

Science with a Difference – Organising Planet Walk in Malta

Joan Borg Marks
 Physics Department
 University of Malta Junior College
 Msida, Malta
 joan.borg-marks@um.edu.mt

Abstract. *Even to this very day, many look at science as something that is done in a classroom. Perhaps, an experiment conducted in a laboratory may relate well to what one understands by ‘Science’.*

A group of twenty young people in Malta decided it is time to show that science can be done with a difference. These young people formed a club, which they called Astro-Club. They got to know about ‘Planet Walk’ from the author of this paper who is the advisor to the group. With their enthusiasm for science, directed especially towards Astronomy, they started on a venture aimed at setting up ‘Planet Walk’ in Malta, thus aiming at promoting science to the general public. The project generated a lot of energy amongst the group members. They knew that nothing like this had ever been done in Malta. This presented more of a challenge.

This paper looks at the process, the difficulties encountered and the satisfaction involved in creating ‘Planet Walk’, offering an incentive and encouragement for others to follow and create more “Planet Walks” in their own countries.

It is argued that the wonder and mystery that are related to astronomy may be used further towards promoting a better attitude towards science, laying the foundations for a long-term relationship between the world of science and the child. An explanation is offered as to how science can become more exciting and how it can be taken out of the classroom and used fruitfully, showing that science has all to do with the way we live.

Keywords. Astronomy, Clubs, Intellectual Curiosity, Planet Walk.

1. Introduction

Malta is a small island in the middle of the Mediterranean Sea. The island is renowned for

its heritage – museums, churches, archeological sites, megalithic temples and plenty more for the islanders and many a visitor from abroad to see and to appreciate in terms of a cultural and historical experience. However, the issue that is being discussed in this paper focuses on the scientific aspect of what Malta can offer.

Some important points that one can ponder upon are:

- What does ‘Science’ stand for in as far as the Maltese population is concerned?
- How big an issue is ‘Science’ in Malta?
- What importance do the Maltese give to science education?
- Which are the sites on the island that one can visit in order to increase one’s motivation towards the appreciation of the fact that science can be fun and is alive?

2. Science in the Maltese context

In order to try and answer the above questions briefly, one may begin with a general example. The issue of the environment in Malta may be considered. Many Maltese have become aware of the importance of keeping our environment clean. Government regulations regarding waste management and pollution overall, have helped a lot in this regard. Reading the regular Environment Section articles of the Maltese weekly newspaper “The Sunday Times” (2004-2005) gives full evidence of this. But, on the other hand, does the general public necessarily relate waste management to ‘Science’? Even to this very day, when the word ‘Science’ is mentioned, more often than not, a science class comes to people’s minds. Perhaps even an experiment conducted in a laboratory may relate well to what one understands by ‘Science’. Some may associate ‘Science’ with the reading of long, maybe abstract or difficult to understand text, with calculations involving sometimes easy or at other times difficult mathematics.

3. Science in Maltese schools

In Maltese schools, students are taught General Science in their primary classes, going on to do the separate sciences throughout their secondary education. The National Minimum Curriculum emphasizes the importance of instilling in our students, a greater awareness of the role of science and technology in everyday life through

- arousing curiosity concerning natural phenomena and stimulating the asking of questions about them,
- presenting science as a systematic means of asking and attempting to answer questions arising from observations,
- recognizing that different students can experience science differently.

(Ministry of Education, 1999, p.49)

In fact, a Science Centre exists within the Department of Curriculum Development of the Education Division in Malta. In a recent interview conducted during the month of June 2005, with the teacher in charge of this centre, it was confirmed that the work of the centre is aimed at developing the curriculum related to primary and secondary science and helping to better implement it in schools. The centre provides ongoing in-service training for science teachers in primary and secondary schools – training aimed at improving teaching methodologies so as to try to teach and reach all students. When asked about whether specific school outings were set by the department, for schools to be prompted to indulge in educational visits, the response was that with more decentralization, state schools have been given autonomy to act on their own. It is up to the teacher to decide where to take the students and to choose the type of visits which are expected to be most beneficial for that particular class and level of education.

Indeed, educational outings have always been organized for school children of different ages. Educators know that “good practice has always looked outward from the classroom and has drawn on the known experience of children to illustrate and instruct” (Hopkins, 1968, p.1-9). Specific reference to such outings was made in a B.A (Educ) dissertation written in 1981. Some of the outings with a scientific aspect were described and analysed for effectiveness. Amongst these outings, the authors mentioned a ship repair facility, a brewery, a printing press,

the Meteorological Office, the Government milk production facility, the power station, an edible oil production plant and the Natural History Museum.

