

SPOT THE MISTAKE

Here are some calculations.

There are some mistakes and some correct methods and correct answers.

Find the mistakes and write out the correct calculation using that method.

Explain how and why the methods that get the correct answers work.

SPOT THE MISTAKE												
How do these methods work? Find the mistake and put it right.												
$\begin{array}{r} 79 \\ \times 8 \\ \hline 642 \end{array}$	<table border="1" style="border-collapse: collapse; width: 100%;"> <tr> <th style="width: 10%;">×</th> <th style="width: 20%;">70</th> <th style="width: 20%;">9</th> <th style="width: 20%;">TOTAL</th> </tr> <tr> <td>8</td> <td>560</td> <td>72</td> <td>632</td> </tr> </table>	×	70	9	TOTAL	8	560	72	632	$632 \div 8 =$ $\boxed{80 \times 7 + 8 \times 9} \div 8 = 79$		
×	70	9	TOTAL									
8	560	72	632									

SPOT THE MISTAKE												
How do these methods work? Find the mistake and put it right.												
$\begin{array}{r} 29 \\ \times 51 \\ \hline 145 \\ 290 \\ \hline 435 \end{array}$	<table border="1" style="border-collapse: collapse; width: 100%;"> <tr> <th style="width: 10%;">×</th> <th style="width: 20%;">20</th> <th style="width: 20%;">9</th> </tr> <tr> <td>50</td> <td>1000</td> <td>450</td> </tr> <tr> <td>1</td> <td>20</td> <td>9</td> </tr> </table>	×	20	9	50	1000	450	1	20	9	29×51 $= 1000 + 450 + 20 + 9$ $= 1479$	
×	20	9										
50	1000	450										
1	20	9										
29×51 $= 30 \times 51 - 51$ $= 1530 - 51$ $= 1479$	29×51 $= 29 \times 50 + 29$ $= 145 \times 100 + 29$ $= 1450 + 29$ $= 1479$											

SPOT THE MISTAKE															
How do these methods work? Find the mistake and put it right.															
$\begin{array}{r} 239 \\ \times 7 \\ \hline 1673 \end{array}$	<table border="1" style="border-collapse: collapse; width: 100%;"> <tr> <th style="width: 10%;">×</th> <th style="width: 20%;">200</th> <th style="width: 20%;">30</th> <th style="width: 20%;">9</th> <th style="width: 20%;">TOTAL</th> </tr> <tr> <td>7</td> <td>1400</td> <td>210</td> <td>63</td> <td>1673</td> </tr> </table>	×	200	30	9	TOTAL	7	1400	210	63	1673	$1673 \div 7$ $= \boxed{200 \times 7 + 30 \times 7 + 9 \times 7} \div 7$ $= 200 + 30 + 9$ $= 239$			
×	200	30	9	TOTAL											
7	1400	210	63	1673											

HELP

If you are stuck with the SPOT THE MISTAKE task the do the following.

- Do the calculations using any method you choose, and then check your calculation using a calculator.
- If you got it wrong look for your own mistake. If you can't find it, ask for help.

If you get the calculation correct then have a go at spotting the mistakes in the example.

NEXT

SPOT THE MISTAKE																				
How do these methods work? Find the mistake and put it right.																				
$\begin{array}{r} 129 \\ \times 34 \\ \hline 486 \\ 3870 \\ \hline 4356 \end{array}$	<table border="1" style="border-collapse: collapse; width: 100%;"> <tr> <th style="width: 10%;">×</th> <th style="width: 20%;">100</th> <th style="width: 20%;">20</th> <th style="width: 20%;">9</th> <th style="width: 20%;">TOTAL</th> </tr> <tr> <td>30</td> <td>3000</td> <td>600</td> <td>270</td> <td>3870</td> </tr> <tr> <td>4</td> <td>400</td> <td>80</td> <td>36</td> <td>516</td> </tr> </table>	×	100	20	9	TOTAL	30	3000	600	270	3870	4	400	80	36	516	129×34 $= 3870 + 516$ $= 4386$			
×	100	20	9	TOTAL																
30	3000	600	270	3870																
4	400	80	36	516																

