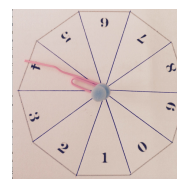# TARGET 4 by 2 DIVISION

Play this game as a lesson starter for the whole class or in pairs. Use a set of 10 cards that you can 'pick out of a hat' or a 0 to 9 spinner.

Version 1 This is a game of chance.
TARGET 100

Each player must draw the grid on a showboard or in their notebook.

Spin the spinner and the players must write the digit in one of the six boxes. Once a number is written the position cannot be changed.

Repeat five more times.

Then the players divide the 4-digit number by the 2-digit number and write the answer on the top line.

The player (or players) with the quotient closest to 100 wins. Score 1 point for a win.

Version 2 is a game of skill.

Each player must draw the grid on a showboard or in their notebook. Spin the spinner 6 times and make a note of the 6 numbers that come up. The players must write the digits in the s boxes so that the answer to the division is as close as possible to 100. A time limit such as 5 minutes is set for this. The player (or players) with the quotient closest to 100 wins. Score 1 point for a win.

Alternative scoring system. Players get penalty points each round equal to the **difference** between their answer and the target. At the end of the game the player with the LOWEST total of penalty points is the winner. Each player must draw the grid on a showboard or in their notebook.

HELP

As a warm-up to Target 4 by 2 division you could play the same game but simply dividing 4 digit numbers by 1 digit numbers with a target 1000.

See Target Division: https://aiminghigh.aimssec.ac.za/years-5-7-target-division/

NEXT

Add another 2 boxes and convert the calculation to give an answer to 2 decimal places and use the chunking method to check answers.

MAKE A 0 – 9 SPINNER

To make your own spinner you will need a paper clip and a pin.

Mark in the lines in the template on the right as in the diagram and cut it out.

Open up the paper clip and pin the paper clip and the template down on a flat surface so that the paper clip spins easily.

If you want to make a spinner without using a pin you can hold down the template and the paper clip with the point of a pencil.
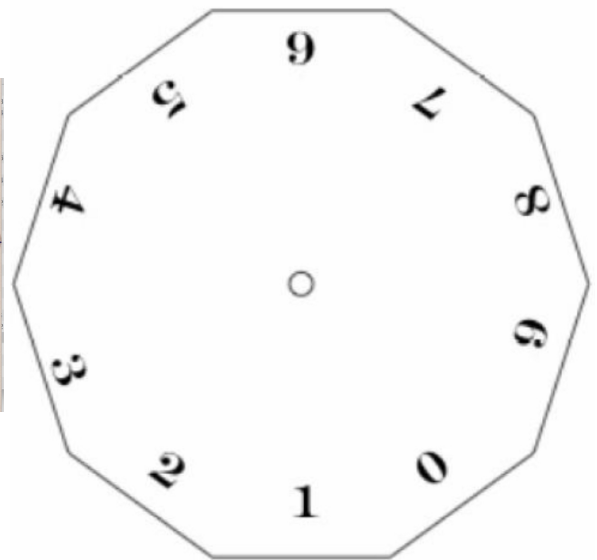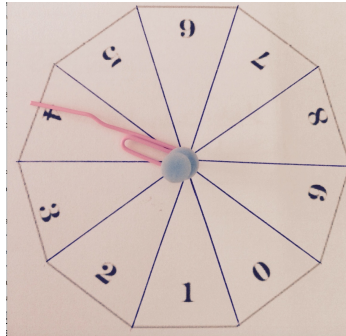
Alternatively make 10 cards that can be put in a bowl so the you can pick one digit randomly by taking one without looking.

NOTES FOR TEACHERS

SOLUTION

To get close to **target 100** you need to aim for numbers such that the 4-digit number to be 100 times the 2 digit number. This is because if $\frac{A}{B} = 100$ then $A = 100B$.

Diagnostic Assessment This should take about 5–10 minutes.

1. Write the question on the board, say to the class:
"Put up 1 finger if you think the answer is A, 2 fingers for B, 3 fingers for C and 4 fingers for D".

