SCIENTIFIC THINKING IN (PRE)PRIMARY SCHOOL SETTINGS

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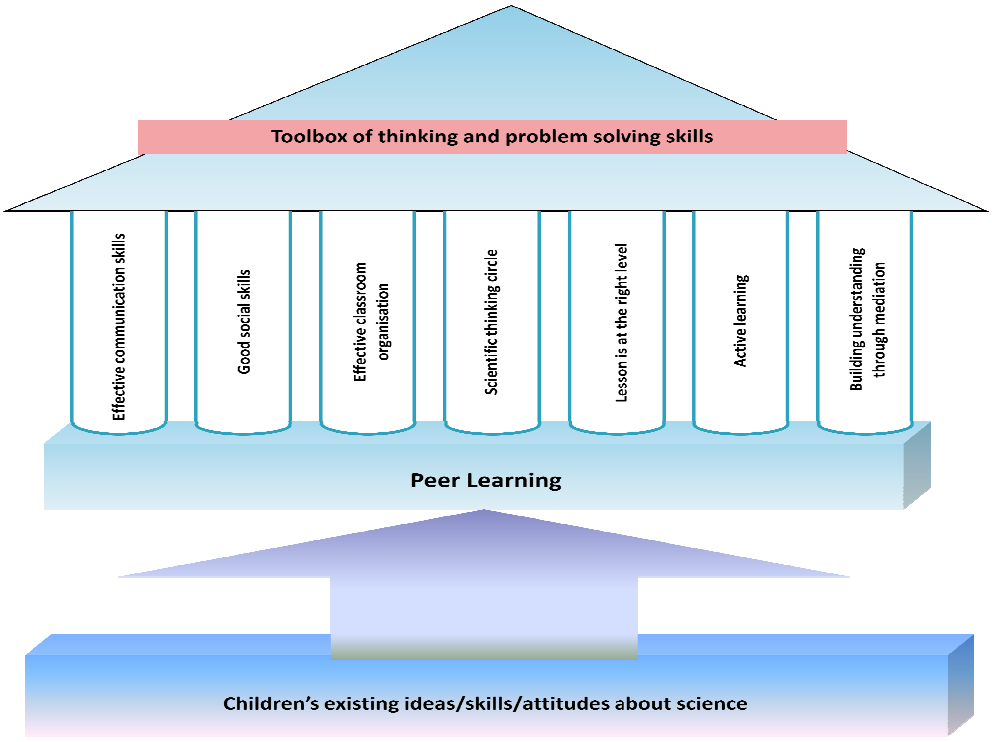
The ability to think in a scientific manner to approach problems in a logical and coherent way is a desirable outcome of schooling for young persons. Not only is scientific thinking important for the cognitive development of young persons, then it also provides them with skills that may be able to be transferred to other learning and social contexts. This aspect of science literacy is a cornerstone of the Scientific Thinking in (Pre) Primary Schools (STIPPS) project. The project emphasises cognitive development of scientific reasoning in (pre) primary school education and provides materials for continuing professional development of teachers in this area. The project presents a research led model for what constitutes effective methods of learning and teaching in science.

The STIPPS model is metaphorically represented as a temple with pillars of learning, and is presented on the website as an interactive tool (www.stipps.info).

The child's initial concepts about science are the basis of the model. Children come to school with powerful resources (in terms of their previous learning and skills at investigating how the world operates) on which science instruction can build. Even young children can learn to explain natural phenomena, design and conduct empirical investigations, and engage in meaningful evidence-based argumentation. This makes it necessary to question and reflect on the best approaches to learning and teaching in science.



Peer learning theories underpin the model of effective learning presented. Peer learning can be effective in learning contexts as it:

- makes pupils learn from each other. Children learn more easily and efficiently in an adapted social context,
- can motivate pupils and challenge them to learn actively and constructively,
- stimulates interaction between pupils and promotes the development of social skills,
- makes use of differences between pupils, turning those into opportunities to learn from each other,
- contributes to creating a positive classroom atmosphere where learning is valued.

The 'roof' of the model is supported by seven pillars, all related to the didactic process which results in the methodology of peer learning. One of the central pillars states that children learn through the process of scientific inquiry (= scientific thinking circle). On the other hand one also needs to pay attention to the other pillars. They are just as indispensable in a (pre)primary school setting or in science education:

- Lesson is at the right level
- Learning Science must be active, challenging and exploring
- Learning Science is based on effective communication; not only among the children, but also between the children and the teacher
- Learning Science makes use of 'social skills' and stimulates their further development.
- Science activities require well-adjusted teaching and coaching methods that make 'mediation' possible
- Learning Science requires an effective classroom organisation.

The roof of the model is the ultimate goal which offers the child a toolbox full of thinking and problem solving skills.

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