

E2 Functional Maths – Bonfire Night

Introduction

Name _____ Date _____

The questions are about Edna and her fireworks party.

Check you can read and understand these words.

Maths words

above	altogether	below	between
bottom	cone	cuboid	cylinder
even number	fraction	how many	left
m (metre)	middle	minute face	odd number
right	second	tick	top
vertex (vertices)	working (out)		



Discuss the maths words with a friend or your teacher.



You might want to highlight the maths words in the worksheets.

Firework words

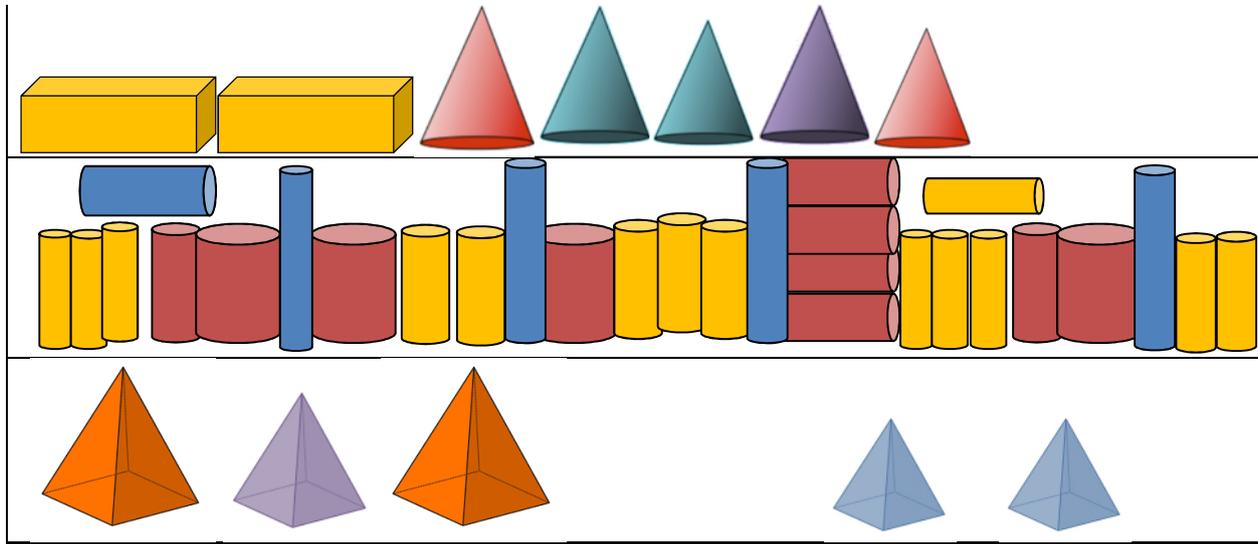
Bonfire Night	duration (time)	minimum safety distance
Roman candle	selection box	sparkler

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Name _____ Date _____

 You must show your working out.  Do not use a calculator.

Edna is having a fireworks party. She looks at the fireworks in the shop.



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

a. The Golden Fountains are cone shaped. **Which shelf are they on?**

top shelf () bottom shelf () middle shelf () (1 mark)

b. The Roman Candles are cylinders. **Which shelf are they on?**

top shelf () bottom shelf () middle shelf () (1 mark)

c. The Waterfalls are cuboids. **Which shelf are they on?**

top shelf () bottom shelf () middle shelf () (1 mark)

2. Write your answer in the box.

What 3D shape are the fireworks on the bottom shelf?

(1 mark)

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3. Write your answers in the boxes.

a. How many Roman Candles are there?

(1 mark)

b. Is your answer to 3a. an odd or an even number?

(1 mark)

c. How many fireworks are there altogether?
(On all three shelves)

(1 mark)

4. Edna looks at this selection box.



Fill in the gaps. Use each word once.

right	left	between	below	above
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a. Jade Blitz is to the _____ of Ruby Blitz.

b. Zircon is _____ Hail Blaze and Pearl Shot.

c. Dark Space is to the _____ of Pearl Shot.

d. Garnet Glitter is _____ Star Drome.

e. Star Blizzard is _____ Jade Blitz.

(5 marks)

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 **You must show your working out.**  **Do not use a calculator.**

5. Describe the properties of Purple Fire.



This firework has: _____ faces
_____ edges
_____ vertices

(3 marks)

6. Edna looks at another selection box. Each firework has a minimum safety distance. Edna's patio is **14.5 metres** from the place where she will light the fireworks. Edna's guests will stand on the patio.

a. **Tick all the fireworks that are safe to use.**

(2 marks)

Firework	Minimum safety distance	Can use in garden? (✓)
Star Drome	15m	
Zircon	8m	
Hail blaze	8m	
Gravity	5m	
Garnet Glitter	20m	
Dark Space	12m	

b. **Should Edna buy the selection box? Explain your answer.**

(2 marks)

7. Sparklers are sold in packs of 5.

Four children are coming to the party. Each child will have 3 sparklers.

a. **How many packs of sparklers must Edna buy?**

b. **Are there any sparklers left over?**



Show your working and your **two** answers in the box.

(3 marks)

c. **Show how you can check your answers to Q7.**

(1 mark)

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 You must show your working out.  Do not use a calculator.

8. Each firework has a duration time (how long it lasts for).

Firework	Duration time	Longer than 1 minute (✓)
Star Drome	120 seconds	
Zircon	40 seconds	
Hail blaze	45 seconds	
Gravity	25 seconds	
Garnet Glitter	150 seconds	
Dark Space	105 seconds	

a. There are 60 seconds in a minute.