Work out giving any remainder as a decimal

$$5636 \div 16$$

A   352.25
B $252\frac{1}{4}$
C   352
D   352.4

2. Notice how the learners respond. Ask a learner who gave answer A to explain why he or she gave that answer and DO NOT say whether it is right or wrong but simply thank the learner for giving the answer.

3. It is important for learners to explain the reason for their answer so as to clarify their own thinking by putting their thoughts into words, and to improve their communication skills.

4. Then do the same for answers B, C and D. Try to make sure that learners listen to these reasons and try to decide if their own answer was right or wrong.

5. **Ask the class again to vote for the right answer by putting up 1, 2, 3 or 4 fingers. Notice if there is a change and who gave right and wrong answers.**

A. is the correct answer.

Common Misconceptions

B. Probably a guess

C. Either did not understand the question or just could not deal with decimals.

D. Dividing 5636 by 16 the remainder is 4, the quotient is $352\frac{1}{4} = 352.25$ But learners sometimes mistakenly write the quotient as 352.4 giving the remainder as the decimal part.
https://diagnosticquestions.com

Why do this activity?

The game develops the learners' number sense and gives practice in estimating the results of calculations. Doing well in this game depends on an understanding of how and why the division algorithm works. This game also develops skills of rounding numbers and estimating the answers to calculations. In life, machines are quicker and more accurate in doing calculations so that **the important life skills for young people are number sense, and the ability to estimate answers**.

The game can be used at different times as a lesson starter. When learning how to do such calculations the game will help to deepen the learners' understanding of the method as well as giving practice. Learners get practice in estimating the results of calculations which is a far more important skill than the ability to carry out the algorithm.

Subsequently the game can be used from time to time to give learners further practice in doing calculations. Players should check their own and each others' calculations.

The game also develops an appreciation of probability as it requires judgement about where to place the numbers in the grid and whether a 'better' number for that position is likely to come up.

Learning objectives

In doing this activity students will have an opportunity to:

- develop numeracy and skills at performing division of 4 digit numbers by 2 digit numbers;
- develop a deeper understanding of place value and methods of calculation;
- develop skills of rounding numbers and estimating the answers to calculations.

Generic competences

In doing this activity students will have an opportunity to:

- **think mathematically,** reason logically and give explanations;
- **think flexibly**, be creative and innovative and apply knowledge and skills.

Suggestions for teaching

Resources: A spinner or 10 number cards for each pair of learners.
To play the game as a whole class, first ask the learners to copy the grid into their workbooks. To introduce your class to this game, play this as a whole class game using Version 1. Once the learners understand the game and have had some practice, then they can progress to Version 2.

Learners can make their own spinners or sets of cards. It is important that the digits can be generated randomly. You could organise for learners to play in pairs or one pair against another pair. The first player to get 5 points is the winner.

The class might use more than one method to check the calculations, for example **the chunking method** as shown in the calculation below.

$$
\begin{array}{r}
62 \,|\, 8759 \\
- \,6200 \\
\hline
2559 \\
- \,2480 \\
\hline
79 \\
- \,62 \\
\hline
17
\end{array}
$$

Chunks

$62 \times 100 = 6200$

$62 \times 40 = 2480$

$6 \times 1 = 300$

Ask
"How many 62's do we need to make 8759?"

"Let's break 8759 into chunks so that we know how many 62's there are in each chunk."

$8759 \div 62 = 141$ remainder 17 or 141.27 to 2 decimal places.

As an alternative way of scoring, players could get penalty points for the difference between their total and the target number and add up their penalty points. They should play a few games until one of the players gets 1000 penalty points and loses the match.

Key questions

How will you choose your thousands digit and the double-digit divisor to get an answer near 100?

Follow up

Magic Numbers https://aiminghigh.aimssec.ac.za/years-5-9-magic-numbers/
Biggest Divisor Same Remainder
https://aiminghigh.aimssec.ac.za/years-9-10-biggest-divisor-same-remainder/