EXPERIENCE OUTDOORS
BENMORE ◆ BANGHOLM ◆ LAGGANLIA

Mathematics Outdoor Learning Cards

The City of Edinburgh Outdoor Learning Team

Title:	**Maths Maze**
Mathematics Zone:	**Number, Money and Measure - Multiples, factors and primes.**
Key Outcomes:	**I can investigate and identify the multiples and factors of numbers.**
Suggested level:	**Second level.** Can be adjusted to different levels/year groups by varying the number and shape properties.

Activity

9	144	17	229	261
124	36	247	93	146
237	113	75	352	909
458	465	921	358	642
2073	4051	1502	A 4 digit even multiple of 3, that is also divisible by 4	2603

Adapted from Outdoor Learning Card TB9 Amazing Maze (OEAP Outdoor Learning Cards).

Resources (1 set):	A large tarpaulin sheet split into grids laid on the playground or grass – marked with gaffer tape. Alternatives: create a permanent grid on the playground or use cones with cards. Laminated A4 sheet – blank for writing on or pre-printed. Marker pen. Cloth. Pad and pencil to support workings. Divisibility rule A3 poster. Calculator to check divisibility rules. Set of rules for pupils.

Aim: work as a team to find a 'safe' way across the maze. A safe route is defined as matching the requested number properties.

Exploratory Phase (10 mins)

1. Reflect on (i) definitions of factors, multiples and primes; and (ii) divisibility rules. Using laminated cards or chalk on the playground – create examples of factors, multiple and primes in response to questioning.

Application Phase (20 mins)

1. Pupils discuss together to find different routes. Try multiples of 3 (red numbers above).

   Key questions:

   How many different routes are there? Can they cover each route?

   What is the shortest route?

   What is the longest route?

   Be flexible and ask additional questions depending on pupil progress.

Differentiation:	Change the numbers – 2 digits rather than 3 digits. Conversely, increase the number of digits. Allow more than one property. Restrict choices e.g. even multiples of 3. Change the size of the grid. Have some blank spaces – pupils insert a number depending on the given statement e.g. a 4 digit even multiple of 3, that is also divisible by 4 – example includes 4572. Ask additional questions e.g. what is lowest number possible using these criteria?
Key Vocabulary	
Factor	**Factors** are numbers we can multiply together to get another number. Example: 2 and 3 are **factors** of 6, because 2 × 3 = 6. A number can have MANY **factors**!
Multiple	The result of multiplying a number by an integer (not by a fraction). Examples: • 12 is a **multiple** of 3, because 3 × 4 = 12.
Prime	A **prime** number is a whole number (integer) greater than 1 whose only factors are 1 and itself. The first few **prime** numbers are 2, 3, 5, 7, 11, 13, 17, 19, 23 and 29.

Divisibility Rules	Useful to find factors.

Divisibility Rules	
A number is divisible by	
2	If last digit is 0, 2, 4, 6, or 8
3	If the sum of the digits is divisible by 3
4	If the last two digits is divisible by 4
5	If the last digit is 0 or 5
6	If the number is divisible by 2 and 3
7	cross off last digit, double it and subtract. Repeat if you want. If new number is divisible by 7, the original number is divisible by 7
8	If last 3 digits is divisible by 8
9	If the sum of the digits is divisible by 9
10	If the last digit is 0
11	Subtract the last digit from the number formed by the remaining digits. If new number is divisible by 11, the original number is divisible by 11
12	If the number is divisible by 3 and 4

NB: Divisibility test for 4: Last 2 digits must be even. Halve the last 2 digits. If the answer is even, then the number (integer) is divisible by 4.

Skills:

Numeracy and mathematical skill	Key features of the skill	Additional guidance
Select and communicate processes and solutions.	• explains choice of process • shares thinking • verbalises or demonstrates thought processes.	Learners need to: • be able to explain why they have chosen a particular process as it demonstrates their understanding of the task, question or assessment; • have frequent opportunities to discuss their thinking with their peers and teachers; • select from a range of processes and increasingly choose processes which are most efficient; • discuss their solutions to verbalise their thought process, either through explaining their thinking or demonstrating it pictorially; and • become more confident in their abilities to select from a growing repertoire of strategies, articulate their chosen approaches with increasing clarity and make greater use of specialised vocabulary.
Justify choice of strategy used	• shows and talks though their thinking • explains their strategy • justifies choice of strategy compared to other approaches.	Learners need to: • show and talk through their thinking to better understand and explain their own strategies; • regularly work in pairs and groups to learn with and from each other to refine their strategies; and • justify their choice of strategy, identifying the most efficient strategies for different types of task.
Use mathematical vocabulary and notation.	• uses correct mathematical vocabulary.	Learners need to: • apply the correct mathematical vocabulary, notation and appropriate units in a range of contexts.

Second Level Numeracy and Mathematics Benchmarks:

Curriculum organisers	Experiences and Outcomes for planning learning, teaching and assessment	Benchmarks to support practitioners' professional judgement of achievement of a level
Multiples, factors and primes	Having explored the patterns and relationships in multiplication and division, I can investigate and identify the multiples and factors of numbers. MTH 2-05a	• Identifies multiples and factors of whole numbers and applies knowledge and understanding of these when solving relevant problems in number, money and measurement.