

## “ THE JOY OF SCIENCE “

**"IN PLAY", Times of India, August 9, 1992.**

"Little Science" by Arvind Gupta. Published by Eklavya, Bhopal. Price not mentioned.

"The Toy Bag" by Arvind Gupta. Published by Eklavya, Bhopal. Price Rs. 10.

"Toy Joy" by Arvind Gupta and Ramesh Kothari. Published by NCSTC, New Delhi. Price Rs. 15.

"Pumps From The Dump" by Suresh Vaidyarajan and Arvind Gupta. Published by NCSTC, New Delhi. Price Rs. 10.

"Leaf Zoo" by Arvind Gupta. Published by NCSTC, New Delhi. Price Rs. 10.

"Khel Khel Mein" by Arvind Gupta (in Hindi). Published by NCSTC and Eklavya. Price not mentioned.

Watching a small child play with her toys, one can't but notice the striking differences in the attitude of children and adults. Children are, naturally curious, ever exploring and improvising, while we adults rarely have the inclination to be curious. Somewhere in the process of growing up, we lose the virtues of childlike curiosity and the "reality principle" takes over. A large part of the blame for this lies with our formal education which encourages rote learning over genuine assimilation, information over understanding and conformity over innovativeness. The natural instinct of children to ask questions is systematically killed.

This tendency is most dangerous in science and mathematics teaching. Where children should be encouraged to experiment and obtain answers to their questions, our teaching tends to be overly dependent on textbooks and there is a disdain for experimentation. The textbooks are usually badly written and do not promote exploration of the student's environment. Whether it is our Brahminical heritage in learning which lays undue stress on the theoretical over that which can be done with our hands, or plain incompetence to be innovative, the net result is that one can learn all of high school science without ever using a siphon!

Although there have been some successful experiments like the Hoshangabad Science Teaching Program and Eklavya, the scenario is extremely bleak. This set of books provide a very welcome relief in this depressing scenario. Little Science is a bilingual collection of several innovative experiments in science. The best part of the collection is that they do

not require very expensive equipment; instead, as the hindi title of the book "Kabaad se Jugaad" suggests, they encourage the use of trinkets and odds and ends around the house. A whole range of very exciting concepts can be learnt from these experiments. From geodesic domes (made using matchsticks and rubber tubing) to bulb microscopes, from eggshell tripods to ray models made from used chappals, the collection encourages the reader to experiment herself and find out the answers. In the process, a lot of concepts which appear opaque when read in a text book are assimilated. And, equally importantly, the reader gets to have a lot of fun!

The Toy Bag and Khel Khel Mein are also similar to Little Science with some amount of overlap in content. Once again here the philosophy is that when you experience something, you understand it better. An example is a simple electric motor made from a cell, some wire and a magnet. Once you have made the motor yourself and played around with it, you will find it easier to understand the working of a variety of similar machines. Then there are many paper toys and flexagons which apart from providing a lot of fun, also illustrate important principles like that of symmetry in nature. Interestingly, Khel Khel Mein has been translated into 12 languages but an English edition is still not out!

Toys serve a very useful purpose in our growing up. Not only do they provide fun, but they are also helpful in developing our sense of shapes, textures and geometrical concepts. Toy Joy is a collection of toys which once again can be made from simple materials found around the house; from buttons to make switches to used icecream sticks to make a delightful flick knife. All the toys illustrate a scientific principle which the reader is encouraged to find out for himself. The emphasis is on the process of using your hands to make toys which can then be a source of excitement and learning.

All of us have seen a variety of pumps around us. From the cycle pump to hand pumps, from Persian wheels to the Archimedean screw. But we might have rarely stopped and pondered on the principles on which these work and the similarities between them. Pumps from the Dump is a splendid collection of about a dozen pumps which can be made from materials around us. Although meant for somewhat older children, it is still very accessible to an average middle school child. It is a wonderful place to learn about different pumps not only by reading about them but by actually making them.

The most fascinating thing about a child is her imagination; she can imagine animals in cloud shapes, can look for hidden figures in shadows and discern patterns in apparently meaningless lines. Leaf Zoo is a charming book on making animals out of leaves. Not only does it fascinate children but also playing with leaves of different shapes, textures and sizes, gives them a chance to play with organic materials instead of plastic and metal!

And hopefully, this would also be a way to inculcate a respect for the environment around them.

All the books are well produced with a lot of wonderful illustrations which supplement the lucidly written text. In these days of high priced books, the publishers are to be complemented for bringing out such worthwhile books at such an affordable price.

These books are a small but important step towards making the learning of science more enjoyable and meaningful; hopefully in the process, the joy of discovery will come back to our classrooms.

(850 words)

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