

Number

This document is part of a set that forms the subject knowledge content audit for Key Stage 1 and Key Stage 2 maths. Each document contains: audit questions with tick boxes that you can select to show how confident you are (1 = not at all confident, 2 = not very confident, 3 = fairly confident, 4 = very confident), exemplifications; explanations; and further support links. At the end of each document, there is space to type notes to capture your learning and implications for practice. The document can then be saved for your records.

Question 1

How confident are you that you understand and can support children to use and apply the principles of counting?

1

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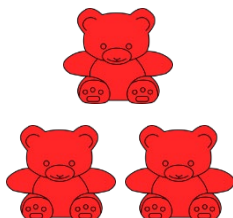
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How would you respond ...?

a. A child has these items in front of them. They state that there are 7 bears.

How would you use the principles of counting to support their understanding?



b. Are you able to match the correct statement to the correct counting principle? For example, Statement 1 matches to Principle E.

Statement	Principle
1. Can instantly recognise a dot pattern on a dice.	A. Has not understood the 1:1 principle.
2. Over counts a set of six objects, saying, whilst pointing: 1, 2, 2, 3, 4, 5, 6, 7.	B. Does not understand the stable order principle.
3. Understands that the final number is the value of the set.	C. Understands the order irrelevance principle.
4. Counts a set of objects as 1, 2, 5, 3, 4, 6, 6, 7, 9.	D. Understands the cardinality principle.
5. Counts a row of five objects correctly, starting with the middle one.	E. Child can subitise.

Responses

Note your responses to the questions here before you engage with the rest of this section:

Did you notice that...?

- a. In this example, we expect the child to count 1, 2, 3. However, the child may not have understood the **1 to 1 principle**, meaning they do not attach one number name to one object and so might over count. In this instance, they might continue to count round in a circle, not knowing when to stop, so are unable to apply the **cardinal principle**.

It is important to arrange objects in different ways, such as in a straight line or circle, to help children learn how to keep track of which objects they have counted and which are remaining. Encourage them to develop strategies to help keep track of those they have counted, such as repositioning objects or pushing or pointing at each one in turn. If children are not secure in recognising when to stop, this will require further practice and focus.

b.

Statement	Principle
1. Can instantly recognise a dot pattern on a dice.	A. Has not understood the 1:1 principle.
2. Over counts a set of six objects, saying, whilst pointing: '1, 2, 2, 3, 4, 5, 6, 7.'	B. Does not understand the stable order principle.
3. Understands that the final number is the value of the set.	C. Understands the order irrelevance principle.
4. Counts a set of objects as '1, 2, 5, 3, 4, 6, 6, 7, 9'.	D. Understands the cardinality principle.
5. Counts a row of five objects correctly, starting with the middle one.	E. Child can subitise.

Cardinality and counting

The cardinal value of a number refers to the quantity of things it represents, such as the numerosity, 'howmanyness', or 'threeness' of 3. When children understand the cardinality of numbers, they know what a number means in terms of how many things it refers to. Counting is one way of establishing how many things are in a group because the last number you say tells you how many there are. Children enjoy learning the sequence of counting numbers long before they understand the cardinal values of the numbers. Subitising is the word we use for the instant recognition of small quantities; it is a way of recognising how many there are without counting.

Progression through the curriculum

Counting: saying number words in sequence

Children need to know number names, initially to 'five', then 'ten', extending to larger numbers, including crossing the boundaries at 19/20 and 29/30. Counting back is a useful skill but initially young children will find this harder because of the demand it places on their working memory.

Activities and opportunities:

- counting backwards, for example using *number rhymes*
- starting from different numbers.

Counting: tagging each object with one number word

Children need lots of opportunities to count things in irregular arrangements. For example, '*How many play people are in the sandpit? How many cars are in the garage?*' These opportunities can also include counting things that cannot be seen, touched or moved.

Activities and opportunities:

- counting things of different sizes – this helps children to focus on the numerosity of the count
- counting things that can't be seen, such as sounds, actions, or words
- counting things that cannot be moved, such as pictures on a screen, birds at the bird table, faces on a shape.

Counting: knowing the last number counted gives the total so far

Children need the opportunity to count out or 'give' the number of things within a larger group, not just to count the number that is there. This is to support them in focusing on the 'stopping number', which gives the cardinal value.

Activities and opportunities:

- playing dice games to collect a number of things
- playing track games and counting along the track.

Numeral meanings

Give the children the opportunity to match a number symbol with a number of things. Try to have a range of number symbols available, such as wooden numerals, calculators, handwritten numbers. Try to include different examples of the same number, for example:



Activities and opportunities:

- using numeral dice in games and matching numerals with varied groups of things
- using 'tidy-up labels' on containers and checking that nothing is missing
- reading number books
- putting the right number of snacks on a tray for the number of children shown on a card.

Conservation: knowing that the number does not change if things are rearranged (when none have been added or taken away)

Children need the opportunity to recognise amounts that have been rearranged, and to generalise that if nothing has been added or taken away then the amount is the same.

Activities and opportunities:

- correcting a puppet, who may say that there are more or fewer objects now as they have been moved around, for example spread out or pushed together
- contexts, such as sharing things out (grouping them in different ways) and then the puppet complaining that it is not fair as they have less/fewer
- encouraging the children to make different patterns with a given number of things.

Common errors in this area may include:

- missing out an object or counting an object twice
- when asked how many cars are in a group of four, simply recounting '1, 2, 3, 4' without concluding that 'there are four cars in the group'
- when asked to 'get five oranges' from a trayful, a child just grabs some or carries on counting past five
- if objects in a group are rearranged the child (unnecessarily) recounts them to find how many there are
- difficulties in counting back
- confusion over the '-teen' numbers as they can be hard to learn
- missing a number like 15 (13 or 15 are commonly missed out) or confusing thir*teen* and thir*ty*.

What to look for

Can a child:

- consistently recite the correct sequence of numbers and cross decade boundaries?
- collect nine from a large pile, for example nine pencils from a pot?
- subitise (instantly recognise) a group that contains up to four, then five, in a range of ways (such as using fingers, dice, or a random arrangement)?
- select a numeral to represent a quantity in a range of fonts?
- correct a puppet who says the amount has changed when a collection has been rearranged?

Links to supporting materials:

NCETM Primary Professional Development materials, Spine 1: Number, Addition and Subtraction:

- Topic 1.1: Comparison of quantities and measure

Notes:

Key learning from support material and self-study:

What I will focus on developing in my classroom practice: