Division: progression of strategies over time

Complexity of numbers / efficiency of strategies

up to 100

up to 20

up to 10

Increasingly efficient strategies
Numerical methods / strategies used to solve the problem but not the long division algorithm

185 divided by 12

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10 x 12=120

5 x 12=80

15 180r5

853 divided by 23

Prelude to long division, for example

853

230 (10)

623

460 (20)

163

115 (5)

48

46 (2)

12 (37)

37r12

108 divided by 9

Using inverse relationship of multiplication, for example

10 x 9 = 90

2 x 9 = 18

90 + 18 = 108

10 + 2 = 12

91 divided by 7

Repeated subtraction, for example

91 - 7 ->84 - 7 ->77 - 7 ->70

- 7 ->63 - 7 ->56 - 7 ->49 etc

91 divided by 7

Using doubling, for example

7 + 7 = 14

14 + 14 = 28

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28 + 28 = 56 + 14 --> 70 + 14 -->84 + 7 --> 91

4 + 4 + 2 + 2 + 1 = 13

51 divided by 3

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10 10 10 30

5 5 5 15

2 2 2 6

17 each 51

Problems use bigger numbers to provoke (encourage) more efficient drawings and ways to solve the problem

The items being shared / grouped are no longer visible

Primitive strategies
Drawings replace direct modelling in order to solve problems.
"Make a plan" drawings, not art class!

12 divided by 2

2 2 2 2 2 2

6 divided by 3

Drawings become less elaborate and more mathematically focussed and possibly start showing use of numbers instead of actual items

12 divided by 3

Drawings are initally elaborate and detailed (when working with small number ranges)

Direct modelling with concrete items such as stones, counters etc.
Often followed by drawing a record of how they did it
(even before children know number names and symbols they can solve problems in this way)

Increasing compression over time

SA NUMERACY CHAIR PROJECT