Grade 5 Fraction Tasks

Empowering Learners in 5.NF: Students learn that they can extend their mathematical skills of completing operations with whole numbers to completing operations that include decimal 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)

- 5.NF.A.1
- 5.NF.A.2
- 5.NF.B.5
- 5.NF.B.4
- 5.NF.B.6
- 5.NF.B.3

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Entry Task: Adding Fractions with Unlike Denominators

This task serves a bridge between students' grade 4 skills of generating equivalent fractions (4.NF.A.1) and adding fractions with like denominators (4.NF.B.3) and the grade 5 expectation of adding fractions and fractions over one with unlike denominators (5.NF.A.1).

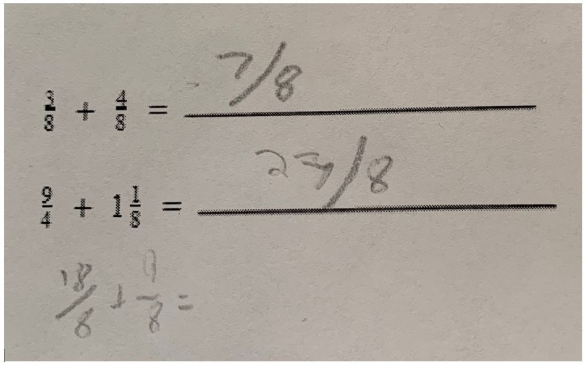
$\frac{3}{8} + \frac{4}{8} =$ _____

$\frac{9}{4} + 1\frac{1}{8} =$ _____

Standard(s) Alignment: 5.NF.A.1
Source: Created by Student Achievement Partners

Students Show What They Know

5.NF.A.1_with visual representation_Elias (Video)



Students are asked to calculate sums with addends that are fractions over one and mixed numbers in these two problems. This student understands the value of a mixed number and expresses it as a fraction over one. The student shows an understanding of adding fractions with both like and unlike denominators.

Fostering Identity, Agency, and Belonging

- How are the two problems similar? How might this difference impact how you would solve them?
- How are they different? How might this difference impact how you would solve them?
- How can you visually represent the two problems?

Resources

- Explore the full grade 5 Number and Operations - Fractions domain on the Coherence Map.
- Fractions on a Number Line (website game)
- Fraction Number Talks (PDF and directions)
- Fraction Talks (website)

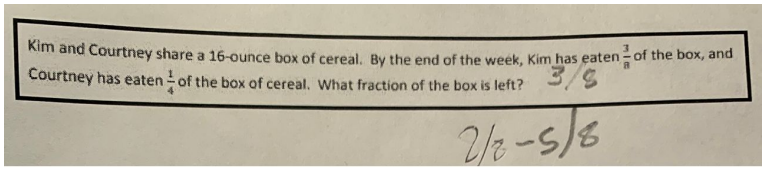
Task: Adding and subtracting fractions application problem

In this task, students solve a real-world problem that includes adding and subtracting fractional values. Students have to find like denominators in order to complete the task.

> Kim and Courtney share a 16-ounce box of cereal. By the end of the week, Kim has eaten $\frac{3}{8}$ of the box, and Courtney has eaten $\frac{1}{4}$ of the box of cereal. What fraction of the box is left?

Standard(s) Alignment: 5.NF.A.1, 5.NF.A.2
Source: EngageNY, Grade 5, Module 4, Lesson 11, Problem Set Task 1

Students Show What They Know



This task allows students to show if they understand part-whole relationships. The student accurately shows that they know in order to find the fraction of the box that is left, they have to find how much of the box was eaten by finding like denominators. It is clear from the student work that they know how to represent the whole box of cereal as a fraction, 8/8, and that they understand 1/4 is equivalent to 2/8.

Fostering Identity, Agency, and Belonging

- What do we know about a box of cereal?
- Do you think you eat as much cereal as Kim does in a week? Courtney?
- What does a 16-ounce box of cereal look like? [Use a search engine with student(s) to see if this is a typical sized box familiar to students.]
- How could you represent this problem?
- How would you get started on this problem? What do you want to find out first?

