

On the Trail of the Countback Kid has been developed to support the maths curriculum and the teaching of numeracy in schools at both Key Stage 1 and 2 and to reinforce much of the number work taught in class.

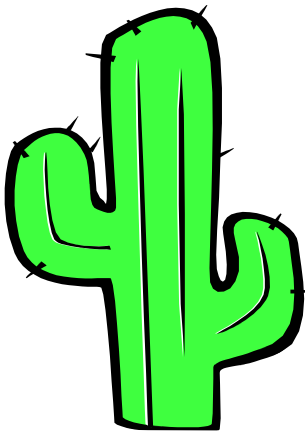
The main focus of the play is on problem solving using a variety of methods and how to identify which is the most appropriate method to use for the problem presented. Along the way we encounter place value, mental calculation, rounding up and down and written methods for approaching addition and subtraction.

The play presents the audience with a series of mathematical clues which must be solved to move the action on and as each mathematical idea is built upon the audience is involved directly in both the calculations and the methodologies employed to do so. Throughout they are encouraged to assess each task as it is presented to them and to choose the best way of effecting a solution.

The following pages provide a summary of the work covered and examples of how it is put into practice in the play. At the back of this booklet you will find a pupils' worksheet designed to tie in with the topics covered in the play which can be photocopied for use in the classroom.



GET THE POINT!



Poor old Pa. He never counts his Saloon takings right. The fact that he gets his digits in the wrong order doesn't seem to have occurred to him. Good thing the Countback Kid, is soon on hand to help him....

EVERYTHING IN ITS RIGHTFUL PLACE!

Using an HTU chart the kid demonstrates how the position of a digit affects its value. Using 9 and 1 she shows Pa how the two digits can make up the numbers 19 and 91 depending on their position and how their values change depending on whether they are in the tens column or the units. Pa discovers another 8 cents in his back pocket and the chart is extended past the decimal point to include tenths and hundredths.

DEALING WITH YOUR DECIMALS

Pa is still struggling with keeping his decimals in order so the Kid decides to give him some simple calculations to help him. Pa is told to multiply or divide a number by 10 and 100 and using bottles from Pa's bar she lines up the number 981.



The kid explains to the audience that in order to multiply by ten you must move the digits one place to the left and by a hundred, two places to the left (remembering to fill the units and tens column with a nought if necessary to hold the new place values), whereas to divide by ten or a hundred the digits all move either one place or two places to the right.

The audience are then given a series of calculations multiplying or dividing by ten or a hundred to demonstrate the use of the decimal point in giving place value.

Th	H	T	U	Th	Hth	
	9	8	1	•	0	
9	8	1	0	•	0	x10
	8	1	9	•	0	
		8	1	•	9	÷10
		9	0	•	1	
9	0	1	8	•	0	x100

Later in the play this knowledge is applied to solve part of a 'clue', this time dividing by 1000. The given number is 42,883 so:

$$42,883 \div 1000 = 42.883$$

GOING 'MENTAL'!

The various methods of mental calculation are now introduced and simple problems using whole numbers are presented to Pa. Each calculation can be approached using an assortment of methods but the kid

chooses the most appropriate method :

- . Breaking numbers up
- . Number bonds
- . Counting on
- . Doubling
- . Rounding and adjusting



These are the problems set for Pa and the methods we use to solve them:

$45 + 49 =$ *round and adjust*: round the 49 to 50, add together and adjust by taking away the 1

$27 + 25 =$ *doubling*: double the 25 to 50 and add on the two

$28 + 35 =$ breaking number up: 8 add 5 is 13, 20 add 30 is 50 and add together—63

$20 + 35 + 45 =$ number bonds: 20 and 35 is 55, 55 and 45 bond to make 100

ALL TOGETHER NOW....

The Kid has a song to remember all her mental methods and the audience is encouraged to join in:

It's time for education
On mental computation
So estimate, count on or back
To solve a calculation
Break numbers up—you've sussed it
Or round and then adjust it
So here we go...Let's calculate!

