

Fractions, Decimal and Percentages Prior Assessment Question 13:

Objective: I can divide fractions by whole numbers.

NC: NFD 5 divide proper fractions by whole numbers [for example, $1/3 \div 2 = 1/6$]

Teacher Input Ideas:

Recap with the children how to multiply a fraction by a fraction. Ensure the children can explain how they have reached the answer and why this method works.

Introduce some left-over food such as pizzas and cakes. Ask the children to work out what they think the fraction of food is left. How do they know this?

Introduce sharing this food again with others. For example: I have $\frac{3}{4}$ of a pizza left. Look at how would you share this if you had 2 friends over. $\frac{3}{4}$ divided by 3 is $\frac{1}{4}$ each. Repeat with other simple fractions such as $3/9$ divided by 3 = $1/9$. Encourage the children to work these out independently or with partners, children may want to use drawings to help or the purple resource sheet could be given to children who do not understand.

Introduce that sometimes we want to share left over food, such as birthday cake, however the slices that have already been cut won't share equally as they are.

For example, $\frac{1}{2}$ of a cake. There are 3 people that would like to share it. What would you do? Ask children for ideas. Can the cake be shared? How would you share this? How was the cake shared initially?

Establish that we need to cut it again/share it/change the fraction. Model using 3 children in the class. So $\frac{1}{2}$ divided by 3. Cut the cake into 3. How much of the whole cake/pizza now has been cut? Imagine that the other half was there, what fraction would the slices be? Establish $1/6$. You may want to use fraction templates to show the size of the fractions you have created. Model counting around in 3s to show what we have done, for example this half is cut into 3, if I had the same on the other side, then that's 2×3 or $3 + 3$. So, know now that the size of each slice is $1/6$.

Repeat with other amounts using images or cakes/pizzas to help. For example, $\frac{1}{4}$ divided by 2 people. $1/3$ shared by 2. $1/3$ shared by 4. Some children may notice the link with multiplying a fraction by another fraction. They may also notice that they can multiply the denominator by the denominator. Ensure the children can explain why this works.

What if I had $2/5$ and I wanted to share with 3 people? Explore this through models initially. Establish that the answer would be $2/15$. Establish that each $1/5$ would be shared by 3 people. So, each person would have 2 of those & each slice would be $1/15$.

Practice Activities

Purple Practice: Most suited for children who made errors in Question 13, and need to further develop their understanding through use of practical aids.

The purple resources sheet provided could be given to each child or enlarged. Allow the children time to explore the images, establishing the fraction each one is showing. For each question, encourage the children to select which image they will need (you may need multiple copies of these for each child/group). Encourage children to cut up the images, colour in or draw new fractions on to these to help them to understand dividing the fraction by a whole number. They can also use these images to explain to others their understanding.

Write down or inform the children of these sums to work out using the resource:

$$\frac{2}{3} \div 2 \quad \frac{3}{4} \div 3 \quad \frac{7}{9} \div 7 \quad \frac{3}{9} \div 3 \quad \frac{2}{4} \div 2, \quad \frac{4}{6} \div 2$$

Then look at fractions where 1 is the numerator.

$$\frac{1}{2} \div 2 \quad \frac{1}{4} \div 2 \quad \frac{1}{3} \div 2 \quad \frac{1}{3} \div 3 \quad \frac{1}{6} \div 3 \quad \frac{1}{6} \div 2$$

Green Practice: Most suited for children who made errors in Question 13, however now show some understanding of dividing a fraction by a whole number.

This activity provides the children with the opportunity to divide fractions by whole numbers. The activity includes six questions with fractions where the numerator is 1. It then progressively gets trickier, where children are given amounts when the numerator is more than 1.

The children are also provided with space to show their working out through either creating their own drawings, recording the calculations they are performing or making jottings to help.

Yellow: Most suited for children who showed understanding in Q13 and need to further explore dividing with fractions when the numerator is not 1 and develop reasoning skills.

The children are presented with fractions to divide by whole numbers in the top section of the activity sheet. The children are required to use fractions that have the numerator of 1 and more than 1, and divide these by whole numbers. Some children may still use images to support understanding however, encourage the children to understand the calculations they are performing and explain why these work. The children are provided with questions to encourage them to explain to others.

