Number Sense

Cherri Moseley

Outcomes

- What is number sense?
- How does children's number sense develop?
- What are the most effective teaching methods and resources?
- How can research findings inform classroom practice?

$$2 \times ? \times 9 = 90$$

Overview of the session

- Definitions
- Activities
- Strategies
- Pedagogy

What is number sense?

Mcintosh et al (1992)

“Number sense … reflects an inclination and an ability to use numbers and quantitative methods as a means of communicating, processing and interpreting information. It results in an expectation that mathematics has a certain regularity.”

“Number sense refers to a person’s general understanding of number and operations along with the ability and inclination to use this understanding in flexible ways to make mathematical judgments and to develop useful strategies for handling numbers and operations.”

Examples of numerical fluency or number sense?

20 + 30 = 50 + 7 = 57 + 8 = 65

Which is bigger? ½ or 3/7

If you know … 7 x 8 = 56 …

0.125 x 0.8 – 0.1

3 – 2 x 1.5

Possible components of number sense

- Place value
- Quantity
- Relationships
- Symbols
- Vocabulary
- Representations
- Operations
- Pattern

Place value

Positional place value is

where the digit of a number is placed, e.g. in 345, the digit 3 is positioned in the hundreds.

Additive place value is

when all the individual values of the digits are added together to give the whole number e.g. 300 + 40 + 5 = 345

Multiplicative place value is

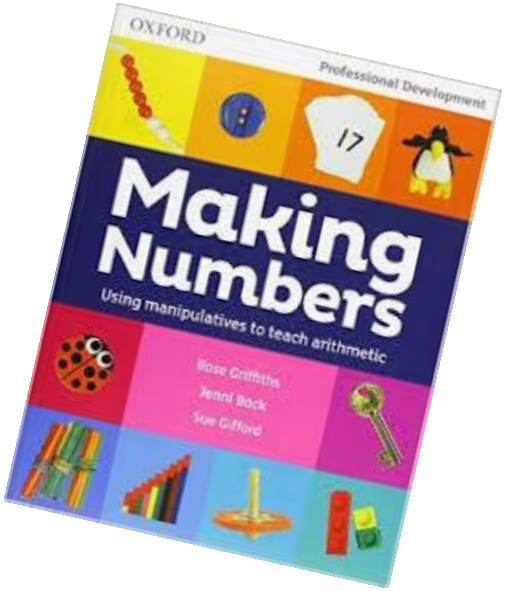
when we multiply the digit by its position to get its true value

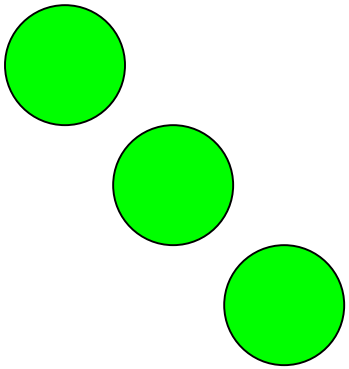
Rising Stars Mathematics

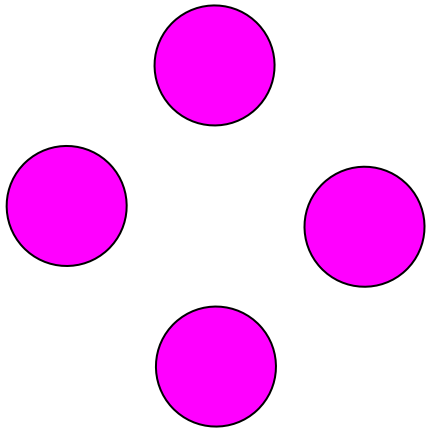
1000	2000	3000	4000	5000	6000	7000	8000	9000
100	200	300	400	500	600	700	800	900
10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9
0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09

