

# Use of MathMatize for formative assessments in large classes

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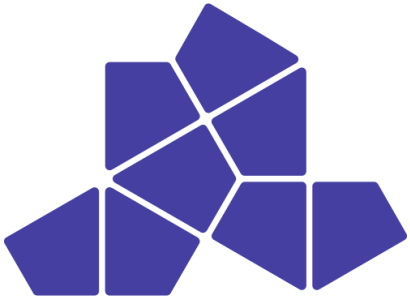
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# What is MathMatize?



**MathMatize** is an educational technology **for high school/university level math** that we are shamelessly exploiting in **physics** courses.

It offers polling and assessment tools with a content editor built to support formulaic/ scientific syntax.

<https://www.mathmatize.com/>

**Disclaimer:** We do not own it, we are not selling it, we have no financial benefits from its use.

We just used it, liked it, and decided more people should know about it.

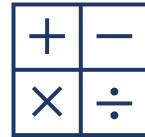
# Use of Mathmatize - outline



# Why we chose MathMatize?



Price tag



Math Equivalence



Simplicity



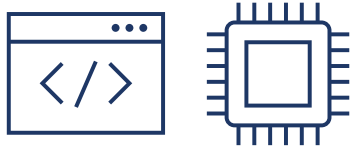
Accessible Statistics



Versatility



Resource requirements



LaTeX!



Dependability

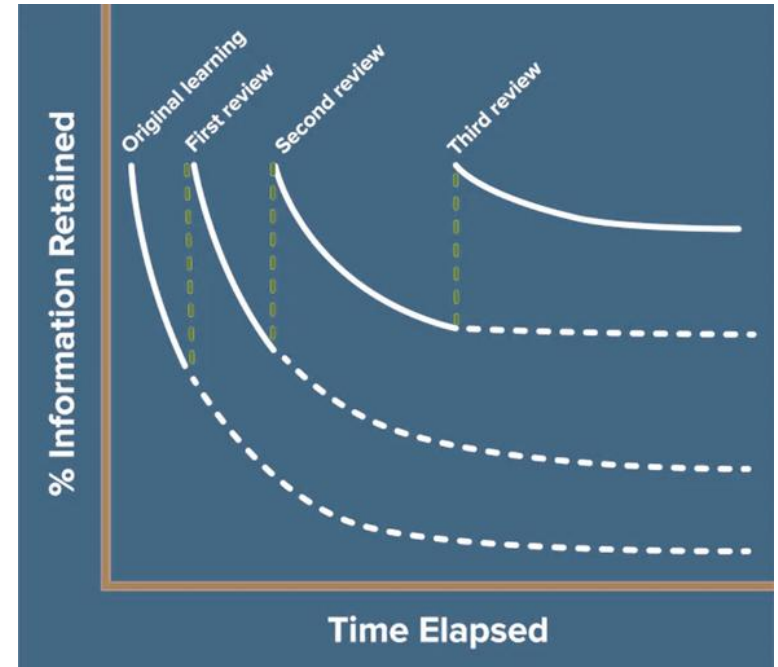
# Why post-class assessments?

Reviewing and refreshing information regularly halts the *Forgetting Curve*.

Murre, J. M. J. and Dros, J., PLoS One, 10, 7, (2015)  
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4492928/>

"Post-class assessment" is opened after a class and due before the next class.

Designed as purely formative – allows multiple attempts, reviews, encourages collaboration and discussion.



Ebbinghaus's "Forgetting Curve" – the forgetting starts after each review session, but it's always slower than before.

<https://www.mindtools.com/a9wjrw/ebbinghaus-forgetting-curve>

# How we used MathMatize – learning curve



Reliance on question banks



Safe choices, simple design



Creative mode on

# How we used MathMatize – variable problems

[CLOSE](#) [SAVE](#) INCLUDED [DUPLICATE](#) [TEST](#) [HELP](#) [MORE ACTIONS](#)

[VARIABLES](#) [BLANKS](#)

What is the magnitude of the magnetic field inside a solenoid of length  $L = [L]$  cm which contains  $[N]$  loops and carries current  $i_s = [I]$  A.

