



The Science Association of Pakistan
SAP
Newsletter

EDITORIAL

Dear Readers

We are here with another issue of the SAP Newsletter. This time we are introducing a new section called "Idea bank" that will publish teaching ideas/activities that you have tested in your own classroom and found it to work. Please contribute your precious ideas to this section so that they can benefit a larger audience.

The year 2003 was very fruitful for SAP – a number of activities such as the annual Symposium, Olympiad and Workshops for teachers were completed on schedule. The SAP Newsletter has again started to come out regularly. The organization is expanding and interest of teachers in its activities has increased. As always we want more members and more volunteers to work with us on different areas. If you are not a member take the time to fill the form and become a member.

Rehana Batool
and Nelofer Halai

Knowledge is there to be shared!

by

Emmanuel Ndoori M.Ed 2004

This paper brief in its form, seeks to focus on two items, namely; the importance of the Science Association of Pakistan (SAP), and a brief reflection

on a Science Workshop that was held on May 10, 2003 under the patronage of the same association.

SAP is an association of individuals assisted with science in some way or the other; they might be teachers, curriculum developers or teacher educators. It brings together the teachers of science once a month by conducting science workshops or seminars. Teachers usually meet at, Aga Khan University-Institute for Educational Development (AKU-IED), a place that hosts the chair and the secretariat of the association. Being a foreigner in this land, I came to learn that science teachers from different schools in and around Karachi meet once a month to share knowledge and experiences from which they learn a lot from one another. It is a professional commitment that could be borrowed by teachers from other countries, Uganda inclusive, a country of my origin. It goes without saying that knowledge is only useful when it is shared especially among people of the same specialty. Through workshops, seminars and conferences that are held regularly by SAP teachers along with their facilitators get to know:

- Their strengths and weaknesses in science as their field of specialization or as their teaching subject;
- How to enrich the science curriculum;
- How to use local or low cost science teaching materials;
- How to relate science to daily situations so that science is not divorced from day to day activities;
- How to improve on their content knowledge and pedagogical practices and above all

- How to grow and develop professionally.

Reflecting on the workshop that was held on May 10, 2003, this workshop was facilitated by one of the senior faculty members of IED assisted by one of the senior Professional Development Teacher (PDTs). The subject of the workshop was to identify *Science processes involved in different test items*. In groups, teachers were given different test items from which they were asked to identify different science processes involved. After that, teachers shared their findings, a strategy that permits teachers to learn and enrich their pedagogical content knowledge from one another. I highly commend it. This workshop was closely connected with classroom teaching, hence it needed another follow-up workshop, in which I would suggest that teachers should set their own test items and then identify the science process involved. This would prove whether teachers are able to set test items that involve a variety of science processes or whether they still set a number of science items but on analyzing them, find that such test items involve one or two science processes. This would serve as an evaluation strategy on both teachers and their facilitators in an endeavor to determine the way forward.

On the whole, it was a rich learning experience for me. It is necessary to devise means of bringing together teachers of the same subject once in a while to share their experiences and knowledge to grow and develop professionally. We should live to emulate the example of SAP, because I believe teachers have vast experience and knowledge in different subject areas that can be shared.

Science Autobiography

by

Dr. Nelofer Halai, AKU-IED

The experience that science teachers have about science teaching from their own science teachers often forms the template on which their own teaching is based. That is why it is said that *teachers teach the way they are taught*. This is even true in Pakistan, where the professional training is very theoretical or as is often the case in private schools, not required at all. This reverting to the practice of teachers' own teachers is mostly done unconsciously; without overt examination of the source of inspiration. If teachers are helped to recall their own experience of learning science in the classroom it opens the doors to

conscious reflection and realization of some of the methods that they use in their own classroom.

I decided to use science autobiography as part of my M.Ed. Science Methods course. I asked the students to ask themselves the following questions:

1. What are your earliest memories of learning science?
2. What do you remember feeling about your science lessons?
3. Do you remember understanding (or not understanding) particular ideas?
4. What did the teacher do in your science lessons?
5. What did you and the other children do?
6. What images come to mind when you remember those lessons?

The responses from the students were analyzed, the initial analysis of data has highlighted a number of issues that I will briefly describe in this paper. The perceptions of science that participants made explicit in their autobiographies generally fell into three categories:

- Science as Nature
- Science as important
- Science as dull and boring

Influence of teaching styles

Research participants have specifically mentioned that teachers' teaching styles whether traditional or more progressive (using demonstrations and some practical work) did influence the way they *felt* about science.

