

# 5th Grade Mathematics

Addition & Subtraction of Fractions

Unit 3 Pacing Calendar - Eureka



ORANGE PUBLIC SCHOOLS  
OFFICE OF CURRICULUM AND INSTRUCTION  
OFFICE OF MATHEMATICS

## From the New Jersey Student Learning Standards:

In **Grade 5**, instructional time should focus on three critical areas: (1) developing fluency with addition and subtraction of fractions, and developing understanding of the multiplication of fractions and of division of fractions in limited cases (unit fractions divided by whole numbers and whole numbers divided by unit fractions); (2) extending division to 2-digit divisors, integrating decimal fractions into the place value system and developing understanding of operations with decimals to hundredths, and developing fluency with whole number and decimal operations; and (3) developing understanding of volume

(1) Students apply their understanding of fractions and fraction models to represent the addition and subtraction of fractions with unlike denominators as equivalent calculations with like denominators. They develop fluency in calculating sums and differences of fractions, and make reasonable estimates of them. Students also use the meaning of fractions, of multiplication and division, and the relationship between multiplication and division to understand and explain why the procedures for multiplying and dividing fractions make sense. (Note: this is limited to the case of dividing unit fractions by whole numbers and whole numbers by unit fractions.)

(2) Students develop understanding of why division procedures work based on the meaning of base-ten numerals and properties of operations. They finalize fluency with multi-digit addition, subtraction, multiplication, and division. They apply their understandings of models for decimals, decimal notation, and properties of operations to add and subtract decimals to hundredths. They develop fluency in these computations, and make reasonable estimates of their results. Students use the relationship between decimals and fractions, as well as the relationship between finite decimals and whole numbers (i.e., a finite decimal multiplied by an appropriate power of 10 is a whole number), to understand and explain why the procedures for multiplying and dividing finite decimals make sense. They compute products and quotients of decimals to hundredths efficiently and accurately.

(3) Students recognize volume as an attribute of three-dimensional space. They understand that volume can be measured by finding the total number of same-size units of volume required to fill the space without gaps or overlaps. They understand that a 1-unit by 1-unit by 1-unit cube is the standard unit for measuring volume. They select appropriate units, strategies, and tools for solving problems that involve estimating and measuring volume. They decompose three-dimensional shapes and find volumes of right rectangular prisms by viewing them as decomposed into layers of arrays of cubes. They measure necessary attributes of shapes in order to determine volumes to solve real world and mathematical problems.

## Yearlong Pacing Guide Grade 5

Grade	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
<b>5</b>	Unit 1 5.NBT	Unit 2 5.NBT		Unit 3 5.NF		Unit 4 5.NF		Unit 5 5.MD	Unit 6 5.OA & 5.G	
<b>6</b>	Unit 1 6.G	Unit 2 6.RP	Unit 3 6.RP	Unit 4 6.NS		Unit 5 6.NS	Unit 6 6.EE	Unit 7 6.NS	Unit 8 6.SP	
<b>7</b>	Unit 1 7.G	Unit 2 7.RP	Unit 3 7.G	Unit 4 7.RP		Unit 5 7.NS	Unit 6 7.EE		Unit 7 7.G	Unit 8 7.SP
<b>8</b>	Unit 1 8.G		Unit 2 8.G	Unit 3 8.EE	Unit 4 8.EE		Unit 5 8.F	Unit 6 8.SP	Unit 7 8.EE	Unit 8 8.G

