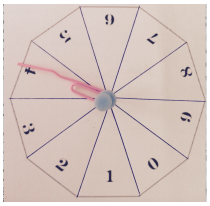
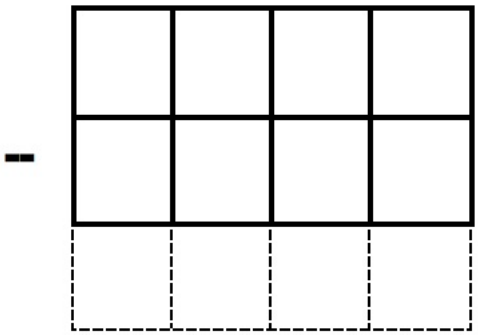
AFRICAN INSTITUTE FOR MATHEMATICAL SCIENCES
SCHOOLS ENRICHMENT CENTRE (AIMSSEC)
AIMING HIGH

TARGET SUBTRACTION



PLAY FOR FUN - THINK AND WIN - PLAY AND LEARN
LESSON STARTER GAME FOR THE WHOLE CLASS
A GAME FOR ANY NUMBER OF PLAYERS
The TARGET is 1000

You will need a set of 10 cards numbered 0 to 9 or a 0-9 spinner like the one in the picture.



Each player draws a grid like the one shown.

Draw a card or spin the spinner and call out the randomly chosen digit. All the players must write the digit in one of the top eight boxes.

Once a number is written it cannot be changed.

Repeat seven more times.

Then the players subtract the 4-digit number below from the number above it and write the difference on the bottom line.

The player (or players) with the difference closest to 1000 wins.

Score 1 point for a win.

ALTERNATIVE VERSION OF THE TARGET SUBTRACTION GAME. The players write down all 8 numbers and then at the end they are given a set time in which to decide where to place them. This is a game of skill that involves mathematical thinking and not luck.

GAME FOR 2 PLAYERS Each player draws a grid like the one shown. Take turns to spin the spinner and each player decides which of their cells to fill in. You can't change the position of the number once it is written in. After 8 spins each player subtracts their 4-digit number below from the number above it and writes the answer on the bottom line.

The players check each other's answers and agree on who has won that round. They need to understand that they must each find the difference (positive or negative) between their answer and 1000 and compare their difference with the other player's difference.

HELP

To win this game you need to estimate the answer to the final subtraction sum to make it as close to 1000 as possible. So you could round the 4-digit numbers to the nearest thousand and, if possible, place digits to make the numbers differ by one thousand, then make the other digits close to get a difference for the final answer as close to 1000 as possible.

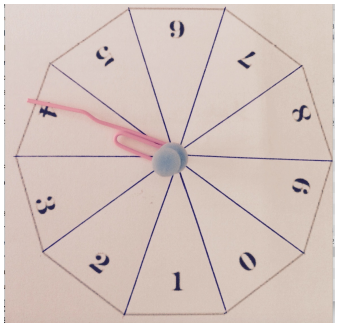
You might play these games first: Target 100 https://aiminghigh.aimssec.ac.za/years-4-5-target-100/ and Target 1000 https://aiminghigh.aimssec.ac.za/years-4-7-target-1000/

NEXT

Change the target, for example make a target of 1500. Does this change your playing strategy?

Organise a knockout competition where everyone in the class plays another learner in Round 1. Then the losers drop out and the winners of Round 1 compete in pairs in Round 2, the winners of Round 2 compete in Round 3 and so on until the Final is played between the last 2 players.