Today, other establishments have been set up like, for example, a Nature Theme Park, which includes a mini zoo (Guzeppina Deguara Primary School website). During an interview with the Headmistress of a Junior Lyceum Secondary School, some other outings with a scientific theme were identified. Students had actually visited these places during the scholastic year 2004/2005. These included the Plant Propagation Unit, where plants are propagated by tissue culture, a National Nature Reserve, and also a Centre for the Study of Marine life. Progress definitely brings about changes and additions. This Headmistress said that students are taken out on scientific outings three times per scholastic year. She said that school outings are a possibility but they are not obligatory. In fact, some teachers prefer to do experiments in the laboratory, to taking their students on outings.

If one looks closely at the places that students are taken to visit, one realizes that except for the Natural History Museum, the rest are either private enterprises or Government establishments where one needs to ask for permission before entering.

However, one must also mention ‘Science Week’ in Malta, which is another scientific activity that has gathered momentum these last years. It is a hands-on exhibition organized “to get people interested in science in a fun way” (The Malta Independent, April 2005).

When one considers all of the above, one can say that while it can be that not all the Maltese can relate all scientific issues to Science yet policy makers do realize the importance of Science and science education. It is the expression of this importance into even more practice, which is what is highly desired and yearned for. With the importance of science that exists in every aspect of one’s life and the great need to increase public awareness of science as well as interest in everything around us, one can never say that one is doing enough.

4. Why Astro-Club?

At the beginning of the scholastic year 2004-2005, the author of this paper made a call to students at the institution where she lectures in Physics, suggesting the start of an Astronomy Club with the aim of increasing awareness that

science can be done with a difference. The choice ended up on Astronomy because it has a sense of wonder and mystery linked to it – something that all of us are intrigued with. A number of young people aged sixteen to twenty two, were enthusiastic about the idea and formed the group, some also bringing their friends with them. The group consists of twenty members, boys and girls, and meets every week.

Ever since the first meeting, the group of youths has shown a lot of energy directed towards what can be done for Malta, in relation to science. Their motto is the same as described by Mayo (2002): “Making a difference in the science education community”

The group decided to call themselves Astro-Club and the Logo they designed for their club can be seen in Fig. 1.



Figure 1. Astro-Club Logo

During an HSci conference held in Cologne in 2004, the author of this paper, as advisor to the group, had learnt about ‘Planet Walk’. The idea of setting up ‘Planet Walk’ in Malta was mentioned to Astro-Club members. The group showed a lot of enthusiasm at the possibility of working at something scientific, on a large scale. They saw a great challenge in working to make project ‘Planet Walk’ a reality and bring it to completion.

5. What is Planet Walk?

One of the most incomprehensible aspects of Astronomy is, in fact, the large distances involved. Even our own solar system’s distances are quite hard to imagine. In ‘Planet Walk’ a number of monuments, starting with the Sun, is set up in such a way that visitors can get the feel of how the solar system is organized, by walking from one monument to the next. The distances between the monuments are in the same ratio as the actual distances between the Sun and the planets in the solar system, but, of course, scaled down. The planets are also scaled down in size and this truly adds perspective to the ‘Planet Walk’ (Walking through the Solar System, 2005). What makes ‘Planet Walk’ so fascinating is the fact that it helps to physically experience

the solar system “in a way that no other medium (book, computer) can. Anyone can directly grasp the dimensions of the solar system” (Planetenweg, 2004).

A number of planet walks are already in existence in the world. There are definitely planet walks in Germany, Sweden, the United States and also in the United Kingdom. It is of interest to know that the first planet walk in the world was set up in 1971 in the German city of Hagen and the largest model in the world is in Illinois, USA (scale 1 : 125,000,000), which extends for a distance of 64 kilometers (Planetenweg, 2004)

6. The Project: The work of Astro-Club members

As one can imagine, it is no joke to take up an initiative such as ‘Planet Walk’ and bring it to completion. Astro-Club, being a non-Governmental, non-profit making organization, working on a voluntary basis, realized that the biggest problem was going to be one of financing the project. The members, therefore, applied for the Youth Programme: Action 3 of the European Union and were fortunate enough to get recognition for what they aim to do and thus received some funding. However, these funds are not enough to finance a project that involves the setting up of ten monuments, including the sun, together with a plaque near each monument showing some basic information about each planet. The group is thus working at trying to get more funds – mainly from those who will be the future beneficiaries of ‘Planet Walk’, namely the general public, including school children, all of whom will gain from the ‘Planet Walk’ experience once this is finished. They are also contacting important institutions, with the aim of finding more sponsors.

