Revised 2021-22

Here are the questions and possible solutions OR there's a "paper" copy on pages 4-6

4th grade Essential Question 8- Teacher page

I can solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators (by using visual fraction models and equations to represent the problem). 4.NF.B.3.d

1. Amy, Beth, Katie, Gretchen, and Deb love chocolate. One afternoon, they each had a 2 large chocolate bars. Each chocolate bar was the same size. Here is what each girl ate:

- Amy: $\frac{8}{6}$ of her chocolate bars
- Beth: $1\frac{1}{6}$ of her chocolate bar
- Katie: $\frac{9}{6}$ of her chocolate bars
- Gretchen: $1\frac{5}{6}$ of her chocolate bars
- Deb: $1\frac{3}{6}$ of her chocolate bars

a. How could you show how many chocolate bars were eaten in total?

b.How much chocolate remains? _____

4.NF.3 – Understand a fraction *a*/*b* with *a* > 1 as a sum of fractions 1/*b*.

c. Add and subtract mixed numbers with like denominators (e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction).
d.Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators (e.g., by using visual fraction models and equations to represent the problem).

Note: Grade 4 expectations in this domain are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.

4	Students can consistently demonstrate and teach any of the concepts in level 3 to another student.
3	Students can consistently: • c. Add and subtract mixed numbers with like denominators (e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction). • d.Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators (e.g., by using visual fraction models and equations to represent the problem).
2	Students can • c. Add and subtract mixed numbers with like denominators (e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction). **OR** • d.Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators (e.g., by using visual fraction models and equations to represent the problem).
1	Students demonstrate minimal to no understanding addition and subtraction of fractions as joining or separating parts relating to the same whole. Students demonstrate minimal to no how to decompose fractions into sums of fractions with the same denominator.

I can add two fractions with respective denominators 10 and 100. *For example, express 3/10 as 30/100, and add 3/10 + 4/100 = 34/100.* **4. NF.C.5**

2.

A dime is $\frac{1}{10}$ of a dollar and a penny is $\frac{1}{100}$ of a dollar.

What fraction of a dollar is 6 dimes and 3 pennies? Use a model to show your thinking. Write your answer in both fraction and decimal form.

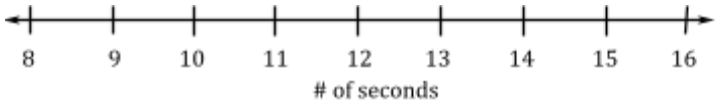
■ **4.NF.5 –** Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.	
4	Students can consistently demonstrate and teach any of the concepts in level 3 to another student.
3	Students can consistently express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.
2	Students can express fractions with denominators of 10 as equivalent fractions with denominators of 100. **Or** Can add fractions with denominators of 10 and 100.
1	Students demonstrate minimal to no understanding of fractions with denominators of 10 as equivalent fractions with denominators of 100.

I can represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale. 4.MD.A.2

3.Jack and Abby are in swim class together. They challenged each other to see who could hold their breath underwater the longest.

Jack and Abby's coach, Coach Foster, timed them with a stopwatch when they went underwater. Jack stayed underwater for $10\frac{1}{4}$ seconds, while Abby was able to stay under for 14 seconds.
Label the number line to show the amount of time Jack and Abby each stayed underwater.

Students should mark 10 ¼ and 14 on the number line.



The 10 ¼ mark does not need to be precise, but the location of the label should be reasonably identified as ¼ of the way between 10 and 11. Students should indicate that Abby spend 3 ¾ seconds longer in the water than Jack.

How much longer could Abby stay underwater than Jack? _____

- I can solve word problems about distance, liquid volume, solid mass, money, and time, including problems that use **simple fractions and decimals**. 4.MD.A.2

I can solve word problems that require expressing measurements given in a larger unit in terms of a smaller unit. 4.MD.A.2

4.Brandon and Kelly are training to run in a 5-kilometer race next month. Each morning, Brandon runs a route through the neighborhood park while Kelly runs on the racetrack at the high school.

On Monday, Brandon ran $3\frac{1}{2}$ kilometers before he needed to take a break. Kelly ran 7 laps on the track, and then she needed to rest. If each lap Kelly ran was 400 meters, who ran a longer distance on Monday: Brandon or Kelly?

a.Circle one: Brandon Kelly

b.Explain how you know which person ran a longer distance.