$B = [ ]$  mT

Preview [HIDE PREVIEW](#)

What is the magnitude of the magnetic field inside a solenoid of length  $L = L$  cm which contains  $N$  loops and carries current  $i_s = I$  A.

$$B = 4\pi 10^{-2} \frac{N}{L} I \text{ mT}$$

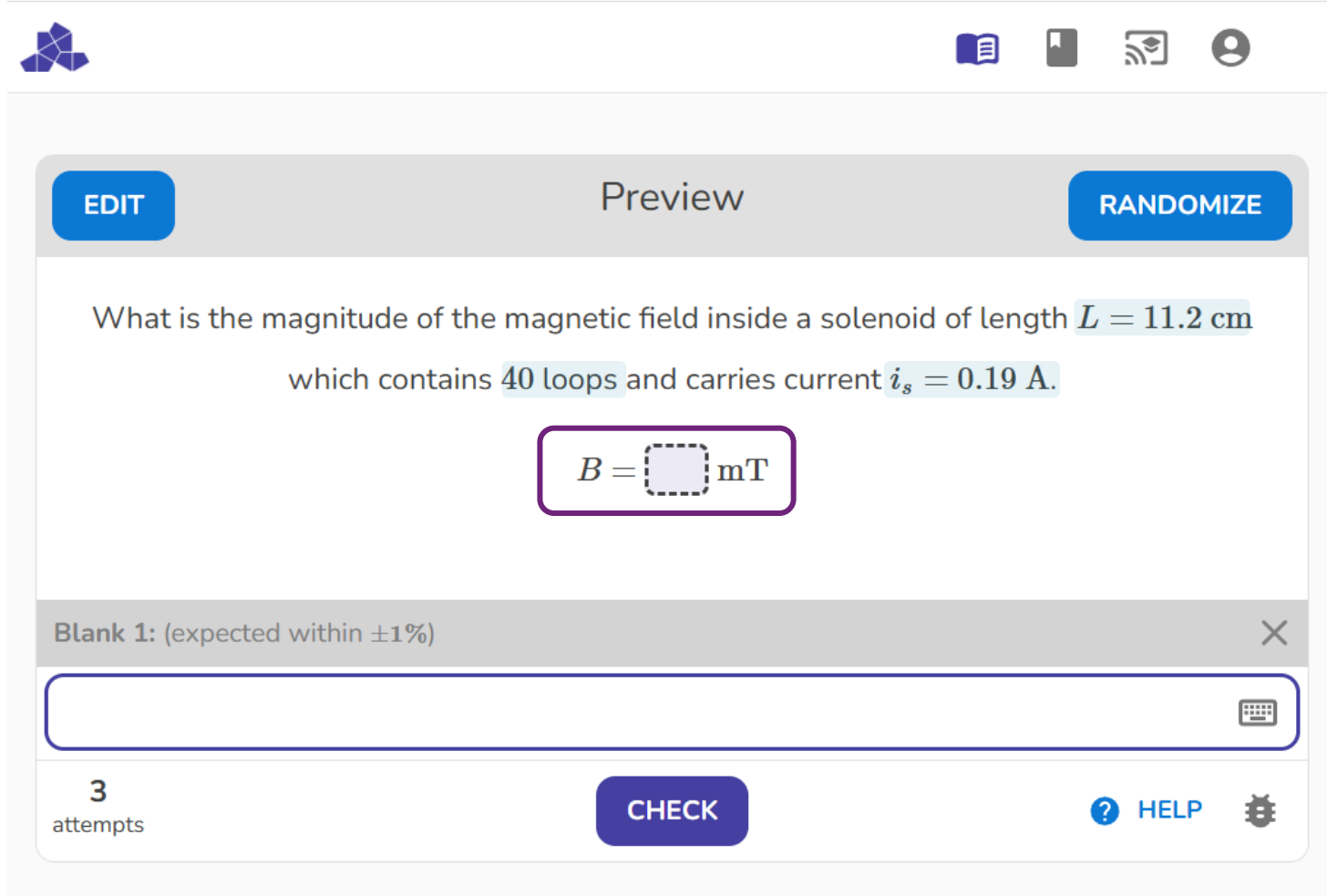
Variables [CLOSE](#)

