

We have a problem!

Sparky Teaching's definitive guide to word problems.

Sample Pack

Download your full version from

www.sparkyteaching.com/resources/thinkingskills/wehaveaproblem.php



You have a problem!*

*In fact you have several... And they're all in this pack.

Thank you...

...for taking an interest in our 'We have a problem!' word-problem resource pack!

The enclosed sample contains extracts from the Teachers' Manual as well as examples of some of the worksheets provided. To see some examples of the Flash Presentations and to find out more, please visit...

www.sparkyteacher.com/resources/thinkingskills/wehaveaproblem.php

To be able to fully benefit from this thinking skills resource, download the full version from the same address.

All the resources in this sample and the full pack are copyright Sparky Teaching 2010 and all copies made must recognise so.

All rights reserved.



The Problem with Problems

It is a shame that, for a lot of pupils, Maths is seen as too hard simply because they struggle with the cognitive processes that are needed to arrive at a solution. We say it's a shame because, in many cases, these cognitive processes are not specifically related to mathematical thinking.

Perhaps the pupil has difficulties retaining information (numbers in this case) in their working memory, struggles to grasp abstract concepts (i.e. needs to physically "see" the sum) or finds it hard to apply their knowledge in new contexts... None of these examples are specifically Maths-related, but they are so integral to Maths lessons - if you struggle with them, you are going to find the subject tough.

Although schools are becoming better at recognising and teaching transferable thinking skills such as these, Maths teaching still leans heavily towards the solving of algorithms.

Let's be honest, what evidence do parents, children, the government and even some teachers look for to prove that a pupil has really grasped a mathematical concept?

Test results?

Ticks on a page?

NC Levels?

(None of which will be of practical use when our pupils enter the rapidly changing world of work in ten years' time or so.) Surely the most effective measure of understanding is to hear the child explain their working and then go on to apply that same skill in different contexts.

We are educating our children to enter a job market that values creative maths thinkers much more than algorithm answerers. Applying maths skills in different contexts is exactly what we do every day. Which brings us to our Word Problem resources...

Too often the teaching of word problems has been as an end-note to a series of lessons on a particular subject. We've all done it. After two weeks of multiplication lessons come the word problems all about... wait for it... multiplication. The pupils know what's coming. As we go on to mention below, a chance to practice one of the key transferable skills (the identification of which operation is necessary) is lost. In the real-world, numbers fly at us in all directions...

How long do I need to set the DVD recorder for?

How much mince do I need to use if I only make half of that lasagne?

How many words have I got left to type?

What time do I need to leave to get there by kick-off?

...and nobody is there to tell us that it's an addition or division operation that we need to do.

Suggested lesson activities

Theme title: *Key word clues*

Linked resources: Key word posters (p.12-15), key word help sheet (p.16), 'Which operation?' worksheets (p. 17-19) and Flash presentation (*KeyWordClues.swf*).

Key thinking skills: - INFORMATION-PROCESSING (*identifying important information*)
 - REASONING (*inferring from key information*)
 - ENQUIRY (*break the question down into parts*)
 - CREATIVE THINKING (*design own word problems*)

Activity aims: - *for pupils to identify and interpret key words*

Suggested activities:

- Give class a selection of word problem worksheets from several sources. Pupils to cut out any word they think give a clue as to what operation is needed. Stick them on separate A4 pieces of paper to form posters.

- The same activity could be done with highlighting the key words.

- Brainstorm class results – *could some of the clues mean more than one operation? (This is why we're calling them 'clues'... Sometimes they give a hint, but may be ambiguous.)*

- Before going through the presentation, get pupils to predict what might be on each slide. *Were there any key words that you thought of that weren't on the slide? Did the slides point out any you didn't get?*

- Display on of the slides. Get pupils to write their own word problem based on one of the key word clues (and calculate the answer as well). Ask their questions to the class.

- Spot the 'Key word clue' : Give pupils a small reward every time they catch you using one of the key word clues during the day. (*e.g. Can you split into groups of 4 for me?*)

- Complete the 'Which operation?' worksheets, identifying key words and choosing the correct operation. 'You're The Teacher' involves identifying where a peer has gone wrong and marking their 'work' accordingly.



in all
altogether

total
add together
perimeter plus
more than
increase

combine
sum of

Key word clues

Just because a word is in the question, it doesn't always mean that you can tell what sort of a word problem it is, but it should give you a half-decent idea...

