Rational Number games

GAME 1: Fraction Comparison

Resources Needed:

- Fraction pieces or fraction strips
- Two 6-sided dice
- 10 counters
- String or chalk line on carpet for empty number line

Game Focus:

- Comparing $\frac{1}{2}, \frac{1}{4}, \frac{1}{3}, \frac{1}{5}, \frac{1}{6}$ fractions: and whole fractions using mathematical symbols (<, >, =)

How to Play:

- The game can be played by **2–4 players**, either individually or in pairs.
- On each turn, players roll the two dice and use the numbers to create a fraction with the fraction shapes or strips.
  Example:
    - **Player 1** rolls a 1 and a 4, so they create ¼.
    - **Player 2** rolls a 2 and a 3, so they create ⅔.
- After each turn, players compare their fractions. The player/pair with the **largest fraction** wins the round and takes a counter. Use mathematical symbols (<, >, =)
  Example:
    - ⅔ is larger than ¼, so **Player 2** wins the round and takes a counter.
- The first player/pair to collect **five counters** wins the game!

Optional Twist:

- For a variation, the winner of each round can be the player/pair with the **smallest fraction**!
- Record all the fractions made during the game. Order from smallest to biggest. Can you put these on an empty number line?

Easier Version :

- Use a simplified set of fractions: ½, ¼, ⅓, and whole.

- Use dice numbered: 1, 2, 2, 3, 3, 4.

Teaching notes - game 1

- **Basic Fractions**: Introduces foundational fractions (½, ¼, ⅓), helping students understand fractions as parts of a whole.
- **Hands-On Learning**: Using fraction circles or strips gives a concrete way to visualise and manipulate fractions, essential for Phase 1 learners.
- **Comparing Fractions**: Helps students compare simple fractions, building early number sense around the size of different fractions.

Key Concepts:

- **Fractions as Parts of a Whole**: Reinforces the idea that fractions represent parts of something larger.
- **Relative Size**: Helps students understand which fractions are larger or smaller, a key learning goal in Phase 1.

Extensions:

- **Visual Number Line**: Introduce a number line to show fractions in relation to whole numbers.

GAME 2: Make 4 Wholes

Resources Needed:

- Game board
- Two 6-sided dice
- Felt pens or markers for shading

Game Focus:

- Identifying and working with fractions: ½, ¼, ⅓, 1/5, 1/6, ⅛, and whole fractions.
- Shading fractions to complete wholes.

How to Play:

- The game is designed for **2–4 players**. Players can play individually or in pairs.
1. **Taking Turns**:
   - On their turn, each player/pair rolls the two dice. The numbers rolled are used to create a fraction, with the smaller number as the numerator and the larger number as the denominator.
   - Players then shade in the corresponding fraction on their game board.
   - **Example**:
     - **Player 1** rolls a 1 and a 4, so they shade ¼ on their fraction strip.
     - **Player 2** rolls a 2 and a 3, so they shade ⅔ on their fraction strip.
2. **Missing a Turn**:
   - If a player cannot shade in a fraction (e.g., if the remaining fraction doesn't match the dice roll), they miss their turn.
   - Encourage players to **discuss what they notice** as they play, such as discovering equivalent fractions (e.g., ½ = 3/6).
3. **Winning the Game**:
   - The first player or pair to **complete 4 wholes** by shading fractions wins the game!

