

Maths Trail



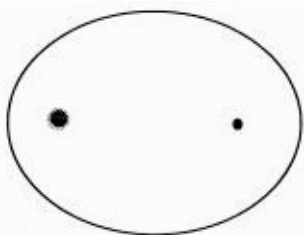
For secondary students in the Questacon *Mathamazing* exhibition

Instructions: Find each of the exhibits on this activity trail. If an exhibit is crowded, go on to another one and come back to it later. You will need to read the instructions on the panel near the exhibit, as well as this sheet to answer the questions. Your group can take turns in writing down the answers.

Names of people in your group

Ellipse (1)

Place the launch ramp on the dot at the opposite end of the ellipse from the hole. Face the launch pad in any direction you like. Draw in some of the paths the ball took.



When you get back to school, measure the lengths of the different paths you drew. Compare these around the class. This should lead to an easy way of drawing an ellipse.

Find Your Age (2)

WARNING! You can only use this exhibit if you are younger than 128 years old.

This exhibit will help you write your age in a different counting system. We use the decimal system every day. This exhibit will use the binary system. Computers use binary counting to perform calculations. Instead of 10 different digits, binary only has two: 0 and 1.

Write the age of someone in your group in binary below:

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How do you write 100 in binary?

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Roll The Dice (3)

List the possible totals when two dice are rolled and the numbers are added together.

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Roll the dice. What is the total?

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.....

List the combinations which could give you this total.

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.....

Decimal To Binary (4)

Write today's date in binary.

Day:

Month:

Year:

Later, if you have time, see whether you can work out the following date in binary:

2 February 1222

.....

Tic Tac Toe (5)

Divide your group into two teams and have a game of Tic Tac Toe. Take it in turns to place a ball of your team's colour in a hole. The winner is the first team with four balls of the same colour in a straight line.

Can you work out (or guess) the number of winning rows in the cube?

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Hint: Counting takes too long! Try splitting the cube up into layers, rows, faces and diagonals.



Draw a line showing your game's winning combination!

Manacles (6)

Use two pairs of manacles to link yourself with someone else.

See whether you can disengage yourself. If you get stuck, use the instructions or ask and explainer to help you.

What branch of mathematics did you (unconsciously) use in escaping the manacles?

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Where else is this kind of knowledge used?

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Cycloid (7)

Place a marble in the top of each track and lift the starting gate. Take note of the colour of the marble in each track.

Which track produced the winning marble?

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Which track is shorter (in distance)?

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A cycloid is the fastest path between two points at different heights.

You may have seen this sort of shape in ski jumps.

Find the other exhibit nearby which has a complete cycloid like this:

Drop a marble from each side at the same time from different heights. Try this several times. Where do the marbles collide? Why?

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