MAKE A 0 – 9 SPINNER

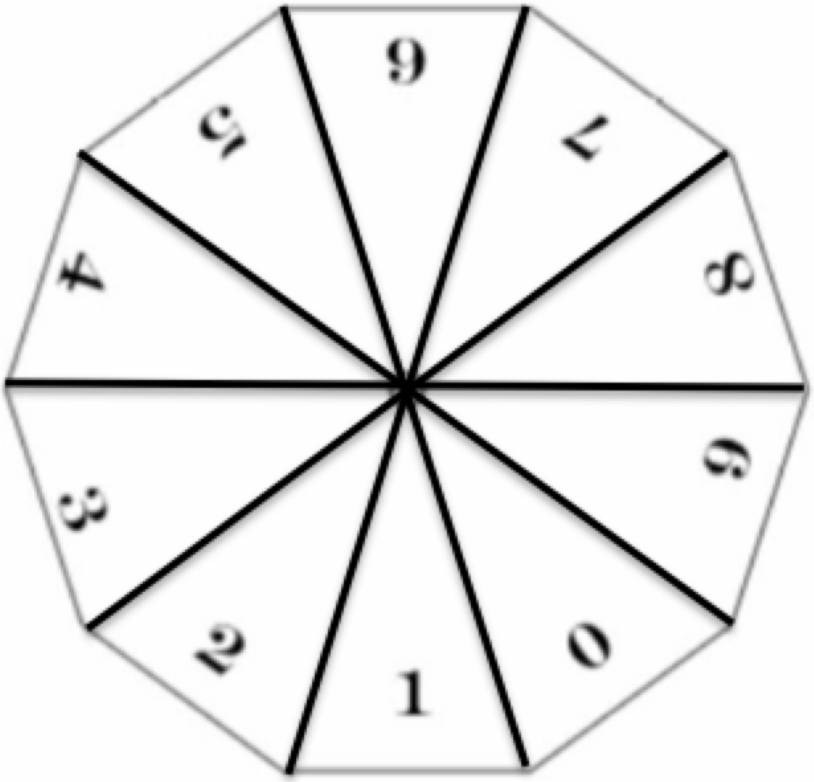


To make your own spinner you will need a paper clip, a pin and some card.

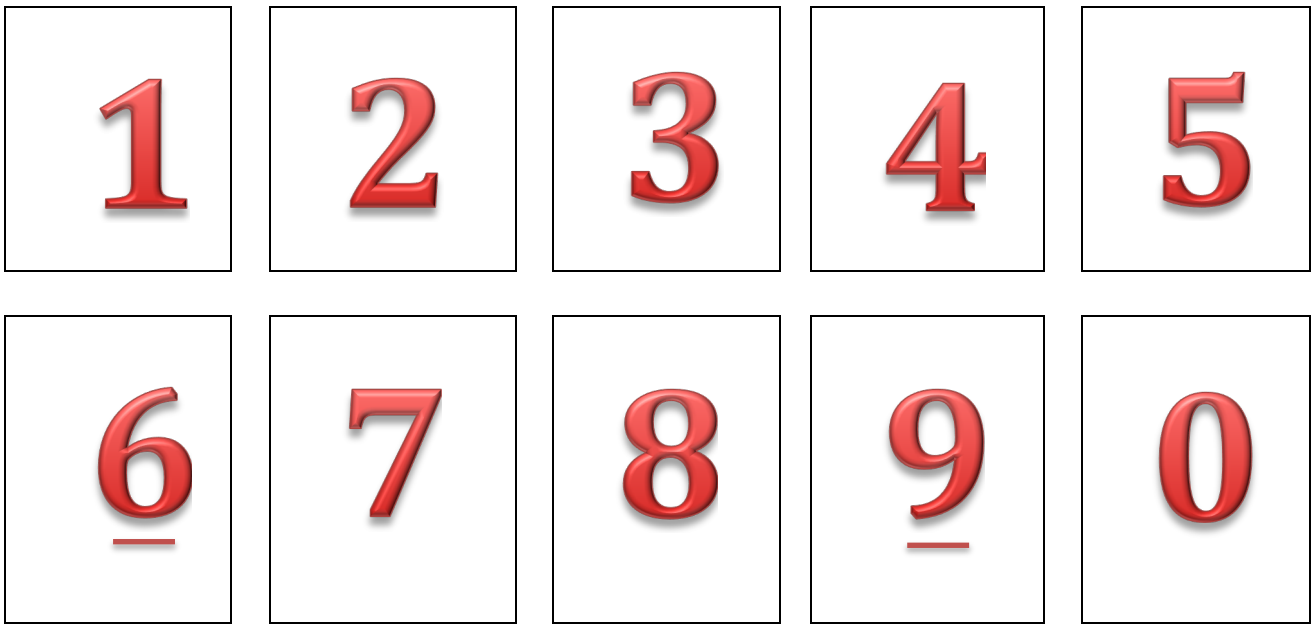
Prick through the template to mark the 10 outer vertices and the centre on the card. Then draw the spinner as in the diagram and cut it out.