SPOT THE MISTAKE																								
How do these methods work? Find the mistake and put it right.																								
$\begin{array}{r} 129 \\ \times 512 \\ \hline 258 \\ 1290 \\ 64500 \\ \hline 65948 \end{array}$	<table border="1" style="border-collapse: collapse; width: 100%;"> <tr> <th style="width: 10%;">×</th> <th style="width: 20%;">100</th> <th style="width: 20%;">20</th> <th style="width: 20%;">9</th> <th style="width: 20%;">TOTAL</th> </tr> <tr> <td>500</td> <td>50000</td> <td>10000</td> <td>4500</td> <td>64500</td> </tr> <tr> <td>10</td> <td>1000</td> <td>200</td> <td>90</td> <td>1290</td> </tr> <tr> <td>2</td> <td>200</td> <td>40</td> <td>18</td> <td>258</td> </tr> </table>	×	100	20	9	TOTAL	500	50000	10000	4500	64500	10	1000	200	90	1290	2	200	40	18	258	129×512 $= 64500 + 1290 + 258$ $= 66048$		
×	100	20	9	TOTAL																				
500	50000	10000	4500	64500																				
10	1000	200	90	1290																				
2	200	40	18	258																				

Make up your own written calculation, and then write it out with a deliberate mistake for your partner to spot and correct.

NOTES FOR TEACHERS

One of these 'spot the mistake' examples makes a good lesson starter. **Do only one each day.** First ask the learners to do the calculation themselves. Then show them the example and ask them to find the mistake and to explain what has gone wrong. Ask the learners to explain how the methods work and why.

SPOT THE MISTAKE - SOLUTIONS

SPOT THE MISTAKE
How do these methods work?
Find the mistake and put it right.

$\begin{array}{r} 79 \\ \times 8 \\ \hline 642 \end{array}$	<table border="1"> <tr> <th>x</th> <th>70</th> <th>9</th> <th>TOTAL</th> </tr> <tr> <td>8</td> <td>560</td> <td>72</td> <td>632</td> </tr> </table>	x	70	9	TOTAL	8	560	72	632
x	70	9	TOTAL						
8	560	72	632						
$\begin{array}{r} 8 \overline{)6372} \\ \underline{79} \end{array}$	$632 \div 8 =$ $\underline{80 \times 7 + 8 \times 9} \div 8 = 79$								

YEAR 4 2 digit by 1 digit multiplication

The correct answer is 632. The mistake is $8 \times 7 + 7$ is 64 where it should be 63. Otherwise this is correct. It shows that multiplication and division are inverse operations.

SPOT THE MISTAKE
How do these methods work?
Find the mistake and put it right.

$\begin{array}{r} 239 \\ \times 7 \\ \hline 1673 \end{array}$	<table border="1"> <tr> <th>x</th> <th>200</th> <th>30</th> <th>9</th> <th>TOTAL</th> </tr> <tr> <td>7</td> <td>1400</td> <td>210</td> <td>63</td> <td>1673</td> </tr> </table>	x	200	30	9	TOTAL	7	1400	210	63	1673
x	200	30	9	TOTAL							
7	1400	210	63	1673							
$\begin{array}{r} 7 \overline{)162763} \\ \underline{238} \end{array}$	$1673 \div 7$ $= \underline{200 \times 7 + 30 \times 7 + 9 \times 7} \div 7$ $= 200 + 30 + 9$ $= 239$										

YEAR 4 3 digit by 1 digit multiplication

The correct answer is 1673. The mistake is giving 63 divided by 7 to be 8 when $7 \times 9 = 63$.

SPOT THE MISTAKE
How do these methods work?
Find the mistake and put it right.

$\begin{array}{r} 29 \\ \times 51 \\ \hline 145 \\ 290 \\ \hline 435 \end{array}$	<table border="1"> <tr> <th>x</th> <th>20</th> <th>9</th> </tr> <tr> <td>50</td> <td>1000</td> <td>450</td> </tr> <tr> <td>1</td> <td>20</td> <td>9</td> </tr> </table>	x	20	9	50	1000	450	1	20	9
x	20	9								
50	1000	450								
1	20	9								
29×51 $= 30 \times 51 - 51$ $= 1530 - 51$ $= 1479$	29×51 $= 1000 + 450 + 20 + 9$ $= 1479$									
29×51 $= 29 \times 50 + 29$ $= 1450 + 29$ $= 1479$	29×51 $= 145 \times 100 + 29$ $= 1450 + 29$ $= 1479$									

YEAR 5 2 digit by 2 digit multiplication

The answer here is 1479 and there are 2 mistakes. In the column method 145 should be 1450 (29×5) and the 290 should be 29 (29×1).

In the calculation that $29 \times 50 = 14.5 \times 100$ the decimal point has been omitted but the product is correct on the line below.

SPOT THE MISTAKE
How do these methods work?
Find the mistake and put it right.