Addition

in all
altogether
total
add
together
perimeter
more than
plus
increase
combine
sum of

Subtraction

less than
fewer than
subtract
take away
how much heavier/longer/shorter etc...
how many more
minus
how many left

Division

"EACH" in the question
split
shared between
equal parts
share
ratio
quotient
per
separate
divide
amount of each
fraction/percent

Multiplication

in all
lots of
groups of
product
times
ratio
per
double, triple, quadruple etc.
volume
area
multiplied by
"EACH" in the statement
total



We have a problem!

© Sparky Teaching 2010
All rights reserved

You're the teacher!
Which operation?

As you can see, this worksheet has already been completed. Today you're the teacher and it's your job to mark the answers! Read each question carefully and then look at the children's answers below. They're all wrong! But instead of trying to correct the numbers, just look at the sign. Ask yourself "what would have been the correct operation to use?"

For each question, use a coloured pencil to...

- Underline any key word (s) you think might give a clue about which operation is needed.
- Write a teacher's comment telling the pupil which symbol they should have used.

1. The strings on Kyle's guitar are 77cm long. During a particularly wild song, he snaps one of them! His replacement string is 120cm long. How much does he have to cut off to make it fit?

$$120 + 77 = 197 \text{ cm}$$

Teacher's comment:

2. Daniel and Naveed bought 24 rhubarb and custard sweets each. How many did they have altogether?

$$24 - 24 = 0 \text{ sweets}$$

Teacher's comment:

3. In the school long jump competition, Ivan stumbled as he got to the jump board and only jumped 40cm. His second jump was better and he managed 120cm. How much further did he jump the second time?

$$40 + 120 = 160 \text{ cm}$$

Teacher's comment:

4. Tariq bought 54 Premier League cards at the shop. He shared them between himself and 3 friends. How many did they get each?

$$54 \times 4 = 216 \text{ cards}$$

Teacher's comment:

5. Jamie gets £1.50 every week for keeping his bedroom tidy. How many weeks will it be before he has saved a total of £12?

$$£1.50 \times 12 = £18$$

Teacher's comment:

STRICTLY NOT FOR CHILDREN'S EYES

Dear Teacher

Thank you for your recent letter enquiring as to how to catch your class out with word problems. Obviously you know that I write most of the word problems for schools and I thought I'd write back to teach you some of the tricks of my trade. There's nothing I like better than trying to fool those unsuspecting kids.

I hope that you have a go at trying some of the following techniques in your classroom. Believe me, the children won't suspect a thing and you'll catch them out every single time!

1) CONFUSE THEM WITH MORE THAN ONE THING TO DO

One of my favourite wheezes is to write books full of questions where they have to do more than one operation to find the answer.

Here's an example: *Preeta has 34 sweets. She keeps 4 for herself, but decides to share the rest equally amongst 3 of her friends. How many do they get each?*

See what I did there? First they've got to subtract the 4 and then they have to divide by 3.

It's the oldest trick in the book, but it's a good 'un!

2) CHANGE THE UNITS OF MEASUREMENT

Another little prank to watch out for is when I change the units of measurement right at the very end of a question. It means they've got to convert the numbers to find the right answer. It gets 'em every time, I tell you!

For example: *Ben's bookshelf is 120cm high and his computer monitor is 25cm high. How many metres will they be if he puts one on top of the other?*

Did you spot it? Fantastic piece of question design that was... Ask 'em in 'centimetres' and then sock 'em with a 'metres' right at the end!

3) PROVIDE USELESS INFORMATION

My mother always used to say, "The muddier the water, the easier it is for natterjacks to hide." I never quite understood what she meant and I'm not really sure what it's got to do with word problems, but a little muddying of the water doesn't do any harm once in a while. Sometimes I like to ask a question that's so full of irrelevant facts, you can hardly tell where the question is.

Something like this: *It is a rainy Tuesday and Katie is daydreaming in a Spanish lesson, looking out of the window counting raindrops. There are twice as many drops coming down the left-hand side as the right. On the right-hand side there are 14 drops. How many raindrops are there on the left-hand side?*

A beautiful piece of word problem trickery there... Tuesday? Raindrops? Spanish? It's all unimportant. All the kids need are the numbers and to understand the question!

I hope these little tips will help you when it comes to teaching your class. And remember: if in doubt, put some wacky names in the word problems too... For some reason, that always confuses 'em!

Best wishes,

D. Seavor

Inventor of the Word Problem

We have a problem!

© Sparky Teaching 2010
All rights reserved

