

Mathematics Professional Learning Resources

to enhance teachers' mathematical knowledge!

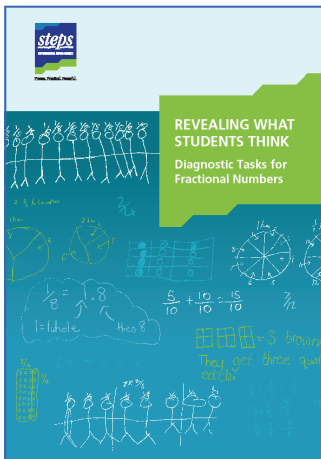
REVEALING WHAT STUDENTS THINK

Diagnostic Tasks for Fractional Numbers



Revealing What Students Think presents **thirty, easy-to-use Diagnostic Tasks** designed to reveal what students really think and understand about fractions.

- Each task has been **tried with students** and deals with **common difficulties**, experienced by many students, **in understanding fractions**.
- Detailed information is included about the **purpose of each task**, how you can **adapt the task** to students' background experiences and how to **interpret their responses**.
- The tasks take the form of **photocopiable worksheets** and **interviews**, and proforma sheets are provided for recording what students say and do.
- Multiple **student work samples** demonstrate the range of responses that may be found in any one classroom.
- Each sample is richly supported by **learning activities** that suggest the mathematics students with similar responses would need to learn.
- The tasks will help you **uncover students' preconceptions, partial conceptions or misconceptions** embedded in their understanding of fractional numbers.
- The tasks are also a powerful vehicle to **promote teacher to teacher conversations about mathematics learning** and their professional judgments.



Task 7 Which Is Bigger?

Purpose
This task will show whether students know that $\frac{1}{2}$ is smaller than $\frac{1}{3}$ because the more portions something is split into, the smaller each portion is.
This task is suitable for more able middle primary students and upper primary students.

Adapting the Task to Accommodate Students' Background Experiences:
You will get more information about students' understanding of fractions if they draw a diagram to help explain their answer. If they do not attempt to do this, prompt them to do this.

Interpreting Students' Responses
Many young students hold a faulty idea of fractions as two whole numbers and so compare them by looking at the size of the numbers. This is a common misconception among young students that can prevent them from making sense of their fraction work. If a student overcomes to the scenario presented, this is reflecting this misconception by saying that $\frac{1}{2}$ is bigger than $\frac{1}{3}$ because 2 is bigger than 3. Students who agree with this idea could be asked to think about the fact that they are trying to solve a problem, as we do not want their misconceptions reinforced. They should be engaged in activities that help them to overcome this misconception, see, for example, *Understanding a Simple Learning Activities* (Watts et al., 2004, vol. 1, pp. 186-187).

Other students who agree with this idea may do so because they are not familiar enough with units. Their mistake becomes very familiar with halves and quarters through everyday interaction; however, these are not as commonly used. Students who understand halves and quarters as parts of a whole may try to use this knowledge to work out what this means. They may partition a shape into quarters thinking of these as thirds, and think in units of three.

Other students will find the four quarters in a shape and divide three of them thinking this is bigger than three because there are three of something. Some students who correctly choose their response may get the right answer based on such faulty reasoning. If they shade $\frac{2}{3}$ of a shape, thinking this is $\frac{1}{2}$, then their diagram will show that $\frac{1}{2}$ is bigger than the $\frac{1}{3}$ they have correctly shaded.

Task 7 Which Is Bigger?

NAME: _____ DATE: _____

Tanya and Brit had been working on fractions at school. After school they were chatting about what they had learned.

Tanya: $\frac{1}{2}$ is bigger than $\frac{1}{3}$.

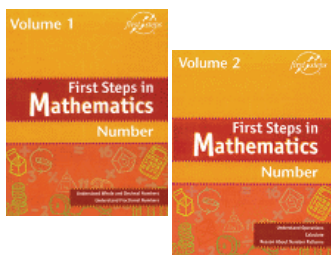
Brit: No, it isn't. $\frac{1}{2}$ is bigger than $\frac{1}{3}$ because 2 is bigger than 3.

Who is right?
Explain to Tanya and Brit how you know which is bigger. You might like to draw a diagram to help.

DIAGNOSTIC TASKS FOR FRACTIONS

Email us to preview further sample tasks.

Revealing What Students Think is a great companion to **First Steps in Mathematics: Number**



Number is a research-based 2-book resource, which aims to improve students' understanding of Number, through developing teachers' professional knowledge of mathematical concepts, and support Numeracy Project learning!

Contents:

Book 1: Diagnostic Map: Number

Understand Whole and Decimal Number / **Understand Fractions**

Book 2: Understand Operations/ Calculate/ Reason about Number Patterns

Find out about the professional learning options available for this resource!

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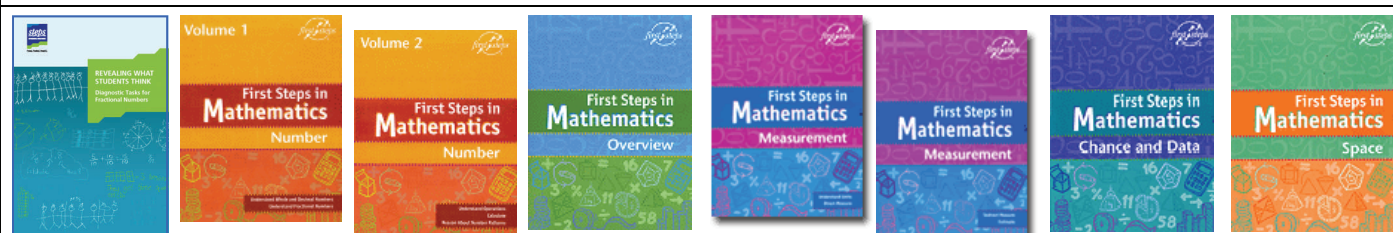
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Revealing What Students Think & First Steps in Mathematics: NUMBER Pack	SPECIAL! 3 books!		\$175	\$160	
First Steps in Mathematics: Overview			\$39.95	\$33.50	
First Steps in Mathematics: NUMBER Pack	2 books		\$118.95	\$99.00	
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