The conference took place on 12th and 13th September and involved 80 teachers with different backgrounds, experiences, from different institutions and teaching different education levels (kindergarten, primary, secondary and upper education)

This conference aimed at:
- sharing experiences in what concerns science teaching in primary and per-primary education
- discussing the country reality in what concerns science education at primary level
- creating a community of teachers (science education) to disseminate good practices
- enlarging this community to new schools through the establishment of a network

The conference was organized according to the following layout:

(1st day) Presentations of projects carried in schools or in science centers (formal and informal education) that involved practical activities and focused on different subject areas (chemistry, astronomy, biology, geography, astronomy, physics, technology, mathematics), most in an interdisciplinary approach.

The presentations referred to practical activities carried out:
- in primary education schools with the support of science centers
- within Ciência Viva projects
- within a European project
- in partnerships between secondary and primary education schools
- with cooperation between a primary education teacher and a scientist
- in a way that allowed teacher training to take place in an informal way
- in situations in which science center experts acted as supporters of teachers

Discussions of several issues raised by the presentations followed the presentations and practical activities.

Support materials related to each presentation have been produced and distributed to the audience. (also published on the project website).

(2nd day) Discussions, (two round tables), with guest speakers having different education experiences (teachers from primary and pre-primary education, professors from teacher training schools and educational university departments, a professor from a university engineering dept. and a teacher from a math’s association).

The following issues were the starting point for the discussion:
- Development of the children’s competences and inquiry based learning
- Human resources in schools (partnerships with the scientific community and secondary schools)
- Material resources in schools for practical activities (experiments): adequacy to the educational level and the experiment
- Activities with an interdisciplinary approach
- In-service teacher training and science education
- Partnerships: school - family - community

The presentations (1st day) showed how essential aspects of teaching science in an inquiry based approach can be put into practice while involving the children in the
activities, that is, learning experiences which enhance the children's ability to think critically by making observations, asking questions, drawing up hypotheses, planning and carrying out researches, and analyzing the data collected, and help children to find answers, explanations, make predictions, as well as communicate their results in writing and orally.

Other aspects were also referred as important in these type of activities:
- involving children in the experiment planning and in the discussion of the results
- making children think about the experiments instead of just carrying them out
- promoting cooperation between primary education school teachers and scientists
- creating partnerships between science centres and primary education school teachers
- stressing the importance of the children’s active role
- making children understand the value of the error, the importance of learning from errors
- how to make children develop their thinking skills
- the importance of creating conditions for the children to ask questions
- the importance of creating conditions for the children to speak/write about what they have learn through experimental activities
- the importance of getting children involved in multidisciplinary activities
- starting an activity from the reality that surrounds children
- the importance of arousing children’s curiosity
- starting from the children’s questions
- challenging children with every day’s problems
- valuing group work
- promoting the children’s autonomy, making them comfortable they can achieve goals

Throughout the two days of the conference other issues have been discussed:
- The importance of science education to help children grow with the tools for life (participation, have opinions, be critical)
- The importance of involving families, of reaching them as well when teaching the children
- the need to improve the preparation of teachers to teach science in primary education
- Today’s tendency in the country: parents choose a school based on the fact the school carries out practical activities
- The importance of the science centres as promoters and supporters of science activities in primary education schools has been shown in the different presentation made by the centres
- The role of the school for the dissemination of the scientific and technological culture in the community

The state-of-the-art in the country in what concerns science teaching in primary and pre-primary education has been given special attention. The following conclusions have been reached:
- Only a small number of teachers develop practical activities with their children.
- Many teachers prefer to use the book instead of involving children in practical activities
- Many have a lack of scientific knowledge of science concepts
- Some teachers fear to pass on incorrect concepts to children when trying to explain complex concepts in a simple way
- Examples of good practice are not known to many teachers (what happens in one school in not known by others)

