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Amazing Mentor! Spotlight Interview with Arvind Gupta, Toy Maker

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Mr. Arvind Gupta is a masterful toy maker from India who creates many toys from trash and materials of every-day use by applying many scientific concepts. He currently works in the Children's Science Center in the Inter-University Centre for Astronomy and Astrophysics, in Pune, India. His official website contains instructions for making about a hundred of such toys. We have many waste materials around us which are of no use, but we can still make the "best out of waste." Mr. Arvind Gupta's toy

making procedures teaches us many scientific theories. Check out the Amazing Mentor! Spotlight interview with Mr. Arvind Gupta!

AK: How did you choose to create toys using various scientific concepts in order to educate children?

AG: In 1978, I took one year's study leave from my job at Tata Motors and went to work in a village on an educational programme which intended to make science fun for marginalized children.

None of the village schools had a science lab. So we devised low-cost experiments based on local materials. Later we realized that our traditional toys could help children understand science concepts. So, we designed toys which children could easily make. And while playing they could have lots of fun and also get a "feel" for science.



AK: How were you inspired to make toys from trash?

AG: Many of the traditional toys are made from throw away stuff. Bits of left-over cloth are sewn into dolls. Old tins, paper, boxes are recycled into toys which spin, dance and make sound. The concepts of reuse/recycle run deep in Indian culture. So, we just followed the old way and have done nothing path breaking or revolutionary. This 5,000 year old story from the life of the Buddha shows a deep respect and sensitivity for the material world. It has many lessons for modern day environmentalists.



RECYCLE! REDUCE! REUSE!

(This ancient story carries a deep lesson about conservation in a consumerist society.)

One day the great Buddha was taking a round of the monastery. He was approached by a monk who wanted a new woolen shawl (angarkha).

Buddha asked him, "What happened to your old shawl?"

"It had become very old and worn out. So I am presently using it like a bed sheet," replied the monk.

Buddha asked again, "But what happened to your old bed sheet?"

"Master, that bed sheet became old with use. It was worn and torn. So I cut it up and made a pillow cover out of it," replied the monk.

"But there certainly was a pillow cover before you made a new one. What did you do with the old pillow cover?" asked the Buddha.

"My head had rubbed a million times against the old pillow cover and made a big hole in it. So I made a foot mat out of it," replied the monk in earnest.

Buddha was not satisfied by this answer. He always delved deep into any issue. In the end he asked the monk, "Tell me what you did with your old door mat?"

The monk replied with folded hands, "Master the old door mat had got totally worn with use. Because of repeated use the warp and the weft had come out. So I collected the cotton fibers and braided a wick out of them. Later I burned the cotton wick in the oil lamp."

Buddha smiled after listening to the monk. The monk got a new shawl.

AK: Describe any real life incident which made you realize that toy making and science is your calling?

AG: I worked for 3 years with the iron-ore miners in Chattisgarh. There were over 300 dumper trucks ferrying ore from the mines to the railway wagon. I found many children there improvising dump-trucks using two matchboxes. They used a matchstick as a lever to lift the

loading platform. This was my first insight into the amazing world of children’s creativity. I documented this Matchbox Dump Truck in my first book – “Matchstick Models & other Science Experiments”.

AK: Can you list out any two of your toys which are your favorite? Can you give a brief description of how to make these toys?

AG: Two science models which I like the most are:

a. Matchstick Meccanno – uses bits of rubber cycle valve tube to join matchsticks. One can make 2D polygons and 3D structures tetrahedrons, cubes, pyramids etc. with them. The basic 3D shapes can then be assembled into making houses and other complex structures. Though designed in 1978, children still find it interesting.

b. A pump to inflate a balloon. This is made by inserting two plastic film cans at the end of an old (20-cm long) bicycle tube. Two simple valves are made using bits of sticky tape. This pump can blow-up and also pop a balloon! Children can pull the whole pump apart and put it back again.

AK: How many toys have you created by using scientific concepts? Do the children need parental guidance in making these toys?

AG: There are over 650 Toys from Trash which we have documented with picture-instructions in books and with photos on the website <http://arvindguptatoys.com>

We have made short 1- minute films on over 260 science models. As the films have been dubbed in over a dozen languages we have close to 1100 films for FREE DOWNLOADS on youtube. The films really help potential tinkerers – as the whole process of making and doing becomes much clearer.

Younger children need some assistance from parents especially in procuring magnets, copper wire and some other materials. Parent’s participation in model making certainly bolsters the children’s confidence. Then they feel the activity is worthwhile.



AK: Who was your role model or inspiration during your childhood? By which scientist were you inspired the most?



AG: My childhood hero was my mother who despite no formal education had loads of commonsense. She struggled hard to give us a good education.

George Washington Carver – the black scientist’s life and work has deeply inspired me. Born a slave he struggled hard against racism and for the good of all humanity.

AK: Can you give us any four principles of science that are applied the most in making the toys?

AG:

- a. Theory gives you an understanding of the principles. By making toys you get a physical “feel” of the principle, you understand it better. The joy of making a toy work is enthralling.
- b. You have to put many things together to make a toy work. In the process you learn a great deal about the properties of different materials. For instance, wood can be shaved and made plane only along the grain and not across. Also, long strips of newspaper can be torn only along the fiber and not across. So you learn about different materials and ways of putting them together.
- c. The toy gives you constant feedback – whether you are on the right track or not. If it doesn’t work you will have to think, analyze, and incorporate changes to make it work.
- d. Simple toys from throwaway junk don’t cost the earth. The poorest children can make them and enjoy them. And unless all children in the whole world can play and be happy, there will never be peace on earth.



AK: The way you make the toys is very creative. Are these toys a demonstration of how we can create a greener environment?

AG: There is a very strong element of recycling in the toys we make. We show children many ways of using tetrapaks, plastic bottles, and boxes – all discards of a consumerist society to make science models. My new book is titled *SCIENCE FROM SCRAP*.



AK: Many children are fascinated by your toys. Which toy fascinated you during your childhood?

AG: As a child I didn't have many bought out toys. In a sense it was a blessing – because then you had to improvise your own toys. However, when I was 6 years old a rich relative gifted me a Meccanno Set – which had steel strips with holes, screws and pulleys. I played with it for years and made more things than were listed in the brochure.

AK: What's your advice to kids who have a keen interest in science and finding 'the best out of waste?'

AG: Keep collecting junk and experimenting. If the toy works the first time it is no fun at all! So keep trying – never give up.

