

# What is the whole?

## Teaching strategies for thinking about fractions

### Best for

- Year level: 3
- Fraction construct: Part-whole



### Overview

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
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| <b>Description</b>         | <p>This activity is designed to support students to develop understanding of the <b>part-whole</b> fraction construct, which is foundational in students' development of thinking about fractions.</p> <p>Through the activity, students can be supported to understand that:</p> <ul style="list-style-type: none"> <li>• a fraction describes a relationship between a part and a whole</li> <li>• the same number can represent any fraction of a larger collection</li> <li>• we can work backwards from the value of the fraction to determine the size of the whole.</li> </ul>                          |
| <b>Learning focus</b>      | <b>Australian Curriculum: Year 3 Mathematics</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                            | <b>Number</b> <ul style="list-style-type: none"> <li>• recognise and represent unit fractions including <math>\frac{1}{2}</math>, <math>\frac{1}{3}</math>, <math>\frac{1}{4}</math>, <math>\frac{1}{5}</math> and <math>\frac{1}{10}</math> and their multiples in different ways; combine fractions with the same denominator to complete the whole (AC9M3N02)</li> </ul>                                                                                                                                                                                                                                    |
|                            | <b>Algebra</b> <ul style="list-style-type: none"> <li>• recall and demonstrate proficiency with multiplication facts for 3, 4, 5 and 10; extend and apply facts to develop the related division facts (AC9M3A03)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                    |
|                            | <b>General capability: Numeracy learning progression</b><br><b>Number sense and algebra: Interpreting fractions</b> <ul style="list-style-type: none"> <li>• re-imagining the whole — divides a whole into different fractional parts (P4)</li> </ul>                                                                                                                                                                                                                                                                                                                                                          |
| <b>Teacher preparation</b> | <ul style="list-style-type: none"> <li>• Identify appropriate groupings for students. This strategy works best when students are in small groups of three to four.</li> <li>• Assemble resources for each group: <ul style="list-style-type: none"> <li>– One <b>number</b> die — a standard six-sided die</li> <li>– One <b>fraction</b> die — a six-sided die labelled with six fractions, e.g. <math>\frac{1}{2}</math>, <math>\frac{1}{3}</math>, <math>\frac{1}{4}</math>, <math>\frac{1}{5}</math>, <math>\frac{1}{8}</math>, <math>\frac{1}{10}</math></li> <li>– 60 paperclips.</li> </ul> </li> </ul> |

## Suggested implementation

1. Organise students into small groups of three to four.
2. Place 60 paperclips in the middle of the table.
3. Ask students to take turns to:
  - a. roll the pair of dice
  - b. based on the roll, complete this sentence:  
 ‘(fraction roll) of my collection is (whole number roll), so altogether, I have ...’  
 e.g.  $\frac{1}{4}$  of my collection is 3, so altogether, I have 12.’
  - c. take the relevant number of paper clips from the centre of the table.

The winner is the student with the most paperclips when the pile is exhausted.
4. Check participants understand that the task is to find the whole when you know a part, not that they are finding a fraction of a whole, i.e. the number of paperclips in the middle of the table is not relevant.
5. Conclude with a whole class discussion. You may like to use the following questions to lead a discussion:
  - a. How did you work out the total number of paperclips you could collect?
  - b. What mathematical operators did you use to help you figure out the ‘whole’?
  - c. Did different strategies produce the same answer?
  - d. Did you use the same strategy every time? Or did you adjust depending on the size of the part or the fraction?
  - e. What made some fractions easier to work with than others?

## Variations

1. Paperclips can be substituted with other items, e.g. counters, buttons and matchsticks.
2. If fraction dice are not available, two different-coloured standard dice can be used. One die represents the value of the collection, while the other represents the denominator of a unit fraction (a roll of 4 would represent the fraction  $\frac{1}{4}$ ).
3. Digital tools could be used instead of dice or for collections of items.
4. This activity could be adapted for higher year levels by incorporating more challenging fractions, e.g.  $\frac{1}{6}$ ,  $\frac{1}{7}$ ,  $\frac{1}{9}$ ,  $\frac{1}{12}$ .

## Reference

This activity is inspired by Australian Association of Mathematics Teachers. (n.d.). *Parts and wholes*. Top drawer teachers: Resources for teachers of mathematics.  
<https://topdrawer.aamt.edu.au/Fractions/Activities/Part-and-wholes>



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