**Unit 1**

**Number & Ops in Base Ten:** Place Value & Decimal Fractions

**Unit 2**

**Number & Ops in Base Ten:** Multi-Digit Whole Numbers & Decimal Fraction Operations

**Unit 3**

**Number & Ops-Fractions:** Addition & Subtraction of Fractions

**Unit 4**

**Number & Ops-Fractions:** Multiplication & Division of Fractions

**Unit 5**

**Measurement & Data:** Addition & Multiplication with Volume & Area

**Unit 6**

**Algebraic Thinking / Geometry:** Problem Solving w/ Coordinate Plane

2019-2020 Grade 5 (Eureka)							
Quarter 1		Quarter 2		Quarter 3		Quarter 4	
Unit 1 / Mod 1	Unit 2 / Mod 2		Unit 3 / Mod 3	Unit 4 / Mod 4	Unit 5 / Mod 5		Unit 6 / Mod 6
5.NBT.3a(M) 5.NBT.3b(M) 5.NBT.4(M)	5.NBT.1(M) 5.NBT.2(M) 5.NBT.5(M) 5.NBT.6(M) 5.NBT.7(M)		5.NF.1(M) 5.NF.2(M)	5.NF.3(M) 5.NF.4a(M) 5.NF.5a(M) 5.NF.5b(M) 5.NF.6(M) 5.NF.7a(M) 5.NF.7b(M) 5.NF.7c(M)	5.NF.4b(M) 5.MD.3a(M) 5.MD.3b(M) 5.MD.4(M) 5.MD.5a(M) 5.MD.5b(M) 5.MD.5c(M)		5.OA.3(A) 5.G.1(A) 5.G.2(A)
20 Days	35 Days		22 Days	38 Days	25 Days		40 Days
Oct. 7	Dec. 4		Jan. 15	March 20	May 4		Jun. 19

Major Work Supporting Content Additional Content

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## I. Unit Overview

In Module 3, students' understanding of addition and subtraction of fractions extends from earlier work with fraction equivalence and decimals. This module marks a significant shift away from the elementary grades' centrality of base ten units to the study and use of the full set of fractional units from Grade 5 forward, especially as applied to algebra.

In Topic A, students revisit the foundational Grade 4 standards addressing equivalence. When equivalent, fractions represent the same amount of area of a rectangle and the same point on the number line. These equivalencies can also be represented symbolically. Furthermore, equivalence is evidenced when adding fractions with the same denominator. The sum may be decomposed into parts (or recomposed into an equal sum). In Topic B, students move forward to see that fraction addition and subtraction are analogous to whole number addition and subtraction. Students add and subtract fractions with unlike denominators by replacing different fractional units with an equivalent fraction or like unit.

Throughout the module, a concrete to pictorial to abstract approach is used to convey this simple concept. In Topic C, students move away from the pictorial altogether as they are empowered to write equations clarified by the model.

Topic C also uses the number line when adding and subtracting fractions greater than or equal to 1 so that students begin to see and manipulate fractions in relation to larger whole numbers and to each other. The number line allows students to pictorially represent larger whole numbers. In Topic D, students strategize to solve multi-term problems and more intensely assess the reasonableness of their solutions to equations and word problems with fractional units.

## II. Pacing Guide

Activity	New Jersey State Learning Standards (NJSL)	Estimated Time (Blocks)
Topic A: Equivalent Fractions (Lessons 1 -2)	4.NF.1; 4.NF.3c ; 4.NF.3d	2
Topic B- Making Like Units Pictorially (Lessons 3-7)	5.NF.1 ; 5.NF.2	5
<b>Mid- Module Assessment (Topics A-B) <i>Optional</i></b>	5.NF.1 ; 5.NF.2	½
Unit/Module 3 Return/ Remediation or Further Application	5.NF.1 ; 5.NF.2	2 ½
Topic C- Making Like Units Numerically (Lessons 8-12)	5.NF.1 ; 5.NF.2	5
Topic D- Further Applications (Lessons 13-16)	5.NF.1 ; 5.NF.2	4
Unit/Module 3 Return/ Remediation or Further Application	5.NF.1 ; 5.NF.2	2
<b>End-of-Module Assessment (Topics A-D) <i>Optional</i></b>	5.NF.1 ; 5.NF.2	½
<b>Performance Task 1</b>	5.NF.1	½
<b>Total Time</b>		<b>22 Blocks</b>

Major Work Supporting Content Additional Content

### III. Pacing Calendar

Please complete the pacing calendar based on the suggested pacing (*see Pacing Guide on page 1*).

# DECEMBER

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Please complete the pacing calendar based on the suggested pacing (*see Pacing Guide on page 1*).

