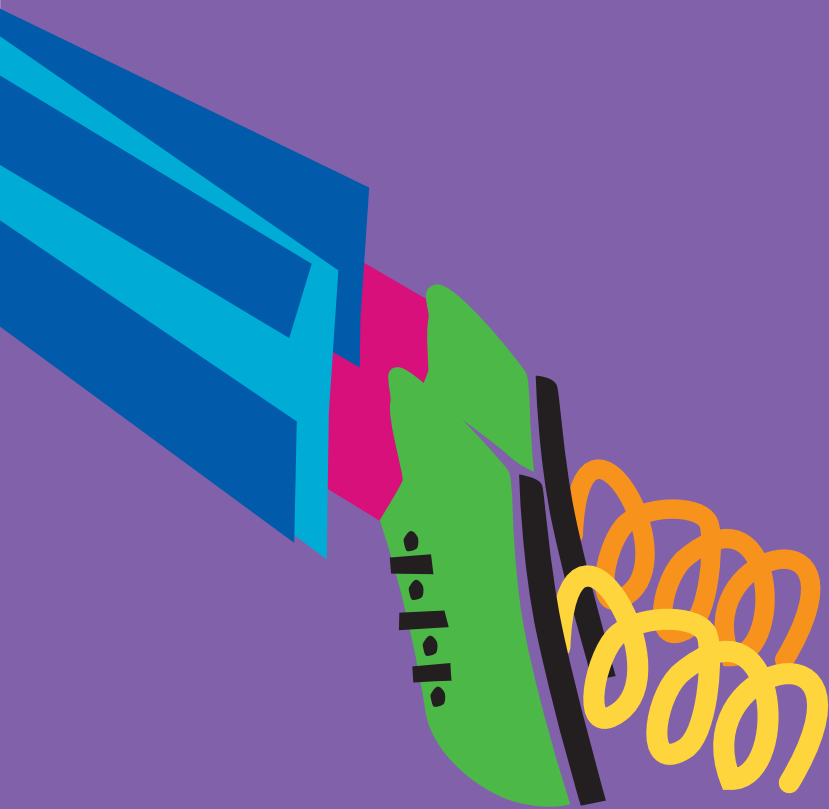


Fundamentals

Games to develop and reinforce mental computation strategies

Sample Game Purple



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ORIGO[®]
EDUCATION



Count Down

2 players

Subtracting multiples of ten

Purpose

The focus of this game is to subtract multiples of ten from two- and three-digit numbers. The first step in the game requires students to multiply single-digit numbers by ten.

Materials

Each pair of players will need

- A 'Count Down' score sheet (page 38) as shown below.
- One (1) standard number cube showing numerals 1-6.



How to Play

The aim is to reach a score close to zero.

- Together, the players nominate a starting number. The number is written in the 'Start' box at the top of the players' score sheets. Encourage the players to use a number between 100 and 150.
- The first player rolls the number cube and records the result on his or her score sheet. The player decides whether to use the number as it is, or to multiply it by 10.

Example: Jed rolls 4. He may use 4 or 40 (4 x 10).

- The chosen number is recorded in the middle column of the player's score sheet.
- The player subtracts this number from the starting number and records the answer in the right-hand column of his or her score sheet.
- The other player has a turn.
- Play alternates until a number rolled takes a score less than zero or the end of a score sheet is reached.
- The player who scores closer to (but not less than) zero is the winner.

Example: The score sheets below show Player One with a final score of 2 is the winner.

Reading the Research

Routinely ask students to defend their method of choice, both to identify users of immature strategies and to shape what is recognized as an acceptable reason (Sowder, 1988).

Player One		
Game One		
	Start	138
Number rolled	Number chosen	Score so far
4	40	98
6	60	38
6	6	32
3	30	2
5	-	
	Final Score	2

Player Two		
Game One		
	Start	138
Number rolled	Number chosen	Score so far
	50	88
1	10	78
3	30	48
4	40	8
5	5	3
4	-	
	Final Score	3

Before the Game

Make an overhead transparency of the score sheets. Select an opponent to help you demonstrate the rules of the game on the projector.

During the Game

Ask players to share their mental strategies for subtraction. Their explanations will vary, for example, these are just some ways students may calculate $149 - 50$:

Nathan: *I count back 5 tens. 149... 139... 129... 119... 109... 99.*

Nikki: *I just know that 99 plus 50 will give me 149, so the answer is 99.*

Neva: *I say, 14 tens take away 5 tens is 9 tens. The answer is 99.*

Noel: *I take away 50 from 150, that is 100, then adjust my answer to 99.*

Encourage the students to explain why they chose their particular strategy. Having to justify their choices will help students move from the less efficient to more efficient strategies.

After the Game

Play a game against the class. Use the game to discuss strategies and raise various questions, such as, *How do you decide whether to multiply the number by 10 or to use it as it is? If my score is 45, what roll do I want next? If my score is 11, what would be the best roll next? Why? If my score is 87, how could I get close to zero in three rolls?*

The image shows two score sheets for a game called 'Target'. The top sheet is for 'Player Two' and the bottom sheet is for 'Player One'. Each sheet has a 'Target' box at the top. Below the target box, there are two columns of 'Number rolled' and 'Score so far'. The 'Player One' sheet also includes a 'Score - final score' box at the bottom.

Beyond the Game

- The game can be varied to involve addition to reach a set target. Give two players a copy of the 'Target' score sheet on page 39 (illustrated). The players agree on a target number in the 100-150 range and write it in the 'Target' box at the top of their first score sheet. This time the players start at zero and stop when they roll a number that would take them beyond the target. The winner is the player that has the lower difference between his or her final score and the target.
- The students can also play both games using two standard number cubes. For each roll, the players have a choice of two numbers and must decide which one will give the better result.

Count Down

Final Score _____

Start

Number rolled	Number chosen	Score so far
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Game Two

Final Score _____

Start

Number rolled	Number chosen	Score so far
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Game One

Player Two

Player One

Game One

Start

Number rolled	Number chosen	Score so far
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
		Final Score _____

Game Two

Start

Number rolled	Number chosen	Score so far
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
		Final Score _____

Target

Target – final score _____

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Number rolled _____
 Number chosen _____
 Score so far _____

Target

Game Two

Target – final score _____

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Number rolled _____
 Number chosen _____
 Score so far _____

Target

Game One

Player Two

Player One

Game One

Target

Number rolled	Number chosen	Score so far
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Target – final score _____

Game Two

Target

Number rolled	Number chosen	Score so far
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Target – final score _____