The reasons for this situation were said to be diverse.
Several teachers:
- do not have preparation to teach science or scientific culture (in the teacher community but also in the community as a whole)
- are frightened to teach science and involve children in practical activities because they consider science is for scientists, too difficult for them to teach
- have difficulty in finding the publications where articles on “good practices” can be found
- in some teacher training schools the preparation given to teachers is not adequate
- refer to the difficulty of handling children when carrying out experiments in the classroom (too noisy and restless).
- feel guilty for taking up time to other subject ares considered more important (mother tongue and maths)
Some suggestions to change the situation have been put forward:
- Motivating teachers to teach science in an inquiry based approach
- Showing teachers what science teaching means by showing the examples of good practice (you do not have to be a scientist to teach science)
- Making teachers feel they have the support of other colleagues, they should not feel isolated
- Recognizing the teachers’ good work
- Giving opportunities for teachers to take part in sessions in which they have the opportunity to carry out practical activities as a means to make them self-confident to carry them out with the children.
- Facilitating teachers’ access to resources
- Making teachers feel that they are giving their contribution to create science awareness not only in the children but also in the community (parents)
- Advising teachers to find ways to overcome the difficulties
- Taking advantage of the recent grouping of schools (secondary and primary) to share resources (human and physical)
- Ciência Viva should continue to act as a mediator and go-between in order to facilitate teachers’ access to scientists and to articles published in specialized magazines.
- What sort of concepts can be taught to children? Can complex concepts be taught? Isn’t there the danger that mistakes are made when oversimplifying? Some suggested that children should only be involved in the experiments that they can understand. Some others disagreed.
- It was considered that more teacher training schools should have been invited (3 have been present).
- The scientific community should take part in this challenge (scientists should get involved and try to find ways to help teachers overcome the difficulties of teaching science to small children)

The conference programme is on:
http://www.cienciaviva.pt/projectos/scienceduc/programa.asp

Materials related to the presentations can be seen on:
http://www.cienciaviva.pt/projectos/scienceduc/

Conference follow-up
Out of this conference a network of teachers to enhance exchanges and the development of good practices in science teaching has been decided has been created. This network will extend to new schools and will allow the sharing of experiences.

This network includes school teachers, teacher trainers, science centres experts,
This will be a means to continue sharing experiences, resources, as well as stimulate teachers to write and publish and to facilitate the access to articles already published.

In order to have a reason for the sharing of ideas, teachers were invited to perform an activity after the meeting, during the Science Week (end of November). Teachers were also invited to share ideas and difficulties during the planning of these activities and to exchange and compare conclusions and results after the activities have taken place.

A new session has been agreed upon and will take place on January 2006.
The Lisbon Meeting
The aim of this meeting is to create a shared space for Kindergarten and 1st Cycle schoolteachers with different experiences, and set up a community of teachers, teacher training schools, science centres and local authorities which will maintain contact throughout the school year. This activity is part of the European project ScienceEduc, in which Ciência Viva is a partner.

PROGRAMME

12th September, 10h00 - 17h30

10h00 - 10h30
Reception

10h30
INTRODUCING PRACTICAL ACTIVITIES
Experiments presentation in different areas of knowledge.
Each presentation will include (1) a practical experiment; (2) a description of the features related to the activities; (3) raising issues for future debate.

Transforming Foods (The Kitchen as a Laboratory)
Paulina Mata, FCT-UNL
Lúcia Ferreira and Margarida Borralho, Pavilhão do Conhecimento

Preserving Food (European Discoveries project)
Luz Figueiredo, School Grouping D. Pedro I, Buarcos
Maria da Conceição Loureiro Dias, Dept. of Botany and Biological Engineering, Higher Institute of Agronomy.
Educational Vegetable Gardens
Lina Ferreira, Exploratório Infante D. Henriques, Coimbra Ciência Viva Science Centre

Science at Play
Sandra Costa, Coimbra (collaborator of Ciência a Brincar)

11h30
Debate on questions raised during the presentations

12h00
Measuring tree shade (Astronomy)
Máximo Ferreira, Constância Ciência Viva Science Centre

