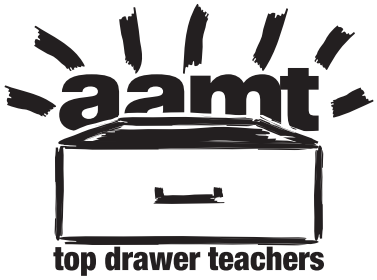

Document extract

Title of chapter/article	Colour in Fractions
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Copyright owner	The Australian Association of Mathematics Teachers (AAMT) Inc.
Published in	Fractions: Teaching for Understanding
Year of publication	2011
Page range	193–194
ISBN/ISSN	978-1-875900-68-8

COLOUR IN FRACTIONS

Anne Roche and Doug Clarke (see Chapter 2 for details)

This is a game that is suitable for all students from Years 4 to 8, as strategies used can vary so much according to levels of understanding. Using dice and a game board (see Resource Sheet 2), students roll the dice to form fractions and represent these on their personal fraction wall, attempting to colour in the whole game board in as few turns as possible.

Relevant mathematical content

Part-whole understanding, appropriate use of fractional language, equivalence, early addition of fractions, probability, problem solving, visualisation.

The rules

Each horizontal strip on the gameboard is one whole. So, the first strip is made up of two halves, the next one three thirds, and so on.

Students have two six-sided dice that together create fractions up to twelfths, and a fraction wall. They colour in sections of the wall that correspond to the fractions that they roll with the dice.

- one die is labelled 1, 2, 2, 3, 3, 4 in one colour
- another die is labelled */2, */3, */4, */6, */8, */12 in another colour

Players in turn throw both dice. They make a fraction, the first die being the numerator.

They then colour the equivalent of the fraction shown. For example, if they throw 2 and */4, then they can colour in $\frac{2}{4}$ of one line, or $\frac{4}{8}$ of one line, or $\frac{1}{4}$ of one line and $\frac{2}{8}$ of another, or any other combination that is the same as $\frac{2}{4}$.

If a player is unable to use their turn, they "pass." They are not allowed to break up a "brick". The first player who colours in their whole wall is the winner, but the other player is encouraged to keep going (with the support of the first player) to fill their board, if time permits.

Introducing the game

We make use of an A3 version of the game board, stuck to the board and gather the class around. We invite one student to roll the two dice and generate a fraction. As we need a fraction that has a number of straightforward equivalences, we prefer something like $\frac{1}{4}$ or $\frac{4}{8}$. This is a

chance to emphasise that the student has many choices in what they shade: for $\frac{4}{8}$, it could be $\frac{1}{2}$ or 4/8 or even $\frac{1}{4}$ from one row and $\frac{2}{8}$ from another.

Each roll, the student should use a different colour, making it easy for the students and the teacher to follow clearly the decisions made at each stage of the game. For example, a student might have rolled "$\frac{3}{8}$", but shaded "$\frac{1}{4}+\frac{1}{8}$".

As will be evident to the reader, no mention has been made to date of improper fractions, which are bound to arise at some stage in the game. This provides a chance to consider a careful inclusive explanation of the numerator and denominator. We prefer this explanation for students:

In the fraction $\frac{a}{b}$, b is the name or size of the part (e.g., fifths have this name because 5 equal parts can fill a whole) and a is the number of parts of that name or size.

So if we have $\frac{4}{3}$, the three tells the name or size of the parts (thirds), and the 4 tells us that we have 4 of those thirds (or $1\frac{1}{3}$). Once this explanation has taken place, students quickly see that rolling an improper fraction, early in the game, can work to their advantage.

A discussion of strategies

In pulling the lesson together, we often ask students to consider questions such as:

- If you played the game tomorrow, what would you do differently?
- If you were giving hints to a younger brother or sister before they played the game for the first time, what would you say?