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PERFORMANCE TASKS FOR FRACTIONS – Where to Start?

Tasks taken from *Revealing What Students Think: Diagnostic Tasks for Fractional Numbers*

Task Name	Purpose	Major Content Focus ¹	Thinking flexibly about fractions as ² ...	Related & Supporting CCSS
1. Licorice	<p>Part One: Whether students understand that a half means one out of two parts, where the two parts are of equal quantity.</p> <p>Part Two: Whether students have generalized their understanding of halves and use the word 'half' to mean one piece out of two equal-sized pieces.</p>	<ul style="list-style-type: none"> Reason with shapes and their attributes 	<ul style="list-style-type: none"> Part of a continuous whole 	<ul style="list-style-type: none"> 1.GA.3 2.GA.3 3.NF.A.1 3.NF.A.3.A
2. Zoo Animals	Whether students have generalized the idea that a half means one out of any two equal-sized parts.	<ul style="list-style-type: none"> Understanding parts and wholes Equivalence 	<ul style="list-style-type: none"> Part of a collection 	<ul style="list-style-type: none"> 3.NF.A.1 3.NF.A.3 3.NF.A.3.A 3.NF.A.3.B
3. Find a Half	Whether students have generalized the idea that a half means one out of any two parts, where the two parts are of equal quantity, and that the half can be half of one object or half of a collection of objects.	<ul style="list-style-type: none"> Understanding parts and wholes Equivalence 	<ul style="list-style-type: none"> Part of a continuous whole and Part of a collection 	<ul style="list-style-type: none"> 1.GA.3 2.GA.3 3.NF.A.1 3.NF.A.3 3.NF.A.3.A 3.NF.A.3.B 4.NF.A.1
4. Feeding the Rabbits	Whether students can use continuous halving to make four equal-sized portions, use up the whole item, and name the resulting portion as one quarter.	<ul style="list-style-type: none"> Understanding parts and wholes Equivalence 	<ul style="list-style-type: none"> Part of a continuous whole 	<ul style="list-style-type: none"> 1.GA.3 2.GA.3 3.NF.A.1 3.NF.A.3 3.NF.A.3.A



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5. Sharing Bananas	Whether students are able to share three items between two people, by giving each person one item each and then cutting the remaining item into two equal-sized portions.	<ul style="list-style-type: none"> Understanding parts and wholes 	<ul style="list-style-type: none"> Division 	<ul style="list-style-type: none"> 3.NF.A.1
6. Walking to School	Whether students are able to use continuous halving to work out a fractional amount and to use the associated symbolic form	<ul style="list-style-type: none"> Partitioning fractions Using unit fractions (a fraction with 1 as its numerator, e.g. $\frac{1}{5}$) 	<ul style="list-style-type: none"> A quantity or measure³ 	<ul style="list-style-type: none"> 4.NF.B.3.A 4.NF.B.3.B 4.NF.B.3.D 5.NF.A.2
7. Which Is Bigger?	Whether students know that $\frac{1}{4}$ is smaller than $\frac{1}{3}$ because the more portions something is split into, the smaller each portion is.	<ul style="list-style-type: none"> Compare and order fractions 	<ul style="list-style-type: none"> Numbers 	<ul style="list-style-type: none"> 3.NF.A.1 3.NF.A.3.D
8. Cooking at Home	Whether students know that $\frac{1}{4}$ is smaller than $\frac{1}{3}$ because the more portions something is split into, the smaller each portion is, and... Whether they are able to consider the size of the numerator and the denominator when they are comparing $\frac{2}{3}$ and $\frac{3}{4}$.	<ul style="list-style-type: none"> Compare and order fractions 	<ul style="list-style-type: none"> A quantity or measure³ 	<ul style="list-style-type: none"> 3.NF.A.1 3.NF.A.3.D 4.NF.A.2
9. Fruit Bowl	Whether students are able to think of a collection of apples and pears as one whole collection of fruit and name the fraction of apples as two fifths.	<ul style="list-style-type: none"> Understanding parts and wholes 	<ul style="list-style-type: none"> Part of a collection 	<ul style="list-style-type: none"> 3.NF.A.1 4.NF.B.3 4.NF.B.3.B 4.NF.B.3.D 5.NF.A.2
10. Sharing Lollies	Whether children can use the fractions a third, two thirds and a quarter to describe parts of a whole when the whole is a collection of items.	<ul style="list-style-type: none"> Understanding parts and wholes 	<ul style="list-style-type: none"> Part of a collection 	<ul style="list-style-type: none"> 3.NF.A.1 4.NF.B.3.B 4.NF.B.3.D 5.NF.A.2