LET'S WRITE THAT DOWN...

Several of the problems set need to be solved using written methods and the audience is taken through each method step by step.

ADDITION

Start by putting the larger number on top and the smaller underneath, lining the units, tens, hundreds and thousand columns neatly underneath each other writing from right to left. Add each column in turn starting with the units on the far right:

$$\begin{array}{r} 35129 \\ 7754 \\ \hline 3 \end{array}$$

9 add 4 is 13 so write the 3 units under the units column and add the extra 1 to the tens. Continue in this fashion until each column is totalled.

SUBTRACTION

Put the number you want to subtract from on top and the one being taken away underneath. As with addition, line the place columns carefully from right to left and start with the units subtracting the bottom number from the top:

$$\begin{array}{r} 8\overset{3}{\cancel{4}}2 \\ 248 \\ \hline 4 \end{array}$$

In the tens column we have a problem taking 8 away from 2, so we 'exchange' a 1 from the hundreds column to make 12 in the tens column, remembering to adjust the hundreds down by 1. Continue in this fashion, borrowing from the column immediately on the left and adjusting if necessary, until all columns have been dealt with and the calculation is complete.

ROUND 'EM UP!

The Kid has a pithy phrase to help with rounding: *If a number is 5 or above round it up—anything below down you go!*

This is put into practice solving one of the clues.

$$95,321 \text{ rounded to the nearest } 10,000 = 100,000$$

$$12,359 \text{ rounded to the nearest } 10,000 = 10,000$$

Finally, a decimal number is rounded to the nearest whole number:

$$42.883 \text{ rounded to the nearest whole number} = 43$$

DIVISION RULES!

The rules of division are a great shortcut to knowing if a number has factors, or will divide exactly with no remainder. We have devised a rhyme to help remember them:

To divide by 2 – even the number must be.

To divide by 3 – sum of the digits divides by 3

To divide by 4- the last two digits must divide by 4

To divide by 5- ending in 5 or 0 is the law.

To divide by 6 – if it's even and the digits sum divides by 3

To divide by 8- 4 into half the number's the key

To divide by 9 – the sum of its digits divides by 9

To divide by 10- the last digit being a naught is the sign

The audience are given a series of four digit numbers and using these rules they have to tell us whether the number divides exactly:

Does 15 divide by 5? Yes, because it ends in a 5

Does 102 divide by 3? Yes, because the sum of the digits (3) divides by 3

Does 111 divide by 2? No, because it's not an even number

Does 148 divide by 4? Yes, because the last two digits (48) divide by 4

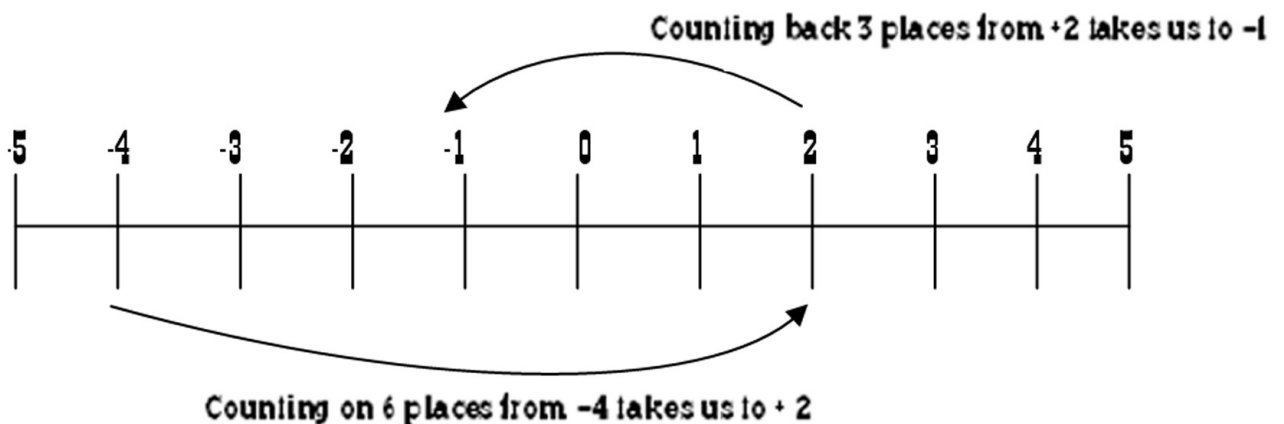
Does 205 divide by 10? No, because the number doesn't end in a 0

