

Reasoning and Problem Solving

Multiplication and Division – Year 4

About This Resource

This resource is aimed at Year 4 Expected 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

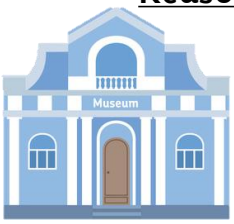
11 and 12 times table
Multiply 3 numbers
Factor pairs
Efficient multiplication
Written methods
Multiply 2-digits by 1-digit
Multiply 3-digits by 1-digit
Divide 2-digits by 1-digit
Correspondence problems

National Curriculum Objectives

Mathematics Year 4: (4C6a) [Recall multiplication and division facts for multiplication tables up to \$12 \times 12\$.](#)
Mathematics Year 4: (4C6b) [Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers.](#)
Mathematics Year 4: (4C6c) [Recognise and use factor pairs and commutativity in mental calculations](#)
Mathematics Year 4: (4C8) [Solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.](#)

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Museum Madness



You have been asked help curate at the National Children’s Museum. The board of directors are offering the chance for children to help run the Museum and make some pretty gigantic decisions about what and how they exhibit.

1. First, up you need to analyse the figures below.
The Museum Director has decided to give each exhibit a value score based on the data.
To find an exhibit score they will calculate the following:



$$\text{Visitors per month} \times \text{Time spent in exhibit} \times \text{Average Customer Score}$$

Exhibit	Visitors per month	Time Spent in exhibit (minutes)	Weeks since exhibit opened.	Average Customer Score (out of 10)	Value score
Egyptians	27	9	56	7	
Dinosaurs	39	8	89	3	
Armouries	53	7	68	5	

The Museum Director has asked for visitor data for the whole year.
Use the monthly figure above to calculate the visitors over the whole year.
Note: The museum was closed for refurbishment during the whole of December.



Exhibit	Visitors last year
Egyptians	
Dinosaurs	
Armouries	

Based on the value score and yearly visitor figures, which two exhibits would you advise to run next year?

2. During the refurbishment all the dinosaur bones were moved to storage.
The bones were coded and order according to length and weight.

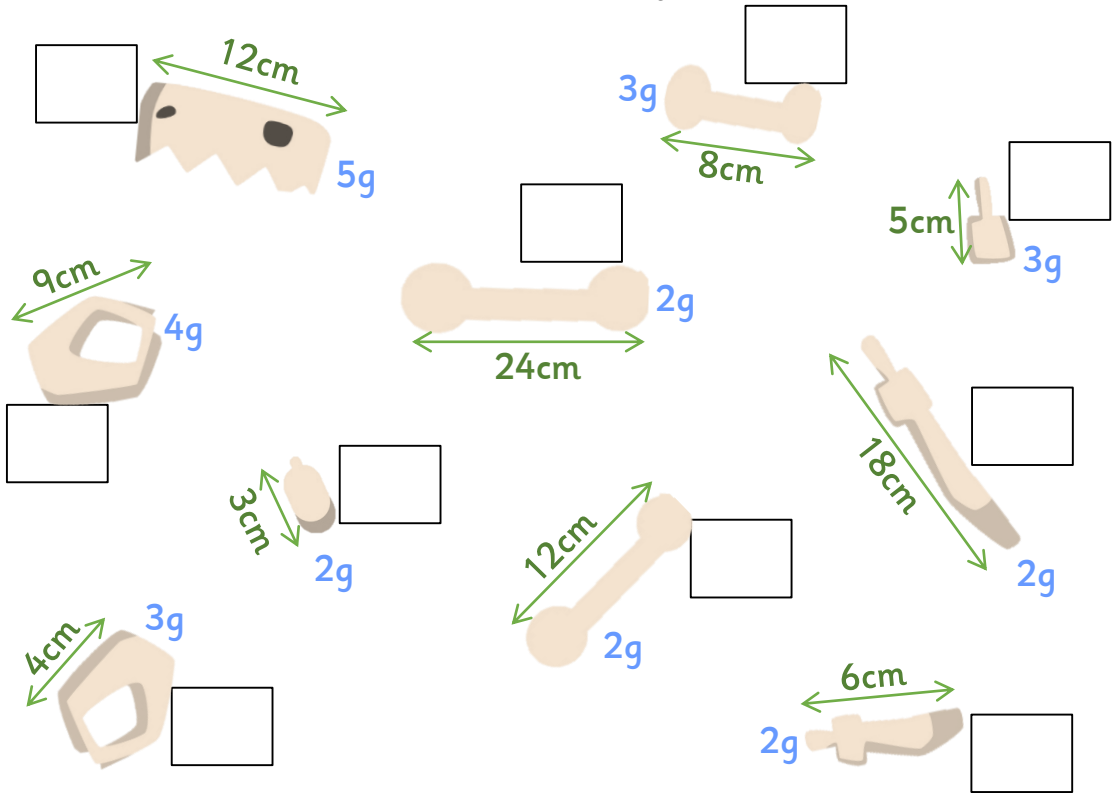
$$\text{length} \times \text{weight} = \text{code}$$