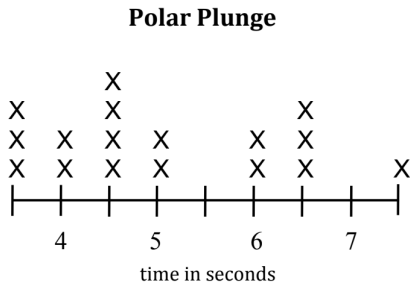
⊡ **4.MD.2 –** Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.	
4	Students can consistently demonstrate and teach any of the concepts in levels 3 to another student.
3	Students can consistently: • Use four operations to solve measurement word problems, including problems involving simple fractions or decimals • Solve problems that require expressing measurements given in a larger unit in terms of a smaller unit • Represent measurement quantities using diagrams such as number lines that feature a measurement scale
2	Students can do <u>two</u> of the following: • Use four operations to solve measurement word problems, including problems involving simple fractions or decimals • Solve problems that require expressing measurements given in a larger unit in terms of a smaller unit • Represent measurement quantities using diagrams such as number lines that feature a measurement scale
1	Students show minimal or no understanding of solving measurement word problems.

I can create line plots displaying fractions and use them to solve addition and subtraction problems. 4.MD.B.4

5.Last winter, Dylan and his boy scout troop participated in a special event called a "Polar Plunge" to raise money for charity.

On a cold winter day, all the kids dressed in their bathing suits and jumped into the water of a local lake. The scouts earned money based on how long they could stay in the lake. The line plot shows the length of time the boys were able to remain in the water.

Dylan was able to stay in the water 1 1/2 seconds longer than his friend Bryce. What are three possible times that Dylan and Bryce could have been in the lake?



possible answers are: 5 & 3 ½, 6 & 4 ½ , 6 ½ & 5, and 7 ½ & 6.

4.MD.4 – Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots. *For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.*	
4	Students can consistently demonstrate and teach any of the concepts in level 3 to another student.
3	Students can consistently: • Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). • Solve problems involving addition and subtraction of fractions by using information presented in line plots.
2	Students can make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8) **OR** • Solve problems involving addition and subtraction of fractions by using information presented in line plots.
1	Students show minimal to no understanding of making a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8), and solving problems involving addition and subtraction of fractions by using information presented in line plots.

I can solve word problems involving multiplication of a fraction by a whole number by using visual fraction models and equations to represent the problem. 4.NF.B.4.c

6.Courtney ran on a path that was 1 ⅛ of a mile in length. She ran the path 3 times.

What is the total distance that Courtney ran? _____ Draw a picture to represent your thinking.

5 x 7/8 = 5 x (7 x 1/8) OR (5 x 7) x 1/8 = 35 x 1/8 -or- 35/8. May draw 1 whole and ⅛ and show it 3 times.

■ 4.NF.4 – Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. a. Understand a fraction *a*/*b* as a multiple of 1/*b*. *For example, use a visual fraction model to represent 5/4 as the product 5 × (1/4), recording the conclusion by the equation 5/4 = 5 × (1/4).* b. Understand a multiple of *a*/*b* as a multiple of 1/*b*, and use this understanding to multiply a fraction by a whole number. *For example, use a visual fraction model to express 3 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.)* c. Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. *For example, if each person at a party will eat 3/8 of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?*	
4	Students can consistently demonstrate and teach any of the concepts in level 3 to another student.
3	Students can consistently: • Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. • Understand a multiple of *a*/*b* as a multiple of 1/*b*, and use this understanding to multiply a fraction by a whole number. • Solve word problems involving multiplication of a fraction by a whole number.
2	Students can do <u>two</u> of the following: • Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. • Understand a multiple of *a*/*b* as a multiple of 1/*b*, and use this understanding to multiply a fraction by a whole number. • Solve word problems involving multiplication of a fraction by a whole number.
1	Students demonstrate minimal to no understanding how to multiply a whole number by a fraction.

Student Page

Name: Date:_____

Directions: complete the math problems as best as you can and show your work, including drawings and equations, to help explain how you solved them.

1. **I can solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators (by using visual fraction models and equations to represent the problem). <u>4.NF.B.3.d</u>**

Amy, Beth, Katie, Gretchen, and Deb love chocolate. One afternoon, they each had a 2 large chocolate bars. Each chocolate bar was the same size.
Here is what each girl ate:

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a. How could you show how many chocolate bars were eaten in total?

b.How much chocolate remains?

