What's the Secret Number?

Overview

This activity is designed to reinforce students' knowledge and use of the language of numbers and operations (+ - x) as they perform simple arithmetic calculations. It comprises a selection of 'cooperative logic' problems related to numbers and their properties. To solve the problems students interpret conceptual language such as odd, even, greater/less than, as well as the language of the operations.

Ideally students work together in small groups to solve the problems cooperatively, thereby reading, listening to and interpreting the relevant language as well as doing the calculations.

This activity is best done after the class have experienced some of the problems in the *Introducing Cooperative Logic* activity in the *Getting Started* section of this resource.

Note: Fewer sets are needed if you start each small group with a different problem and swap them around as they finish. However, this does require more attention during the class and can distract from observing and assisting students.

Skills and Knowledge

Addition, subtraction & multiplication of single digit numbers.

Language of number operations, such as:
- add, subtract, multiply, difference, total.

Language of number properties and comparison, such as:
- digit, odd, even, greater than, less than.

Preparation and Materials

Read the procedure for these problems as described in the *Introducing Cooperative Logic* activity (see *Getting Started*)

Photocopy *Activity Sheets 1 – 5*: (1 each per small group of students) onto stiff paper or card. Cut the clues and place into labelled envelopes.

Photocopy *Activity Sheet 6: Digit Sheet*. Cut to create one set of digits per small group (**two** of each digit per set).

Suggested Procedure

The suggested procedure for this activity is outlined in *Introducing Cooperative Logic.*

If students have experienced these problems before then remind them of the rules before they commence. If not explain the rules as in *Introducing Cooperative Logic*

Distribute one set of digits per small group and ask them to tip the contents onto the table.

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Explain:
- *You will be doing a few problems that ask you to find a 'secret' number*
- *I will give them to you one at a time*
- *The set of numbers, digits, I gave you can be used to solve all of the problems so keep them on your table*
- *Who knows what this word 'digit' means?*

Ensure that students realise that the term 'digit' refers to the single figures within a number. For example 56 is made of two digits, 5 and 6. If they were arranged in a different order, 65, the digits would be the same but the value of the number would be different.

To get students warmed up for the problems you could ask a few questions about this number, 56, and discuss the meaning of the words as they answer.

For example, ask:
- *Which digit is greater/smaller?*
- *Which is the tens digit?*
- *Which digit is odd/even?*
- *What is the sum, or total of these digits?*
- *What is the difference between these digits?*
- *If we multiply the digits what is the product (answer)?*

Distribute the problems one at a time to the small groups as they are ready. Ensure that they double check their own answers by reading out the clues again rather than relying on you for the correction.

Extension

Ask students to work in pairs to create a secret number problem of their own, based on the sorts of clues in the problems they have just done.

They should then cut up the clues and give them to other pairs or groups of students to solve.

Collect the successful problems to use yourself when you do this activity with another class of students.

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What's the Secret Number?

✂ Copy onto card and cut.

What's the secret number? Set 1 ## The number has two digits	What's the secret number? Set 1 ## The number is even
What's the secret number? Set 1 ## The number is less than 50	What's the secret number? Set 1 ## The difference between the digits is 1
What's the secret number? Set 1 ## The tens digit is greater than the other digit	What's the secret number? Set 1 ## The number is greater than 20

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What's the secret number? Set 2 **The number is even**	What's the secret number? Set 2 **The total of the digits is even**
What's the secret number? Set 2 **The number is not 20 or 24**	What's the secret number? Set 2 **8 is not one of its digits**
What's the secret number? Set 2 **Only one of its digits is 2**	What's the secret number? Set 2 **The number is less than 30**

What's the Secret Number?

✂ Copy onto card and cut.

What's the secret number?　Set 3 The number has two digits	What's the secret number?　Set 3 The sum of the digits is 10
What's the secret number?　Set 3 The tens digit is less than the second digit	What's the secret number?　Set 3 There are no odd digits in the number
What's the secret number?　Set 3 The number is greater than 30	What's the secret number?　Set 3 The difference between the digits is less than 5

What's the Secret Number?

✂ Copy onto card and cut.

What's the secret number? Set 4	What's the secret number? Set 4
The number is between 20 and 100	The difference between the digits is odd
What's the secret number? Set 4	What's the secret number? Set 4
The largest digit is even	If the digits are multiplied the product is even
What's the secret number? Set 4	What's the secret number? Set 4
The tens digit is the smallest	The sum of the digits is 9

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✂ Copy onto card and cut.

What's the secret number?　　　Set 5 **The sum of the digits is even**	What's the secret number?　　　Set 5 **The number is less than twenty**
What's the secret number?　　　Set 5 **The number is greater than 10**	What's the secret number?　　　Set 5 **Zero is not one of the digits**
What's the secret number?　　　Set 5 **The difference between the two digits is 6**	What's the secret number?　　　Set 5 **The number is odd**

✂ Copy onto card or stiff paper and cut into sets of digits.

1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9
0	0	0	0	0	0	0	0

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