In the second part of the task, the children are required to perform both fraction \times fraction sums and fraction \div whole number. They are then to show understanding that the answers are the same. The children here may want to use examples of the calculations they have performed and images to explain their understanding of why this is. Again, the children are provided with key questions to prompt their thinking.

Mastery 1: This activity provides the children with the opportunity to apply the skills of dividing a fraction by a whole number and deciding which symbols should be placed to complete the number sentences. For those children that will benefit from only securing this skill, the first 2 questions can be completed. Questions 3 and 4, also provide the opportunity for children to apply knowledge of \times fraction by a fraction and finding equivalent fractions to help the children to compare the amounts.

Mastery2: The children are presented with a word problem. The children are required to extract the relevant information and understand that they are must divide $1/6$ by 2 or they may also understand that this can be recorded as $1/6 \times 1/2$. Encourage the children to use the space provided to either create an image to help them or record the calculation they have used. The children should also reason their decisions and explain their method to another member of the class.

Answers:

Green:

- | | | |
|------------------|-----------|-----------|
| 1) $\frac{1}{4}$ | 2) $1/8$ | 3) $1/12$ |
| 4) $1/15$ | 5) $1/35$ | 6) $1/54$ |
| 7) $3/8$ | 8) $5/12$ | 9) $2/9$ |

Yellow:

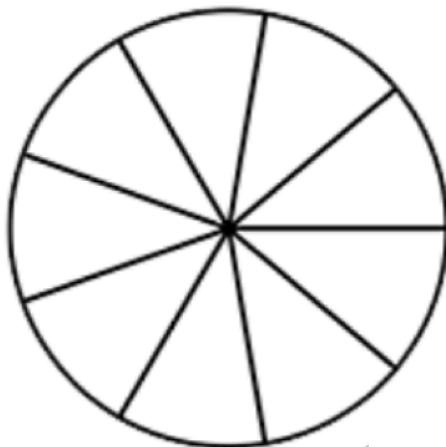
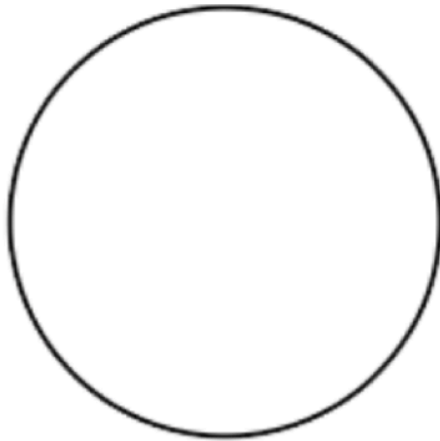
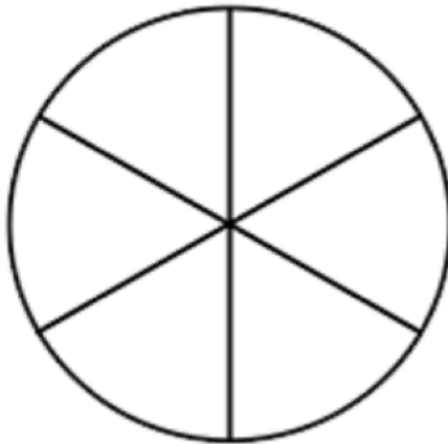
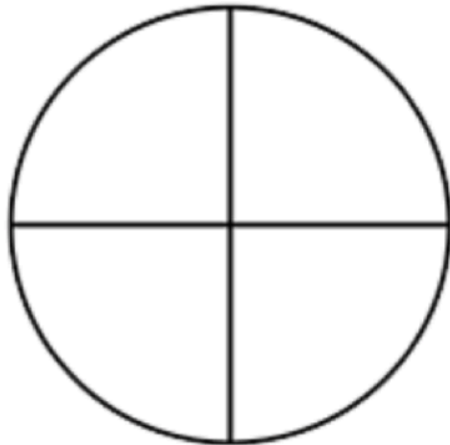
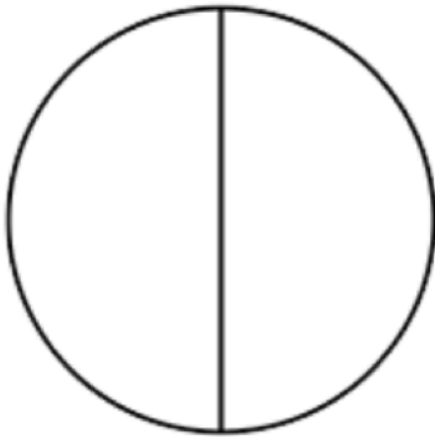
- | | | |
|---|-----------|--------------------|
| 1) a) $1/12$ | b) $1/32$ | c) $1/42$ |
| d) $3/10$ | e) $4/35$ | f) $2/18$ or $1/9$ |
| 2) a) $1/2 \div 5 = 1/10$ and $1/2 \times 1/5 = 1/10$ | | |
| b) $1/7 \times 1/3 = 1/21$ and $1/7 \div 3 = 1/21$ | | |
| c) $3/5 \div 2 = 3/10$ and $3/5 \times 1/2 = 3/10$ | | |