12h30
Lunch time
14h00
Are Materials Made of Grains?
Lurdes Abreu, Queluz Elementary School

The Archimedes’ Experiment
Alberto Ferro, Materials Department, Higher Technical Institute (IST)

14h30
Debate on questions raised during the presentations

14h45
Beach life – exploring a rock pool
Elsa Santos, Vila do Conde Ciência Viva Science Centre

Discovering the Earth
Rui Dias, Estremoz Ciência Viva Science Centre

Heat and electricity: how to introduce the concept of energy.
Rosa Peres, Tavira Secondary School
José Brás, Silves Secondary School
(teachers whose activities are supported by Tavira Ciência Viva Centre)

15h30
Debate on questions raised during the presentations

15h45 - 16h15
Coffee Break
16h15
Presentation of the proposal for the 1st networked activity

13th September, 9h30 - 13h00
PANEL
Science in Kindergarten and 1st Cycle Schools.

9h45
Debate: Table 1
Guest Speakers
Alberto Ferro, Materials Department, Higher Technical Institute (IST)
Ana Rodrigues, Didactics and Educational Technology Dept., University of Aveiro
Clara Madeira and Cristina Aragão, Kindergarten teachers
Margarida Afonso, Castelo Branco Teacher Training School

Topics for debate:
- Practical activities in Kindergarten and 1st Cycle Schools: the development of children’s competences and enquiry based learning.
- Human resources in schools (partnerships with the scientific community and the secondary schools)
- Material resources in schools for practical activities (experiments) + equipment for the experiments (adequacy: educational level and the experiment)

11h15 – 11h45
Coffee Break
Debate: Table 2 Moderator: António Gomes da Costa, Pavilhão do Conhecimento – Ciência Viva

Guest Speakers

Alice Carvalho, EB1 Orlando Gonçalves, Alforhelos School Grouping
Luz Figueiredo, Buarcos School, Infante D. Pedro School Grouping,
Paulina Mata, FCT-UNL
Pedro Reis, Teacher Training School Santarém

Topics for debate:
- Interdisciplinarity in Kindergarten and 1st Cycle Schools
- Assessing of the practical activities in Kindergarten and 1st Cycle Schools
- In-service teacher training and science education
- Partnerships school-family / community
- Science teaching-learning in the curricula and educational policy.
Participants