Name (Random Real)	Minimum	Maximum	Precision	Appearance	
L	5	15	1	7.7	
Name (Random Real)	Minimum	Maximum	Precision	Appearance	
I	0.1	0.3	2	0.10	
Name (Random Integer)	Minimum	Maximum	Step	Appearance	
N	45	80	5	Skip	50

Drag and drop, [UPLOAD](#) or [SELECT RECENT](#) image

Select a [blank](#) or [variable](#) to create and edit

# How we used MathMatize – variable problems



The screenshot shows the MathMatize interface. At the top, there is a navigation bar with a logo on the left and icons for a book, a document, a magnifying glass, and a user profile on the right. Below this is a header bar with three buttons: "EDIT" on the left, "Preview" in the center, and "RANDOMIZE" on the right. The main content area contains a physics problem: "What is the magnitude of the magnetic field inside a solenoid of length  $L = 11.2$  cm which contains 40 loops and carries current  $i_s = 0.19$  A." Below the text is a text input field containing the equation  $B = \square \text{ mT}$ , where the square is a dashed box. Below the input field is a feedback bar that says "Blank 1: (expected within  $\pm 1\%$ )" with a close button on the right. Below the feedback bar is a large empty text input field with a keyboard icon on the right. At the bottom, there is a footer bar with "3 attempts" on the left, a "CHECK" button in the center, and "HELP" with a question mark icon and a bug report icon on the right.

EDIT Preview RANDOMIZE

What is the magnitude of the magnetic field inside a solenoid of length  $L = 11.2$  cm which contains 40 loops and carries current  $i_s = 0.19$  A.

$B = \square \text{ mT}$

Blank 1: (expected within  $\pm 1\%$ )

