



In my view,  
teaching science is not just  
teaching about the preparation of  
oxygen, atomic structure, magnetic lines  
of force. I believe that teaching science  
is teaching how to think scientifically keeping  
the superstitions far away; and teaching how to  
find solutions for problems. A child learning about  
water resources means not only learning the laws,  
principles and technology behind digging a well,  
fitting a pump and constructing a check dam, but also  
realizing the blood, toil, tears and sweat behind them.  
Then only children will develop an attitude that not  
even a single a drop of water be wasted. They  
should realize that the food in their plates is the result  
of the labour of many people and start respecting  
their efforts and hard work. When  
taught in this way, SCIENCE becomes a  
wonderful tool to deliver social justice  
to one and all.

Gijubhai Badheka

## Free will Education

I believe that discussion, logic and thinking are the vital organs of any philosophy. I strongly believe that truth should be strained off through rigorous observation and tangible evidence. It is not proper to accept a thing just because somebody told it or because everybody believed in it. I think that inquiry like 'Is that true?' and 'Why did it happen like this?' is the heart and soul of any theory. I strongly believe that logic and thinking are the most important and the most valuable things in our ancient Indian tradition.

I can never agree on that the process to learn how to do mathematics or how to build bridges or how to use atomic energy is education. Education is discovering our relations with nature, people, and all the living and nonliving things around us. Education is developing good understanding; education is exploration with good potential to understand – I believe in this, in word and deed. The duty of the teachers is to teach children how to put their best foot forward to have such education and to think freely, creatively and scientifically. The education we impart becomes meaningful only when teachers have such broad outlook and when they can respond compassionately to the children's needs.

Wherever there are freedom and liberty there would not be any differences in class, caste or creed, which means, in such an atmosphere, no other thing except education is regarded as valuable. There, teachers and students teach and learn helping each other in a cooperative atmosphere. Such a great profession is teaching. Nevertheless, our main problem is not how to educate children, but how to motivate teachers to do such a great profession efficiently.

Jiddu Krishnamurti

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## Preface

Whichever country that gives freedom and opportunities for children to think creatively and express their ideas without any fear, there only develops a knowledge society spreading the fragrance of democracy. This is what John Dewey said in his book ‘Democracy in Education.’ Isn’t this true? Children can think creatively only in a free and fair atmosphere. Psychologists also say, only in such an atmosphere, their sensory organs ready themselves and work best to construct knowledge from the world around them. In this regard, Sir Francis Bacon says that the creative world in the classroom will be uncovered only when what children see, do, and hear in the classroom is meaningful and related to them. I must say this is the gospel truth.

The activities conducted in school should not be one-sided, ignoring the interests and feelings of the children. One should be doubly sure of this in a science classroom, since it follows a specific method for knowledge construction. It follows social constructivism which helps children learn through observation, hypothesizing, experimentation, analysis of results and making conclusions. Only when the learning experiences in the classroom follow this path, the children will learn in a friendly atmosphere participating in them and discovering new things, as directed by section 29(2) (e) of the RTE Act – 2009. The NCF, SCF and the RTE Act have indicated that children at high school stage should learn science as Physical Science and Biological Science. Teaching science should not be reduced to giving information; it should enable children to construct knowledge by taking part in various learning situations and by interacting with teachers, peers, teaching learning material, members of the society and nature. The RTE – 2009 reiterates that the achievement of class-specific academic standards is the responsibility of the teachers and the school. The new textbooks are developed, keeping this in view, with a multiplicity of activities that facilitate the achievement of targeted academic standards.

In the present examination system, children are really gasping for breath as they are unable to cope with it. Hence, as a breath of fresh air, we introduced the new evaluation procedure, which will take them away from the rote memorization procedures and give them an opportunity to be assessed in a stress-free atmosphere. The children’s physical, social and emotional development is as important as their cognitive development, so a number of experiments, field investigations, projects, quizzes, seminars, etc., were included in the science curriculum. Since the new evaluation procedure is ‘Continuous Comprehensive Evaluation’, it measures the children’s all round development using all these activities.

By studying science, children should learn to worship nature and protect the environment. They should come up as people who respect human endeavor and who appreciate the wonders of nature. They should realize that every being and thing in nature is as valuable as s/he is and protect biodiversity. I hope you, as a science teacher, will put your best foot forward to make such beautiful people. And I am happy to present you with this handbook which, I’m sure, will help you realize the goals of teaching science at high school level.

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*Science is the attempt to make the chaotic diversity of our sense experience correspond to a logically uniform system of thought.*

*– Albert Einstein (1879-1955)*

## **Right to Education Act – Chapter 5**

### **Curriculum – Evaluation Procedure**

The Right to Education Act – 2009 has given clear directions/ instructions regarding curriculum and evaluation procedure. Sections 29(1), 29 (2) (e), 29 (2) (g) and section 35(1) under chapter – 5 directed that the overall development of the children should be assessed through Continuous Comprehensive Evaluation.

**Section 29(1):** The curriculum and evaluation procedure for elementary education shall be laid down by an academic authority (S.C.E.R.T.) to be specified by the appropriate Government, by notification

(2): The academic authority, while laying down the curriculum and the evaluation procedure under sub-section (1), shall take into consideration the following, namely:-

- Conformity with the values enshrined in the Constitution.
- All round development of the child.
- Building up child's knowledge, potentiality and talent.
- Development of physical and mental abilities to the fullest extent.
- Learning through activities, discovery and exploration in a child friendly and child-centered manner.
- Medium of instruction shall, as far as practicable, be in child's Mother tongue.
- Making the child free of fear, trauma and anxiety and helping the child to express views freely.
- Continuous and Comprehensive Evaluation of child understanding and knowledge and his / her ability to apply the same.

**Section 30 (1):** No child shall be required to pass any Board examination till completion of elementary education.

(2) Every child completing his elementary education shall be awarded a certificate, in such form and in such manner as may be prescribed.