Does 117 divide by 9? Yes, because the sum of the digits (9) divides by 9

The audience are given the following numbers and using the above rules have to work out which one divides exactly by 4: 1811, 1797, 1809, 1784

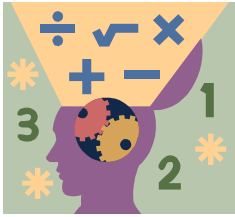
NUMBER LINE DANCING

The water levels of river have to drop in order for our pioneers to cross. So here we introduce a number line which includes positive and negative numbers.



The audience are involved in counting on and back from positive and negative numbers.

PROBLEMS! PROBLEMS!



Throughout the play runs a series of mathematical clues which must be solved in order to uncover the final destination of the missing money. These have been devised to encourage deft manipulation of numbers and a deeper understanding of their relationships.

PROBLEM NO 1

Using the number 35,129 make the largest and smallest number out of the digits:

95,321 — *the digits are arranged from left to right from the largest to the smallest*

12,359 — *the digits are arranged from left to right from the smallest to the largest*

Round both numbers to the nearest 10,000:

95,321 rounds up to 100,000

12,359 rounds down to 10,000

Take the smaller number from the larger: 90,000

Then divide by 1000: 90

This is the final answer, giving them the direction they must head: 90° North

PROBLEM NO 2

Find two consecutive numbers which add up to 149

Divide 150 by two and adjust to get the consecutive numbers 74 and 75

Make the largest number you can from the four digits 7, 4, 7, and 5: 7754

Add this number to the total of money stolen, 35,129. (Here written addition comes into play!) to get the total 42,883

Now divide the answer by 1000: 42.883

Round to the nearest whole number: 43

So they need to head to square 43

PROBLEM NO 3

Find the number in a series of 4 digit numbers which divides exactly by 4: 1784

Using the rules of division we know this one divides exactly by 4

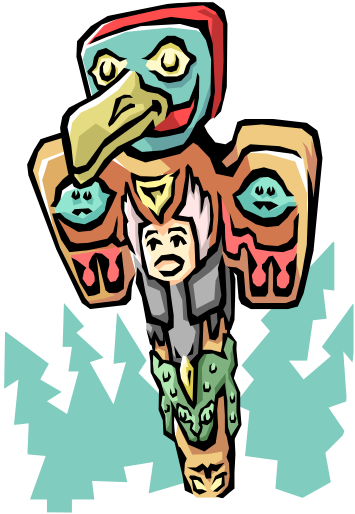
Now take 1784 away from the length of the Carryover River, 2081 (using counting on to find the difference) to get the answer 297

Take 1784 away from the height of Countback Mountain, 7919 (again using written methods!) to get the answer 6135

The answers are a code: 1=a 2=b 3=c etc. and spell out 'Big Face' - the name of the totem pole up on Countback Mountain and where they need to head for next:

THE RIDDLE OF THE POLE

To gain access to the missing money they must solve a series of mathematical problems set by Chief Big Face, the talking totem pole:



What is the product of 8×90 ? 720

What is the square root of 64? 8

Does 702 divide by 9? Yes

What is 5649 rounded to the nearest hundred? 5600

If there are 572 chiefs and 326 Indians how many in total? 898

What is the next number in this sequence? -23 -17 -11 -5
answer: 1

The kid enlists the help of the audience to solve the problems and calculate the answers and finally the money is theirs.....



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