Mathematical Sequences

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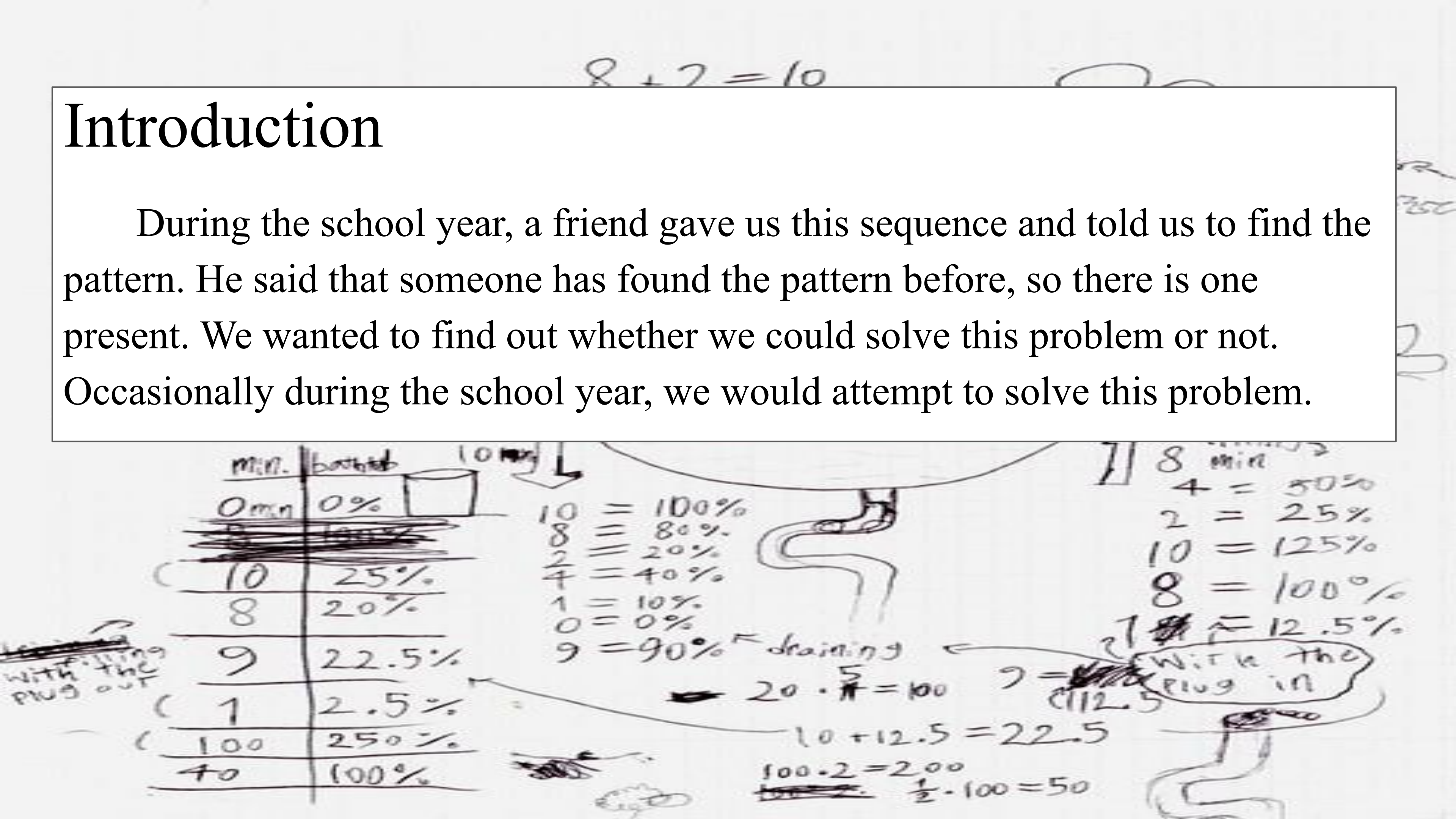
Introduction

During the school year, a friend gave us this sequence and told us to find the pattern. He said that someone has found the pattern before, so there is one present. We wanted to find out whether we could solve this problem or not. Occasionally during the school year, we would attempt to solve this problem.



Problem Statement

Find the pattern in this sequence:

2 4 2 1 0 4 3 1 0 4 2 1 0 4 2 1 2 4 2 1 0 4 3 1 0 1 2 4 0 1 2 3 4 0 0 4 4 3 1 4 2 2 4 2 4 1 0 4 3

Pattern in groups of 7 (As will be explained in the results):

2 4 2 1 0 4 3

1 0 4 2 1 0 4

2 1 2 4 2 1 0

4 3 1 0 1 2 4

0 1 2 3 4 0 0

4 4 3 1 4 2 2

4 2 4 1 0 4 3

Results I

2	4	2	1	0	4	3
1	0	4	2	1	0	4
2	1	2	4	2	1	0
4	3	1	0	1	2	4
0	1	2	3	4	0	0
4	4	3	1	4	2	2
4	2	4	1	0	4	3

Tried Processes I:

- Seven groups of seven, added up all the numbers in each group:

  16, 12, 12, 15, 10, 20, 18

- Noticed “2 4 2 1 0 4 3” and “1 0 4 2” each repeated twice. We tried to find what these two number sequences meant or what significance they gave.
- Next, we found the difference between every two numbers (Ex: “4 2” would be -2, and “2 4” would be +2, and these would cancel out to 0.) to see if we would end up with 0.

Results II

Tried Processes II:

- Next, tried adding the first number in every group together, second number, third, etc:

  17, 15, 18, 12, 12, 13, 16
- Matching in groups of 8, 7, 6, 5, 4, 3, and 2
- Nine 0s, ten 1s, eleven 2s, five 3s, and fourteen 4s.
- Largest number was 4, so sequence possibly had something to do with dividing by 5.
  - Tried to make the remainder of the numbers being divided by 5 become the sequence going in an ascending order.
  - Example: “2 4 2 1 0 4 3” would be “2 4 7 11 15 19 23”
  - Still a work in progress.

Conclusion

- Our results didn't lead us to what the pattern was. However, our results did give us some insight on how to improve next time we do this problem.
- If we were to keep on going with this project, we would research and maybe try to look at this problem differently.
- Interpret the sequence as a description of something, or, as our friend hinted us, something to do with music.
- In conclusion, we thought this problem was a good challenge that we will continue to work on.