Rote Learning in Science

Majority of the M.Ed. students (23 out of 35) recalled (a) a very rote method of learning science where students were asked to memorize "answers" to prescribed questions, (b) with emphasis on theoretical knowledge, (c) not having an atmosphere where students could ask questions of the teacher or the text. This did not enhance learning and there was a tendency to lose interest in science. Data shows that the research participants particularly mentioned two results from such teaching: Negative feelings towards science and poor understandings of science. They said with some regret that often they could not recall any science content from their school days as most of it was rote memorization which had been obliterated from their minds.

Progressive Methods of Teaching

There were a small number of participants who recalled that their teachers used more practical

approach that allowed for experiments, demonstrations, examples and discussions. Students' questions would be entertained and answered. Another group of students said that the requirement to draw in the science notebook and the use of pictures in the textbook by the teachers enhanced their interest in science.

Leaving science

A number of autobiographical accounts have a strong element of regret from those research participants who could not continue their learning of science beyond the very basic required in elementary classes. This was due to either having to "leave" science due to reasons beyond their control or "not allowed to take" science due to low grades or other school policies. This particular group felt that if they had understood the content their results would have been different and they would have continued with science.

Language as Barrier to Studying Science

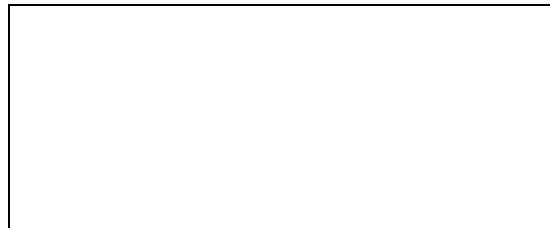
This is a barrier that is also related to rote learning. Many participants recalled that they studied in systems where science was taught in English at the Secondary or Higher Secondary level. Hence, though they completed elementary /secondary school with science but could not continue at the college level – some tried to cope by learning by rote, but often the end result was moving away from science.

Implications

The influence of teachers' practice on future teachers of science puts a lot of responsibility on science teachers of today. It is they who will have to help the future science teachers recall science as being taught with more progressive modes of teaching. Today our teachers can recall little else but "chalk and talk" modes of teaching. Though this mode of teaching too has a place in teaching in our context, but we have to give our teachers of the future more progressive role models or prototypes to follow.

Idea Bank

Dear Readers,
 We are initiating a regular feature for SAP Newsletter in which you can also share simple ideas or activities that can be a part of your lesson plan. This will enable the science teacher to experience more interactive teaching in the classroom.



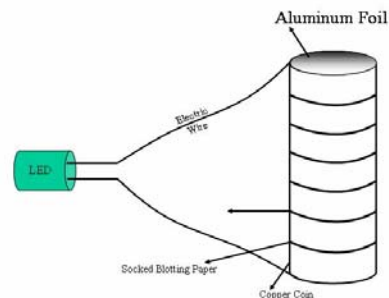
Pucker Power

Material:

1. A Pair of Scissor
2. A Piece of Blotting Paper
3. Aluminum Foil Sheet (3cm x 2.5cm)
4. One Knife
5. 4 Fresh Lemon
6. One Small Bowl
7. Adhesive tape - a 6 inch piece
8. Electric wire – a 6 inch length
9. 10 coins of 1 Rupee
10. A light emitting device (LED)

Instruction:

- A) Cut ten coin sized circles each from blotting paper and aluminum foil.
- B) Cut the lemon in half and squeeze out all of the juice into a small bowl.
- C) Soak the blotting paper circles in the juice for about 30 seconds.
- D) Tape one end of electrical wire to an aluminum circle with the wire on the bottom, place a juice- soaked circle of blotting paper on the top of the aluminum circle and place a coin on the top of that.
- E) Now complete the pile of 10 coins.
- F) Tape one end of the second piece of electrical wire to the top coin.
- G) Connect the loose ends of both wires to the LED. The LED should light up.