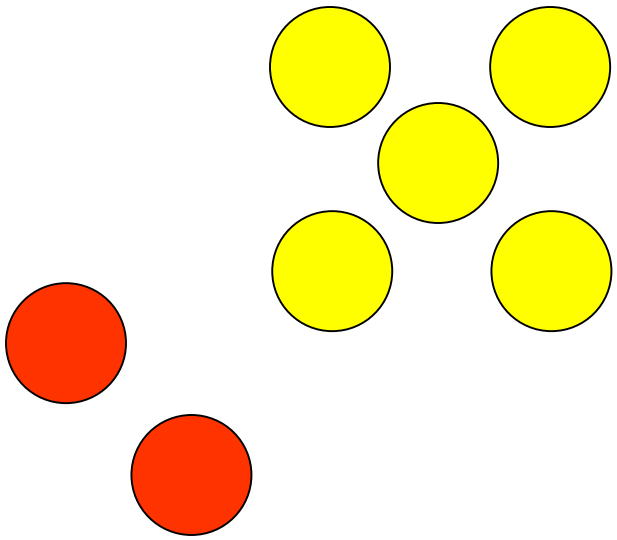
Quantity

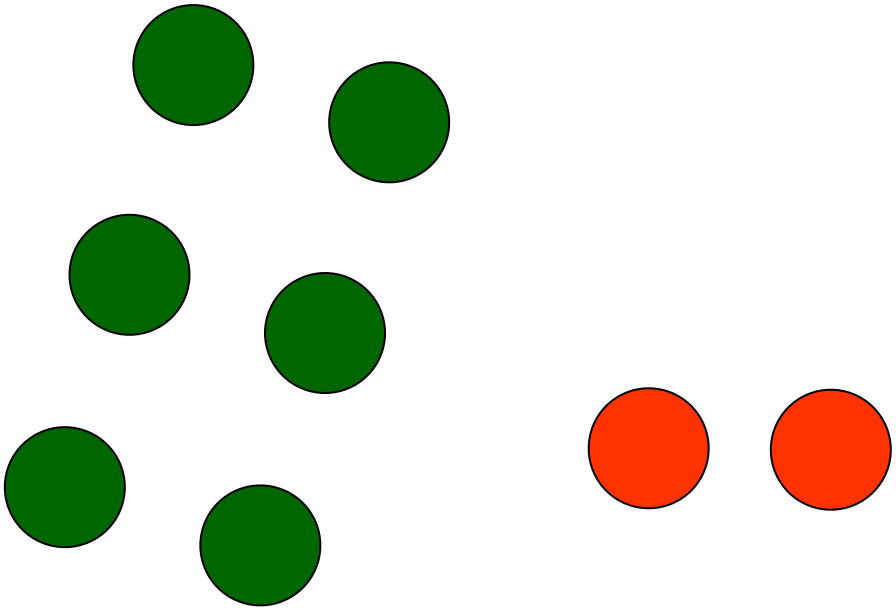
- Counting
- Subitising
- Number system
- Magnitude

