

## **The Science Awareness committee of IWSA organized a four-day (3rd to 6th May 2022)**

Refresher Course for School teachers who are teaching Science and Mathematics for standards 7 to 10.

This four-day course was designed such that the subjects of Physics, Chemistry, Biology and Mathematics were covered on consecutive days. The morning sessions consisted of two lectures on different unique methodologies of teaching Science and Mathematics by some of the best resource persons in the fields. The newly introduced chapters of the curriculum were also included. Though these lectures touch upon several topics of the syllabus, however, emphasis was laid on how to strengthen the basic concepts and inspire.

The laboratory sessions were designed slightly at a higher level, so that the teachers understood the concepts aided by hands on techniques. It was also suggested that very interesting demonstrations can be done using simple components available at home or even toys.

On the first day, the keynote address was delivered by Ms. Sangeeta Sohni, President's National Best Teacher Awardee in 2020 and a senior teacher at the Atomic Energy Schools. She gave an insightful talk on how to make Chemistry interesting and clear the basic concepts by using simple toys. The next session on chemistry was conducted by Dr. D. V. Prabhu, Retired Head, Dept of Chemistry, Wilson college, President of the Mumbai Branch of Indian Chemical Society and an active member of Bombay Association for Science Education (BASE), He has been a member of the DAE appointed National Steering Committee for organizing Science Olympiads in India and was the Delegation Leader of the Indian teams to International Chemistry Olympiads held at Mumbai (2001). He spoke on Chemical Kinetics with simple examples and role of catalysts. He gave a glimpse of Green Chemistry with green catalysts which is an emerging branch of chemistry, especially considering the efforts put by governments and organizations on sustainable environment, all over the world.

The afternoon Lab session was conducted by Ms. Sujata Haralkar, Retd. Chemistry teacher, Siddharth College of Arts, Science and Commerce, Fort, Mumbai. She conducted a very

interesting session on how to find the equivalence point of the acid base titration thermometrically. Generally, when we carry out an acid-base titration, we know that we can determine the end point with the help of a proper indicator. Suppose an indicator is not available, you can still determine the equivalence point of a neutralization titration since these reactions are exothermic in nature. She also showed how to determine the atomic weight of a metal using a very simple experiment.

On the 4<sup>th</sup> May, chapters on Physics were covered the topics-Refractive index of light, gravitation, laws of motion and conservation of energy were covered by Ms. Lalitha Ramaswami, Retired teacher from Atomic Energy Central School and President's National Best Teacher Awardee. This was followed by a talk by Mr. Zohar Attari explaining the impact of graphs while teaching physics. The afternoon lab session was conducted by Prof. R. Nagarajan, Emeritus professor at the Centre of Excellence in Basic Science, DAE. He demonstrated the very interesting equipment of PhET, with which helps in demonstrating Interactive Simulations for Science and Mathematics. Next, he demonstrated an experimental kit "expEYES" (Experiments for Young Engineers and Scientists) an inexpensive open-source hardware and software for experiments in Physics, particularly, electricity and electronics, developed by Prof. B.P. Ajtiah Kumar, (formerly at Inter-University Acceleration Centre, New Delhi under a project of UGC ([www.expeyes.in](http://www.expeyes.in))). The kit works with a PC, laptop, Tablet. The kit has 16 school level experiments in electricity, 7 experiments on higher level Electrical experiments, 13 experiments in Electronics, 3 experiments in Sound and 5 experiments in Mechanics and Heat. Thus, a variety of electrical components such as, resistors, capacitors and inductors, bread boards, digital multi-meters and how a circuit for an experiment can be quickly wired and tested can be shown. Mr. Chintamani Pai, PhD scholar from University of Mumbai, Co-Founder of an entrepreneur group called 'Space Geeks' demonstrated a very interesting microscope set up using a laser pointer focused on a drop of muddy water. The microscope can show the living organisms within the drop of water. Mr. Attari and Ms. Ramaswami demonstrated certain DIY experiments that clear the basic concepts of mechanics and light respectively. Dr. Lalitha Dhareshwar and Dr. Devaki Ramanathan also showed simple experiments using laser light.

On the 5<sup>th</sup> of May, lectures on Biology were taken up by Dr. Shashibhal Pandey, Vice

Principal and Associate Professor in Zoology, Smt. C.H.M. College, Ullhasnagar. He informed the rapt audience about quite a few amazing facts in the animal and plant kingdom which were quite unique and outstanding and encouraged the teachers to mould the children's minds such that they looked out for more such anomalies in nature. Ms. Jyoti Shiddanagoudar spoke on the new topics introduced in the syllabus, namely- introduction to biotechnology and heredity. Organic farming, herbarium, comparison between hybrid seeds and normal seeds was explained. The lab sessions included demonstrations on extraction of DNA from banana and DNA finger printing basics were explained. Extraction of enzymes, presence of stomata and conductive tissues like xylem bundles from easily available materials such as- fruits and vegetables was also demonstrated. Simple projects that would make the students learn and remember diagrams were shown.

Mathematics chapter were covered on 6 th May, where, Ms. Vimala Nandakumar, Former teacher of Atomic Energy schools, Chairperson of Shaktii Girls' Education Trust, with a 50 year experience in teaching mathematics at middle and high school level. She was able to demonstrate how to make Set theory concepts using classification in biological kingdoms. Concepts of compound interest was made easy for the students by using simple and interesting worksheets.

Dr. Bakhtaver Mahajan emphasized the need of presenting the bigger picture of imminent dangers of Climate change to the students. The students and the teachers can observe, and help gather data which will help solve environmental problems in a very scientific manner. The students must be made aware and coaxed to contribute towards salvaging the damages done by mankind before it is too late.

The training course ended with the valedictory session in the afternoon. The valedictory address was delivered by Dr. Saramma Mathews, Professor at the Pillai College of Education and Research. She introduced the teachers to a captivating deliberation on the nuances of NEP 2020 and in what ways we can impart holistic education to school students.

The program ended with distribution of certificates to the participants and a vote of thanks. A very positive feed back has been given by the participating teachers, which have encouraged IWSA to conduct similar refresher courses in the future.