The group has done a lot of research. This will be used as base knowledge to set up the monuments that will be a unique set, specifically designed for Malta. The group also intends to contact members from other local astronomy groups, in order to discuss their work with the members of these groups and thus get feedback for their project. Thus, if any changes need to be done, they will be done before the monuments are set up.

After a study of the various places where best to set up ‘Planet Walk’ on the island, a nice promenade by the sea, extending over 2

kilometers, has been located. Astro-Club members talked to the Local Council under whose jurisdiction this site falls and, after a committee meeting, the Council approved the Planet Walk Project. An adequate scale was chosen for the distances between the monuments and also the relevant sizes required. Table 1 shows the actual diameter of the sun and each planet, as well as their distances from the sun, and the relative scale values to be used for Planet Walk.

Table 1. The Sun's satellites

	diameter (km)	model scale size (cm)	distance from Sun ($\times 10^3$ km)	scale distance in walk (m)
Sun	1,390,000	200		
Mercury	4,878	0.70	57,910	19.59
Venus	12,104	1.74	108,200	36.59
Earth	12,756	1.84	149,600	50.60
Mars	6,794	0.98	227,940	77.09
Jupiter	142,984	20.57	778,330	263.24
Saturn	120,536	17.34	1,426,940	482.60
Uranus	51,118	7.36	2,870,990	970.99
Neptune	49,528	7.13	4,497,070	1,520.95
Pluto	2,320	0.33	5,913,520	2,000.00
scale	1 : 695,000,000		1 : 295,676,000	

The group set to work hard in coming up with various designs of the monuments, visiting local artisans and getting feedback about the feasibility of their designs, as well as the costs involved. However, a major difficulty has still to be overcome. A permit is required from the Malta Environment and Planning Authority (MEPA), which is the regulatory body in Malta, to set the monuments on site once they are completed. At the moment Astro-Club is working with the Council's architect in order to decide on the final design of the monuments and their layout and in drawing final plans to be submitted to MEPA for approval. The group is trying to avoid disrupting the promenade as much as possible, so that the costs will be reduced and so that approval will be easier to obtain.

A lot of work still needs to be done. The group is also trying to promote awareness amongst the Maltese. A publicity campaign has been launched and members of the group have already appeared on two popular television programs explaining the project and its aims.

The group intends to continue to work hard through the summer months, bringing the project to completion by the end of this year.

7. The wonder of astronomy

This project has made more evident once again, that science can be approached with enthusiasm. Astro-Club members joined the group because they were looking for something more than what was being offered to them elsewhere. This need not have been just Astronomy. It could have been that they were looking for new friends through the club, for example, but those who looked only for something outside astronomy left the group, once they got what they wanted. Those really interested in Astronomy stayed on and have a great desire to see the fruits of what they started. This has been expressed by the members of Astro-Club themselves, in answers that they gave to a questionnaire, which was used to get feedback from the group.

8. Foundations of scientific knowledge

The following are some responses to questionnaire that undoubtedly need further reflection.

(i) M1: ' I joined the group because I like astronomy a lot...., since I was a child. I think that we should be able to finish our project but problems may arise due to lack of money and time.'

M2: 'Astronomy is one of the subjects I really get interested in.'

M3: 'I joined the group to broaden my knowledge about Astronomy and also to meet new people and make new friends. I have been interested in Astronomy since I got to know that there are other planets besides our Earth and got to know about the Universe and what it is made up of. I believe that if everyone makes an effort we will be ready by the end of the year.'

M4: 'Originally I joined Astro-Club because I was interested in Astronomy. I've been interested since I was 12 years old. It is possible to get the project done. Our pace is slow at the moment, due to exams. This makes it less likely for us to get it done; not unless we work really fast through the summer'.

