Maths can be your pathway to other A Levels

Where’s the maths?

**Philosophy**

**Does God exist?**
In Pascal’s Wager, the French mathematician used maths to explain why he believed in God. Pascal argued that the expected value of believing in God is far greater than the expected value of being an atheist.

<table>
<thead>
<tr>
<th>God exists</th>
<th>You go to heaven when you die: eternal bliss</th>
<th>Result: 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>God doesn’t exist</td>
<td>Nothing happens when you die: it doesn’t matter</td>
<td>Result: 0.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>God exists</th>
<th>You go to hell when you die: eternal misery</th>
<th>Result: 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>God doesn’t exist</td>
<td>Nothing happens when you die: it doesn’t matter</td>
<td>Result: 0.5</td>
</tr>
</tbody>
</table>

Expected value: $E = \frac{1 + 0.5}{2} = 0.75$

Expected value: $E = \frac{0 + 0.5}{2} = 0.25$

**Mathematical knowledge is vital in many subjects, for example...**

**Biology**

**Understanding Genetic Variation**
The Hardy–Weinberg equation estimates how many carriers there may be of recessive traits, e.g., for genetic diseases like cystic fibrosis, or the colour of dogs: for labradors, black is revealed as dominant over chocolate or yellow.

**Geography**

**Understanding Climate Change**
Climate models are mathematical representations of our climate system. They combine many different parts of maths, including differential equations and game theory, to help explain how the climate is affected by greenhouse gases.

**Psychology**

**Understanding IQ Scores**
Distributing data evenly around a mean value (an IQ score of 100) produces the ‘bell curve’ of the ‘Normal’ distribution, which enables psychologists to predict the IQ scores of a random population, and understand when an IQ score can be described as abnormal.

$p^2 + 2pq + q^2 = 1$
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