$\begin{array}{r} 129 \\ \times 34 \\ \hline 486 \\ 3870 \\ \hline 4356 \end{array}$	<table border="1"> <tr> <th>x</th> <th>100</th> <th>20</th> <th>9</th> <th>TOTAL</th> </tr> <tr> <td>30</td> <td>3000</td> <td>600</td> <td>270</td> <td>3870</td> </tr> <tr> <td>4</td> <td>400</td> <td>80</td> <td>36</td> <td>516</td> </tr> </table>	x	100	20	9	TOTAL	30	3000	600	270	3870	4	400	80	36	516
x	100	20	9	TOTAL												
30	3000	600	270	3870												
4	400	80	36	516												
129×34 $= 3870 + 516$ $= 4386$																

YEAR 6 3 digit by 2 digit multiplication

The answer here is 4386 and there is one mistake. In the column multiplication 486 (129×4) should be 516 and the total below should be 4386.

SPOT THE MISTAKE
How do these methods work?
Find the mistake and put it right.

129
×512
258
1290
64500
65948

×	100	20	9	TOTAL
500	50000	10000	4500	64500
10	1000	200	90	1290
2	200	40	18	258

129 × 512
= 64500 + 1290 + 258
= 66048

YEAR 6 3 digit by 3 digit multiplication
The answer here is 66048 and this time the mistake is in the addition in the column multiplication. The numbers 258, 1290 and 64500 are correct but the 1 is not carried over from the tens to the hundreds column in the addition.

Diagnostic Assessment

This quiz introduces a different method. The learners may not have seen the method before or may not remember it. After your group has done the other examples, use the quiz to help the learners to figure out how the method works and to explain it.

Show your learners the question and say:

“Put up 1 finger if you think the answer is A, 2 fingers for B, 3 for C and 4 fingers for D”.

37 × 42 = 1554

What number goes in place of the *?
How does this work?

The * should be:
A. 28 B. 2 C. 12 D. 14

1. Notice how the learners respond. Ask them to explain why they gave their answers and DO NOT say whether the answers are right or wrong but simply thank the learner for giving the answer.

2. It is important for learners to explain the reason for their answer otherwise many learners will just make a guess. Try to ensure that learners listen to each other and try to decide if their first answer was right or wrong.

3. Ask the learners 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.

B. is the correct answer.

Reading the thousands, hundreds, tens and units diagonally gives

$$1000 + (4 \times 100) + (15 \times 10) + 4 = 1554$$

Common Misconceptions

A. The learner knows $7 \times 4 = 28$ goes in this quarter but

does not understand that this triangle should have the hundreds value.

C. The learner may have multiplied 3×4 without understanding the process or relevance of place value.

D. Learner may have multiplied 7×2 without understanding the process or relevance of place value.

<https://diagnosticquestions.com>

Why do this activity?

Learners need practice in doing routine calculations and this activity gives them the necessary practice in an unusual way. More importantly, it encourages learners to think for themselves. It is often helpful to allow learners to work in pairs so that they can talk about the methods and exchange ideas. They will probably do the calculation to find out the correct answer if they don't spot the mistake straight away. They are also reminded how the working can be set out.

Also they have to understand the reasons for the working and not just the steps in the calculation process. They will gain a better understanding of multiplication and division by thinking about different methods of calculation and why the different methods work.

Learning objectives

In doing this activity students will have an opportunity to:

- practise doing routine calculations and to check calculations;
- deepen their understanding of multiplication and division.

Generic competences

In doing this activity students will have an opportunity to:

- apply knowledge and skills;
- gain number sense, and the ability to estimate answers to calculations, so that they can spot answers given by a calculator or computer that are obviously wrong. This is an important skill because, when rubbish is keyed into an automatic processor, rubbish has come out.

Suggestions for Teaching

Use these examples as lesson starters. They can be used in secondary school as well as in primary school.

Follow up

Ask the learners to make up their own written calculation, and then write it out with a deliberate mistake for someone else to spot and correct.

Target Multiplication <https://aiminghigh.aimssec.ac.za/years-4-7-target-multiplication/>

And other 'Target' activities.

Two by Two Puzzle <https://aiminghigh.aimssec.ac.za/years-4-7-two-by-two-puzzle/>

Magic Numbers <https://aiminghigh.aimssec.ac.za/years-5-9-magic-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.

For resources for teaching A level mathematics see <https://nrich.maths.org/12339>

Note: The mathematics taught in Year 13 (UK) and Secondary 6 (East Africa) is beyond the school curriculum for Grade 12 SA.

	Lower Primary Age 5 to 9	Upper Primary Age 9 to 11	Lower Secondary Age 11 to 15	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