

## LET'S LEARN SCIENCE AND MATHEMATICS BY PLAYING

TEACHER	Shivamkumar Bhaskarray Pandya
SCHOOL	Shri Sathra Primary School, Mahuva Taluka, Bhavnagar District, Gujarat
PHONE NUMBER	9427-5592-28
E-MAIL	sbp1211989@gmail.com



Scan QR-code  
to watch video



Shri Shivamkumar Bhaskarray Pandya holds a BSc degree in Chemistry, a B.Ed from Babasaheb Ambedkar Open University and a primary teaching certificate. He teaches Mathematics and Science. When teaching he realized that the children of the same age had different aptitude for learning, he thought of using teaching aids to bridge gap in learning and provide all students a level playing field.

He experimented and developed the following innovations:

### 1. A card kit to explain the term equation

Problems faced by school or students: chemical equations are introduced in standard. These equations are represented by the symbols and as also in the words form. The students are tested about these equations in the unit tests but are unable to answer correctly.

Problem solving: as a way out to this problem, Shri Pandya came up with the idea of using cards such that each word in the chemical equation formed a separate card. He made a total of 33 kits with such cards and gave one each to all students of standard 7. First, he taught the equations in the class using the blackboard and chalk. He then took a pre-test after which he

asked the children to use their card kit to write the equations by themselves. He split the children into groups and asked each group to make equations using the card kits given to them. Then he asked them to individually carry out the same function. Tests revealed that 70 to 80 percent of the children were comfortable with the word equations.

### 2. Mathematics Science Model Workshop

Problems faced by school or students: in Mathematics and Science, children find some concepts difficult to comprehend, for instance, periscope, kaleidoscope, cube, cuboids, etc. As a result, children showed a lack of interest in studying these topics.

Problem solving: at first, Shri Pandya prepared a list of models that formed part of the curriculum of classes 6 to 8. For standard 6, the models include Kocher, thermos and cubes; for standard 7, cuboid, periscope, and kaleidoscope; and for Standard 8, episcope, and triangular pyramid. He then made a list of equipment required to create the models and was granted funds from the school. The children were then divided into groups according to the class they were studying in. One group was made for standard 6,



Learning shapes – Math activity



Teaching learning material making activity



*Cooking competition as a part of science fair activity*



one for standard 7 and one for standard 8. In the beginning, each standard was divided into two or three groups and the materials were distributed among them. They had to use the material to create a model. During the first 3 to 4 years, this Maths Science model workshop was conducted for one day but now it has been extended to three days. Children are given a list of the models they have to create along with material to use. In the evening at the end of the model workshop, the children are awarded first, second and third positions for their efforts.

The list of Maths models made during the workshop is available on Inshodh website of IIM Ahmedabad.

**Implementation of innovative experiment:** this innovative idea is implemented every year in the first week of February. In this process, children participate in one day, two-day or three-day workshops and make various models. In the Maths, Science model workshop conducted in February 2020, a group managed to prepare at least 48 models including a JCB, laptop, etc. This innovative experiment was implemented in 2011, and every year it evolves to include new models and experiences.

#### 4. Maths Star

Shri Pandya based this innovation on math puzzles. He would present a mathematical puzzle during the prayer meeting. Any child who came up with a solution would get points. The child receiving the most marks would get the “Math Star” badge. This exercise helped children learn some basics of maths in a fun way.

**Implementation of innovative experiment:** Every child of the school was informed about this innovative idea. The children were made aware of the kind of puzzles to be presented in the prayer meeting and how to present its solution.

The puzzles developed a lot of enthusiasm and curiosity among the children. Over a period of time rewards were also announced for the children who came up with the correct solution.

**Results:** There was a change in the children’s attitude towards the subject and they showed a marked increase in the subject. Prompted by the success, a similar activity was initiated for science.

#### 5. Gyan Dhara (Knowledge Flow)

The aim of the activity was to promote a sense of spirituality in the students. From Monday to Saturday, during the daily prayer assembly, Shri Pandya announced a general knowledge question on the subject of spirituality. The children were free to discuss it with their parents and provide an answer. Next day again before the morning prayer assembly, each child would write the answer on a piece of paper and put it in the “Gyan Dhara” box. Shri Pandya then checked the box for the right answer, which he then shared with the students. Five children helped him select the correct answers. The children who had come up with the correct answer were duly acknowledged. Besides, they also received a point and those who received the highest score were rewarded on the last day of the week that is Saturday.

6. Besides, he was also conducted a **Science Fair at the school-level.**

**Problems faced by the school or students:** the children did not have a positive attitude towards Math and Science.

**Problem solving:** Shri Pandya decided to organise a Science Fair. At first, he made a list of experiments given in the classes 5 to 7 textbooks. For each of the experiments, a write up was created. The most daunting task was to prepare the children to participate in this activity. To encourage them, he told them about stories of great scientists and how they overcame all roadblocks to succeed in

their fields. These stories greatly motivated the students to give wings to their creativity. The first Science Fair was held at the school in 2011. The children presented 14 experiments in all. This was a humble yet successful beginning. This Science Fair was deliberately planned on 28 February which is celebrated as National Science Day.

The children are allotted the experiments to prepare about 15 days before the actual event so that they have ample time to practice. They are provided with all the necessary resource materials by the school.

Implementation of the innovative experiment: the Science Fair that was initiated in 2011, is being held even today with necessary modifications. In the beginning, the fair began with 14 experiments which have now risen to anywhere between 75 to 100 experiments today. Almost 80 percent of the students of standard 5 to 8 get an opportunity to participate in the fair, which is held on or around 28 February every year. Other nearby schools and government officials are also invited to visit and motivate the children. Students from other schools also come to see the Science Fair.

Result: children have become extremely self-motivated and there is healthy competition between them to outperform in their given

tasks. A few other schools have started their own Science Fairs but on different days, so that they are able to attend the Science Fair held at Shri Pandya's school.

Shri Pandya is now working on making his videos of the Science Model Workshop, Science Fair and other topics available through YouTube.

The school is rated A by the government. Over the last few years, the children have been consistently participating in the district-level Science Fairs and in exams like NMMS, PSE, and Navodaya entrance.



Science game with students



#### QUESTIONS FOR TEACHERS

1. What should be done to explain the issues to the children?
2. What are the changes in the teaching-learning process by conducting various workshops?
3. Why is it important to involve parents in children's studies?

#### QUESTIONS FOR TRAINEES

1. How is a puzzle useful in explaining various concepts of mathematics?
2. How does group activity change the normal study?
3. What are the benefits of organizing science fairs in the field of science?