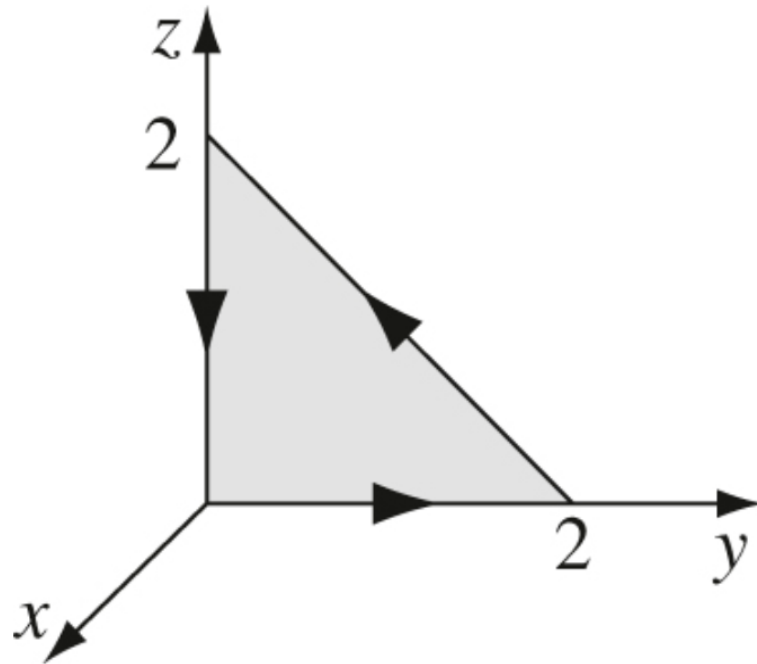
3 attempts

CHECK ? HELP

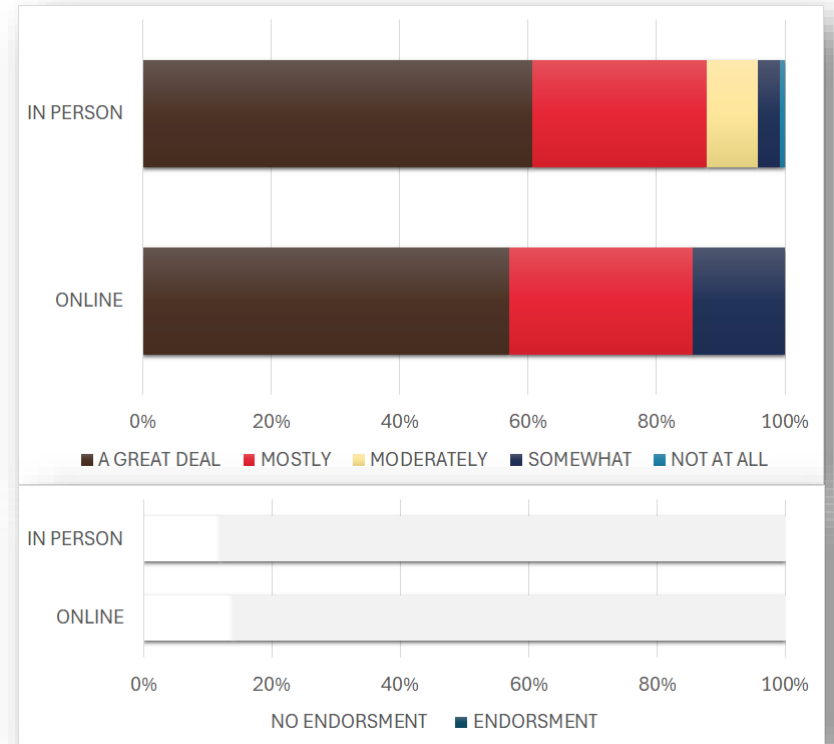
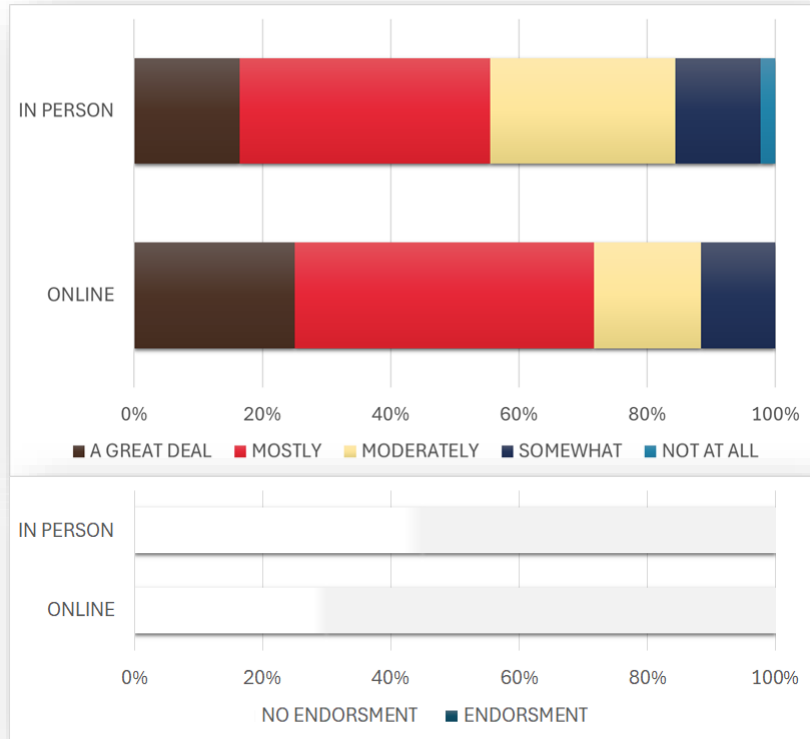
# How we used MathMatize – formula problems

Let  $\vec{D} = (xy)\hat{x} + (2yz)\hat{y} + (3zx)\hat{z}$ . Find  $\int(\vec{\nabla} \times \vec{D}) \cdot d\vec{a}$  for the triangle show below.

$$\int(\vec{\nabla} \times \vec{D}) \cdot d\vec{a} = \int_{\square} \left( \int_{\square} (\square) dy \right) dz = \square$$



# Student Feedback



Responses to the course evaluation question inquiring whether use of educational technology contributed to (PHY2xx, left) or promoted (PHY1xx, right) learning in the course.

# Summary

We used [MathMatize](#) – educational technology designed with focus on mathematical language – in various junior physics courses.

We liked it – especially the multi-variable and formula questions, flexibility in setting access, transparent design and relative simplicity in downloading grades.

There is a learning curve, and it still has some flaws, but it is fully functional



Try sample questions!