# JANUARY

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	



## IV. PARCC Assessment Evidence Statements

Type I

Type II

Type III

NJSLs	Evidence Statement	Clarification	Math Practices	Calculator ?
<u>5.NF.1-1</u>	<p>Add two fractions with unlike denominators, or subtract two fractions with unlike denominators, by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators.</p> <p>For example, <math>\frac{2}{3} + \frac{5}{4} = \frac{8}{12} + \frac{15}{12} = \frac{23}{12}</math>. (In general, <math>\frac{a}{b} + \frac{c}{d} = \frac{ad+bc}{bd}</math>.)</p>	<p>i) Tasks have no context.</p> <p>ii) Tasks ask for the answer or ask for an intermediate step that shows evidence of using equivalent fractions as a strategy.</p> <p>iii) Tasks do not include mixed numbers.</p> <p>iv) Tasks may involve fractions greater than 1 (including fractions equal to whole numbers).</p> <p>v) Prompts do not provide visual fraction models; students may at their discretion draw visual fraction models as a strategy.</p>	MP.6 MP.7	No
<u>5.NF.1-2</u>	<p>Add three fractions with no two denominators equal by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum of fractions with like denominators.</p> <p>For example, <math>\frac{1}{2} + \frac{1}{3} + \frac{1}{4} = (\frac{3}{6} + \frac{2}{6}) + \frac{1}{4} = \frac{5}{6} + \frac{1}{4} = \frac{10}{12} + \frac{3}{12} = \frac{13}{12}</math> or alternatively <math>\frac{1}{2} + \frac{1}{3} + \frac{1}{4} = \frac{6}{12} + \frac{4}{12} + \frac{3}{12} = \frac{13}{12}</math>.</p>	<p>i) Tasks have no context.</p> <p>ii) Tasks ask for the answer or ask for an intermediate step that shows evidence of using equivalent fractions as a strategy.</p> <p>iii) Tasks do not include mixed numbers.</p> <p>iv) Tasks may involve fractions greater than 1.</p> <p>v) Prompts do not provide visual fraction models; students may at their discretion draw visual fraction models as a strategy.</p>	MP.6 MP.7	No

5<sup>th</sup> Grade Unit 3: Addition & Subtraction of Fractions

<p><u>5.NF.1-3</u></p>	<p>Compute the result of adding two fractions and subtracting a third, where no two denominators are equal, by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. For example, <math>1/2 + 1/3 - 1/4</math> or <math>7/8 - 1/3 + 1/2</math>.</p>	<p>i) Tasks have no context. ii) Tasks ask for the answer or ask for an intermediate step that shows evidence of using equivalent fractions as a strategy. iii) Subtraction may be either the first or second operation. The fraction being subtracted must be less than both the other two. iv) Prompts do not provide visual fraction models; students may at their discretion draw visual fraction models as a strategy.</p>	<p>MP.6 MP.7</p>	<p>No</p>
<p><u>5.NF.1-4</u></p>	<p>Add two mixed numbers with unlike denominators, expressing the result as a mixed number, by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum with like denominators. For example, <math>3 \frac{1}{2} + 2 \frac{2}{3} = (3 + 2) + (1/2 + 2/3) = 5 + (3/6 + 4/6) = 5 + 7/6 = 5 + 1 + 1/6 = 6 \frac{1}{6}</math>.</p>	<p>i) Tasks have no context. ii) Tasks ask for the answer or ask for an intermediate step that shows evidence of using equivalent fractions as a strategy. iii) Prompts do not provide visual fraction models; students may at their discretion draw visual fraction models as a strategy.</p>	<p>MP.6 MP.7</p>	<p>No</p>
<p><u>5.NF.1-5</u></p>	<p>Subtract two mixed numbers with unlike denominators, expressing the result as a mixed number, by replacing given fractions with equivalent fractions in such a way as to produce an equivalent difference with like denominators.</p>	<p>i) Tasks have no context. ii) Tasks ask for the answer or ask for an intermediate step that shows evidence of using equivalent fractions as a strategy. iii) Prompts do not provide visual fraction models; students may at their discretion draw visual fraction models as a strategy.</p>	<p>MP.6 MP.7</p>	<p>No</p>

