

# Implementing Creative Strategies into Science Teaching Structure

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## 1.0 Objectives:-

After reading this unit you will be able to

- \* Understand the meaning & importance of general science.
- \* Describe the place of science in school curriculum
- \* Explain the disciplinary approach of organization of science curriculum.
- \* Explain the integrated approach of organization of science curriculum.

## 1.1 Introduction:-

“Science does not simply sit down & pray for things to happen, but seeks to find out why things happen. It experiments and tries again and again and sometimes fails and sometimes succeeds & so bit by bit it adds to human knowledge. This modern world of ours is very different from ancient world or the middle ages. This great difference is largely due to Science.”

- Pandit Jawaharlal Nehru –

As very rightly quoted above our every day is different from the earlier days & this is largely due to the contribution of science in our life. We can't live happy life without Science. The science has become integral part of our life. Science has also influenced educational enterprise & hence it is also the integral part of our educational system. Learning of science has become unavoidable part of general education. In this chapter we shall discuss the meaning importance & place of science in school curriculum and general and specific instructional objectives we shall also learn about organization of science curriculum using disciplinary approach & integrated approach

## 1.2 Meaning of General Science

The term science & general science are used synonymously.

Einstein defines science as

“An attempt to make the chaotic diversity of our sense experience correspond to logically uniform systems of thought.”

According to the Columbia dictionary “Science is an accumulated & systematized learning, in general usage restricted to natural phenomenon.” According to ‘Science Manpower Project’, “Science is a cumulative and endless series of empirical observation which result in the formation of concepts & theories, with both concepts & theories being subject of modification in the light of further empirical observation. Science is both a body of knowledge & the process of acquiring & refining knowledge.”

According to Griggs, “In the literal sense science means the pursuit of knowledge but it has a wider connotation for our purpose, and can be said to mean a knowledge of nature in the widest possible form.”

On the basis of these definitions of science we can say that

1. Science is a study of natural phenomenon.
2. It is organized & systematized learning.
3. It is a body of cumulative & ordered observations.
4. It is the knowledge based on observations, experiments.
5. Science is a process as well as the product.

### 1.3 Importance of General Science

The modern civilization is a scientific civilization. In this age the modern society is completely drawn into the scientific environment. Today science has become an integral part of our life & living. Now we cannot think of a world without science. The importance of general science in day to day life may be summarized as under.

#### 1. Agricultural Advancement:-

The Science has revolutionized the agricultural field. The new scientific understanding of the nature of living creatures, both plants & animals, has led to a spectacular improvement in agricultural technology. Science has brought revolution in mechanism of agriculture to which Indian Farmers have readily accepted. The effective use of fertilizers, pesticides, modern methods of cultivation, improved varieties of seeds etc. are few examples of importance of science in the agricultural sector. Science gives information about insect-control, cattle-diseases, use of manures & health measures help a farmer & his family.

#### 2. Health:-

Science has helped all of us in improving our health. The old prejudice of vaccination has broken down with the result of that small pox has been practically wiped out. Science has proved to be a savior to mankind where contagious diseases & epidemics have been prevented by scientific techniques. Due to contribution of science and average life of an individual is increased from 32 years in 1950 to over 55 years to day in India.

#### 3. Trade & Industry:-

The ways & processes of trade & industry have been changed due to impact of science. Industries have become advanced due to advancement in sciences. For example industries such as textile, steel, electronic, drug, small scale etc have been advanced due to advancement in science. In the words of Kothari Commission, "The Wealth & Prosperity of a nation depends on the effective utilization of its human & material resources through industrialization. The use of human material for industrialization demands its education in science & training in technical skills. Industry opens up possibilities of greater fulfillment for the individual." 4. Education:- Facilities for study of engineering & medicine in different branches have been increased due to development of science. As a result various new branches in different disciplines have emerged. This provides more opportunities for jobs in the market.

### Science Curriculum at Different Stages

Consistent with the general aims, the objectives, content, pedagogy and assessment for different stages of the curriculum are summarized below. At the primary stage the child should be engaged in joyfully exploring the world around and harmonizing with it. The objectives at this stage are to nurture the curiosity of the child about the world (natural environment, artifacts and people), to engage in exploratory and hands on activities to acquire the basic cognitive skills

At the upper primary stage the child should be engaged in learning simple principles of science through familiar experiences, in working with hands to design simple technological units and modules and in continuing to learn more on the environment through activities and surveys. Scientific concepts are to be arrived at mainly from activities and experiments.

