

Task 27 Doing Homework Together



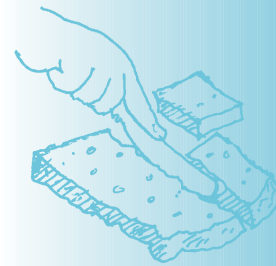
27

Purpose

The purpose of Part One is to find out 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.

Part Two will show whether students have a sense of the size of the improper fraction $\frac{4}{3}$.

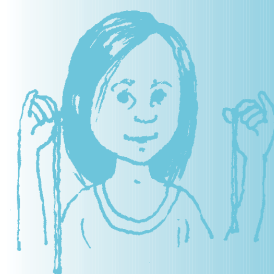
This task is suitable for more able upper primary students.



Adapting the Task to Accommodate Students' Background Experiences

If students are unable to complete this task successfully, give them an easier task to see whether they understand the relationship between fractions and division – for example, Task 25, Party Food, or Task 26, Brownies – Yum!

If students are able to successfully complete Doing Homework Together, then modify the task to ask about the relationship between more difficult fractions – for example, $\frac{3}{8}$ – and decimal numbers such as 0.3, 0.8, 0.38, 0.375 and 3.8. Ask: *Which of these cannot possibly be correct? Why?*

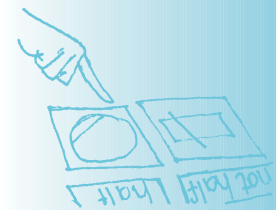


Interpreting Students' Responses

After students have developed their ideas about fractions in relation to sharing collections and objects, they need to extend their ideas to include fractions as numbers and then, later, the relationship between fractions and decimal numbers. Students who have little understanding of the relationship between fractions and decimal numbers will automatically choose 0.8 as the correct answer.

As they develop awareness of the size of fractions and decimal numbers, they will realise that 0.8 cannot possibly be correct, as 0.8 is almost one whole, whereas $\frac{1}{8}$ is a small part of one whole.

Children who have a sophisticated understanding of the relationship between $\frac{1}{8}$ and 0.125 will refer to the fact that $\frac{1}{8}$ is half of $\frac{1}{4}$ and that $\frac{1}{4}$ as a decimal is 0.25.



Links to First Steps in Mathematics

Understand Fractions KU 6
Phase – Operating



Task 27 Doing Homework Together



NAME:

DATE:

Part One

Seina and Pho were doing their homework together. The question said, *What is $\frac{1}{8}$ as a decimal?*



Who is right, or are they both right?
Draw a diagram below to explain what you think.

Part Two

Another question said: *How big is four thirds?*
Draw a diagram to show how big it is.

Task 27 Doing Homework Together

Ruby, Year 6

In Part One, Ruby (right) thinks that both children are wrong. She sees $\frac{1}{8}$ as the decimal 1.8 because she is thinking of fractions as two whole numbers. The 1 on the top of the 8 therefore has to be shown in the decimal number.

Similarly, in Part Two, she sees $\frac{4}{3}$ as 4.3, so that both of the numbers are represented in the decimal.

Who is right, or are they both right? *They were both wrong.*
 Draw a diagram below to explain what you think.

$\frac{1}{8} = 1.8$
 1 = 1 whole then 8

$0 = \text{no hole}$
 And the fraction has one whole.

Part Two
 Another question said: *How big is four thirds?*
 Draw a diagram to show how big it is.

4 wholes → 4.3 ← 3 thirds

Who is right, or are they both right?
 Draw a diagram below to explain what you think.

Seina because that is the only one with 8 in it.

Part Two
 Another question said: *How big is four thirds?*
 Draw a diagram to show how big it is.

*I think it's an improper fraction.
 = $1\frac{1}{3}$*

Jessica, Year 6

In Part One, Jessica's (left) response shows that she does not understand the relationship between fractions and decimals or the size of $\frac{1}{8}$ or 0.8. If she knew that $\frac{1}{8}$ is half of $\frac{1}{4}$ or that 0.8 is almost one, then she would know that this cannot possibly be the right choice.