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11. Counting by Fractions	Whether children are able to count by fractional amounts.	<ul style="list-style-type: none"> Counting by fractional amounts Equivalence 	<ul style="list-style-type: none"> Numbers 	<ul style="list-style-type: none"> 3.NF.A.2 3.NF.A.2.A 3.NF.A.2.B
12. Broken Eggs	Whether students can use written symbols to name less common fractions within collections of items, particularly 5/12, 7/12 and 3/12. It will also show whether they can add the fractions 5/12 and 3/12 in a practical situation.	<ul style="list-style-type: none"> Adding fractions Equivalence 	<ul style="list-style-type: none"> Part of a collection 	<ul style="list-style-type: none"> 3.NF.A.1 4.NF.B.3.A 4.NF.B.3.D 5.NF.A.2
13. Naming Fractions	Whether students can use written symbols to name fractions including 1/2, 1/4, 1/8, 1/16 and 1/6.	<ul style="list-style-type: none"> Understanding parts and wholes 	<ul style="list-style-type: none"> Part of a continuous whole 	<ul style="list-style-type: none"> 3.NF.A.1
14. Running a Race	Whether students are able to count by eighths and thirds beyond 'one' to solve a problem. It may also show evidence of whether students can calculate with fractions.	<ul style="list-style-type: none"> Counting by fractional amounts Equivalence 	<ul style="list-style-type: none"> Numbers 	<ul style="list-style-type: none"> 3.NF.A.1 3.NF.A.3 5.NF.B.6
15. After School	Whether students have an understanding of simple equivalent fractions like $\frac{3}{4} = \frac{6}{8} = \frac{9}{12}$.	<ul style="list-style-type: none"> Equivalence 	<ul style="list-style-type: none"> Numbers 	<ul style="list-style-type: none"> 3.NF.A.3.A 3.NF.A.3.B 4.NF.A.1 4.NF.A.2 5.NF.A.1
16. Who Knows Best?	Whether students have an understanding of fractions as quantities or whether they have more of a rote understanding that does not allow them to think of the fraction 3/4 in this situation in practical terms. It may also show evidence of whether students can calculate with fractions.	<ul style="list-style-type: none"> Equivalence 	<ul style="list-style-type: none"> A quantity or measure³ 	<ul style="list-style-type: none"> 3.NF.A.1 3.NF.A.3.A 3.NF.A.3.B 4.NF.A.1 4.NF.A.2 5.NF.A.1



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17. Cookies	Whether students are able to name fractions of a collection, eight twenty-fourths and six twenty-fourths, and some fractions that are equivalent to these.	<ul style="list-style-type: none"> Equivalence 	<ul style="list-style-type: none"> Parts of a collection 	<ul style="list-style-type: none"> 3.NF.A.3.A 3.NF.A.3.B 3.NF.A.3.D 4.NF.A.1 4.NF.A.2
18. Toy Cars	Whether students are able to solve a problem when given the number of objects for $\frac{3}{4}$ of a collection as 24, and have to find out how many objects are in the whole collection.	<ul style="list-style-type: none"> Partitioning Fractions Multiplying and dividing fractions 	<ul style="list-style-type: none"> Parts of a collection 	<ul style="list-style-type: none"> 4.NF.B.3.B 4.NF.B.4.A 5.NF.B.3
19. Three Quarters of a Pie	Whether students are able to work out equivalent fractions to find a quantity of pie – that is, one sixth of three quarters of the pie. It may also show whether students can calculate with fractions.	<ul style="list-style-type: none"> Equivalence Partitioning Fractions 	<ul style="list-style-type: none"> Division 	<ul style="list-style-type: none"> 4.NF.A.2 4.NF.B.3 5.NF.A.1 5.NF.A.2 5.NF.B.6 5.NF.B.7.A 6.NS.A.1
20. Jumping Competition	Whether students can compare the size of fractional numbers $\frac{1}{3}$ and $\frac{1}{4}$ on a number line and/or count in units of a third and a quarter.	<ul style="list-style-type: none"> Compare and order fractions 	<ul style="list-style-type: none"> Numbers 	<ul style="list-style-type: none"> 3.NF.A.2 3.NF.A.2.A 3.NF.A.2.B
21. How Long Is the Snake?	<p><u>Part One:</u> Whether students are able to read fractions on a number line, and to use this to combine fractions and to compare the size of fractions.</p> <p><u>Part Two:</u> Whether students can use a number line to accurately draw creatures of particular fractional lengths ($\frac{5}{8}$, $2\frac{1}{4}$) and to compare the two fractions $\frac{2}{3}$ and $\frac{3}{4}$.</p>	<ul style="list-style-type: none"> Compare and order fractions Locating fractions on a number line 	<ul style="list-style-type: none"> Numbers 	<ul style="list-style-type: none"> 3.NF.A.2 3.NF.A.2.A 3.NF.A.2.B 5.NF.A.2 5.NF.A.2