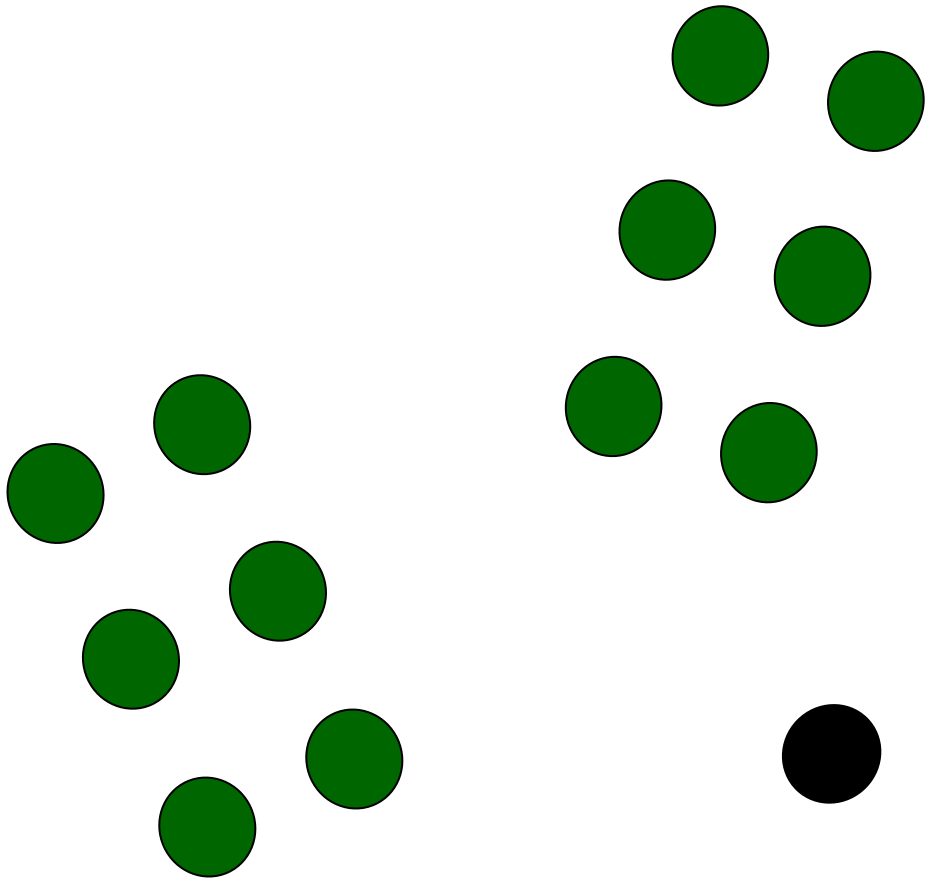












Relationships

- Fact families

- Derived facts

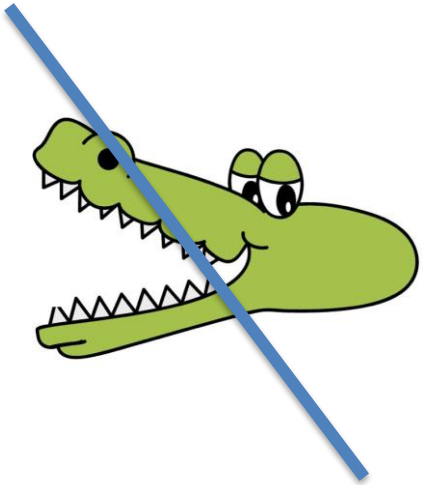
- Connections:

  commutative associative distributive

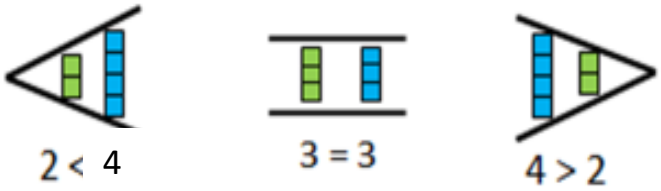
  inverse equivalence

Symbols

- What is a symbol?
- Zero
- Equivalence and inequalities



Inequalities



BEAM Maths of the Month

Digits

Use each digit once only.

Can you make numbers to fit the descriptions?

a number under 30	.....
a number over 50	.....
an odd number	.....
an even number	.....
a number in the 5 times table	.....

Vocabulary

- The importance of using the correct vocabulary

  augend + addend = sum

  minuend – subtrahend = difference

  multiplicand x multiplier = product

  and factor x factor = multiple

  dividend ÷ divisor = quotient

Representations

- Pictorial and concrete

- Are your classroom resources accessible e.g. trugs?

13

Operations

- 18 x 5
- A farm shop sells about 72 eggs each day. How many days will 300 eggs take to sell? What time will the last egg be sold?

"When arithmetic is taught as a logical structure of connected processes and results, rather than a sequence of standard procedures, children will learn that there is flexibility and choice in solving problems."

(Anghileri, 2000, p.139)

Pattern

What's in the box?

What patterns exist?

The pedagogy of number sense

- Open
- Flexible
- Mistakes/misconceptions
- Pair and group work
- Making connections
- Less is more
- Playing
- More than one answer/method/explanation
- One question … five different ways

Possible components of number sense

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Where is it going?

- Look at the sample GCSE questions
- Which ‘number sense’ strategy or strategies would you use to solve the question?

Outcomes

- What is number sense?
- How does children's number sense develop?
- What are the most effective teaching methods and resources?
- How can research findings inform classroom practice?

"If teaching approaches change so that children learn connections then the outcome could be a new generation of mathematical thinkers who will be autonomous learners driven on by their fascination with numbers"

Anghileri, 2000, p.138

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