Part Two shows that she has some procedural understanding of improper fractions. She has not drawn a diagram as requested, which suggests that she may be unable to.

Planning for Learning

As Ruby and Jessica show limited understanding in this task, it would be appropriate to use other tasks to help work out what they know and don't know, to identify a more focussed starting point for them. A couple of different Diagnostic Tasks could be used to find out whether they understand fractions of objects (try Task 8, Cooking at Home, or Task 13, Naming Fractions) and whether they understand fractions of collections (try Task 12, Broken Eggs, or Task 17, Cookies).

Kimberley, Year 7

In Part One, Kimberley (right) used a procedure to work out that $\frac{1}{8}$ is the same as 0.8.

In Part Two, she drew a sequence of diagrams showing quarters, not thirds, to illustrate $\frac{4}{3}$. To her, $\frac{4}{3}$ is shown by the quarter that is removed from one whole circle - that is, after finding $\frac{3}{4}$ of one circle, she shaded the remaining $\frac{1}{4}$.

This suggests that Kimberley does not really understand fractions as decimals or the size of fractions that are more than one - that is, improper fractions.

Who is right, or are they both right?
Draw a diagram below to explain what you think.

$$\frac{1}{8}$$

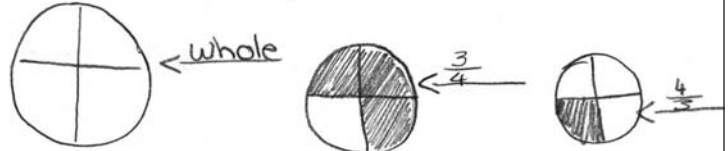
$$\frac{1}{100} \times \frac{8}{10}$$

$$0.8$$

I think Seina Right

Part Two

Another question said: How big is four thirds?
Draw a diagram to show how big it is.



Who is right, or are they both right?
Draw a diagram below to explain what you think.

$0.125 + 0.125 = 0.25$
 $0.25 + 0.125 = 0.375$
 $0.375 + 0.125 = 0.500$
 $0.500 \times 2 = 1.000$
 $1.000 \div 8 = 0.125$
 $0.500 \times 2 = 1.000$

$0.8 = \frac{8}{10} = 0.8$

$1,000 \div 8 = 125$

1.33

Part Two
Another question said: How big is four thirds?
Draw a diagram to show how big it is.

James, Year 7

James's (left) work shows that in Part One suggests that he has an understanding of the relationship between fractions and decimals. He knows that 0.8 is the same as $\frac{8}{10}$ and has used a doubling process to show that 8×0.125 makes one whole. He wrote $1,000 \div 8 = 0.125$, which shows that he knows he can use division to find the decimal equivalent. It is interesting that he has written 1 as 1,000 and 0.5 as 0.500, suggesting that he may not yet fully understand decimal numbers.

In Part Two, he has successfully drawn a picture to show $\frac{4}{3}$ as $1\frac{1}{3}$.

Planning for Learning

Kimberley would benefit from activities that help her to think about the relationships between fractions and decimals based on their size. For example, she could be asked to show $\frac{1}{2}$ of an object and 0.5 of the same object, then $\frac{1}{4}$ and 0.25 of the object, then $\frac{3}{4}$ and 0.75. Later she could be asked to compare various fractions to commonly known decimal numbers (0.5, 0.25, 0.75). For example, after drawing a diagram to show $\frac{1}{8}$, ask: *Is this close to one whole? Is it closer to 0.5, or closer to 0.25? Ask: If it is smaller than 0.25, then what decimal number might it be? Could it be 0.8? Why not?*

James shows a good understanding of the relationship between fractions and decimals; however, he seems to be having some problems with decimals. To continue working with him on fractions, find out whether he understands that fractions can be used to represent ratios (try Task 28, Visit to the Zoo, or Task 29, Making Lemonade) or the relationships between fractions, percentages and decimals (try Task 30, 'More' Game). Otherwise, use a decimal task to find out exactly what he needs to learn about decimals.