Game Board

Game board - 'Make 4 Wholes'
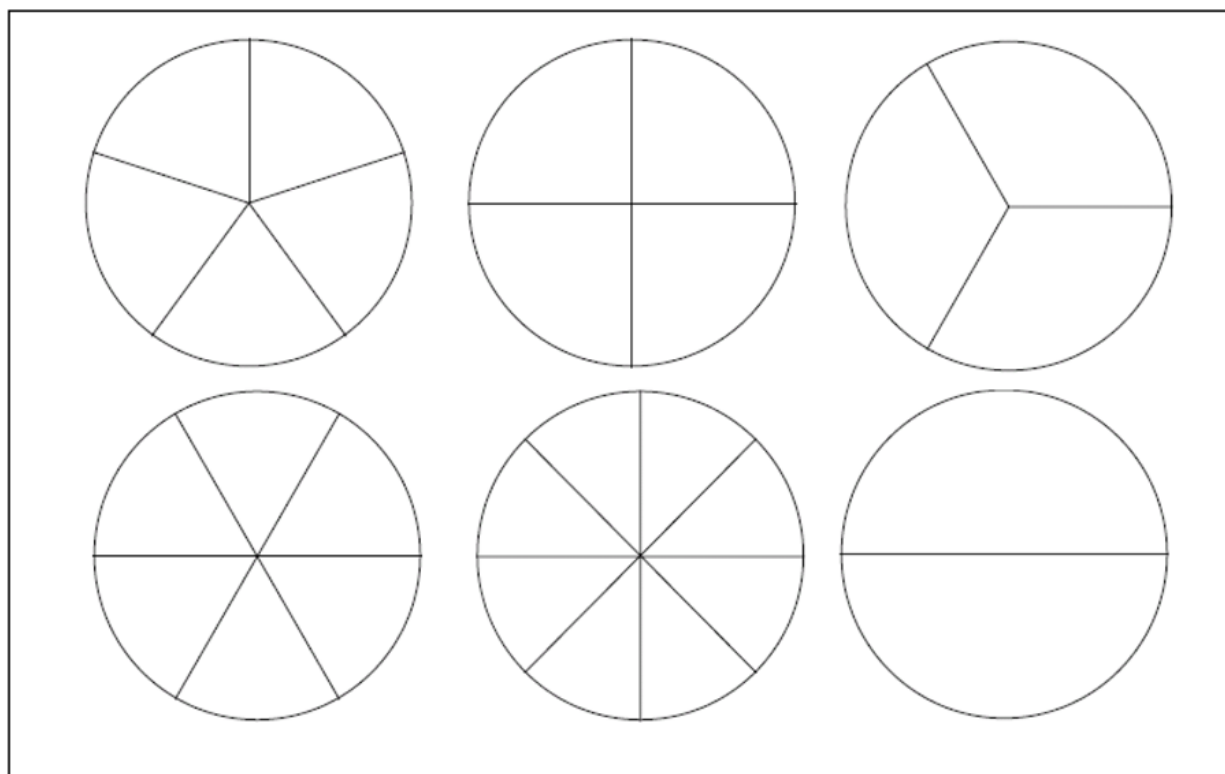
Teacher notes:

The Make 4 Wholes game fits into Phase 2 of the NZC Mathematics and Statistics curriculum by focusing on identifying, visualising, and comparing fractions using fraction strips.

In Phase 2, students build fluency with fractions through repeated practice, similar to how they later gain fluency with decimal place value. The Make 4 Wholes game helps students repeatedly work with fractions, building their confidence, just as they later do with decimals.

The game encourages flexible thinking as students combine different fractions to make a whole, just like the strategic placement of decimals in later phases. Both involve adapting and thinking flexibly about numbers.

Students develop the ability to compare fractions and estimate their sizes in relation to a whole. This skill is foundational to the estimation and precision required when working with decimals in later phases.

Game 3: Target

Resources Needed:

Target chart per student (or just draw it in books)
1 x 10 sided dice
Pencils
Place value houses

Game Focus:

Place value
Addition – counting on, subtraction
Probability
Estimation

The aim of the game is to be as close to the target as possible after 10 rolls of the dice.

1. Class chooses a target (i.e. 5235). Write it on the board. At the end of 10 rolls, their sum must be as close as possible to the target.
2. Roll 10 sided dice. Call out number
3. Next to 'roll 1' students write the number rolled, then in the 'my choice' column choose whether to make it a unit, tens, hundreds, thousands etc. Number must be entered before the next roll. You can't go back and change anything.
4. Continue until you have 10 rolls.
5. Add up all the 'choices'
6. Closest sum to the target is the winner

Extensions:
Practise decimal place value by making a decimal target and they can choose to make hundredths, tenths etc
Make the numbers larger
Make a negative target
Discuss strategy

Target!   _____

Roll	Number rolled on the dice	My choice
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
SUM of your choice column		

Target!   _____

Roll	Number rolled on the dice	My choice
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
SUM of your choice column		

Teacher notes

- **Decimal Place Value**: By using a decimal target, students practise assigning numbers to tenths, hundredths, or even thousandths places. This deepens their understanding of decimal fractions and how they fit into the place value system.

- **Addition of Decimals**: Students add decimal numbers as they aim for the target, reinforcing their ability to work with decimal place values and practising accurate addition, a key skill for Phase 3.
- **Strategic Use of Place Value**: Students must think critically about where to place each rolled number—whether in the units, tenths, or hundredths—based on their target, helping them build strong number sense and flexibility with decimals.
- **Estimation with Decimals**: The game introduces estimation with decimals, encouraging students to anticipate the outcome of their choices and adjust their strategies to get as close as possible to the target.

Extenders:

- **Decimal Focus**: Use a decimal target (e.g., 52.35) and have students place their rolled numbers into units, tenths, hundredths, or thousandths, further challenging their understanding of decimal place value.
- **Comparing and Ordering Decimals**: After completing the game, have students compare their results, discussing which decimals are larger or smaller, and order them from smallest to largest.
- **Operations with Decimals**: Extend the game by including multiplication or subtraction with decimals, reinforcing that operations with decimals follow the same principles as whole numbers.