Entry Functional Maths – Vending Machine

Name _____ Date _____

A1
48p

A2
62p

A3
57p

B1
53p

B2
56p

B3
49p

C1
61p

C2
64p

C3
66p

D1
98p

D2
75p

D3
88p

D4
69p

Entry Functional Maths – Vending Machine

Name _____ Date _____

A. Entry 1-2. Using letters, numbers and money.

You buy snacks from a vending machine.
The machine is not giving any change so you must pay with the exact amount.
The vending machine takes these coins.

For each question **use as few coins as possible.**

1a. How much does a bottle of orange juice cost? _____

1b. What coins do you use? _____

2a. How much is a bar of Dairy Milk? _____

2b. What coins do you use? _____

3a. You want a bag of Salt & Vinegar flavoured crisps.

What buttons do you press on the vending machine? _____

3b. What coins can you use to pay? _____

4a. How much is a Snickers bar? _____

4b. What coins can you use to pay? _____

5a. What buttons do you press for a bottle of water? _____

5b. What coins do you use to pay for this? _____

Entry Functional Maths – Vending Machine

Name _____   Date _____

A. Entry 1-2. Using numbers, letters and money (continued).

6a. How much does a Mars bar cost?   _____

6b. What coins can you use to pay for this?   _____

7a. How much is a packet of Ready Salted crisps?   _____

7b. What coins can you use?   _____

8a. If you press **B2** on the machine, what do you get?   _____

8b. What coins can you use to pay for this?   _____

9a. How much does a can of coke cost?   _____

9b. What coins can you use to pay for this?   _____

10a. How much does a KitKat cost?   _____

10b. What coins can you use?   _____

11a. What buttons would you press to get a Caramel?   _____

11b. What coins can you use?   _____

12a. How much does a bottle of Lucozade cost?   _____

12b. What coins can you use?   _____

13a. You press **C3** on the machine. What do you get?   _____

13b. What coins can you use?   _____

B. Entry 2-3. Working out change.

You buy snacks from a vending machine.
The machine is only taking £1 coins.
Can you work out the change you will get?

1a. How much does a bottle of orange juice cost? _____

1b. How much change do you get from £1? _____

2a. How much is a bar of Dairy Milk chocolate? _____

2b. How much change do you get from £1? _____

3a. How much is a packet of Salt & Vinegar crisps? _____

3b. How much change do you get from £1? _____

4a. How much does a Snickers bar cost? _____

4b. How much change do you get from £1? _____

5a. How much does a bottle of water cost? _____

5b. How much change do you get from £1? _____

6a. How much does a Mars bar cost? _____

6b. How much change do you get from £1? _____

6c. **Show how you can check your answer.**

Name _____ Date _____

B. Entry 2-3. Working out change (continued).

7a. How much is a packet of Ready Salted crisps? _____

7b. How much change do you get from £1? _____

8a. How much does a Twix cost? _____

8b. How much change do you get from £1? _____

9a. How much does a can of coke cost? _____

9b. How much change do you get from £1? _____

10a. How much does a KitKat cost? _____

10b. How much change do you get from £1? _____

11a. How much does a Caramel cost? _____

11b. How much change do you get from £1? _____

12a. How much does a bottle of Lucozade cost? _____

12b. How much change do you get from £1? _____

13a. How much are the Cheese & Onion crisps? _____

13b. How much change do you get from £1? _____

13c. **Show how you can check your answer.**

14a. The most expensive item in the vending machine is the _____.

14b. What is the cheapest item in the vending machine? _____.

C. Entry 3. Rounding money.

a. Complete the table below to show the prices of all 13 snacks in the vending machine.
- **Use decimal notation**
- Write the snacks in order of cost. Start with the cheapest snack.
- Round each price to the nearest 10p and the nearest £.

Snack	Price	Price rounded to nearest 10p	Price rounded to the nearest £1.
Totals			

b. Use the rounded prices in column 3 to **estimate** the total cost of 13 snacks.

c. Now use a calculator to work out the actual cost. **Compare** this to your estimate.

Entry Functional Maths – Vending Machine

Name _____ Date _____

D. Entry 1-2. Position words.

---

1. Tick (✓) the correct shelf for each snack.

   a. **Where is the KitKat?**

   top shelf   bottom shelf   middle shelf

   ( )   ( )   ( )

   b. **Where is the Mars bar?**

   top shelf   bottom shelf   middle shelf

   ( )   ( )   ( )

   c. **Where are the crisps?**

   top shelf   bottom shelf   middle shelf

   ( )   ( )   ( )

D. Entry 1-2. Position words (continued)

2. Fill in the gaps. Use each word once.

right	left	between	below	above

a. The Mars bar is to the _____ of the Snickers bar.

b. The Twix is _____ the Dairy Milk and the KitKat.

c. The Salt & Vinegar crisps are to the _____ of the Ready Salted crisps.

d. The Cheese & Onion crisps are _____ the KitKat.

e. The Caramel bar is _____ the KitKat

3. Write your own sentences about the position of each drink. Use each word once.

next to	between	far left	far right

a. The Lucozade is _____ .

b. The Coca Cola is _____ .

c. The orange juice is _____ .

d. The water is _____ .