Resources

- Add Fractions with Unlike Units Using the Strategy of Creating Equivalent Fractions (lesson)

Task: Ordering expressions with fractional values

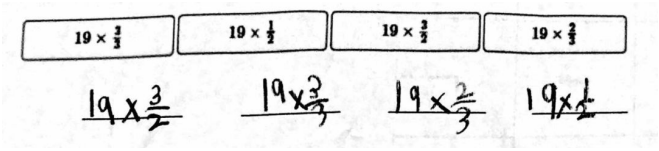
In this task, students are asked to interpret multiplication as scaling. Students use their understanding of the scaling factor being greater than or less than one and use it to determine its impact on the other factor making the product equal to, less than, or greater than the other factor. Students should be able to complete ordering the values without calculating. This problem provides the opportunity to reinforce the key takeaway of the 3.NF domain, understanding fractions as numbers.

Order the following expressions from least value to greatest value.

$19 \times \frac{3}{3}$	$19 \times \frac{1}{2}$	$19 \times \frac{3}{2}$	$19 \times \frac{2}{3}$
_____	_____	_____	_____

Standard(s) Alignment: 5.NF.B.5
Source: PARCC

Students Show What They Know



This student showed that they were able to correctly order the values without calculating and how the scaling factor impacts the other factor. While they did not order the following expressions from least value to great value as the task requires, this error does not impede their ability to order.

Fostering Identity, Agency, and Belonging

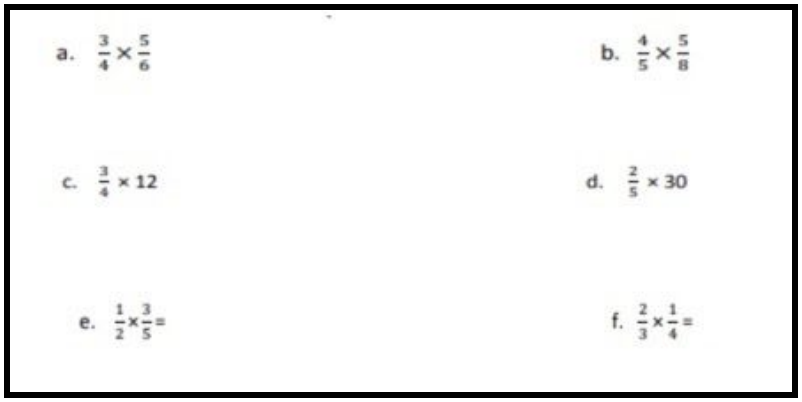
- Do you think that you need to find all of these products to answer this question? Why or why not?
- What's similar about these four problems? What's different? How might that difference impact the products?
- How does this task relate to tasks that you completed in previous grades?

Resources

- Reasoning about Multiplication, an additional task to support instruction.

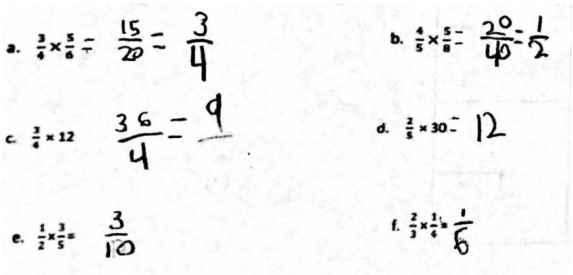
Task: Multiplying fractions

In this task, students are asked to find the product. Each expression is important in grade 5 in order to make sure students can find the product regardless of the type of factor. The task includes both multiplying by whole numbers and fractional values. Students need to understand the impact when both factors are fractions and when one of the factors is a whole number.



Standard(s) Alignment: 5.NF.B.4, 5.NF.B.5
Sources: EngageNY, Grade 5, Module 4, Mid-Module Assessment Task 1; EngageNY, Grade 5, Module 4, Lesson 14, Problem Set Task 1; EngageNY, Grade 5, Module 4, Lesson 15, Problem Set Task 2

Students Show What They Know



The student shows they understand how to multiply fractions. This task provides students with a variety of problems to solve allowing them to to find the product of multiplying fractions by whole numbers, unit fractions, and non unit fractions.

Fostering Identity, Agency, and Belonging

- Which problems seem more similar to the other problems on this page? Which problems seem more different? Why?
- Which problems do we think will give a product less than one? Why?
- How does one of the factors impact the other factor?
- How does the product change when multiplying a fraction by a whole number? How do you know?

