**A Mathematician’s Lament** *by Paul Lockhart*

*In this lament, Paul Lockhart explains the flaws in our society when teaching mathematics. Read the following section in which he talks about how badly mathematics is taught inside schools.*

There is surely no more reliable way to kill enthusiasm and interest in a subject than to make it a mandatory part of the school curriculum. Include it as a major component of standardized testing and you virtually guarantee that schools will suck the life out of it. School boards do not understand what math is, neither do educators, textbook authors, publishing companies, and sadly, neither do most of our math teachers. The scope of the problem is so enormous, I hardly know where to begin.

Let’s start with the “math reform” debacle. For many years there has been a growing awareness that something is wrong in the state of mathematics education. Studies have been commissioned, conferences assembled, and countless committees of teachers, textbook publishers, and educators (whatever they are) have been formed to “fix the problem.” The mathematics curriculum doesn’t need to be reformed, it needs to be scrapped.

All the controversies about which “topics” should be taught in what order, or the use of this notation instead of that notation, or which make and model of calculator to use, for god’s sake— it’s like rearranging the deck chairs on the Titanic! Mathematics is the music of reason. To do mathematics is to engage in an act of discovery; to be in a state of confusion— not because it makes no sense to you, but because you gave it sense and you still don’t understand what your creation is up to; to have a breakthrough idea; to be frustrated as an artist; to be awed and overwhelmed by an almost painful beauty; to be alive. Remove this from mathematics and you can have all the conferences you like; it won’t matter. Operate all you want, **doctors**: *your patient is already dead*.

The saddest part of all this “reform” are the attempts to “make math interesting” and “relevant to kids’ lives.” You don’t need to make math interesting— it’s already more interesting than we can handle! And the glory of it is its complete irrelevance to our lives. That’s why it’s so fun! Algebra is not about daily life, it’s about numbers and symmetry— and this is a valid pursuit in and of itself: Suppose I am given the sum and difference of two numbers. How can I figure out what the numbers are themselves? Here is a simple and elegant question, and it requires no effort to be made appealing. The ancient Babylonians enjoyed working on such problems, and so do our students.

A good problem is something you don’t know how to solve. That’s what makes it a good puzzle, and a good opportunity. A good problem does not just sit there in isolation but serves as a springboard to other interesting questions. I can understand the idea of training students to master certain techniques— I do that too, but not as an end in itself. Technique in mathematics, as in any art, should be learned in context. The great problems, their history, the creative process— that is the proper setting. Give your students a good problem, let them struggle and get frustrated. See what they come up with. Wait until they are dying for an idea, then give them some technique but not too much.

Mathematics is an art, and art should be taught by working artists, or if not, at least by people

who appreciate the art form and can recognize it when they see it. Why is it that we accept math teachers who have never produced an original piece of mathematics, know nothing of the history and philosophy of the subject, nothing about recent developments, nothing in fact beyond what they are expected to present to their unfortunate students? Now I’m not saying that math teachers need to be professional mathematicians— far from it. But shouldn’t they at least understand what mathematics is, be good at it, and enjoy doing it?

Teaching is not about information. It’s about having an honest intellectual relationship with your students. It requires no method, no tools, and no training. Just the ability to be real. If you can’t be real, then you have no right to inflict yourself upon innocent children.

*This essay was edited in order to facilitate students’ understanding, as well as question-setting.*

Source  
Lockhart, P. (2009). A Mathematician’s Lament. Retrieved September 17, 2023, from https://www.mimuw.edu.pl/~pawelst/rzut\_oka/Zajecia\_dla\_MISH\_2011-12/Lektury\_files/LockhartsLament.pdf.

