of $1/b$. Previously, in grade 3, the unit fraction $1/b$ was used to build understanding of all fractions a/b . This idea is now carried over into grade 4 as students understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$ to develop concepts of addition and subtraction. Similarly, the concept is used in fraction multiplication to develop flexibility with fraction operations. Students are able to show their understanding of the unit fraction in multiplication; writing a fraction as factors of a whole number and unit fraction.

Example Stem: Enter the unknown number that makes the equation true.

$$\frac{4}{12} = \square \times \frac{1}{12}$$

Standard(s) Alignment: 4.NF.B.4.a

Source: Example 1, [Smarter Balanced](#)

Example 2, [Grade 4 Mini-Assessment, Task 7](#)

7. Decide whether each expression is equal to $5 \times \frac{2}{4}$. Check the correct box for each row.

	Equal to $5 \times \frac{2}{4}$	Not Equal to $5 \times \frac{2}{4}$
$2 \times \frac{1}{20}$	<input type="checkbox"/>	<input type="checkbox"/>
$5 \times \frac{4}{8}$	<input type="checkbox"/>	<input type="checkbox"/>
$10 \times \frac{1}{4}$	<input type="checkbox"/>	<input type="checkbox"/>

Students Show What They Know

$$\frac{4}{12} = 4 \times \frac{1}{12}$$

7. Decide whether each expression is equal to $5 \times \frac{2}{4}$. Check the correct box for each row.

	Equal to $5 \times \frac{2}{4}$	Not Equal to $5 \times \frac{2}{4}$
$2 \times \frac{1}{20}$	<input type="checkbox"/>	<input checked="" type="checkbox"/>
$5 \times \frac{4}{8}$	<input checked="" type="checkbox"/>	<input type="checkbox"/>
$10 \times \frac{1}{4}$	<input checked="" type="checkbox"/>	<input type="checkbox"/>

The tasks also allow students to express equivalent and nonequivalent fractions in relation to multiplication. This student shows that they understand a fraction a/b as a multiple of $1/b$ on both tasks. Further, the student uses fraction understanding in the second task as they consider equivalence or not to the given expression.

Fostering Identity, Agency, and Belonging

- Is there one answer that you are most sure of? If so, which one and why?
- Explain how you approached these different problems.
- You didn't do any calculating, so how do you know your answers are correct?
- How does this task relate to tasks that you completed in previous grades?

Resources

- Video: [Fraction Progressions Unit 5 - Multiplication of Fractions, Part 1](#) (Illustrative Mathematics, see through 2:20)

Task: Reasoning between whole number and fraction multiplication

This problem serves to illustrate the extension of students' work with whole number multiplication from Grade 3 to grade 4 where they are multiplying a fraction by a whole number. Additionally, in selecting the true statement the product is positioned between two whole numbers. This allows for students to continually think about the magnitude of fractions drawing heavily on their work positioning different fractions on number lines.

5. Nicole gives $\frac{6}{8}$ cup of food to each of her rabbits every day. She has 7 rabbits. How many cups of food will Nicole feed to the rabbits every day?

Answer: _____

Select the true statement.

- a. Between 4 and 5 cups of food every day
- b. Between 5 and 6 cups of food every day
- c. Between 6 and 7 cups of food every day
- d. Between 7 and 8 cups of food every day

Standard(s) Alignment: 4.NF.B.4

Source: [Grade 4 Mini-Assessment, Task 5](#)

Students Show What They Know

5. Nicole gives $\frac{6}{8}$ cup of food to each of her rabbits every day. She has 7 rabbits. How many cups of food will Nicole feed to the rabbits every day?

Answer: 5 1/4 cups 1/4

Select the true statement.

- a. Between 4 and 5 cups of food every day
- b. Between 5 and 6 cups of food every day
- c. Between 6 and 7 cups of food every day
- d. Between 7 and 8 cups of food every day

$$7 \times \frac{6}{8} = \frac{42}{8} = \frac{15}{2} = 7\frac{1}{2}$$

This task allows students to recognize the value of a fraction in comparison to whole numbers. The task presents an opportunity for students to

take any approach that seems appropriate in order to solve the real world problem and reason about it's relation between two whole numbers. Here, the student finds the total by multiplying and transitions from $5/1$ ish to $5 \frac{1}{4}$ cups. The erasure marks are probably a result of sense making of the context and questions asked. In the end, they are able to select a true statement.