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 so that you can draw one randomly from a box.



NOTES FOR TEACHERS

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".
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.

The answer to

$$\begin{array}{r} 8234 \\ \underline{-5678} \end{array}$$

is A. 3444 B. 2556 C. 2666 D. 2656

3. It is important for learners to explain the reason for their answer because putting thoughts into words helps them to clarify their thinking and to develop 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**
6. As the concept is needed for the lesson to follow, explain the right answer or give a remedial task.

The correct answer is B

A. A common error is to subtract the smaller from the larger digit in each column.

C. The units digit has been subtracted correctly but the carrying across to the tens and hundreds column has been ignored.

D. Mistake in the hundreds column. https://diagnosticquestions.com

Why do this activity?

The game develops the learners' number sense and gives practice in estimating the results of calculations. Understanding how and why the algorithm works, and the skill of rounding numbers and getting a good estimate of the answers to calculations, are more important life skills than actually doing calculations.

Doing well in this game depends on an understanding of place value and how and why the subtraction algorithm works. 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. Subsequently the game can be used from time to time to give learners practice in doing calculations. Players should check their own and each others' calculations without using a calculator.

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 of calculating subtraction of 4 digit numbers;
- develop a deeper understanding place value and methods of calculation.

Generic competences

In doing this activity students will have an opportunity to:

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

Suggestions for teaching

You may want to use this as a lesson starter quite often and only use the diagnostic quiz on one occasion. The quiz will lead naturally to a review of subtraction methods.

To play the game as a whole class, first ask the learners to copy the grid into their workbooks. The teacher draws a card or spins the spinner and calls out the digits. The learners fill in the digits in their grids. When they have filled in 8 digits they must subtract the lower number from the one above it and work out the difference.

Ask learners who have got an answer near the target number to come to the board and write up their answer. If anyone has got closer to the target they should show their working on the board. After deciding on the winner ask the class if anyone could have got closer to the target if they had known all the digits before filling any digits into the grid.

You might vary the game by making the target smaller, for example 500 or 600 or larger, for example 2000 or 3000.

The learners could make number cards or spinners and play the game in pairs. In this case the first player to get 5 points is the winner. The learners could use a different way of scoring. They 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

- You want the difference between these two numbers to be 1000. How will you choose the digits to put in the thousands place?
- Can you think about the subtraction sum all the time and try to make the answer near to 1000?

Follow up

Target Multiplication: https://aiminghigh.aimssec.ac.za/years-4-7-target-multiplication
Target Division: https://aiminghigh.aimssec.ac.za/years-5-7-target-division/
Target 4 by 2 Division: https://aiminghigh.aimssec.ac.za/years-6-7-target-4-by-2-division/
Square of numbers: https://aiminghigh.aimssec.ac.za/grades-4-to-7-a-square-of-numbers/

Note: The Grades or School Years specified on the AIMING HIGH Website correspond to Grades 4 to 12 in South Africa and the USA, to Years 4 to 12 in the UK and up to Secondary 5 in East Africa. New material will be added for Secondary 6. The mathematics taught in Year 13 (UK) and Secondary 6 (East Africa) is beyond the school curriculum for Grade 12 SA.
For resources for teaching A level mathematics see https://nrich.maths.org/12339

	Lower Primary or Foundation Phase Age 5 to 9	Upper Primary Age 9 to 11	Lower Secondary Age 11 to 14	Upper Secondary Age 15+
South Africa	Grades R and 1 to 3	Grades 4 to 6	Grades 7 to 9	Grades 10 to 12
USA	Kindergarten and G1 to 3	Grades 4 to 6	Grades 7 to 9	Grades 10 to 12
UK	Reception and Years 1 to 3	Years 4 to 6	Years 7 to 9	Years 10 to 13
East Africa	Nursery and Primary 1 to 3	Primary 4 to 6	Secondary 1 to 3	Secondary 4 to 6