Why? Fractions? Threashold concepts 10 symbols

Jack Marwood

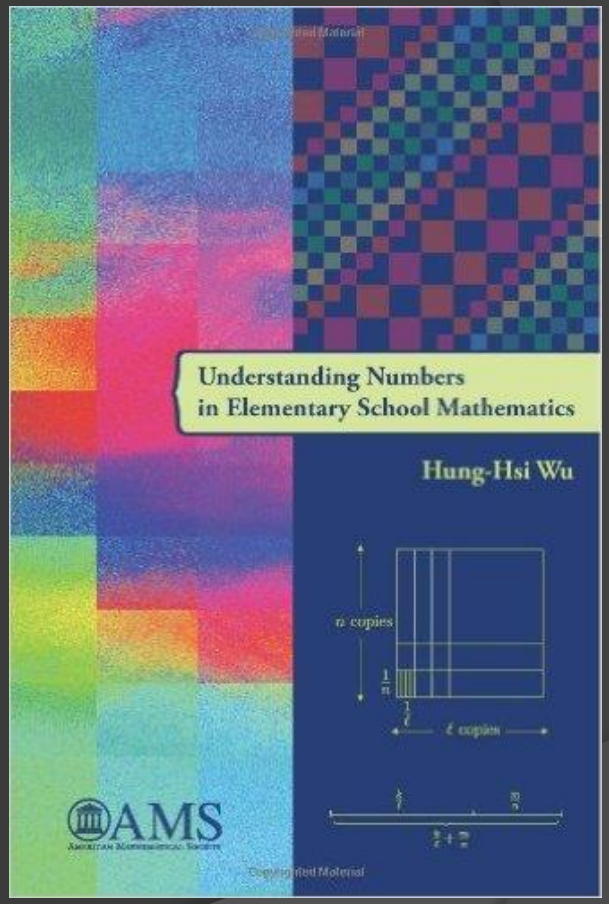
10 Things You Should Know About Primary Maths

General observations

1) Making the difficult easy
2) Secondary Teachers want the basics
3) Accuracy, Beauty and Clarity

Mathematical engineering

Professor Hung-Hsi Wu



https://math.berkeley.edu/~wu/
https://math.berkeley.edu/~wu/Schoolmathematics1.pdf

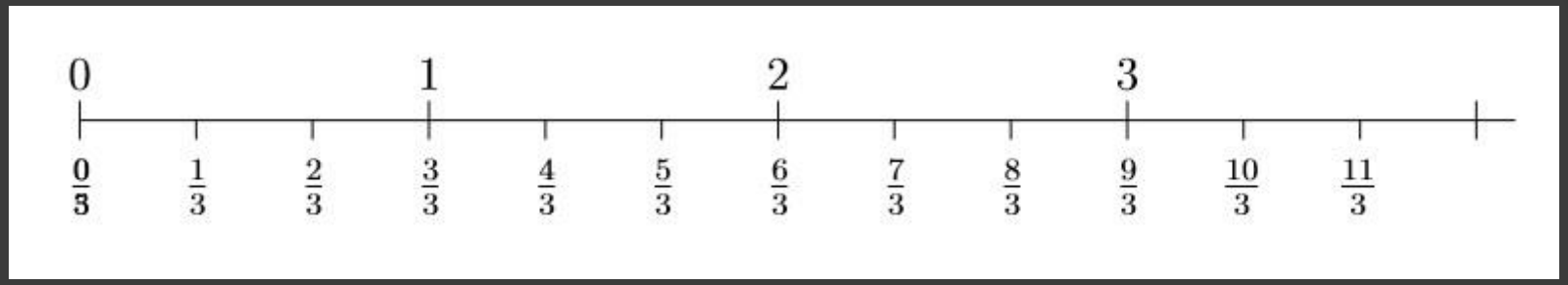
Mathematical Engineering

4) 10 symbols to represent every number

00	01	02	03	04	05	06	07	08	09
10	11	12	13	14	15	16	17	18	19
20	21	32	33	34	35	36	37	38	39
↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
90	91	92	93	94	95	96	97	98	99

Mathematical Engineering

5) Fractions are numbers



Mathematical Engineering

6) $26 \div 3 \neq 8$ r 2

If $42 \div 5 = 8$ r 2, and $26 \div 3 = 8$ r 2,
then $42 \div 5 = 26 \div 3$

Better to teach $26 = (8 \times 3) + 2$ and $47 = (8 \times 5) + 2$

Mathematical Engineering

7) Five Basic Charcteristics

Precision: Mathematical statements are clear and unambiguous. At any moment, it is clear what is known and what is not known.

Definitions: They are the bedrock of the mathematical structure. They are the platform that supports reasoning. No definitions, no mathematics.

Reasoning: The lifeblood of mathematics. The engine that drives problem solving. Its absence is the root cause of teaching- and learning-by-rote.

Coherence: Mathematics is a tapestry in which all the concepts and skills are interwoven. It is all of a piece.

Purposefulness: Mathematics is goal-oriented, and every concept or skill is there for a purpose. Mathematics is not just fun and games.

Key Takeways

8) Threshold Concepts

Fractions

Percentages

Key Takeways

9) Linking the basics

$3876 \times 5382 = ?$

$4000 \times 5000 = ?$

$3876 \times 5382 = 20\ 860\ 632$

Key Takeways

10) Always ask, “Why?”

Key Takeways

1) Making the difficult easy
2) Secondary Teachers want the basics
3) Accuracy, Beauty and Clarity
4) 10 symbols to represent every number
5) Fractions are numbers
6) $26 \div 5 \neq 5 \text{ r } 1$
7) Five basic characteristics
8) Threshold Concepts
9) Linking the basics
10) Always ask, "Why?"

Why? Fractions? Threshold Concepts 10 symbols

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