Encourage the children to notice that the answers are the same; they may need to use images or resources to help to explain why.

Mastery 1:

- | | |
|----------------------------------|--------------------------------|
| 1) $1/5 \div 3 > 1/3 \div 4$ | 2) $1/4 \div 6 = 1/8 \div 3$ |
| 3) $1/9 \div 2 = 1/2 \times 1/9$ | 4) $1/2 \div 3 < 1/3 \times 2$ |

Mastery 2: $1/6 \times \frac{1}{2}$ or $1/6 \div 2 = 1/12$



Look at each question. Use the space to show how you have worked out the answer by either creating a drawing, making jottings or recording calculations.

$$\frac{1}{2} \div 2$$

$$\frac{1}{2} \div 4$$

$$\frac{1}{4} \div 3$$

$$\frac{1}{3} \div 5$$

$$\frac{1}{5} \div 7$$

$$\frac{1}{9} \div 6$$

$$\frac{3}{4} \div 2$$

$$\frac{5}{6} \div 2$$

$$\frac{2}{3} \div 3$$

1) Find the answers to the questions below. Make jottings or use drawing if this helps to calculate the answer.

a) $\frac{1}{4} \div 3$

b) $\frac{1}{8} \div 4$

c) $\frac{1}{7} \div 6$

d) $\frac{3}{5} \div 2$

e) $\frac{4}{7} \div 5$

f) $\frac{2}{6} \div 3$

Explain to a friend how you worked out the answers. If you performed any calculations, explain why you used these.

2) Calculate the answers to each pair of sums below.

a) $\frac{1}{2} \div 5 = \square$

$\frac{1}{2} \times \frac{1}{5} = \square$

b) $\frac{1}{7} \times \frac{1}{3} = \square$

$\frac{1}{7} \div 3 = \square$

c) $\frac{3}{5} \div 2 = \square$

$\frac{3}{5} \times \frac{1}{2} = \square$

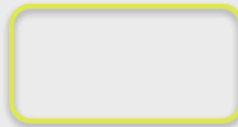
Look at each pair of sums. What do you notice? Why do you think this is? How do the calculations link? What relationship do they have?

Place each block in the correct place to make each number sentence correct.



1.

$$\frac{1}{5} \div 3$$



$$\frac{1}{3} \div 4$$

2.

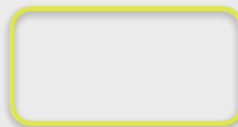
$$\frac{1}{4} \div 6$$



$$\frac{1}{8} \div 3$$

3.

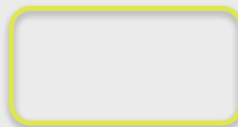
$$\frac{1}{9} \div 2$$



$$\frac{1}{2} \times \frac{1}{9}$$

4.

$$\frac{1}{2} \div 3$$



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

Amelia's birthday cake is cut into 6 equal pieces for all her guests. After it is cut an additional guest arrives, Sam. Amelia shares her piece of cake with Sam. How much of the cake do they get each?



A large, empty rounded rectangular box with a purple border, intended for the student to write their solution to the problem.

What is the calculation you have completed? Can you explain to another child how you worked out the answer? Do you need any images or resources to help you to explain?