SAP Working Committee

1. Ms. Arshia Saeed, Habib Girls' School.
2. Ms. Farah Huma, Chairperson, Habib Girls' School.
3. Ms. Ismat Jehan, Govt. G.S.S Sir Syed town.
4. Ms. Mehnaz Fatima, Govt. Girls College Nishtar road.
5. Ms. Naheed Anwar, Foundation Public School.
6. Ms. Qamar Syed, GBSS, Airport.
7. Ms. Rehana Batool, Beaconhouse School Systems Cambridge Branch, North Nazimabad.
8. Ms. Rukshanda, P.A.F Degree College, Faisal.
9. Mr. Shahid Pervaiz, SMS, Karimabad
10. Ms. Suraiya Yousufi, General Secretary, Orient Pak. G.B.S.S, North Nazimabad.
11. Ms. Tahira Firdous, Habib Girls' School.
12. Ms. Unaeza Alvi, Senior Instructor, IED.

SAP Symposium & Olympiad 2003

by

Farah Huma and Suraiya Yousufi

To commemorate the 5th Anniversary of the Science Association of Pakistan two major events, Science Olympiad and Science Symposium were held on October 4, 2003 and December 13, 2003 respectively. A brief report of the two events is given below.



SAP Olympiad

Science Olympiad is traditionally considered as an extra curricular activity. Some American science educators started it on March 29, 1982. The major

aims of the Science Olympiad is to improve the quality of science education, to change the way science is perceived, the way it is taught giving emphasis to problem solving skills and hands-on, minds-on activities.

SAP Science Olympiad was held on the 4th October 2003 at AKU-IED premises. More than 170 children and 65 teachers attended it from 45 schools. There was a group of 22 students and teachers who especially came from Shahdadpur (Interior Sindh) to participate in Olympiad. Each school was asked to nominate a group of three students from grade VIII.



The Olympiad consists of two levels of competition. The first level was of 'Puzzles' which was compulsory for each participating team. The second level was optional and comprised of three categories (a) poster competition, (b) construction task, and (c) problem-solving activity. The children contested with other schools for two hours and were judged by the Professional Development Teachers and the Subject Specialist Teachers from IED's cooperating schools. The children were assessed on both the process and product of their work.



Dr. Harcharan Pardhan, Assistant Professor, AKU-IED, was the Chief-Guest. She gave away certificates to all contestants and awarded shields to the winning teams.

All the students and teachers greatly appreciated the Olympiad. They found the activities at the Olympiad exciting, challenging, and interesting. They also

expressed their hope that SAP, in future, will continue to conduct such activities for children.

SAP Symposium

SAP National Symposium was held on December 13, 2003. The topic of the symposium was 'Development of Scientific Attitude in Children'. Fifty five members participated in the symposium. The first session of the symposium was general for all the participants. The Symposium started with the recitation from the Holy Quran.



Zulfikar Ali Shah, PDT (AKU-IED), was the key note speaker. He highlighted the importance of developing scientific attitude in children. He also emphasized on the development of key elements of scientific attitude which are: curiosity, perseverance, critical thinking, caring, persistence, inventiveness, scientific mind, etc. Quoting his own example he suggested changing existing methods of science teaching which are hindering development of scientific attitude among children and as a result of it we are far behind in scientific research, innovation, discovery and modern technology.



Farah Huma, PDT (Habib Education Trust) and the Chairperson of SAP, briefed the participants about the key elements of scientific attitude and discussed the importance of these elements in development of scientific attitude in children in very interactive

manner. She emphasized that; if a child has a scientific attitude then he/she will accept only carefully and objectively verified facts.



Dr. Nelofer Halai, Associate Professor, AKU-IED shared her research paper on science teaching and teachers' autobiographies. Her session was very lively and interactive. She explored the experiences of participants about teaching and learning of science. Reflecting on the experiences the participants realized and felt a need to change the existing science teaching strategies and incorporate some new methods to develop scientific attitude among the children. The paper that arose from her research is a part of this newsletter.



In the afternoon concurrent sessions were facilitated on different topics, i.e. *Promoting inquiry in a science classroom*, *Discrepant Events: Curiosity leading to exploration*, *An attempt to develop scientific attitude*, and *Process skills essential to inquiry*. All the sessions were appreciated by participants.

A Journey Towards Change

by
Surraiya Yousufi

After graduation from AKU-IED the PDTs from the Government sector got opportunities to work in their schools to help in school improvement efforts. They were also invited to work at AKU-IED to offer professional development in-service courses.