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<p><u>5.NF.2-1</u></p>	<p>Solve word problems involving addition and subtraction of fractions referring to the same whole, in cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem.</p>	<p>-</p>	<p>MP.1 MP.4 MP.5</p>	<p>No</p>
<p><u>5.NF.2-2</u></p>	<p>Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers to word problems involving addition and subtraction of fractions referring to the same whole in cases of unlike denominators. For example, recognize an incorrect result <math>2/5 + 1/2 = 3/7</math>, by observing that <math>3/7 &lt; 1/2</math>.</p>	<p>i) The situation types are those shown in Table 2, p. 9 of the OA Progression document, sampled equally. ii) Prompts do not provide visual fraction models; students may at their discretion draw visual fraction models as a strategy. iii) Tasks may involve fractions greater than one, including mixed numbers.</p>	<p>MP.2 MP.5 MP.7</p>	<p>No</p>
<p><u>5.C.4-1</u></p>	<p>Base arithmetic explanations/reasoning on concrete referents such as diagrams (whether provided in the prompt or constructed by the student in her response), connecting the diagrams to a written (symbolic) method. Content Scope: Knowledge and skills articulated in 5.NF.2</p>	<p>-</p>	<p>MP.3 MP.5 MP.6</p>	<p>No</p>
<p><u>5.C.7-2</u></p>	<p>Distinguish correct explanation/reasoning from that which is flawed, and – if there is a flaw in the argument – present corrected reasoning. (For example, some flawed ‘student’ reasoning is presented and the task is to correct and improve it.) Content Scope: Knowledge and skills articulated in 5.NF.2</p>	<p>-</p>	<p>MP.3 MP.6 MP.7</p>	<p>No</p>

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<p><u>5.C.7-3</u></p>	<p>Distinguish correct explanation/reasoning from that which is flawed, and – if there is a flaw in the argument – present corrected reasoning. (For example, some flawed ‘student’ reasoning is presented and the task is to correct and improve it.) Content Scope: Knowledge and skills articulated in 5.NF.1</p>	<p>-</p>	<p>MP.3 MP.6</p>	<p>No</p>
<p><u>5.C.7-4</u></p>	<p>Distinguish correct explanation/reasoning from that which is flawed, and – if there is a flaw in the argument – present corrected reasoning. (For example, some flawed ‘student’ reasoning is presented and the task is to correct and improve it.) Content Scope: Knowledge and skills articulated in 4.NBT, 4.NF.A, 4.NF.B</p>	<p>i) Tasks may have scaffolding, if necessary, in order to yield a degree of difficulty appropriate to Grade 5.</p>	<p>MP.3 MP.6</p>	<p>No</p>
<p><u>5.D.2</u></p>	<p>Solve multi-step contextual problems with degree of difficulty appropriate to Grade 5, requiring application of knowledge and skills articulated in 4.OA, 4.NBT, 4.NF, 4.MD</p>	<p>-</p>	<p>MP.4</p>	<p>No</p>

## V. Differentiated Instruction

### Pacing

If pacing is a challenge, consider the following modifications and omissions. Omit Lesson 2 as it addresses a Grade 4 standard. In Lesson 3, omit the paper folding exercise, and consider it a remediation tool. Omit the Sprint in Lesson 12, and replace it with simple reasoning about fractions on the number line, such as “Is  $\frac{3}{4}$  greater than or less than  $\frac{1}{2}$ ?  $\frac{3}{5}$ ?  $\frac{3}{7}$ ?” In Lesson 15, choose two or three problems, and omit the others. Use the omitted problems as Application Problems in future lessons. Consider omitting Lesson 16 and using it in a center for early finishers, or have advanced students work the problems and present their solutions in a video or interactive demonstration. Consider asking the following questions to students “Have you ever thought about what the whole would look like if this paper were one-half? What if it were one-third? What if this is three-fourths of the whole? What would the whole look like then?” Note: In the first year of implementation, beginning in Lesson 5, be sure to include the fluency activities requiring students to subtract fractions less than one from a whole number (e.g.,  $4 - \frac{5}{8}$ ) in order to prepare students to subtract larger mixed numbers in Topics B and C. Model these fluency activities on the number line and with a tape diagram.

### Scaffolds

The Common Core State Standards for Mathematics require that “all students must have the opportunity to learn and meet the same high standards if they are to access the knowledge and skills necessary in their post school lives.” The writers of A Story of Units agree and feel strongly that accommodations cannot be just an extra set of resources for particular students. Instead, scaffolding must be folded into the curriculum in such a way that it is part of its very DNA. Said another way, faithful adherence to the modules IS the primary scaffolding tool. See [\*III. The Common Core Approach to Differentiating Instruction \(Pg. 14\)\*](#) for additional information.

Use the links below for support with specific groups of learners.