Complete the missing codes of the bones. Which two codes are missing?

Note from the Museum Director:

Remember there were a number of bones assigned the same code.

CODES	
15	
24	
12	
36	
48	



These bones have the same code but their measurements are incomplete. Fill in possible missing measurements.



3. The marketing team are working on the price to charge for tickets, they have a few choices of pricing structure. The Museum Director has been very clear he wants a family of four to be able to visit for less than £25.

Which prices would meet this criteria? Which would you recommend and why?

A
Adult £6.75
Child £3.50

B
Adult £8.59
Child £4.25

C
Adult £11.00
Child £2.50

D
Adult £ 7.85
Child £3.75

4. The Egyptian exhibit has acquired a set of previously undiscovered coins from an ancient pharaoh's tomb. The coins must be displayed in rows and columns, then labelled according to their dates.

How many rows and columns should each group of coins could have? There may be more than one choice for each group.

	3100BC to 2500BC	2500BC to 2000BC	2000BC to 1500BC	1500BC to 1000BC	1000BC to 500BC
Number of coins	50	24	30	<input type="text"/>	63
choice 1	2 x 25	4 x 6	<input type="text"/> x <input type="text"/>	12 x 3	<input type="text"/> x <input type="text"/>
choice 2	5 x 10	<input type="text"/> x <input type="text"/>	<input type="text"/> x <input type="text"/>	<input type="text"/> x <input type="text"/>	<input type="text"/> x <input type="text"/>
choice 3	25 x 2	<input type="text"/> x <input type="text"/>	<input type="text"/> x <input type="text"/>	<input type="text"/> x <input type="text"/>	<input type="text"/> x <input type="text"/>



5. The Museum Director has been reviewing visitor numbers and wants to encourage people to spend longer at each exhibit. He employs tour guides to take people around the exhibits and give fun facts along the way.



Each tour guide can work up to 98 minutes between breaks, each area takes 7 minutes to tour. How many areas can a guide cover between their breaks? Show your calculation.

On the first day of the new tours, a school trip arrives with 84 children. There are 3 tour guides at the Museum that day. How many children will each tour guide have in their group? Show your calculation.

6. To make the most of the school trips and extra visitors, the Museum shop is looking to stock a variety of trinkets on sale for under £5 each. Tick which of the stock from the orders book could make a profit if sold for £5 or less each.



Plastic Roman Helmet



Miniature Gold Sarcophagus



Cuddly Woolly Mammoth



Metal Roman Soldier

12 for £48

9 for £36

7 for £14

11 for £88

7. Now you have decided on which items to buy, you have a budget to complete the order form below. Be careful, you can **ONLY** spend a maximum of £250!