At the secondary stage the students should be engaged in learning science as a composite discipline, in working with hands and tools to design more advanced technological modules than at the upper primary stage, and in activities and analysis on issues surrounding environment and health. Systematic experimentation as a tool to discover/verify theoretical principles, and working on locally significant projects involving science and technology are to be important parts of the curriculum at this stage.

At the higher secondary stage science should be introduced as separate disciplines with emphasis on experiments/technology and problem solving. The current two streams, academic and vocational, being pursued as per NPE 1986 may require a fresh look in the present scenario.

### Methodology of teaching science

Science, taught badly, not only degenerates into superstition, but makes a negative contribution to education. To learn science is to do science. In this context, teaching of science gain significant importance and it needs an appropriate method. The methods are namely Laboratory method, Project method, problem solving method, Technology in science classroom and innovative method. It is upto a teacher's discretion to choose the method which is most suitable for a certain topic in a certain class and sometimes a teacher should introduce different methods in a lesson plan to address the learning styles of the students

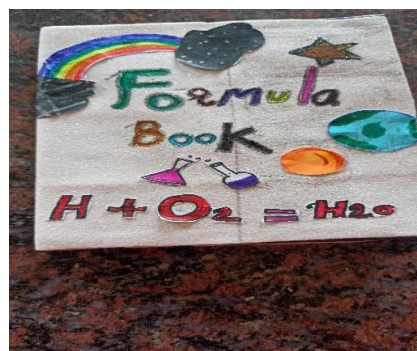
### Laboratory method :-



Laboratory teaching assumes that first-hand experience in observation and manipulation of the materials of science is superior to other methods of developing understanding and appreciation. Laboratory training is also frequently used to develop skills necessary for more advanced study or research.

### Project method:-

Students in a project method environment should be allowed to explore and experience their environment through their senses and, in a sense, direct their own learning by their individual interests. Very little is taught from textbooks and the emphasis is on experiential learning, rather than rote and memorization. A project method classroom focuses on democracy and collaboration to solve "purposeful" problems.



### Examples of Projects:-

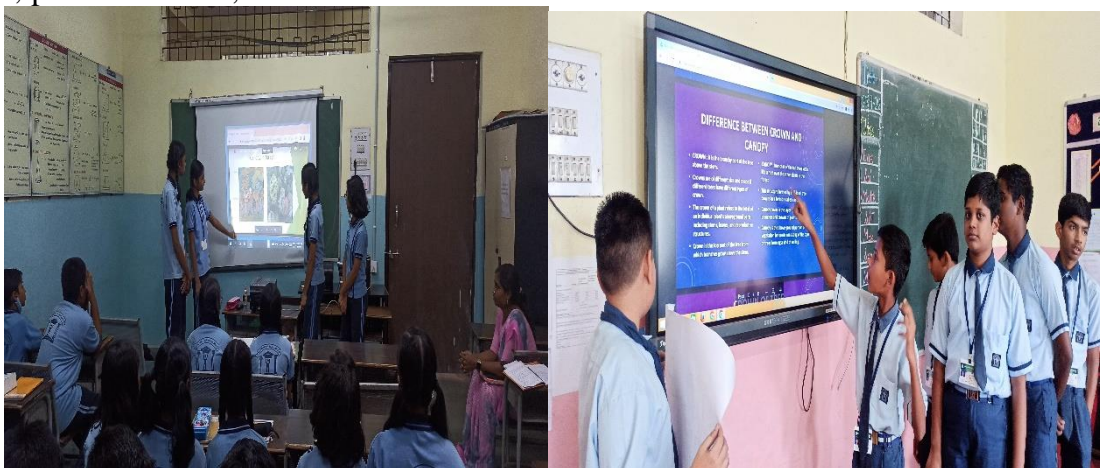
1. Arrangement of science fair
2. Improvise apparatus
3. Beautifying campus
4. Establishing science museum
5. Establishing physical science laboratory
6. Painting iron apparatus to prevent it from rusting

### Problem solving method:-

Problem solving is the process of identifying an existing problem, determining the root cause or causes of the problem, deciding the best course of action in order to solve the problem, and then finally implementing it to solve the problem. Another problem solving meaning is that it is simply a methodology for solving everyday issues. Problem-solving is crucially important for the basic continued survival of all living creatures, especially human beings. We use it throughout our everyday lives to solve basic needs, such as food and water, as well as more complex issues such as changing a light fixture on the International Space Station. There are various types of problem solving that are used in countless ways and in countless fields of study such as mathematics and physics to determine to solve complex equations and theoretical issues. It is also widely used in a variety of professional fields such as construction and plumbing where workers must be able to adapt to meet the needs of specific clients. There are many ways to solve problems. The countless number of everyday solutions are as diverse and specialized as the problems themselves.