Adelaide Paredes da Silva, Centro Formação Proformar
Adelina Machado, Centro Ciência Viva da Amadora
Alberto Ferro, Dpt Materiais, Instituto Superior Técnico (IST)
Alice Carvalho, EB1 Orlando Gonçalves, Agrup Alfornelos
Aline Oliveira, aluna do curso de Educação de Infância, ESE Santarém
Ana Catarina Santos, aluna do curso de Educação de Infância, ESE Setúbal
Ana Cristina Mateus da Silva, aluna do curso de 1º Ciclo, ESE Santarém
Ana Cristina Nogueira, professora do 1º Ciclo
Ana Isa da Conceição Sousa, EB1 da Portela
Ana Lúcia Dias Delgado, aluna do curso de 1º Ciclo, ESE Santarém
Ana Maria Romão Nunes Fonseca, professora do 1º Ciclo
Ana Paula Mendes APPACDM de Figueira de Lorvão
Ana Rodrigues, Dpt Didáctica e Tecnologia Educativa, Univ. Aveiro
Ana Sofia Charuto, aluna do curso de 1º Ciclo, ESE Setúbal
Ana Sofia, Externato S. Filipe, Estremoz
Andreia Santos, aluna do curso de Educação de Infância, ESE Setúbal
Angélica Queirós, EB1 Marco Cabaço
Carlos Alves, APPACDM de Figueira de Lorvão
Catarina Pombo, aluna do curso de 1º Ciclo, ESE Santarém
Clara Madeira, EB1/JI dos Arcos, Setúbal
Conceição Bettencourt, formadora do Centro de Formação Loures Oriental
Conceição Loureiro Dias, Dep. Botânica e Engenharia Biológica, Inst. Superior Agronomia
Cristina Amaral da Silva, EB1 N° 1 da Bobadela
Cristina Aragão, Jardim de Infância Aquário, Setúbal
Dorinha Cardoso, Centro Formação Proformar
Dora Isabel Jerónimo Oliveira, aluna do curso de 1º Ciclo, ESE Santarém
Elsa Santos, Centro Ciência Viva de Vila do Conde
Fátima Rito Louza, EB1 da Solum, Coimbra
Fátima Sequeira, Escola EB1 nº 2 de Corroios
Gabriela, Educadora de Infância
Georgette Garcia, Externato Aljubarrota, Amadora
Helena Isabel Gonçalves Domingos, Centro Ciência Viva de Tavira
Henrique Macedo, Dpt Materiais, Instituto Superior Técnico (IST)
Infância Xavier, EB1 N°1 / JI da Trafaria
Isabel Cruz, aluna do curso de Educação de Infância, ESE Setúbal
Joana, APPACDM de Figueira de Lorvão
José António Costa Pereira, Escola Secundária do Monte de Caparica
José Manuel Maurício Brás, Escola Secundária de Silves
Julia, Educadora de Infância
Laura Casca, EB1 Marco Cabaço
Liliana Alberto, aluna do curso de Educação de Infância, ESE Setúbal
Lina Ferreira, Exploratório D. Henrique - Centro Ciência Viva
Lúcia Ferreira, Pavilhão do Conhecimento – Ciência Viva
Lurdes Abreu, EB1/J. Infância do Monte Abraão.
Márcia Mateus, aluna do curso de Educação de Infância, ESE Setúbal
Margarida Afonso, ESE Castelo Branco
Margarida Borralho, Pavilhão do Conhecimento – Ciência Viva
Maria Adélia Gomes, EB1 nº 1 de Algés
Maria Angelina Venâncio, EB1 nº1 de Oeiras
Maria Aurora, Externato S. Filipe, Estremoz
Maria da Glória Louza, EB1 nº1 de Oeiras
Maria da Luz Figueiredo, Agrupamento de Escolas D. Pedro, Buarcos
Maria de Jesus Valadas, EB1 nº3 de Agualva
Maria José Calheiros, Educadora de Infância
Marisa Viegas, aluna do curso de Educação de Infância, ESE Setúbal
Máximo Ferreira, Centro Ciência Viva de Constância
Mónica Castelo, aluna do curso de Educação de Infância, ESE Santarém
Nádia Moutinho, aluna do curso de Educação de Infância, ESE Santarém
Nélia Montês, Educadora de Infância
Nundina Dores Palmeira Gaspar, Escola Secundária de Tavira
Patrícia Nunes, aluna do curso de Educação de Infância, ESE Setúbal
Patrícia Valério, aluna do curso de Educação de Infância, ESE Setúbal
Paula Ribeiro, Centro de Ciência Viva de Estremoz
Paulina Mata, FCT-UNL
Pedro Reis, ESE Santarém
Rita Canhoto, aluna do curso de Educação de Infância, ESE Setúbal
Rosa Lima Fernandes Peres, Escola Secundária de Tavira
Rosa Montês, Educadora de Infância
Rui Dias, Centro Ciência Viva de Estremoz
Sandra Costa, equipa Ciência a Brincar
Sara Ribeiro, aluna do curso de Educação de Infância, ESE Setúbal
Susana Durão da Cruz, aluna do curso de 1º Ciclo, ESE Santarém
Tânia Pereira, aluna do curso de Educação de Infância, ESE Santarém
Teresa Cunha, Educadora de Infância
Teresa Jacinto, aluna do curso de Educação de Infância, ESE Santarém
Vera Vassalo, aluna do curso de Educação de Infância, ESE Santarém
Zélia Hermínia, EB1 nº 4 Stª Iria de Azóia