<i>MuseumGifts.com order form</i>		
<i>Item</i>	<i>Amount Ordered</i>	<i>Cost</i>
<i>Total Cost</i>		

8. Lots of schools are contacting to arrange summer trips. They would like to know the cost of visiting the museum, a guided tour and an interactive session. Use the price list to calculate the full cost for the schools.

School Visit Prices

ENTRY
£123 per class

TOUR
£137 per class

SESSION
£234 per half class

<i>St. Jude's</i>	<i>5 classes</i>
<i>Heath Manor</i>	<i>3 classes</i>
<i>Oak Mount</i>	<i>8 classes</i>
<i>Moorhill</i>	<i>2 classes</i>

9. Your time at the museum is over. The visitor numbers are up! 6 times more people visited the Dinosaurs last month, 4 times more people visited the Egyptians and 9 times more visited the Armouries. That's FANTASTIC!!

Uh Oh! Here's the director with just one more job before you leave...

Could you calculate the increase in visitors to each exhibit please before you go?



PSST!
You're going to need those monthly figures from question 1!!

Reasoning and Problem Solving – Multiplication and Division – Year 4

1.

Exhibit	Visitors per month	Time Spent in exhibit (minutes)	Weeks since exhibit opened.	Average Customer Score (out of 10)	Value score
Egyptians	27	9	56	7	1,701
Dinosaurs	39	8	89	3	936
Armouries	53	7	68	5	1,855

Exhibit	Visitors last year
Egyptians	297
Dinosaurs	429
Armouries	583

Children's answers may vary but should show understanding of the meaning of the figures e.g. Egyptians has the lowest score for visitors, but also has a high positive feedback and value score, so they may recommend the Egyptians and Armouries exhibits continue.

2.

CODES

15
24
12
36
48
6
60



3. A = £20.50; B = £25.68; C = £27.00; D = £23.20, so A and D meet the Director's limit. Price structure D will give the most profit to the museum.

4. Children's answers may vary from those shown. They should show accurate knowledge of factor pairs and commutative rule of multiplication.

	3100BC to 2500BC	2500BC to 2000BC	2000BC to 1500BC	1500BC to 1000BC	1000BC to 500BC
Number of coins	50	24	30	36	63
choice 1	2 x 25	4 x 6	10 x 3	12 x 3	9 x 7
choice 2	5 x 10	8 x 3	5 x 6	4 x 9	21 x 3
choice 3	25 x 2	2 x 12	15 x 2	3 x 12	7 x 9

5. $98 \div 7 = 14$ $84 \div 3 = 28$

6.

	Plastic Roman Helmet		Miniature Gold Sarcophagus		Cuddly Woolly Mammoth		Metal Roman Soldier
12 for £48	<input checked="" type="checkbox"/>	9 for £36	<input checked="" type="checkbox"/>	7 for £14	<input checked="" type="checkbox"/>	11 for £88	<input type="checkbox"/>

7. Answers give children the chance to practice multiplying efficiently and estimating answers. Answers may vary widely but should amount to no more than £250.

8. St. Jude's: $£123 \times 5 = £615$; $£137 \times 5 = £685$; $£234 \times 10 = £2,340$. $£615 + £685 + £2,340 = £3,640$ full cost.
 Heath Manor: $£123 \times 3 = £369$; $£137 \times 3 = £411$; $£234 \times 6 = £1,404$. $£369 + £411 + £1,404 = £2,184$ full cost.
 Oak Mount: $£123 \times 8 = £984$; $£137 \times 8 = £1,096$; $£234 \times 16 = £3,744$. $£984 + £1,096 + £3,744 = £5,824$ full cost.
 Moorhil: $£123 \times 2 = £246$; $£137 \times 2 = £274$; $£234 \times 4 = £936$. $£246 + £274 + £936 = £1,456$ full cost.

9. Egyptians: 81 visitor increase. Dinosaurs: 195 visitor increase. Armouries: 424 visitor increase.