Entry Functional Maths – Vending Machine
Curriculum mapping

Teaching notes: a collection of tasks that covers several aspects of Reformed Entry Level Mathematics, with a particular focus on money (sections A-C). Section D covers positional vocabulary. Each section can be used independently to suit you and your learners (note sections A-C each require access to the image on page 1).

Vending machines should be a familiar context to most learners but using one 'for real' would make a great introduction, as would counting out amounts / change with real money. Supermarket receipts (online or from the till) can be very useful for practising the use of rounding to estimate totals.

Subject Content: Reformed Functional Skills Mathematics – Entry Levels 1-3
Purpose (at all Entry Levels): to demonstrate a sound grasp of the underpinning skills and basics of mathematical skills appropriate to the level, and the ability to apply mathematical thinking to solve simple problems[1] in familiar situations. Achievement of these qualifications can provide the skills for further study at Levels 1 and 2.
Learning aims and outcomes at Entry Level: enable students to become confident in their use of fundamental mathematical knowledge and skills, as described through the content; and indicate that students can demonstrate their understanding by applying their knowledge and skills to solve simple mathematical problems[1] or carry out simple tasks.
Source: DfE (Feb 2018) https://www.gov.uk/government/publications/functional-skills-subject-content-mathematics
✓✓ = **main content & problem-solving skill(s) covered in this resource**, although these will vary with the student group and how the resource is used by the teacher. ✓ = minor content. → or ← = not covered but included to show progression across levels.
Content at each level subsumes and builds upon the content at lower levels.   **[1] *See page 11***

1. Fundamental mathematical knowledge and skills must be demonstrated in their own right, **with and without a calculator**, in addition to being used to solve problems or complete tasks.

Entry Level 1	Entry Level 2	Entry Level 3
Using numbers and the number system (NS)		
1. Read, write, order and compare numbers up to 20 ✓✓ **A1-13** 2. Use whole numbers to count up to 20 items including zero 3 Add numbers which total up to 20, and subtract numbers from numbers up to 20 → 4. Recognise and interpret the symbols +, - and = appropriately	1. Count reliably up to 100 items 2. Read, write, order and compare numbers up to 200 ✓✓ **B14 Ca** 3. Recognise and sequence odd and even numbers up to 100 4. Recognise and interpret the symbols +, – , x, ÷ and = appropriately 5. Add and subtract two-digit numbers ✓✓ **B1-13** 6. Multiply whole numbers in the range 0x0 to 12x12 (times tables) 7. Know the number of hours in a day and weeks in a year. 8. Divide two-digit whole numbers by single-digit whole numbers and express remainders 9. Approximate by rounding to the nearest 10, and use this rounded answer to check results 10. Recognise simple fractions (halves, quarters and tenths) of whole numbers and shapes 11. Read, write and use decimals to one decimal place	1. Count, read, write, order and compare numbers up to 1000 2. Add and subtract using three-digit whole numbers ← 3. Divide three-digit whole numbers by single- and double-digit whole numbers and express remainders 4. Multiply two-digit whole numbers by single- and double-digit whole numbers 5. Approximate by rounding numbers less than 1000 to the nearest 10 or 100 and use this rounded answer to check results 6. Recognise and continue linear sequences of numbers up to 100 7. Read, write and understand thirds, quarters, fifths and tenths including equivalent forms 8. Read, write and use decimals up to two decimal places ✓ **Ca Cb Cc** 9. Recognise and continue sequences that involve decimals

Entry Functional Maths – Vending Machine
Curriculum mapping

1. Fundamental mathematical knowledge and skills (continued): These must be demonstrated in their own right, **both with and without a calculator**, in addition to being used to solve problems or complete tasks.