[Scaffolds for English Language Learners \(Pg. 16-17\)](#)

[Scaffolds for Students with Disabilities \(Pg. 17-18\)](#)

[Scaffolds for Students Performing Below Grade Level \(Pg. 19\)](#)

[Scaffolds for Students Performing Above Grade Level \(Pg. 20\)](#)

[Scaffolding Instruction for English Language Learners: A Resource Guide for Mathematics](#)

## VI. VOCABULARY

<b>Term</b>	<b>Definition</b>
<i>Benchmark Fraction</i>	e.g., $1/2$ is a benchmark fraction when comparing $1/3$ and $3/5$ )
Like denominators	e.g., $1/8$ and $5/8$
<i>Unlike denominators</i>	e.g., $1/8$ and $1/7$
<i>Between</i>	e.g., $1/2$ is between $1/3$ and $3/5$
<i>Denominator</i>	denotes the fractional unit: fifths in 3 fifths, which is abbreviated as the 5 in $3/5$
<i>Equivalent fraction</i>	e.g., $3/5 = 6/10$
<i>Fraction</i>	e.g., 3 fifths or $3/5$
<i>Fraction greater than or equal to 1</i>	e.g., $7/3$ , $3\ 1/2$ , an abbreviation for $3 + 1/2$
<i>Fractional unit</i>	e.g., the fifth unit in 3 fifths denoted by the denominator 5 in $3/5$
<i>Hundredth</i>	$1/100$ or 0.01
<i>Number sentence</i>	e.g., Three plus seven equals ten. Usually written as $3 + 7 = 10$ .
<i>Numerator</i>	denotes the count of fractional units: 3 in 3 fifths or 3 in $3/5$
<i>One tenth of</i>	e.g., $1/10 \times 250$
<i>Tenth</i>	$1/10$ or 0.1
<i>Whole unit</i>	e.g., any unit that is partitioned into smaller, equally sized fractional units

## VII. Assessment Framework

<b>Unit 3 Assessment Framework</b>				
<b>Assessment</b>	<b>NJSLS</b>	<b>Estimated Time</b>	<b>Format</b>	<b>Graded ?</b>
<b>Mid-Module Assessment</b> (After Topic B - Optional) <i>Eureka Math</i>	5.NF.1 , 5.NF.2	1 Block	Individual	Yes
<b>End-of-Module Assessment</b> (After Topic D - Optional) <i>Eureka Math</i>	5.NF.1 , 5.NF.2	1 Block	Individual	Yes

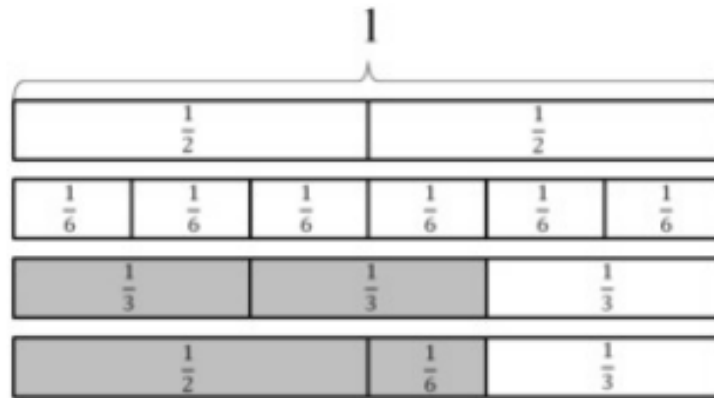
<b>Unit 3 Performance Assessment Framework</b>				
<b>Assessment</b>	<b>NJSLS</b>	<b>Estimated Time</b>	<b>Format</b>	<b>Graded ?</b>
<b>Unit 3 Performance Task 1</b> (Mid-January) <i>Egyptian Fractions</i>	5.NF.A.1	½ Block	Individual w/ Interview Opportunity	Yes; Rubric
<b>Unit 3 Performance Task Option 1</b> (Optional) <i>Sharing Lunches</i>	5.NF.A.2	Teacher Discretion	Teacher Discretion	Yes, if administered

## 5<sup>th</sup> Grade: Unit 3 Performance Task

Name \_\_\_\_\_ Block \_\_\_\_\_ Date \_\_\_\_\_

### Egyptian Fractions (NJSLS 5.NF.A.1)

Ancient Egyptians used unit fractions, such as  $\frac{1}{2}$  and  $\frac{1}{3}$ , to represent all fractions. For example, they might write the number  $\frac{2}{3}$  as  $\frac{1}{2} + \frac{1}{6}$ .



We often think of  $\frac{2}{3}$  as  $\frac{1}{3} + \frac{1}{3}$ , but the ancient Egyptians would not write it this way because they didn't use the same unit fraction twice.

a. Write each of the following Egyptian fractions as a single fraction:

i.  $\frac{1}{2} + \frac{1}{3}$ ,

ii.  $\frac{1}{2} + \frac{1}{3} + \frac{1}{5}$ ,

iii.  $\frac{1}{4} + \frac{1}{5} + \frac{1}{12}$ .

b. How might the ancient Egyptians have written the fraction we write as  $\frac{3}{4}$ ?



## Unit 3 Performance Task 1 PLD Rubric

**SOLUTION:**a) (i.)  $5/6$  (ii.)  $31/30$  (iii.)  $32/60$ b) Student writes  $3/4$  as the sum different unit fractions. Possible solutions are included the scoring guide (see page 14-15)

<b>Level 5: Distinguished Command</b>	<b>Level 4: Strong Command</b>	<b>Level 3: Moderate Command</b>	<b>Level 2: Partial Command</b>	<b>Level 1: No Command</b>
<p>Clearly constructs and communicates a complete response based on concrete referents provided in the prompt or constructed by the student such as diagrams that are connected to a written (symbolic) method, number line diagrams or coordinate plane diagrams, including:</p> <ul style="list-style-type: none"> <li>• a logical approach based on a conjecture and/or stated assumptions</li> <li>• a logical and complete progression of steps</li> <li>• complete justification of a conclusion with minor computational error</li> </ul>	<p>Clearly constructs and communicates a complete response based on concrete referents provided in the prompt or constructed by the student such as diagrams that are connected to a written (symbolic) method, number line diagrams or coordinate plane diagrams, including:</p> <ul style="list-style-type: none"> <li>• a logical approach based on a conjecture and/or stated assumptions</li> <li>• a logical and complete progression of steps</li> <li>• complete justification of a conclusion with minor conceptual error</li> </ul>	<p>Clearly constructs and communicates a complete response based on concrete referents provided in the prompt or constructed by the student such as diagrams that are connected to a written (symbolic) method, number line diagrams or coordinate plane diagrams, including:</p> <ul style="list-style-type: none"> <li>• a logical, but incomplete, progression of steps</li> <li>• minor calculation errors</li> <li>• partial justification of a conclusion</li> <li>• a logical, but incomplete, progression of steps</li> </ul>	<p>Constructs and communicates an incomplete response based on concrete referents provided in the prompt such as: diagrams, number line diagrams or coordinate plane diagrams, which may include:</p> <ul style="list-style-type: none"> <li>• a faulty approach based on a conjecture and/or stated assumptions</li> <li>• An illogical and Incomplete progression of steps</li> <li>• major calculation errors</li> <li>• partial justification of a conclusion</li> </ul>	<p>No parts are correct.</p> <p>The student shows no work or justification.</p>

5<sup>th</sup> Egyptian Fractions – Scoring Guide

## Solution

a.

For the Egyptian fraction  $\frac{1}{2} + \frac{1}{3}$ , a common denominator would be 6 since 6 is divisible by both 2 and 3. Converting to this common denominator we find

$$\begin{aligned}\frac{1}{2} + \frac{1}{3} &= \frac{3 \times 1}{3 \times 2} + \frac{2 \times 1}{2 \times 3} \\ &= \frac{3}{6} + \frac{2}{6} \\ &= \frac{5}{6}.\end{aligned}$$

For  $\frac{1}{2} + \frac{1}{3} + \frac{1}{5}$  we could use what we have just found, namely that  $\frac{1}{2} + \frac{1}{3} = \frac{5}{6}$ . To add  $\frac{5}{6}$  and  $\frac{1}{5}$  we can use  $5 \times 6 = 30$  as a common denominator:

$$\begin{aligned}\frac{1}{2} + \frac{1}{3} + \frac{1}{5} &= \frac{5}{6} + \frac{1}{5} \\ &= \frac{5 \times 5}{5 \times 6} + \frac{6 \times 1}{6 \times 5} \\ &= \frac{25 + 6}{30} \\ &= \frac{31}{30}.\end{aligned}$$