Tick all the fireworks that last for longer than a minute.

(1 mark)

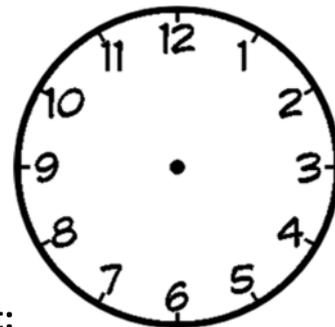
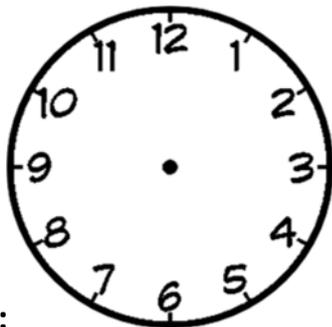
b. Which firework lasts the longest?

(1 mark)

c. Write the duration times in order. Start with the shortest time.

_____ (1 mark)

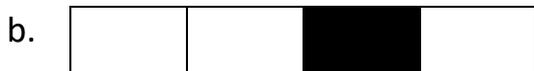
9. Edna’s party starts at 7.30pm. It finishes at 11.15 pm. Draw the times on the clocks.



(2 marks)

10. Two fireworks are shown below. What fraction of each firework is coloured black?





(2 marks)

E2 Functional Maths - Bonfire Night Curriculum mapping, marking and notes

Teaching notes: Written to look at the reformed Entry Level 2 'Measures, shape and space' content, the main focus of this resource is positional vocabulary, 3D shapes and time. It also covers aspects of Number and Data. It is not recommended for the initial teaching of skills (underpinning). If used for this, ensure all the 'maths words' (p1) are covered in advance and supply learners with real-life materials such as counters (I use pasta or dried beans) and 3D shapes where needed. Bonfire Night is a familiar context for most learners but the 'Fireworks words' should also be discussed.

Note that a few questions are not strictly 'simple mathematical problems'¹ as they draw on knowledge from more than one mathematical area (e.g. Q6a, Q8a) or include more than one step (e.g. Q7). Consider these as extension tasks.

Marking guidance: Total marks = 30. Suggested pass mark (if using for formal assessment) 22/30. For most questions (Q) marking is obvious. For Qs that require working out, award 1 mark for correct answer and another mark *only* if a correct process (working out) is shown. Q6a: 1 mark for 3 correct ticks, 2 marks if all 4 correct. Q6b: 1 mark for 'no' and 1 more mark for clear explanation (i.e. 2 fireworks would be wasted / cannot be used). Q7a: 1 mark for '3 packs', 1 mark for clear working out. Q7b: 1 mark for 'yes' or for stating correct amount left over (3). Q7c: a suitable reverse or different check for any part of the calculation – these can include diagrams (e.g. $4 \times 3 = 12 / 12 \div 4 = 3, 15 \div 4 = 3 \text{ rem } 3$, etc.).

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 problems¹ 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 problems¹ or carry out simple tasks.

✓✓ = main content and 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 coverage. → 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 8

1. Fundamental mathematical knowledge and skills 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 numbers and the number system (N)		
1. Read, write, order and compare numbers up to 20 → 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 ✓ Q3a, c. 2. Read, write, order and compare numbers up to 200 ✓✓ Q6a, Q8abc 3. Recognise and sequence odd and even numbers up to 100 ✓ Q3b 4. Recognise and interpret the symbols +, −, ×, ÷ and = appropriately 5. Add and subtract two-digit numbers 6. Multiply whole numbers in the range 0x0 to 12x12 (times tables) ✓ Q7a 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 ✓ Q7b 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 ✓ Q10 11. Read, write and use decimals to one decimal place ✓ Q6a	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 ← 9. Recognise and continue sequences that involve decimals

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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 (MSS)		
5. Recognise coins and notes and write them in numbers with the correct symbols (£ & p), where these involve numbers up to 20 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 ✓✓ Q4ace	12. Calculate money with pence up to one pound and in whole pounds of multiple items and write with the correct symbols (£ or p) 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 ✓ Q8, Q9 14. Use metric measures of length including millimetres, centimetres, metres and kilometres ✓ Q6 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 ✓✓ Q1abc 20. Describe properties of common 2-D & 3-D shapes inc. nos. of sides, corners, edges, faces, angles & base ✓✓ Q5 21. Use appropriate positional vocabulary to describe position and direction including between, inside, outside, middle, below, on top, forwards and backwards ✓✓ Q1abc, Q4bd	10. Calculate with money using decimal notation & express money correctly in writing in pounds and pence 11. Round amounts of money to the nearest £1 or 10p 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 kilometres ← 16. 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 ✓ Q1abc 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 ✓ Q1, Q4, Q6, Q8 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	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 and bar charts

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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 problem¹ 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. N, MSS 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 ✓ Most Qs	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 Q produce / present, Q7c check.		
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. ✓ Q6b	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. Most Qs	✓
B Tasks that provide for multiple representations, such as use of a sketch or a diagram as well as calculations. Q7ab	✓
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. Q6b	✓
D Tasks have a variety of techniques that could be used. Q7abc	✓
E The solution requires understanding of the processes involved rather than just application of the techniques. Q6a, Q8a	✓