



Got It!

<http://nrich.maths.org/1272>

GOT IT is an adding game for two.

Start with the GOT IT target 23.

The first player chooses a whole number from 1 to 4.

Players take turns to add a whole number from 1 to 4 to the running total.

The player who hits the target of 23 wins the game.

To change the game, choose a new GOT IT! target or a new range of numbers to add on.

Play the game several times.

Can you find a winning strategy?

Does your strategy depend on whether or not you go first?

Can you work out a winning strategy for any target?

Can you work out a winning strategy for any range of numbers?

Is it best to start the game? Always?

Challenge your friends: One of you names the target and range and lets the other player start.

Are you good at mental arithmetic? Can you play without writing anything down?

You Will Need:

- Two standard 1 - 6 dice
- Copies of playing board above are available for printing from the site

Why do this problem?

Got It is a motivating context in which learners can apply basic addition and subtraction. However, the real challenge here is to find a winning strategy that always works and this involves conjecturing, refining ideas, generalising and using knowledge of factors and multiples.

Possible approach

All the notes that follow assume that the game's default setting is a target of 23 using the numbers 1 to 4.

Introduce the game to the class by inviting a volunteer to play against the computer. Do this a couple of times, giving them the option of going first or second each time.

Ask the students to play the game in pairs. Challenge them to find a strategy. As they play, circulate around the classroom and ask them what they think is important so far. Some might suggest that in order to win, they must be on 18. Others may have thought more and have ideas about how they can make sure they get to 18, and therefore 23.

After a suitable length of time bring the whole class together and invite one pair to demonstrate their strategy, explaining their decisions as they go along. Use other ideas to refine the strategy.

Demonstrate how you can vary the game by choosing different targets and different ranges of numbers. Ask the students to play the game in pairs, using settings of their own choice. Challenge them to find a winning strategy, whatever the setting.

Key questions

How can I work out the 'stepping stones' that I must 'hit' on my way to the target?

Is there an efficient way of finding the first 'stepping stone'?

When is it better to go first and when is it better to let the computer go first?

If the computer says 1, I say...?

If the computer says 2, I say...?

If the computer says 3, I say...?

Possible extension

Two more demanding games, requiring similar strategic thinking, are "Got a Strategy for Last Biscuit?" and "Nim-interactive"

Possible support

You could demonstrate the game a few more times at the start. Alter the settings on the game to have a lower target and a shorter range of numbers (for example a target of 10 using the numbers 1 and 2). As you play, note down the running totals to refer back to later.