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2. **I can add two fractions with respective denominators 10 and 100.** ***For example, express 3/10 as 30/100, and add 3/10 + 4/100 = 34/100.*** **4. NF.C.5**

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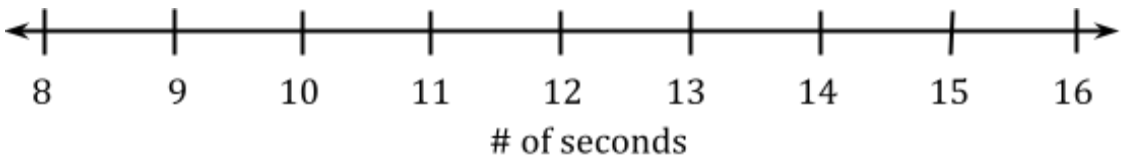
Jack and Abby's coach, Coach Foster, timed them with a stopwatch when they went underwater. Jack stayed underwater for $10\frac{1}{4}$ seconds, while Abby was able to stay under for 14 seconds.

a.Label the number line to show the amount of time Jack and Abby each stayed underwater.



b.How much longer could Abby stay underwater than Jack? _____

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Brandon and Kelly are training to run in a 5-kilometer race next month. Each morning, Brandon runs a route through the neighborhood park while Kelly runs on the racetrack at the high school.

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a. **Circle one**: Brandon Kelly

b.Explain how you know which person ran a longer distance.

_____

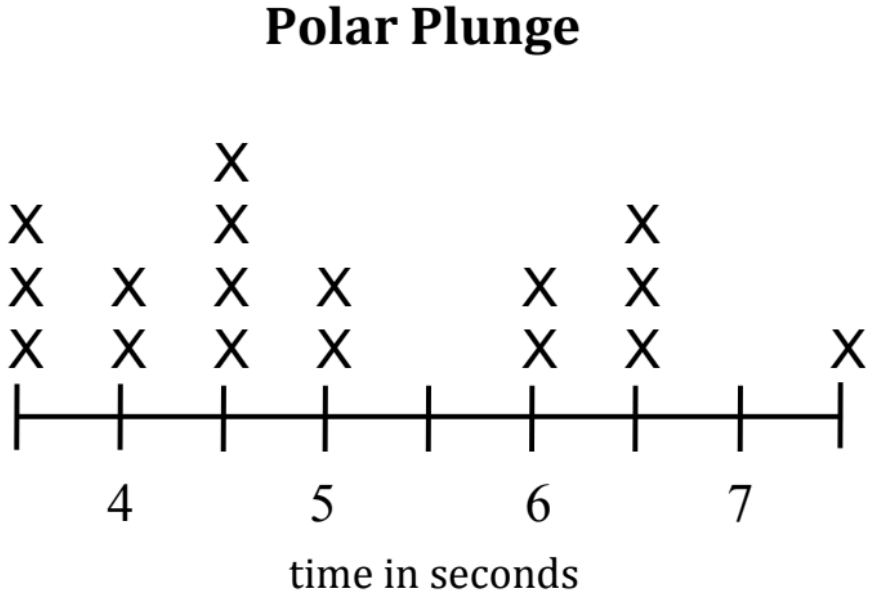
_____

_____

5. **I can create line plots displaying fractions and use them to solve addition and subtraction problems. 4.MD.B.4**

Last winter, Dylan and his boy scout troop participated in a special event called a "Polar Plunge" to raise money for charity.

On a cold winter day, all the kids dressed in their bathing suits and jumped into the water of a local lake. The scouts earned money based on how long they could stay in the lake. The line plot shows the length of time the boys were able to remain in the water.



Dylan was able to stay in the water 1 1/2 seconds longer than his friend Bryce.

What are three possible times that Dylan and Bryce

could have been in the lake?

possibility #1	
Dylan's time	Bryce's time
_____ sec	_____ sec

possibility #2	
Dylan's time	Bryce's time
_____ sec	_____ sec

possibility #3	
Dylan's time	Bryce's time
_____ sec	_____ sec

I can solve word problems involving multiplication of a fraction by a whole number by using visual fraction models and equations to represent the problem. 4.NF.B.4.c

6.Courtney ran on a path that was 1 ⅕ of a mile in length. She ran the path 3 times.

a.What is the total distance that Courtney ran?

b.Draw a picture to represent your thinking.