Fostering Identity, Agency, and Belonging

- What do we know about feeding animals?
- What is Nicole doing in the problem? Can you represent it on paper or act it out?
- Why do you think Nicole measures how much food she gives to each rabbit? Do you think people really do that for their pets?
- What might you do first to solve this problem?
- Talk with your small group about how much rabbit food Nicole might need in a month.

Resources

- Read this [blog post](#) to remedy possible misaligned instructional moves when teaching 4.NF.B.4.

Task: Estimate and compute sums of mixed numbers

The purpose of this task is for students to estimate and compute sums of mixed numbers in a context. Since equivalence between $\frac{4}{8}$ and $\frac{1}{2}$ is a grade 3 expectation, students should be able to recognize $8\frac{4}{8}$ as $8\frac{1}{2}$ as a final solution. Their solution should be formative information for the teacher to incorporate into classroom instruction.

Task

Cynthia is making her famous "Perfect Punch" for a party. After looking through the recipe, Cynthia knows that she needs to mix $4\frac{5}{8}$ gallons of fruit juice concentrate with $3\frac{7}{8}$ gallons of sparkling water.

- Just as she is about to get started she realizes that she only has one 10-gallon container to use for mixing. Will this container be big enough to hold all the ingredients?
- How much punch will this recipe make?

Standard(s) Alignment: 4.NF.B.3.c

Source: [Illustrative Mathematics](#)

Students Show What They Know

The image shows a student's handwritten work on a piece of paper. On the left, the task text is written in small print. The student has written "Yes 8.5 gallons" in large, bold letters. To the right, the student has written two equations: $4 + 3 = 7$ and $\frac{5}{8} + \frac{7}{8} = 1.5 = \frac{12}{8}$.

The task presents an opportunity for students to take multiple approaches in order to solve the real-world problem. This

student shows that they recognize the whole numbers and fractional parts from the mixed number need to be added together to reach a solution. This student demonstrates their ability to flexibly alternate between fractions over one and mixed numbers. The student also displays an ability to alternate between fractions and decimals.

Fostering Identity, Agency, and Belonging

- What questions do we have about making punch?
- What is Cynthia doing in this problem? Can you represent it on paper or act it out?
- What might you do first to solve this problem?
- Was this a problem you solved on paper or in your head?
- Can you explain your solution to me?
- (For students with the answer $8\frac{4}{8}$): What does it mean to be "four-eighths"? Students may benefit from drawing a number line.

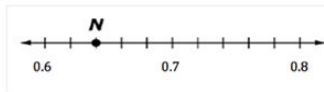
Resources

- Read this [blog post](#) to discover the conceptual underpinnings of units in grade 4 fraction operations.
- Video: [Fraction Progression Unit 4 - Addition of Fractions](#) (Illustrative Mathematics)

Task: Equivalence and ordering

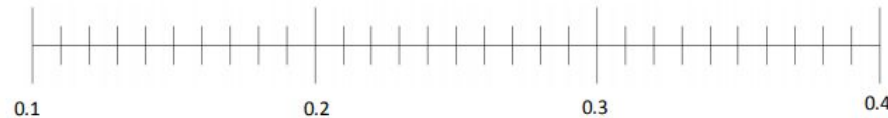
These two tasks ask students to order, compare, and label fractions using what they know about equivalence. The first task example is less complex given that it is partitioned into tenths and the points students are to plot are given in tenths and hundredths. The second task example has a stronger notion of equivalence, as students must consider the partitions of fifths.

Enter the decimal value for the number located at point N.



