# SEMANTIC TYPES OF NUMBER

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The poster will be compartmentalised to contain illustrations of fundamental terms; the table given below; student's tasks and solutions and didactic applications of the theoretical ideas presented.

The world of numbers emerges from children's everyday experiences. During the first years at school this world reaches its autonomy, a natural consequence of mental development, very often loosing its linkage to the real world - a cause of low quality future mathematical knowledge in students. This paper classifies different types of **anchored numbers**, - numbers linked to the real world, using a slightly improved version of the classification defined in Hejný, Stehlíková (1999), as follows:

| **Class** | | **Sub-class** | | **Examples** | |
|---|---|---|---|---|---|
| | | | | **Count** | **magnitude (is measured)** |
| Identifier | | name | | Bus number 15. Telephone number 37. (is observed) | |
| | | address | | Newton was born 1643. Beethoven's fifth symphony. | |
| Q u a n t i t y | State | | | Six apples on the plate. | Mary is 152 cm tall. |
| | Operator | Comparison | A | Tom has £5 less than Ed | Doug is 7 cm taller than Debby |
| | | | M | Michael did 3 times more steps than Karin | The Rhine is twice as long as the Seine. |
| | | Change | A | I put two more apples into the basket. | She shortened her hair by 10 cm. |
| | | | M | The number of participants was four times those expected | During the flood, water in this brook increased 90 times. |

A – additive; M- Multiplicative.

An anchored number is either an **identifier** or a **quantity**.

A number as an identifier is used to denote some object, person, time, location, event, ... If it is part of a structured set like the scale on a thermometer, a seat in a theatre we will call it an **address.** If there is not a structure to the set, numbers on ice-hockey player's shirts, bus destination numbers, it is a **name.**

A number as quantity can be classified from the points of view of its **function** and of its **quality**. As a function a number describes either a **state** – it quantifies some object, situation, event.. or an **operator** – which is either a **comparison,** comparing two different states or a **change,** turning a given state to another. The quality of a number expresses either a **magnitude** – such as length, weight, pressure, etc. which is measured by means of some unit, or the **count** of the elements of a set. Boundaries between the classes, sub-classes are not well defined.

Reference:
Hejny, M., Stehlikova, N. (1999) *Ciselne Predstavy Deti* Charles University, Prague