Resources

- Comparing a Number and a Product, an additional task to support instruction.
- Reasoning about Multiplication, an additional task to support instruction.

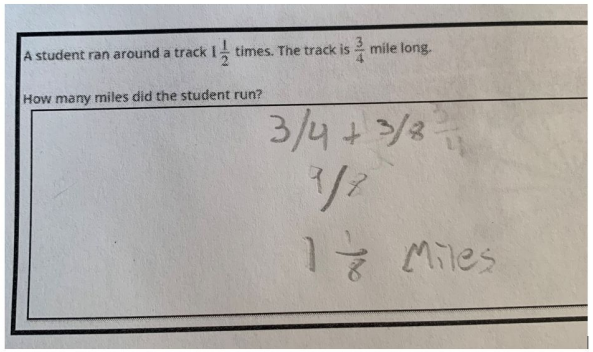
Task: Multiplying mixed numbers application problem

In this task, students are asked to solve a real-world problem that includes a fraction and a mixed number. Students may approach this problem differently, but students have the option to solve by multiplying a fraction in order to accurately reach the value of miles that the student ran.

> A student ran around a track $1\frac{1}{2}$ times. The track is $\frac{3}{4}$ mile long.
>
> How many miles did the student run?

Standard(s) Alignment: 5.NF.A.1, 5.NF.A.2, 5.NF.B.6
Source: Adapted from NWEA

Students Show What They Know



The task provides students an opportunity to find a strategy to solve. This student recognizes that, in order to find the number of miles the student ran, they need to include the length of the whole track and half of the length of the track. The student accurately finds the number of miles the student ran by finding like denominators, calculating half of the length of the track, and adding the two lengths together.

Fostering Identity, Agency, and Belonging

- How would you represent this problem?
- Does the length of the track impact the number of miles that the student ran? How do you know? (How?)
- Does the amount of times the student ran around the track impact the number of miles that the student ran? How do you know? (How?)

Resources

- Reasoning about Multiplication, an additional task to support instruction.

Task: Division expressions as fractions

In this task, students are asked to calculate division expressions. Students use the chart to show the relationship between division expressions and fractions. Students estimate the quotient and are then asked to find the actual quotients using the standard algorithm. This task assesses whether students understand how fractions relate to division.

Division Expression	Fraction	Between which two whole numbers is your answer?	Standard Algorithm
a. $16 \div 5$	$\frac{16}{5}$	3 and 4	$5\overline{)16}$ $3\ \frac{1}{5}$, -15, 1
b. ___÷___	$\frac{3}{4}$	0 and 1	
c. ___÷___	$\frac{7}{2}$		$2\overline{)7}$
d. ___÷___	$\frac{81}{90}$		

Standard(s) Alignment: 5.NF.B.3
Source: EngageNY, Grade 5, Module 4, Lesson 4, Homework Task 2

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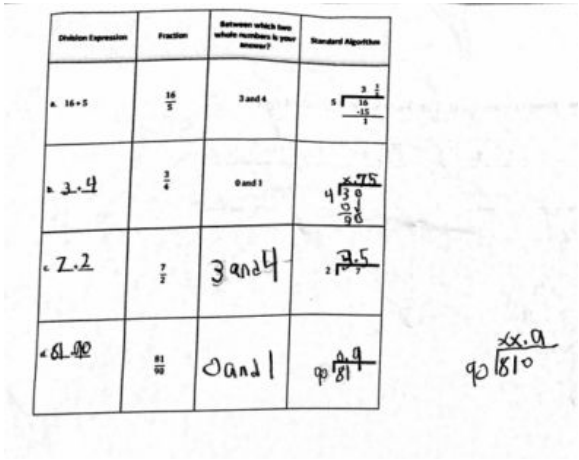
Students Show What They Know



Relating division to fractions in several ways is a key underpinning of this task, and the task provides students an opportunity to move back and forth between the division expression, fraction, estimation question, and algorithm. This student shows that they can relate division to fractions in the ways presented in the task. The student estimates quotients and uses both the standard algorithm and multiplication to check their work.

Fostering Identity, Agency, and Belonging

- How does each fraction translate into a division expression?
- What does the denominator reveal? How is this shown in division expressions?
- What is a situation for each division expression? What would the fraction represent in each situation?

Resources

- Click here for a video of students engaged in a lesson examining fractions as division.
- Engage NY Module 4 Overview: Read the PDF, which includes robust details about teaching decimal fractions.

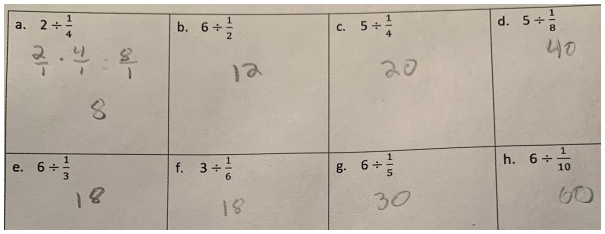
Task: Dividing by fractions

In this task, students divide whole numbers by unit fractions. Upon completion of the task students can also apply their understanding in order to complete tasks that include dividing unit fractions by whole numbers.

a. $2 \div \frac{1}{4}$	b. $6 \div \frac{1}{2}$	c. $5 \div \frac{1}{4}$	d. $5 \div \frac{1}{8}$
e. $6 \div \frac{1}{3}$	f. $3 \div \frac{1}{6}$	g. $6 \div \frac{1}{5}$	h. $6 \div \frac{1}{10}$

Standard(s) Alignment: 5.NF.B.7
Source: [EngageNY Grade 5 Module 4 Lesson 25](), Homework Task 2

Students Show What They Know



Students should have repeated practice with key concepts without overloading them. This task allows students to practice dividing whole numbers by unit fractions. Half of the problems involve the whole number 6 allowing for further discussion. The student shows that they know how to accurately divide whole numbers by unit fractions.

Fostering Identity, Agency, and Belonging

- What do you notice is similar about these problems? What is different?
- How can you visually represent each problem?
- What do you notice about the quotients that you computed?
- What do you think would happen to the quotient if the dividend were all 1? What if they were less than one?

Resources

- Engage NY Module 4 Overview: Read the PDF, which includes robust details about teaching decimal fractions.

Task: Comparing decimal fractions

In this task, students are asked to compare quotients and products. The task is designed so that the expressions can be compared without computing the actual products or quotients. Students are asked to use their understanding of decimal fractions and fractional values to conclude which value is greater than, less than, or equal to. In order to complete this task, students need to be able to rename fractions as decimals, compare dividing a whole number by a whole number and by a fraction, and compare dividing by a whole number to multiplying by fractions.

Write >, =, or < to make each comparison true.

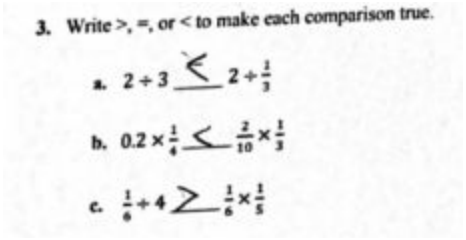
a. $2 \div 3 \_\_\_\_ 2 \div \frac{1}{3}$

b. $0.2 \times \frac{1}{4} \_\_\_\_ \frac{2}{10} \times \frac{1}{3}$

c. $\frac{1}{6} \div 4 \_\_\_\_ \frac{1}{6} \times \frac{1}{5}$

Standard(s) Alignment: 5.NF.B
Source: Grade 5 Mini-Assessment, Task 3

Students Show What They Know


3. Write >, =, or < to make each comparison true.
a. $2 \div 3 < 2 \div \frac{1}{3}$
b. $0.2 \times \frac{1}{4} < \frac{2}{10} \times \frac{1}{3}$
c. $\frac{1}{6} \div 4 > \frac{1}{6} \times \frac{1}{5}$

The student work shows an ability to accurately express numbers in different forms in order to compare them. Grade 5 students use reasoning strategies to compare expressions without computation.

Fostering Identity, Agency, and Belonging

- What do you notice about the numbers in the two expressions in each example? [Point to the two expressions in (a) as an example.]
- Can you express decimals as fractions? How does this skill help you compare numbers?
- How do the factors in a multiplication expression affect the product?

Resources

- Progressions, the complete video collection used throughout the grade-level materials highlighting important features of teaching and understanding fractions across grades 3 through 5.