

## Montessori Science Education

I had never thought that toddlers could/should be taught scientific subjects like the solar system and geographical subjects like the seven continents, not until I enrolled my son for a Montessori playgroup.

I was completely amazed when my two-year-old son could recite the Solar System Song and Continents Song after singing them for one to two times only. Not only could he remember the lyrics, he could even identify the planets and continents on books and posters. This knowledge has intensified his interest in galaxies and rockets, which he has already been developing from books and DVDs. I am not sure if I have helped to nurture his interest – the ceiling light I bought for his bedroom is in the form of two astronauts and a rocket ship hanging down from a space saucer. Then I followed the advice of my Montessorian tutor to stick some fluorescent stars and a moon on the ceiling. My son was a bit scared at the very beginning. My tutor reckoned that it might be due to the fact that I had stuck the stars myself without involving my son's participation, so he was taken by surprise.

It dawned on me that I had not given due respect and regard to my son. I had devoted quite a lot of time, energy and resources on my son and tried to learn better ways to bring him up. But I might have done all this from my own perspective, so much so that I had taken for granted that he ought to respond positively to anything I had so thoughtfully done for him. I had strived to give him a 'prepared environment', but the best environment perhaps ought to be created by the joint effort of the mother and the child, with the latter's participation and due regard to the individual child's liking and temperament.

So I tried to 'move' some of the stars in his presence. I bought him books and toys on space and took him to the Space and Science Museums. He enjoyed a lot of the exhibits and interactive games there. He knows that certain toys need batteries to keep them moving, wind can blow things off, and round objects can roll down the slope. He is also fascinated by the huge size and bones of dinosaurs and the mammoth. I was amazed that he could memorize the name and characteristics of many things after I had mentioned them just one to two times. I think this is because I have taught him in front of concrete and visible objects or models.

I bought a 3-D model of the solar system months ago, thinking that I would set it up with my son later when he got older and would discard the habit of biting, tearing and breaking things. When he spotted the model and wanted to unpack the box, I told him that he had to wait till daddy returned from work. I did not expect that he would remember it. When daddy came home in the evening, my son said, "Daddy, let's play the galaxy!" I was really surprised and so let him open the box, though I told him that we would set up the model some day later.

I am not eager to explain to my son about the earth's rotation round the sun and the concepts of day, week, season and year, since I think he is still young. Nevertheless he can recite the days of the week, the twelve months and the seasons. He also knows that when it is hot in summer, he can go to swim. When it is autumn, leaves fall down from the trees. I taught my son to identify shadows and he is aware of the surroundings when it turns from day to night and vice versa. He is also aware of the fact that when the sun goes down the hill, the moon goes up the hill. He can also tell the different shapes of the moon when I ask him. "It's like a circle." "Oh, it's like a banana." "The moon is very bright." I often ask him to spot where the sun or moon is, or whether he can see the clouds. Once when I was driving along a long winding road, and he realized that the moon was sometimes "here" and sometimes "there", I told him that it was everywhere. In a minute, he quickly picked up what could have been an abstract concept for a two-year-old. When I asked him later where the moon was, he exclaimed, "It's everywhere!"

My son has no difficulty understanding that he comes out of my belly, because I showed him pictures when I was pregnant and after I had given birth to him. He realized that he had grown bigger and bigger. I also taught my son about the life cycle of plants. He understands that if I dig a hole in the soil, plant a seed, water it (together with him) and expose it to sunlight, the seed will grow into a plant, get taller and taller and become a big tree. I have also drawn an analogy between plants and men, and he is convinced that if he eats food and drinks water as told, he will grow and become a strong boy. (I am now showing him the Popeye cartoons trying to convince him that spinach and green vegetables can make him strong.)

Back to the Continents Song. We happened to take a short vacation to Korea in May. I showed him on the world map how we were to fly from the Hong Kong airport to Korea and then back. He was not afraid when he got on the plane. He enjoyed looking at the planes at the airport and even rejoiced after leaving the plane.

I think songs are very crucial for preschoolers in learning science. Rhyme, rhythm and music help to concretize one's memory and boost the imagination. Afterall, imagination is the basic requirement of scientific discovery.