In the year 2003 I together with some of my colleagues got a similar opportunity to plan, organize and conduct professional development programmes for secondary and primary school teachers from all over Sindh province. The Education Department of the Government of Sindh provided this opportunity. This was an indication that the Government had started to recognize and use the expertise of the PDTs.

Three projects were launched with the support of donor agencies. I was involved with two of them. In the section below I will first describe these three projects then I will share some of my experiences and learning from them.

Girls Primary Education Development Project Phase II: This phase has started from July 1997 and ended in June 2003. This project had two major aims, (a) to increase girls' access to primary education and (b) to improve the quality of education. These aims were to be achieved through improving physical infrastructure as well as through staff development programmes. For staff development three-months accelerated in-service training programme for 308 untrained primary school teachers of the community model schools was planned, organized and conducted by the PDTs at the provincial level. We developed a training manual for master trainers before the start of the programme.

Middle School Project: This project was launched at federal and provincial levels (Sindh, NWFP and Balochistan) in 1994 and will end in 2003. The main aim of this project was to strengthen the middle school level education by expanding access, improving quality, and efficiency of middle schools. Through this programme 3200 middle school teachers were trained to teach the revised curriculum.

In-service teachers training for 12000 Primary School teachers: This programme was launched and conducted under the guidance of Directorate of Research and Assessment Sindh Jamshoro. It is planned to train 12000 primary school teachers within 3 years. The manual was developed by a group of teacher educators from elementary colleges of education in Urdu and Sindhi languages.

As a PDT only I was involved in Middle School Project and in in-service teachers' training for primary school teachers. In the Middle School Project I got a chance to serve as a resource person, and develop a manual for science teacher trainers. Then I also got an opportunity to conduct a two-week programme for master trainers and four-week

programme for middle school teachers. This was my first experience of working with lecturers and professors of Government College of Education and subject specialists of government schools. Tailoring the programme according to the needs of the teachers and objectives of the programme was a quite a challenging task because of the limited time of just two days. Officials hold the opinion that since we are graduates of AKU-IED so we have ready made programmes in our hands. However, we convinced them to realize the uniqueness of each programme as the aims and objectives of one programme are different from the other programme. We were very fortunate that the officials trusted us and gave us a free hand to teach what ever we planned to teach.

The main focus of the programme was to equip teachers with the skills to teach science text books of Sindh Text Book Board for classes VI-VIII with activity based method. Therefore we gave demonstration lessons based on text book activities and also enriched them by infusion of other activities. Teachers in the government schools generally use the lecture method to teach science. They use demonstration method only when some inspectors visit their classes for annual inspections. The activities were given in the textbook but teachers were just explaining them instead of providing students a chance to do them.

Teachers thought that neither they have resources and nor do they have time to incorporate these activities. In fact they don't know how to do these activities with available resources and time. Although some teachers have attended different refresher courses and have teaching kits as a support material in their schools. Some teachers were unaware of the existence of these teaching kits. In some cases the Headteachers were reluctant to allow their teachers to use materials from these teaching kits. Learning about the use of low cost/no cost material opened their eyes and one of them said, "Now we can do these activities easily and we can not say that resources are not available. We can turn our classrooms into laboratories with the help of these low-cost and no cost materials."

During the visit of high officials in the training center of Middle School Project one of the participant who was representing the whole class said: "Why are P.T.C. and C.T. and B.Ed trainings are not conducted in similar manner. Change the method of training in our teaching institutions." The Primary school teachers also expressed the similar views.

Beside challenges and successes I learned various ways to interact with diverse group of teachers and high officials. In the beginning of the programme some experienced teachers who were holding the view that lecture method is the only method which is most suitable in our environment later on changed their views and appreciated activity-based method. This change of attitude was due to provision of teaching practice at training center. The training center was based in a school hence it was easy to give input and provide chance to practice that method in the real classroom. Due to this opportunity to practice what was taught the discussions were very lively and based on realities of a classroom setting.

Developing the teacher's manual and conducting these programmes not only enhanced and updated my conceptual understanding about professional development but sharpened my skills of effective ways of teaching science in the context of Government school system. I realized that analytical and reflective approach is necessary not only for becoming aware of existing beliefs but also help in questioning these beliefs and attitudes in order to modify or replace them with most appropriate ones. This opportunity also helped me to develop an appreciation of social construction of knowledge through holding discussions. I realized the complexity of the change process and constraints involved in it. The High level officials involved in this project promised not to end the professional development of teachers at this point but also arrange for a follow-up process. This is very encouraging as it gives hope that this journey towards change will never end.

