



# FIVE PRINCIPLES OF COUNTING



Monday 3<sup>rd</sup> December 2018

# EARLY COUNTING

Social counting  
songs  
1, 2, 3, jump  
climbing stairs  
counting steps  
rhymes

Early counting happens as children learn to speak and use sounds in a social context. Delighted adults begin to use rhymes stories and songs to teach number names, and are soon rewarded by children repeating them. This is related to being able to count by the adult.

Research shows adults' and children's view of what's happening is very different.

**For children it is a social/playful activity with no aim of finding a quantity.** The purpose of these early activities is not always clear and needs to be established.

There is however much more to counting than repeating sounds. It entails doing many things at once like rubbing your tummy and patting your head, only more complicated and with a purpose you need to be aware of.



# FIVE PRINCIPLES OF COUNTING

For Gelman and Gallistel the following five principles govern and define counting:

1. **The one-one principle.**
2. **The stable-order principle**
3. **The cardinal principle**

These three principles are considered by Gelman and Gallistel to be the 'how-to-count' principles as they specify the way in which children must execute a count.

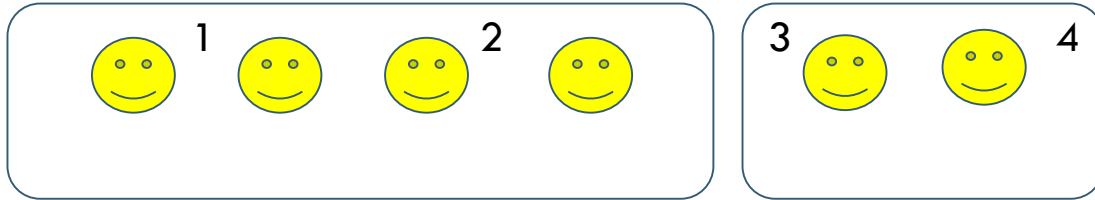
4. **The abstraction principle**
5. **The order-irrelevance principle**

The remaining two are 'what-to-count' principles, as they define what can actually be counted.



# 1. ONE TO ONE

This involves the assigning of one, and only one, distinct counting word to each of the items to be counted. Therefore the same number of items as tags/words. To follow this principle, a child has to be able to **partition** and **repartition** the collection of objects to be counted into two categories: those that have been allocated a number name (counted) and those that have not (been counted).



If an item is not assigned a number name or is assigned more than one number name, the resulting count will be incorrect.



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[https://www.youtube.com/watch?  
v=dvyLUpE6o7A](https://www.youtube.com/watch?v=dvyLUpE6o7A)



## 2. STABLE ORDER

**To be able to count also means knowing that the list of words used must be in a repeatable order.**

This principle calls for the use of a stable list that is at least as long as the number of items to be counted; if you only know the number names up to 'six', then you obviously are not able to count seven items.

**The same list needs to be used count after count.**

However, a child who repeatedly counts a three-item collection as 2, 1, 3 does appear to have grasped the stable-order principle – although, in this case, has not yet learned the conventional sequence of number names.



- <https://youtu.be/1EzGw-JxSmA>

### 3. CARDINALITY

This principle says that (when one-to-one and stable-order principles have been followed) **the number name allocated to the final tag in a count represents the number of items in that set.**

To achieve this, a child needs to appreciate that the final number name is different from the earlier ones. It not only 'names' the final object, signalling the end of the count, but also tells you how many objects have been counted: it indicates what we call the **numerosity** of the collection.

If a child recounts when asked how many objects there are, then they have not yet grasped this principle.





- <https://youtu.be/ieRYzIFWWUg>



## 4. ABSTRACTION PRINCIPLE

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**This states that the preceding principles can be applied to any collection of objects, whether tangible or not. It is about the properties of the set.**

Easier to count if the objects are tangible and movable, to help them to distinguish the 'already counted' from the 'yet to be counted' group.

As counting develops, children need to know they can count:

**physical things - non physical things**



# ABSTRACTION CONTINUED...

Early counters must develop an understanding they can count items **present and not present**. (Hidden objects, remembered items)

Early counters must also develop an understanding that the items counted can be

**similar or dissimilar**



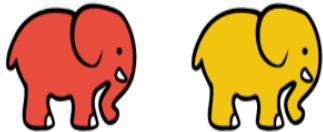


## 4. ABSTRACTION PRINCIPLE CONT'D

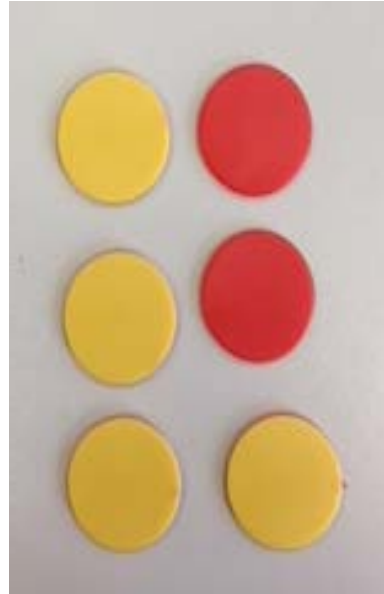
This is also related to Conservation of Number

- a certain quantity of large things is still equal to the same quantity of small things.

E.g. a set of 5 large elephants is the same quantity as 5 small beads



- <https://youtu.be/6WbYPsr9lgc>



These are all equal to six, no matter how they are arranged.

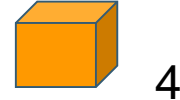
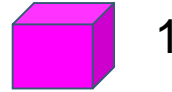
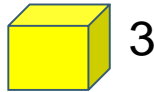
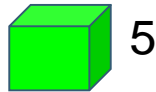
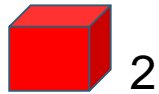
Piaget says children cannot be considered counters if they haven't got CONSERVATION of number.



# 5. ORDER IRRELEVANCE PRINCIPLE

**This principle refers to the knowledge that the order in which items are counted is irrelevant.**

It does not really matter whether the counting procedure is carried out from left to right, from right to left or from somewhere else, so long as every item in the collection is counted once and only once.



- <https://youtu.be/xVv-qjhEUgc>



# TASK

You will be given a principle and definition and some thinking prompts to consider.

Make a poster about the principle giving as many ideas as you can under each prompt.



# QUESTIONS FOR TASK:

- Skills needed
- What other principles do you need?
- What does it look like in action? See? Hear?
- What mistakes might you see when a child hasn't 'got it'?
- Activities?
- Questions?

## 5 Principles

1. **Stable Order**- I know the number words and can say the number words correctly
2. **One to One**- I can assign one item with one number name
3. **Cardinality**- I know that the last number I say is the quantity I have counted so far
4. **Abstraction**- I know what I am counting can be seen or unseen. A set can have different properties.
5. **Order Irrelevance**-the order in which you count the items doesn't affect the quantity/count