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22. Number Lines	Whether students are able to think of fractions as numbers rather than just as quantities and to locate them on a number line.	<ul style="list-style-type: none"> Locating fractions on a number line 	<ul style="list-style-type: none"> Numbers 	<ul style="list-style-type: none"> 3.NF.A.2 3.NF.A.2.A 3.NF.A.2.B
23. Circle the Bigger	Whether students are able to compare fraction numbers using benchmark fractions – for example, $\frac{4}{9}$ is less than a half, or $\frac{7}{8}$ is close to one.	<ul style="list-style-type: none"> Compare and order fractions 	<ul style="list-style-type: none"> Numbers 	<ul style="list-style-type: none"> 3.NF.A.3 3.NF.A.3.D 4.NF.A.2 5.NF.A.2
24. Pocket Money	Whether students consider the size of the whole when asked to compare fractions.	<ul style="list-style-type: none"> Compare and order fractions 	<ul style="list-style-type: none"> A quantity or measure³ 	<ul style="list-style-type: none"> 3.NF.A.1 3.NF.A.3.D 4.NF.A.2
25. Party Food	Whether students are able to work out shares in a situation where there are more shares required than objects – for example, more children than pieces of garlic bread.	<ul style="list-style-type: none"> Partitioning Fractions Multiplying and dividing fractions 	<ul style="list-style-type: none"> Division 	<ul style="list-style-type: none"> 5.NF.B.3 5.NF.B.5.B 5.NF.B.6 5.NF.B.7.A 5.NF.B.7.B 5.NF.B.7.C
26. Brownies – Yum!	Whether students are able to see the relationship between fractions and division.	<ul style="list-style-type: none"> Multiplying and dividing fractions 	<ul style="list-style-type: none"> Division 	<ul style="list-style-type: none"> 5.NF.B.3 5.NF.B.5.B 5.NF.B.6 5.NF.B.7.A 5.NF.B.7.B 5.NF.B.7.C
27. Doing Homework Together	<p><u>Part One:</u> Whether students have a sense of the size of the fraction $\frac{1}{8}$ and of the decimal numbers 0.8 and 0.125 and know that $\frac{1}{8}$ is a different name for 0.125</p> <p><u>Part Two:</u> Whether students have a sense of the size of the improper fraction $\frac{4}{3}$</p>	<ul style="list-style-type: none"> Understand decimal notation for fractions Compare and order fractions 	<ul style="list-style-type: none"> Related to decimals and percentages 	<ul style="list-style-type: none"> 4.NF.C.5 4.NF.C.6 4.NF.C.7



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28. Visit to the Zoo	Whether students are able to use fractions to express ratio relationships and use these to work out a larger quantity in a situation involving a collection.	<ul style="list-style-type: none"> Understand and use ratios 	<ul style="list-style-type: none"> Ratios 	<ul style="list-style-type: none"> 6.RPA.1 6.RPA.2 6.RPA.3 6.RPA.3.A
29. Making Lemonade	Whether students are able to use fractions as ratios to work out a larger amount of liquid from a smaller one.	<ul style="list-style-type: none"> Understand and use ratios 	<ul style="list-style-type: none"> Ratios 	<ul style="list-style-type: none"> 6.RPA.1 6.RPA.2 6.RPA.3 6.RPA.3.A 6.RPA.3.D
30. 'More' Game	Whether students have an understanding of the relationships between fractions, percentages and decimals. You will also get more information about students' understanding of equivalent fractions.	<ul style="list-style-type: none"> Understand decimal notation for fractions Compare and order fractions Equivalence 	<ul style="list-style-type: none"> Related to decimals and percentages 	<ul style="list-style-type: none"> 4.NF.C.5 4.NF.C.6 4.NF.C.7

¹Students will also get a great deal of practice from the majority of these tasks in using fractional language and associated symbolic forms.

²Fractions can be interpreted in many different ways depending on the context of the problem and students need practice with all these interpretations in order to learn to think flexibly about fractions. For the purposes of the tasks in *Revealing What Students Think: Diagnostic Tasks for Fractional Numbers*, the following are used: Fractions as A) part of a continuous whole; B) part of a collection; C) numbers; D) division; E) a quantity or measure; F) ratios; G) related to decimals and percentages

³Fractions can also be used to describe other categories of quantity – or measurements - such as time, distance, area, volume, mass, weight, money...