D.A.R.T - Directed Activities Related to Texts by **Farah Huma**

DART activities (Directed Activities Related to Texts) are a repertoire of devices, teaching strategies and principles to enable the students to focus on the structure and meaning of different types of texts. These activities include:

1. Text completion (Delete words or phrases. Pupils predict what each deletion should be.)
2. Sequencing (Completion activities with 'disordered' text. Predict a logical sequence for segments of texts. Classify segments according to categories given by the teacher.)
3. Prediction (Pupils predict next parts of text with segments presented in sequence.)
4. Comparing texts
5. Underlining and highlighting texts
6. Reforming or replacing text
7. Diagram completion (Pupils complete a diagram using text or other resources.)
8. Table completion (Completion of a table which contains blanks, using table categories and text as reference.)

Why DARTs?

- They can be used in any subject area.
- They make texts more manageable to read.
- Enable children to develop skills such as skimming, scanning and also to read for inference.
- Allows time for reflection.
- Encourages children to really think about what they are reading.
- Allows whole class to work on the same text - mixed-ability grouping.
- Allows teacher to check students' understanding.
- They help students to analyze, compare and evaluate texts.
- Encourage students and teachers to explore difficult texts.
- Enable group work and exploratory talk.
- Generate motivation in students by emphasizing problem solving.

Given below is an example of a DART activity. In this activity strategy #5, underlining and highlighting the text, is being used.

Activity:

Note: Read the text carefully and underline the different parts of the mouth and write each one's function in the space provided at the end of the worksheet.

Text

Digestion of food starts in the mouth. The food that we eat is broken down into smaller pieces by the chewing action of our teeth. It is then mixed with saliva and its enzyme. The enzyme in the saliva helps to break down the large starch molecules into smaller, simpler sugar molecules. However, food is usually not kept long enough in the mouth for all the starch to be broken down into simpler sugars. The tongue rolls the partly digested food into small balls which are swallowed into the esophagus.

Parts	Function
1. _____	(a) _____
2. _____	(b) _____
3. _____	(c) _____

October 9	SAP Olympiad and Exhibition
November 13	(Tentative) Topic to be announced Later
December 11	

Note: Any change of date or topic will be informed to our members through circulars.

Membership Regulations

Three types of memberships are available at SAP which is as follows:

Teacher Member

Any science educator teaching at any educational level is eligible to become a member of SAP. Membership fee is Rs.200 per annum.

Associate Member

Persons not teaching science but interested in science can become associate members. Membership fee is Rs.200 per annum.

Institutional Member

Educational institutions / teachers' training institution / any other institution associated with improving the quality of Science education or disseminating science knowledge can become an Institutional member of SAP. Membership fee is Rs.500 per annum.

For school systems with a number of schools each school will have to register separately.

Saturday Workshops

On the second Saturday of every month, from 9 am – 12: 30 pm, SAP organizes workshops on various topics of interest to science teachers at no cost to them. For registration call Ms. Parveen Al-amin in the first week of every month. She is available at Phone No.: 6347611-4 Ext: 3174. Please note that registration is on first come, first serve basis. Schedule for the upcoming workshops is as follows:

Date	Topic
January 10	Animal circulatory systems
February 14	PTAN Conference
March 13	How to design Activities in Science?
April 10	Group Work
May 8	Variation and Classifications
June 12	The Solar System
July 10	Habitats, adaptation and Chains
August 14	Ecology relations
September 11	Teaching Periodic Table

Resource Persons

Interested persons and teachers who wish to join SAP and contribute towards the improvement of quality of Science teaching and learning should fill in the Resource Person forms. These forms are available at the registration counters of workshops and may be submitted after the workshop. Mailed to IED or to Farah Huma (farahhuma@hotmail.com).

SAP Newsletter – Information for Contributors

Contributions for SAP –Newsletter from everyone who is interested in promoting science is welcome. Handwritten articles with clear legible writing and clear handmade diagram or pictures are acceptable. However, contributions submitted in the form of word processed or typed pages are preferred. The length of the piece cannot exceed --- words, you are welcome to give a picture and a brief description of your current position.