1. Plot the following points on the number line.

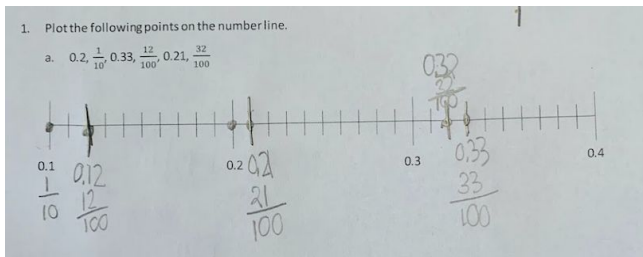
a. 0.2 , $\frac{1}{10}$, 0.33 , $\frac{12}{100}$, 0.21 , $\frac{32}{100}$



Standard(s) Alignment: 4.NF.C.7, 4.NF.C.6

Source: Example 1, [Engage NY Module 6, Lesson 11](#), Problem Set Task 1
Example 2, [Smarter Balanced](#)

Students Show What They Know

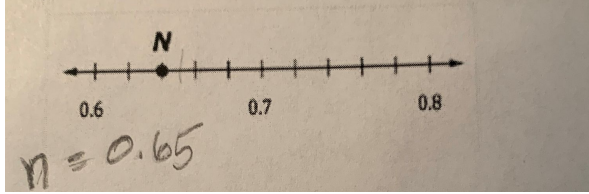


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Fostering Identity, Agency, and Belonging

- Which number would you like to plot first on the number line? Why?
- How did you decide that ___ was located at this point on the number line?
- What are some other numbers that you can find on the number line(s) shown?
- How are the two problems similar? How are they different? How might this difference impact how you would solve them?

Enter the decimal value for the number located at point N.



These tasks require the student to place fractions and decimals on the number line. In the first task, the student attempts to determine an accurate decimal value for the labeled point, given a limited number of tick marks. In the student work sample, the student is still trying to figure out the N value, and incorrectly marks .65, not fully understanding that the partitions each increase by .02. In the second task, the student has to use what they know about equivalence in order to complete the task, and demonstrates a clear ability to alternate between decimals and fractions in order to compare values on the number line.

Resources

- [Engage NY Module Overview](#): Read the PDF, which includes robust details about teaching decimal fractions.

Task: Comparison

Students use their knowledge of fraction equivalence in this task and extend that thinking to work with decimal numbers. If it is helpful they can use area models and number lines to compare decimal numbers and use the $<$, $>$, and $=$ symbols to record their comparisons. Using representations may help students move beyond the common misconception of assuming a great number of hundredths must be greater than a lesser number or tenths.

3. Use the symbols $>$, $=$, or $<$ to compare the following. Justify your conclusions using pictures, numbers, or words.

a. $0.02 \bigcirc 0.22$

b. $0.6 \bigcirc 0.60$

c. 17 tenths \bigcirc 1.7

d. $1.04 \bigcirc 1\frac{4}{10}$

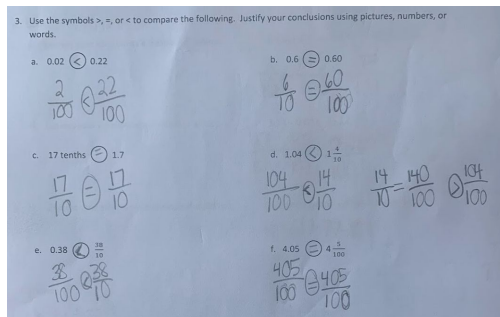
e. $0.38 \bigcirc \frac{38}{10}$

f. $4.05 \bigcirc 4\frac{5}{100}$

Standard(s) Alignment: 4.NF.C.7

Source: [Engage NY Module 6 End-of-Module Assessment](#), Task 3

Students Show What They Know



The student shows the ability to compare fractions and decimals. The task asked students to justify their answers using any approach they prefer. The student chose to create all equivalent fractions in order to accurately compare each of the problems.

Fostering Identity, Agency, and Belonging

- Allow students to independently notice ideas about comparing quantities. Simple prompts such as, “What do you notice?” allow students to have their mathematical insights valued.
- Provide choice to students and ask them to explain one of the comparisons and justify their comparison.
- Ask students if there are other comparisons they are wondering about. Record their wonderings for later exploration.

Resources

- Video: <https://tasks.illustrativemathematics.org/progressions>
- [Engage NY Module Overview](#): Read the PDF, which includes robust details about teaching decimal fractions.
- [Using Place Value](#), an additional task to support instruction.