### Technology in science classroom:-

Now, there are countless ways to utilize technology to enhance teaching science, English, math, and more. Particularly in the science classroom, technological integration can be key to getting students interested, keeping them engaged, and encouraging participation in activities. It can even be used to administer tests, present lessons, and more.



### \*Smart Classroom- Virtual Field trips:

The use of virtual field trips and augmented reality explorations can engage students more in learning and provide opportunities for them to move from consumers to creators.

### \*K-Yan Utilization:

It is an electronic device which facilitates students in getting visual representation of the content/video which enables students to make it more easier to understand.



### \*Flipped classrooms:

It is a part of modern technology used in classroom. With this technology students can use their personal computers to watch lectures hosted on school server.

### \*Desktop and Laptop:

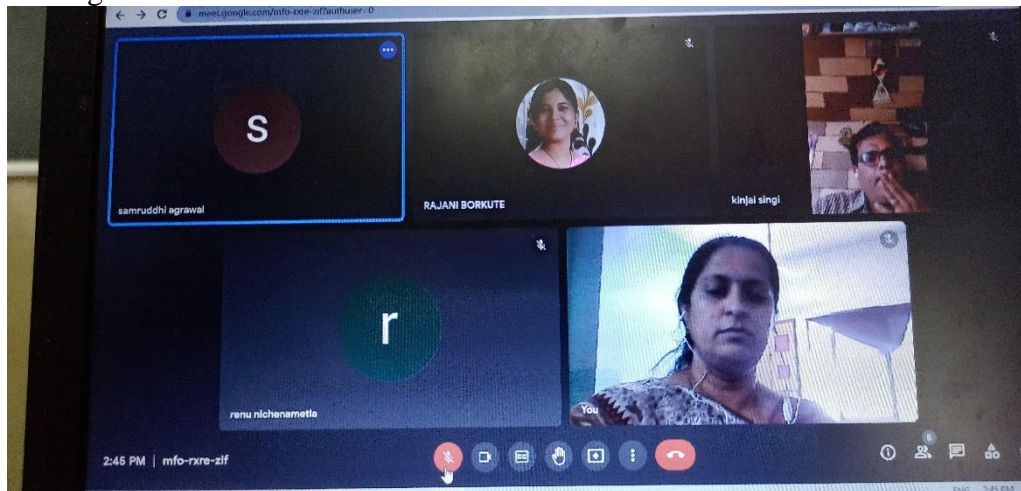
More teaching applications and classroom software are being introduced into the technology market. This drives the need of school to get sophisticated computers with powerful processors to run the said applications.

### \*Projectors:

In a large classroom, all students may not be able to view what the teaching is showing on the laptops screen, that's where projectors come in.

### \*Video conferencing classroom technology:

Through videoconferencing students in different geographical locations can attend to a lecture through online streaming.



### \*Mobile Learning:

Mobile device enable learners to take their classroom anywhere. There are more education apps available already that students, as well as teachers, can use.

### \*Computer Networking:

Networking of classroom computers is an effective way of using technology. The teacher can monitor what students are doing on their personal computer from a central point.

### Conclusion:

“Science Educationists should build the capacities of the spirit of inquiry, creativity, entrepreneurial and moral leadership among students and become their role model.”

-APJ Kalam

- To cater to a wide variety of learning styles and the demand of process skills in a classroom, different methodology of teaching is important in science.
- The methods are namely lecture method, demonstration method, lecture cum demonstration method, laboratory method, heuristic method, assignment method, project method, problem solving method, question and answer method, role playing method, brain storming method and innovative method.

### REFERENCE:

1. file:///C:/Users/user/Downloads/PAPER%20PRE-INTERNATIONAL/Methodology%20of%20Teaching%20Science.pdf
2. file:///C:/Users/user/Downloads/PAPER%20PRE-INTERNATIONAL/Education\_Paper\_5\_SCIENCE.pdf