

# Reasoning and Problem Solving

## Multiplication and Division – Year 5

### About This Resource:

This resource is aimed at Year 5 Secure and has been designed to give children the opportunity to consolidate the skills they have learned in Spring Block 1 – Multiplication and Division.

The questions are based on a selection of the same ‘small steps’ that are addressed in the block, but are presented in a different way so children can work through the pack independently and demonstrate their understanding and skills.

### Small Steps:

Multiply 4-digits by 1-digit  
Multiply 2-digits (area model)  
Multiply 2-digits by 2-digits  
Multiply 3-digits by 2-digits  
Multiply 4-digits by 2-digits  
Divide 4-digits by 1-digit  
Divide with remainders

### National Curriculum Objectives:

Mathematics Year 5: (5C6a) [Multiply and divide numbers mentally drawing upon known facts.](#)

Mathematics Year 5: (5C7a) [Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers.](#)

Mathematics Year 5: (5C7b) [Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context.](#)

Mathematics Year 5: (5C8b) [Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign.](#)

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## GEOLOGICAL EXPEDITION #4657 VOLCANIC MEASUREMENT AND ANALYSIS

Volcano studies form an extremely important sector of our geological studies. The department is coming under increasing pressure to save money and streamline our resources. We must fight to maintain our volcanic studies. Although a volcanic eruption can be an awesome display of the Earth's power, it also causes disastrous loss of life and property, especially in densely populated regions of the world. As such, we can argue our work is cheaper than the impact of an unmonitored volcano. We must only think of Vesuvius or Eyjafjallajökull in Iceland to understand the importance of our work.

Calculate carefully, as your expedition cost analysis will be submitted to the committee for review and authorisation.

Focus and accuracy is needed.



### 1. Individual Kit List

Rucksack	£17
Waterproofs	£9
Thermals	£13
Walking Boots	£26
Torch	£6
Sleeping Bag	£37
Sleep mat	£48
Survival Bag	£11

There are **13** members in your team.

Calculate the total cost of individual kit for the team.

### 2. Camp Kit

Camp kit costs will depend on the length of your expedition. Use the details below to calculate your expected expedition length. Note: You need to add one fifth contingency to the total days. Formula: days x team number = length

	Current Study
Travel Days	19
Study Days	65
Rest Days	11

Each camp day you have calculated will have the following costs: food £23, first aid £7, fuel £17, life and accident insurance £51 and wages £98.  
Showing a breakdown of each cost plus a total cost for the camp, calculate your full camp costs.



### 3. Technical resources

For each selected item please ensure you add £5 per day insurance to the hire cost.



Equipment		Hire (cost per day)	Number of days	Hire Cost	£5 per day Insurance	Total cost
Thermometer	✓	£1,234	65			
Soil collection pods	✓	£2,543	23			
Chemical analysis	✓	£7,325	30			
Richter graph	✓	£5,731	35			

### 4. Permits

You will need to ensure you have adequate permits from local agencies for any exclusion zones which are necessary. Please detail the daily cost of an exclusion zone permit below. These are charged at £7 per metre<sup>2</sup>.

*Diagrams not to scale*



## 5. Transportation



Helicopter transportation saves time, reducing days spent on site and therefore costs. Costing options for Helicopter transport is detailed below.

Calculate cost per passenger to help maximise value for money. Note: 2 members of the team will be on rest each day, and 2 more will remain at the lab.

Helicopter	Cost per trip	Per passenger	Tick to select option
4 seater	£1,224		
8 seater	£2,943		
10 seater	£3,510		

Jeeps are needed to transport kit and workers (except the ones on rest days). Calculate the best daily option to hire. Note: The daily kit needed takes up 3 seats.

Jeep	Cost per trip (outward and return journey)	Total Daily Cost	Price per Person	Tick to select option
4 seater	£242			
8 seater	£473			

## 6. PRE EXPEDITION TRAINING AND BRIEFING

Now you are all ready for your training and pre-expedition briefing. An external company has quoted £346 per person for three days training. Internally we know we can run the training for £4,364 for the whole group.

Which is the most cost effective?



**APPROVED**

Brilliant work the whole expedition is approved!  
Thanks for your help!

## Reasoning and Problem Solving – Multiplication and Division – Year 5

1.  $£17 + £9 + £13 + £26 + £6 + £37 + £48 + £11 = £167$ .  $£167 \times 13 = £2,171$ . Calculation may stimulate discussion whether to add then multiply (most efficient) or multiply then add (less efficient, more chance for errors).

2.  $19 + 65 + 11 = 95$  days;  $95 \div 5 = 19$ ;  $95 + 19 = 114$ ;  $114 \times 13 = 1,482$  days.

Food	$£23 \times 1,482$	34, 086
First aid	$£7 \times 1,482$	10,374
Fuel	$£17 \times 1,482$	25,194
Insurance	$£51 \times 1,482$	75,582
Wages	$£98 \times 1,482$	145,236
<b>Total</b>	<b><math>£196 \times 1,482</math></b>	<b>290, 472</b>

3.

Equipment		Hire (cost per day)	Number of days	Hire Cost	£5 per day Insurance	Total cost
Thermometer	✓	£1,234	65	£80, 210	£325	£80,535
Soil collection pods	✓	£2,543	23	£58, 489	£115	£58,604
Chemical analysis	✓	£7,325	30	£219, 750	£150	£219,900
Richter graph	✓	£5,731	35	£200,585	£175	£200,760

4. Camp exclusion zone:  $105 \times 15 = 1,575$ , costing  $£7 \times 1,575 = £11,025$

Volcano exclusion zone:  $97 \times 94 = 9,118$ , costing  $£7 \times 9,118 = £63,826$

Laboratory exclusion zone:  $12 \times 23 = 276$ , costing  $£7 \times 276 = £1,932$

5.

Helicopter	Cost per trip	Per passenger	Tick to select option
4 seater	£1,224	9 people (13 minus 2 on rest day and 2 at the lab) would need 3 helicopters: $3 \times £1,224 = £3,672$ . $£3,672 \div 9 = £408$ per person	
8 seater	£2,943	9 people (13 minus 2 on rest day and 2 at the lab) would need 2 helicopters: $2 \times £2,943 = £5,886$ . $£5,886 \div 9 = £654$ per person	
10 seater	£3,510	9 people (13 minus 2 on rest day and 2 at the lab) would need 1 helicopters: $1 \times £3,510 = £3,510$ . $£3,510 \div 9 = £390$ per person	✓

Jeep	Cost per trip (outward and return journey)	Total Daily Cost	Price per Person	Tick to select option
4 seater	£242	11 people plus 3 seats for kit would need 4 jeeps: $4 \times £242 = £968$ .	$£986 \div 11 = £88$	
8 seater	£473	11 people plus 3 seats for kit would need 2 jeeps: $2 \times £473 = 946$	$£946 \div 11 = £86$	✓

6.  $£346 \times 13 = £4,498$  so more cost effective to use in house training.

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