Entry Level 1	Entry Level 2	Entry Level 3
Using common measures, shape and space (MS)		
5. Recognise coins and notes and write them in numbers with the correct symbols (£ & p), where these involve numbers up to 20 ✓✓ **A1-13** 6. Read 12 hour digital and analogue clocks in hours 7. Know the number of days in a week, months, and seasons in a year. Be able to name and sequence 8. Describe and make comparisons in words between measures of items including size, length, width, height, weight and capacity 9. Identify & recognise common 2-D and 3-D shapes inc. circle, cube, rectangle (inc. square) and triangle 10. Use everyday positional vocabulary to describe position and direction including left, right, in front, behind, under and above ✓✓ **D1, 2, 3.**	12. Calculate money with pence up to one pound and in whole pounds of multiple items and write with the correct symbols (£ or p) ✓✓ **B1-13** 13. Read and record time in common date formats, and read time displayed on analogue clocks in hours, half hours and quarter hours, and understand hours from a 24-hour digital clock 14. Use metric measures of length including millimetres, centimetres, metres and kilometres 15. Use measures of weight including grams and kilograms 16. Use measures of capacity including millilitres and litres 17. Read and compare positive temperatures 18. Read and use simple scales to the nearest labelled division 19. Recognise and name 2-D and 3-D shapes inc. pentagons, hexagons, cylinders, cuboids, pyramids, spheres 20. Describe properties of common 2-D & 3-D shapes inc. nos. of sides, corners, edges, faces, angles & base 21. Use appropriate positional vocabulary to describe position and direction including between, inside, outside, middle, below, on top, forwards and backwards ✓✓ **D1, 2, 3.**	10. Calculate with money using decimal notation & express money correctly in writing in pounds & pence ✓✓ **B1-13 Ca Cb Cc** 11. Round amounts of money to the nearest £1 or 10p ✓✓ **Ca** 12. Read, measure and record time using am and pm 13. Read time from analogue and 24 hour digital clocks in hours and minutes 14. Use and compare measures of length, capacity, weight and temperature using metric or imperial units to the nearest labelled or unlabelled division 15. Compare metric measures of length including millimetres, centimetres, metres and kilometres16. Compare measures of weight including grams and kilograms 17. Compare measures of capacity including millilitres and litres 18. Use a suitable instrument to measure mass and length 19. Sort 2-D and 3-D shapes using properties including lines of symmetry, length, right angles, angles including in rectangles and triangles E3.20 Use appropriate positional vocabulary to describe position and direction inc. eight compass points and including full/half/quarter turns ←
Handling information and data (HD)		
11.Read numerical information from lists → 12. Sort and classify objects using a single criterion 13. Read and draw simple charts and diagrams including a tally chart, block diagram/graph	22. Extract information from lists, tables, **diagrams** and bar charts ✓ 23. Make numerical comparisons from bar charts 24. Sort and classify objects using two criteria 25. Take information from one format and represent the information in another format inc. use of bar charts ✓ **Ca**	E3.21 Extract information from lists, tables, diagrams and charts and create frequency tables ← E3.22 Interpret information, to make comparisons and record changes, from different formats including bar charts and simple line graphs E3.23 Organise and represent information in appropriate ways including **tables**, diagrams, simple line graphs & bar charts←

Entry Functional Maths – Vending Machine
Curriculum mapping

2. Mathematical problem solving, carrying out tasks and decision-making

Entry Level students are expected to be able to use the knowledge and skills (see previous pages) to recognise a simple problem[1] and obtain a solution.

[1] **A simple mathematical problem** is one which requires **working through one step or process**. **Context** for simple problems at Entry levels should be **familiar to all students** and easily described. At Entry levels it is expected that students will be able to address individual problems each of which draw upon knowledge and/or skills **from one mathematical content area** (i.e. NS, MS or HD).

Entry 1 students	Entry 2 students	Entry 3 students
are expected to be able to:		
Use the content knowledge and skills to recognise a [1]**simple problem** and obtain a solution		
E1a. Use given mathematical information and recognise and use simple mathematical terms appropriate to E1 ✓✓	E2a. E3a. Use given mathematical information including numbers, symbols, simple diagrams and charts. ✓✓ *All Qs*	
	E2b. Recognise, understand and use simple mathematical terms appropriate to Entry Level 2 ✓✓	E3b. Recognise, understand and use simple mathematical terms appropriate to Entry Level 3 ✓✓
E1b. E2c. E3c. Use the methods given above to produce, check and present results that make sense [E3 only: to an appropriate level of accuracy]. ✓✓ All Qs produce / present. B6c & B13c ask for checks.		
E1c. Provide a simple explanation for those results. ✓✓	E2d. Present appropriate explanations using numbers, measures, simple diagrams, simple charts and symbols appropriate to Entry Level 2. ✓	E3d. Present results with appropriate explanation using numbers, measures, simple diagrams, charts and symbols appropriate to Entry Level 3. ✓

Defining problem solving (at all levels of Functional Maths)

Although underpinning knowledge is tested in its own right, problem solving is a core element of Functional Skills mathematics yet should not obscure or add additional mathematical complexity beyond the level of the qualification. Defining problem solving is a challenge but the attributes below may help. Not all (often just one) of the listed attributes must be present in a single task for it to be considered to be problem solving. ✓ indicates why all or parts of this resource can be considered to be problem solving.

Source: DfE (Feb 2018) https://www.gov.uk/government/publications/functional-skills-subject-content-mathematics

One or more of the following attributes may be present in a single task for it to be considered problem solving:	
A Tasks that have little or no scaffolding: there is little guidance given to the student beyond a start point and a finish point. Questions do not explicitly state the mathematical process(es) required for the solution. E.g. which coins to use, working out change.	✓
B Tasks that provide for multiple representations, such as use of a sketch or a diagram as well as calculations.	
C The information is not given in mathematical form or in mathematical language; or there is a need for the results to be interpreted or methods evaluated, for example, in a real-world context.	✓
D Tasks have a variety of techniques that could be used. E.g. working out change using: subtraction, counting on, real money, counters. diagrams, etc.	✓
E The solution requires understanding of the processes involved rather than just application of the techniques.	