UNIT 3

CHICKEN NIBBLERS

Introduction

This task looks at the various totals it is possible to obtain when adding combinations of any number of the values 6, 9 and 20 within the context of buying different numbers of 'Chicken nibblers'. Questions focus on the number of chicken nibblers as well as the cost of the boxes.

The task could be introduced by looking at fast food sales or undertaking some survey of fast food. This work will lead naturally to considering box sizes and undertaking the following investigation.

Curriculum coverage	Functional standards
✓ Number and algebra	✓ Analysing ■ Processing and using the mathematics ✓ Interpreting ■ Interpreting and communicating the results of the analysis
Cross-curricular links	**Every Child Matters**
✓ Food technology ■ the task offers potential for discussion on the nutritional value of chicken nibblers and other fast food	✓ Staying healthy
Prior knowledge	**Vocabulary**
✓ Four rules applied to number ✓ Multiples The work is developed as an investigative approach.	✓ Least, smallest, minimum, cheapest ✓ Largest, greatest, maximum ✓ Exact An ability to communicate in writing is important when answering those questions requiring students to explain their answer

Chicken nibblers

Chicken nibblers can be bought in boxes of 6, 9, and 20 nibblers.

a What is the cost of a box of 6 chicken nibblers? *(1 mark)*

b What is the least cost of 18 chicken nibblers? *(2 marks)*

c Work out the cost of three family boxes and two large boxes of chicken nibblers. *(2 marks)*

d What is the cheapest way of buying 38 chicken nibblers? *(2 marks)*

e What is the largest number of chicken nibblers that can be bought for £5.00? *(2 marks)*

f Colleen says that it is not possible to buy exactly 16 chicken nibblers.
Is she correct? Give a reason for your answer. *(2 marks)*

Encourage students to read the question carefully as you can buy 3 boxes of 6 or 2 boxes of 9. What is the cheapest way this can be done?

Again, encourage students to read the question carefully and work systematically.

They might consider
- *4 × 128p + 1 × 92p*
- *3 × 128p + 2 × 92p*
- *2 × 128p + 4 × 92p*

The cheapest option involves buying 2 boxes of 20 (that is, 40 nibblers)

It is important to work through this question in a systematic way. Encourage student to check their final answer

Students must appreciate that not all numbers are possible and that the question says 'exactly'. Encourage students to write down answers to their attempt to find a way of buying exactly 16 nibblers

Answers and markscheme

Question	Answers	Marks	Comments
a	92p	D1	Accept £0.92
b	2 x 128p	M1	Allow 3 x 92p
	256p	A1	Accept £2.56
c	3 x 260p + 2 x 128p	M1	
	£10.36	A1	Accept 1036p
d	2 x 260p	M1	Allow attempts such as 4 x 128p + 1 x 92p 3 x 128p + 2 x 92p 2 x 128p + 4 x 92p
	£5.20	A1	Accept 520p
e	20 + 9 + 6	M1	Implied by 260p + 128p + 92p
	35	A1	
f	Yes she is correct	B2	Full explanation showing that combinations of 9 and 6 cannot be added to make 16 Allow B1 for a partial explanation

Common Errors

Look out for students who:

- do not appreciate how combinations of numbers can be made from 6, 9 and 20
- are not confident with their multiplication tables
- misread questions – is it the cost or the number and is it the cheapest or the highest number that is required?
- round answers incorrectly..

Extension Questions

a Tristan is working out different ways to buy exactly 78 chicken nibblers.

He can says that you can buy 3 family boxes and 2 large boxes.

He shows the information in a table:

Family (20)	Large (9)	Small (6)	Total
3	2	0	78

Copy the table.

Complete the table to show two other ways in which Tristan can buy exactly 78 chicken nibblers.

b Lewis says that it is not possible to buy exactly 30 chicken nibblers.
Is he correct? Give a reason for your answer.

c Natasha has worked out that it is possible to buy any number of chicken nibblers greater than 50. What is the largest numbers of chicken nibblers that **cannot** be bought?

d Find all the different numbers of chicken nibblers that **cannot** be bought?
Give reasons for your answers.

Investigate further.

Extension Answers

Question	Answers	Comments
a	<table><tr><th>Family (20)</th><th>Large (9)</th><th>Small (6)</th><th>Total</th></tr><tr><td>3</td><td>2</td><td>0</td><td>78</td></tr><tr><td>3</td><td>0</td><td>3</td><td>78</td></tr><tr><td>0</td><td>0</td><td>13</td><td>78</td></tr></table>	
b	No he is incorrect	$2 \times 9 + 2 \times 6 = 30$
c	43	For this question students should appreciate that when you reach the point where you can order 6 consecutive integers then it is possible to order every integer that follows. This is because an additional order of six can be added to these six sums to get the next six and so on… For this reason, 43 has to be the highest possible number of nibblers you cannot order because it is possible to order: $44 = 20 + 6 \times 4$ $47 = 20 + 9 \times 3$ $45 = 9 \times 5$ $48 = 6 \times 8$ $46 = 20 \times 2 + 6$ $49 = 20 \times 2 + 9$
d	1, 2, 3, 4, 5, 7, 8, 10, 11, 13, 14, 16, 17, 19, 22, 23, 25, 28, 31, 34, 37, and 43	A 10 × 10 grid might be a useful focus for answering this question. Crossing out multiples of 6, then multiples of 9, then multiples of 20, and so on.
		The task might be developed by looking at different combinations of numbers of nibblers in a box and finding the smallest numbers where applicable.