These quotes show that these members have built their foundations of astronomy quite some time earlier on. But we have to be careful of

what we really mean by 'foundations of scientific knowledge'. Indeed, the word 'foundations' may be misleading. One can interpret the word as a base, consisting of concepts and skills, which, once acquired at an early age, can secure the construction of the whole edifice of scientific knowledge. However, it can also be argued that while a strong conceptual base is a prerequisite for this construction, yet the latter cannot take place without the establishment of a long-term relationship between the world of science and the child. The implication is that early childhood education should work at creating the right attitudes towards science. It is attitudes that are even "more important than a strong conceptual base since they are the motivators for children's engagements in science activities. Intellectual curiosity, for example, is such an attitude" (Hadzigeorgiou, 2001).

(ii) The following are some answers to the question, 'What is Science to you?':

M1: For me science is part of my life. I like to study it a lot, especially Chemistry and Biology. I like to learn about our mysterious world and universe.

M2: Understanding the facts of life, the answer to why certain things happen.

M3: Science is what I see. It provides answers to certain things and gives solutions for a better life.

M4: Science is knowing what is around you, why things happen the way they do...it is logical and requires reasoning. It provides answers to many of our questions - though not to all... Science could ultimately lead to discovering more about yourself.

These are answers coming from people with an enthusiastic attitude towards science. Astro-Club members are simply emphasizing the importance of Science for ALL. "The greatest insight into the way scientific knowledge is acquired will be gained by students if they themselves are engaged in real science activities. This will include not only their personal investigative work, but sharing their ideas and results at meetings and contributing to and reading journals" (Driver et al , 1997, p.147).

9. Conclusion

What Astro-Club members are actually doing is making 'Science' part of their every day life experience. "Science is an adventure that people everywhere can take part in, as they have done

for many centuries" (Science for All Americans: Benchmarks On-line, 2005, p.12)

Moreover, the formation of the club is giving the club members a better chance to grow socially through meeting new people with similar interests. Together they can learn to co-operate with each other, forming part of a team. They learn how to gain the courage to discuss and ask questions, exposing their ideas to criticism. Through the meetings they gain confidence at clearly communicating their views, also evaluating and improving their critical thinking skills and independent thought.

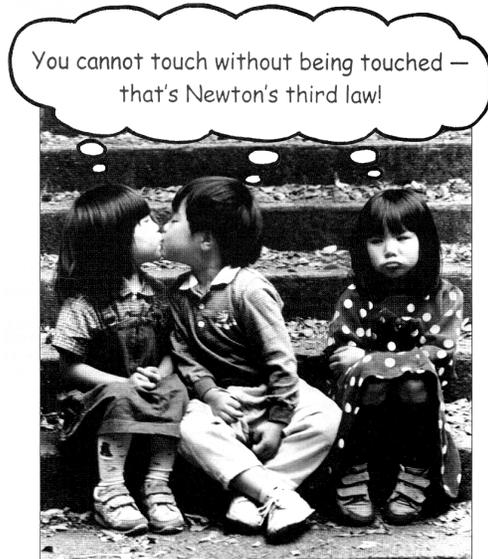
The high enthusiasm generated in the expectations for the project to work, is helping to improve the attitude of the members of the group towards science. Some members have explicitly said, in their questionnaire answers and during informal meetings, that they look forward to the weekly meetings. They have learnt that science is not necessarily a set of facts or a pack of notes to be memorized. Whitehead (1929) rightly believed "that any subject should first come alive and become stimulating before the student can establish a long-term relationship with it". It is, indeed, such a relationship that educators wish for every child or student under their care.

In as far as the advisor's role is concerned, this is a position that must be handled with care. A good balance must exist between the advisor as a member of the group and the professional who is there to give advice when required. All members need to feel comfortable as they talk to the advisor and air their views. It is the job of the advisor, as the mature individual in the group, to initiate and maintain interest in what is going on and in what needs to be done. Through brainstorming, one realizes how many ideas the members come up with. Young people are indeed a wellspring of ideas. The advisor has to guide the club members so that right choices are made, emphasizing the practical perspective of the plans and the jobs that need to be done in relation to the project.

In conclusion, it is hoped that not only will Planet Walk in Malta be a pleasant experience for all visitors to the site, but that, more especially, it will be one of those sparks that will generate wonder and enthusiasm for science, thus laying a solid foundation for a life-long interest and understanding in Science. The author also wishes that there would be more Astro-Clubs and Planet Walks, budding in other countries. One must find the courage to take the plunge, similar to what Astro-Club is doing

now in Malta. One must remember that unless one acts, one cannot expect anything back.

Newton's Third Law of Motion that "for every action there is an equal and opposite reaction", gives us more reason to be sure of this.



(Hewitt, 2002, p.19)

Figure 2. Newton's Third Law

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