Target 100

Overview

This is a game designed to develop students' awareness of decimal place value and estimation skills when multiplying with decimals. Students enjoy it because they can normally see improvement after a few rounds, but it also allows more advanced students to be challenged further by varying the initial input number.

This activity should follow activities such as '*Exploring the Second Decimal Place*', which explore the meaning of decimal place value. It also compliments other decimal estimation activities such as '*Sorting Decimals: a near thing'* and *'Is the Answer Reasonable?'* , and the more complex estimation game '*Decimal Dilemma'*.

Skills and Knowledge

- Decimal place value
- Estimation of decimal calculations
- Multiplication of decimals
- Use of a calculator

Preparation and Materials

- Calculators (1 per student pair)
- Photocopy Activity Sheet: Target 100 (1 per student)

Suggested Procedure

Hand out a copy of the Activity Sheet to each student.

Arrange them in pairs ready to play and make sure each pair has a calculator between them.

Introducing the game

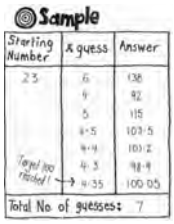
Explain:

- *This is an estimation game.*
- *You may find it a challenge the first time, but don't worry, most people get better after one or two tries.*
- *Look at the sample game on your sheet.*
  We will go through this together.

Sample play

- *As you can see the 'Target' or aim of the game is to get to 100 in the smallest number of guesses*
- *One of you (person A) will choose a starting number (in the sample game it is 23)*

- *The other person (B) has to estimate what to multiply it by to get to 100 and to do it without making too many guesses.*
- *In the sample game B has chosen 6.*
- *Person A does the multiplication 23 x 6 on the calculator. The answer is 138 which B writes into the table.*
- *It is too large, so B tries a smaller number, 4.*
- *But 4 x 23 = 92, too small!*
- *On the fourth try person B has to find something between 4 and 5 so it must be a decimal number.*
- *She tries 4.5, then 4.4 then 4.3 until she realises that it needs to be between 4.3 and 4.4.*
- *The only way to get this is to use the second decimal place*
- *Finally 23 x 4.35 gives her 100.05 which is close enough (as long as the whole number in the result is 100 you can ignore the decimal part).*
- **Person B** took **7 guesses**.



Explain that the players now swap roles – the second person supplies a starting number and the first person does the guessing. They are competing to get '100.something' with the lowest number of guesses.

Playing the Game

Get the pairs to play against each other, taking turns to select a starting number. The reason for asking the second person to perform the calculation is to keep both players involved in, and watching, the results of each guess.

It would be useful for students to play the game again several sessions later to remind them of what they learned, have forgotten from it.

Extending the students who are excelling

If you can see one or more of the players getting very quick with their estimations, it is time to challenge them further by suggesting more difficult starting numbers for them. For example, very low numbers or numbers quite close to 100, such as 95, 98 will be greater challenges.

Numbers just over 100 will also stimulate students who are progressing well. [See also the variations below.]

Possible variations of the game

The game can be made even more challenging for some students by:

1. Specifying a target number other than 100, for example a lower number.
2. Instead of using the starting number for each guess, the answer to the first calculation becomes the starting number for the next guess. For example, in the sample play, the answer 138 becomes the starting number for the second guess, so the player now has to find a number to multiply 138 by to get to 100. This does change the nature of the game considerably and should only be done with advanced students.

Sample

Starting Number	x guess	Answer
23	6	138
	4	92
	5	115
	4·5	103·5
	4·4	101·2
	4·3	98·9
Target 100 reached! →	4·35	100·05
Total No. of guesses: 7		

Round 1

Starting Number	x guess	Answer
Total No. of guesses:		

Round 2

Starting Number	x guess	Answer
Total No. of guesses:		

Round 3

Starting Number	x guess	Answer
Total no. of guesses:		