For  $\frac{1}{4}$ ,  $\frac{1}{5}$ , and  $\frac{1}{12}$  note that 12 is divisible by 4 so we can look for a common denominator of  $\frac{1}{5}$  and  $\frac{1}{12}$  and this will also work with  $\frac{1}{4}$ . For  $\frac{1}{5}$  and  $\frac{1}{12}$  we can use  $5 \times 12$  as a common denominator:

$$\begin{aligned}\frac{1}{4} + \frac{1}{5} + \frac{1}{12} &= \frac{15 \times 1}{15 \times 4} + \frac{12 \times 1}{12 \times 5} + \frac{5 \times 1}{5 \times 12} \\ &= \frac{15}{60} + \frac{12}{60} + \frac{5}{60} \\ &= \frac{15 + 12 + 5}{60} \\ &= \frac{32}{60}.\end{aligned}$$

As a parenthetical note, this gives an example where even though we found the least common denominator to perform the addition, the resulting fraction is not in reduced form: the reduced form is  $\frac{8}{15}$ .

b. To write  $\frac{3}{4}$  as an Egyptian fraction, we might notice that

$$\begin{aligned}\frac{3}{4} &= \frac{2+1}{4} \\ &= \frac{2}{4} + \frac{1}{4} \\ &= \frac{1}{2} + \frac{1}{4}.\end{aligned}$$

Alternatively, since  $\frac{1}{2}$  is the largest of the unit fractions that is less than  $\frac{3}{4}$  it would be reasonable to take  $\frac{1}{2}$  as one of the unit fractions in the Egyptian fraction expression for  $\frac{3}{4}$ . Performing subtraction gives

$$\begin{aligned}\frac{3}{4} - \frac{1}{2} &= \frac{3}{4} - \frac{2 \times 1}{2 \times 2} \\ &= \frac{3}{4} - \frac{2}{4} \\ &= \frac{1}{4}.\end{aligned}$$

This gives us the same expression as above:  $\frac{3}{4} = \frac{1}{2} + \frac{1}{4}$ .

There are many other ways to write  $\frac{3}{4}$  as an Egyptian fraction. Since

$$\begin{aligned}\frac{1}{2} &= \frac{3}{6} \\ &= \frac{2}{6} + \frac{1}{6} \\ &= \frac{1}{3} + \frac{1}{6}\end{aligned}$$

and since  $\frac{3}{4} = \frac{1}{2} + \frac{1}{4}$  we have another expression of  $\frac{3}{4}$  as an Egyptian fraction, namely

$$\frac{3}{4} = \frac{1}{3} + \frac{1}{6} + \frac{1}{4}.$$

All Egyptian fractions share this same property: there are always endless ways to write an Egyptian fraction.

## 5<sup>th</sup> Grade: Unit 3 Performance Task Option 1

Name \_\_\_\_\_ Block \_\_\_\_\_ Date \_\_\_\_\_

### Sharing Lunches (5.NF.A.2)

#### Task

Alex, Bryan, and Cynthia are about to eat lunch, and they have two sandwiches to share.

A. Draw a picture to show how they could equally share the sandwiches. How much of a sandwich does each person get?

B. Write an equation involving addition to show how together these parts make up the 2 sandwiches. Explain how the equation you wrote represents this situation.

C. Write an equation involving multiplication to show how all the parts make up the 2 sandwiches. Explain how the equation you wrote represents this situation.

## IX. 21st Century Career Ready Practices

- CRP1. Act as a responsible and contributing citizen and employee.
- CRP2. Apply appropriate academic and technical skills.
- CRP3. Attend to personal health and financial well-being.
- CRP4. Communicate clearly and effectively and with reason.
- CRP5. Consider the environmental, social and economic impacts of decisions.
- CRP6. Demonstrate creativity and innovation.
- CRP7. Employ valid and reliable research strategies.
- CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
- CRP9. Model integrity, ethical leadership and effective management.
- CRP10. Plan education and career paths aligned to personal goals.
- CRP11. Use technology to enhance productivity.
- CRP12. Work productively in teams while using cultural global competence.

For additional details see [21<sup>st</sup> Century Career Ready Practices](#) .

## References

“Eureka Math” *Great Minds*. 2018 < <https://greatminds.org/account/products>>