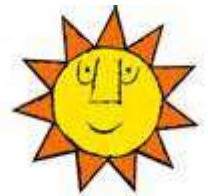


The mathematicians of tomorrow.

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Challenge ourselves and our children.



The Swedish curriculum.

Here are the four goals that includes mathematics in the Swedish curriculum for preschools its written in 1998 but it is revised in 2010.

The preschool should strive to ensure that each child:

- develop their understanding of space, shapes, location and direction, and the basic properties of sets, quantity, order and number concepts, also for measurement, time and change,
- **develop their ability to use mathematics to investigate, reflect over and test different solutions to problems raised by themselves and others,**
- develop their ability to distinguish, express, examine and use mathematical concepts and their interrelationships,
- develop their mathematical skill in putting forward and following reasoning,



Children:

- should get rich opportunities to discover and use mathematics in the everyday activities in the preschool.
- They should be given the opportunities to express their discoveries, how they do it and what they are thinking while they are doing it.
- They should also be allowed to take part of other children's experiences and perceptions.
- There are many situations where children express their mathematic knowledge in both formal and informal ways and symbols, they express it in the way they are acting, in pictures, words etc.
- It is important that children get the chance to investigate and discover the room.



Children

- A child must have concrete experience to create a knowledge (hands on to minds on) Mathematics develops when we both act with our bodies and use our mind. We can see this when we observe the children while they are playing.
- It is important that we use a language that is suitable for the children that we are working with, a language that they understand and at the same time challenge them with new words and concepts.
- Drawing is one way for children to transport them in to solving mathematic problems. They should be challenged in different ways to document different numbers, quantities and the different ways to use numbers and discover patterns with numbers and no numbers.
- Children need to have trust in their own knowledge and their own ability and rely on their own knowledge.
- Children's first meeting with mathematics is important we want to make them curious. This will have an impact for life and future way of learning mathematics.



Educator.

The educator's opinion about the subject, his/her engagement and awareness about the children's knowledge and thinking is crucial for which opportunities that will be created for the children to learn and experience mathematics.

For the children it is central to have an educator who is engaged and responsive, an educator that tries to listen and understand how the children are thinking and communicates so they can get help to clarify and develop their thoughts.

If an educator should be able to analyze children's activities in a mathematic perspective, it is a must that we have the competence to recognize the mathematics and that we can understand children's way of expressing it.

We need to be the one who accommodate the children not the other way around.

We are the ones who should support. We must talk with the children in the right way, giving them the right questions.



What does we educators need to know?

- We need to have mathematic skills ourselves,
- we need to have knowledge about the development children have in a mathematic perspective.
- We need to know which kind of preschool activities includes mathematics.
- We need to be aware of the mathematics the children meet during a day, while they are playing, in the food-situations as well as in our planned activities.
- We need to be able to meet, understand and challenge every child, because they all have different experiences and perceptions about mathematics.



What shall the educators do?

- We should participate in activities, reasoning and discussions.
- We should introduce new concepts and we should give the children nuances of the meaning of the concepts.
- We should encourage the children to think, reflect, solve problems, see patterns and connections in games and activities.
- We are responsible for the materials in the preschool, it should be available and interesting.
- We shall ask questions that develop logic thinking and reasoning.
- We should ask children to pay attention to similarities and differences.
- We should give children opportunities to translate their knowledge from one situation to another.



What are the right questions?

In the book "Primary Science Taking the Plunge" by Wynne Harlen you can find a whole chapter, written by Jos Elgeest, about questions, which question should we as a teacher give the children and why and why should we avoid certain kind of questions?

The question we want to ask is the questions that makes children keep investigate and explore. Question that starts with a why, how or what demand often a correct answer and doesn't give a problem to solve or gives the children the opportunity to make hypotheses and investigate it.

The right question encourages the children to find their own answer in their own way instead of just remember something from a book or a class.

It is important for me to start with these kind of questions early because then we give the children a way of thinking and relying to their own minds to solve problems we also teach them that there is more than one way to an answer even if it sometimes is a better way than another to solve problems.



Productive questions.

1. Questions that puts the attention in the center.
2. Questions that focus on measuring or counting.
3. Questions that puts the focus on comparing.
4. What happens if? Questions.
5. Questions that gives the children a problem.

If you use questions that starts with why and how you should think about using them so they get personal directed and not “The right answer” directed.



How do children learn?

Spontaneous situations

informal situations

structured situations



How do we choose our activities?

We must have a purpose, it should be meaningful for the participants, it should be challenging enough but not too much.



Reflections.

How did the children cooperate? How did they interplay? What did they learn, which experiences did they achieve? What did you learn about the children and their learning? Reflect over how you as a teacher can challenge the children to understand contexts, to generalize, to evolve their language and their thinking. How can you get the children to document their learning processes and their experiences?



How do we plan our environment?

How does the kindergarten look? What possibilities does it have to offer? Does it contribute to let the children explore and investigate mathematics, in different ways? What material do we have? Where do we place the material and is it allowed to use? How do we present our material? What challenges can children meet in our environment?