**Questions**

1. Find a word in paragraph 1 which can be replaced by ‘dependable’.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. According to the writer, who in the following groups of people understand mathematics?
   1. Textbook authors
   2. School boards
   3. Publishers
   4. None of the above
2. What is the writer’s tone in paragraph 1?
   1. Excited +
   2. Optimistic +
   3. Worried -
   4. Sarcastic ~
3. In paragraph 2, what opinion is becoming increasingly popular?
4. What does “the problem” (line 11) refer to?
5. Which of the following best describes the writer’s way of fixing the problem in paragraph 2?
   1. Abandoning the current curriculum.
   2. Adding new material to math classes.
   3. Raising the standard for the mathematics curriculum.
   4. Rearranging the order at which topics are taught.
6. Why does the writer compare the controversies in lines 14-15 like rearranging deck chairs on the titanic?
7. Determine whether the following statements are true, false or not given from the information from paragraph 3.
   1. There is a specific calculator which students must use. \_\_\_\_\_\_\_\_
   2. To be confused is a key part of learning mathematics. \_\_\_\_\_\_\_\_
   3. Math is very painful to learn. \_\_\_\_\_\_\_\_
   4. The writer believes mathematics has no artistic value. \_\_\_\_\_\_\_\_
8. Who do “doctors” (line 21) refer to?
9. What does the writer mean by *“your patient is already dead”* ?
10. Does the writer believe that mathematics needs to be made more interesting? Why?
11. Find two words which have the following meanings in paragraph 4:
    1. Unrelatedness \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    2. Attractive \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
12. Complete the following passage using words from paragraphs 3 and 4. **Use no more than 1 word in each blank**.

The writer believes that the current (i)\_\_\_\_\_\_\_\_\_\_\_\_ about how the curriculum can be revamped completely neglects the core artistic nature of mathematics. He believes that mathematics is about coming up with (ii)\_\_\_\_\_\_\_\_\_\_\_\_ theorems and try to know what you have created whilst making sense of it. He thinks that it is (iii)\_\_\_\_\_\_\_\_\_\_\_\_ for math to remain disconnected with daily life. He states that students enjoy solving simple and (iv)\_\_\_\_\_\_\_\_\_\_ problems, just like people in the (v)\_\_\_\_\_\_\_\_\_\_\_\_ times.

1. Which of the following is not a characteristic of a good problem?
   1. Something you do not know how to solve.
   2. Something that can be solved by easy techniques.
   3. Something which inspires you to solve other problems.
   4. Something challenging which makes students frustrated.
2. Complete the following table with the information from paragraph 5.

|  |  |  |
| --- | --- | --- |
|  | Is it important to learn? | Where should it be learnt from? |
| Techniques | (i) Yes/No | (ii) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Creative problem-solving process | (iii) Yes/No | (iv) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

1. When should the teacher provide help to students when solving problems?
2. Name one quality which makes a person qualified to teach mathematics.
3. What does the writer imply about current math teachers in paragraph 6?
4. Why are students described as “unfortunate” in paragraph 6?
   1. The teacher will give them a lot of coursework.
   2. They are given a teacher who has little interest and knowledge about mathematics.
   3. They cannot enjoy mathematics.
   4. Their grades in the subject will be terrible.’
5. Determine whether the following statements are true, false or not given?
6. A good math teacher should keep up with new mathematical discoveries \_\_\_\_\_\_\_\_\_
7. Mathematics must be taught by professional mathematicians \_\_\_\_\_\_\_\_\_
8. The writer believes that students should choose their own math teachers \_\_\_\_\_\_\_\_\_
9. What is the most important ability for teaching according to the writer?
10. What does the writer mean by “*you have no right to inflict yourself upon innocent children*”?
    1. You cannot attack children.
    2. You are not qualified to take care of children.
    3. You are not qualified to teach children.
    4. You are not real.
11. Match the each of the headings with a paragraph of the text, some headings are not used.

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| --- | --- | --- | --- |
| Be Real |  | It’s Time to Ditch it |  |
| Our Massive Problem |  | The Essence of Good Problems |  |
| Who Should Teach Mathematics? |  | The Beauty in Irrelevance |  |
| An Artform Gone Unappreciated |  | Missing the Point |  |