

Seed Cities for Science

A COMMUNITY APPROACH FOR A SUSTAINABLE GROWTH OF SCIENCE EDUCATION IN EUROPE

Guide for the

Seed City Coordinator





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Tools for designing and implementing a school development programme in science

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This guide has been written for use by coordinators who are going to design and implement a school development programme in primary science education. It should, of course, be viewed as suggestions, ideas and advice on how to implement such a programme, and has to be adapted to the specific situation in each Seed City.

Some annexes in this description have been included to give some concrete examples of different activities. The examples are taken from Sweden and France.



Pollen in the Seed Cities



Introduction

A Pollen Seed City is an educative project that sets forth science education as a priority for children and the community as a whole, convinced that the outcomes will go beyond the learning process and improve the quality of their lives in all dimensions.

An educative city is not limited to schools. All cultural, scientific, economic, political, leisure and other resources are mobilised to improve the community's knowledge, abilities, skills, attitudes and values, which will, as a knock-on effect, irrigate the city and improve its resources, thus contributing to local development. The Seed City aims to build a sustainable framework for science education through a child-centred approach starting in school and extending to the whole community, offering a model for the development of similar centres. Pollen will provide the opportunity to have an organised forum for ongoing discussion about the science and technology curriculum, involving teachers and their students, school administrators, politicians, scientists, engineers and researchers in the field of educational science.

The relations between the partners may be represented by the following picture. They may be formalised through the signature of an agreement, which expresses the commitment of each partner to carry out the project, providing some human and financial resources, equipment for the class, scientific coaching, opportunities for out-of-school visits, etc.





www.pollen-europa.net

An interactive web portal (E-centre) will be developed in order to stimulate the mutual exchange of experiences and support and disseminate processes during the entire duration of the project, at local, national and European levels.

The E-centre will provide:

- A space for each Pollen Seed City.
- Cooperative workspaces for all Pollen participants to develop joint projects.
- A set of resources and tools for teachers, trainers and coordinators.
- An agenda of events taking place in all participating cities.



Coordination and follow-up

The first step entails establishing a local coordination team in each Seed City. Typically, this consists of a coordinator, a trainer, a local authority representative and a scientist. The coordinator is in charge of implementing the different activities of the project in agreement with its schedule and aims.



Different levels of coordination

There are three levels of coordination in the Pollen project: a local, a national and a European level. For the purpose of the guide we will mention all three of them, despite the fact that the European one is specific to Pollen. Nevertheless, this guide may be understood as a general tool for every local structure that would like to develop a pilot centre for science teaching, in the same spirit as Pollen.



Role of the local coordinator (Seed City coordinator)

It is important that a Seed City coordinator define his/her role as one of coordination of all partners and activities carried out in the city.

This coordinator works closely with:

- A local coordination team
- A Seed City community board, on which the different actors of the project are represented (teachers, trainers, scientists, educational authorities, city council, parents, etc.)
- The national coordinator
- The Pollen general coordinators

The role of the Seed City coordinator and the local coordination team

The Seed City coordinator is part of the local coordination team, which may be composed of a minimum of two people, one mainly in charge of the global management of the project, and the other responsible for relations with the schools and the teachers.

BASIC WORK TASKS FOR A SEED CITY COORDINATOR

- See to it that the project in the municipality is developed according to objectives, qualities, development strategy and calendar.
- Contact with teachers, institutions and entities to introduce them to the project. Define the participating schools and teachers, and follow their involvement in the programme.
- Ensure community awareness about Pollen (schools, parents, associations, stakeholders, etc.).
- Develop a strategic plan for schools and community.
- Coordinate and manage the work of the Pollen local community board. Write a state of the art report on science in the city, to be completed with the help of this board. The state of the art report will include information about methodology used by teachers, the practice of science activities, attitudes towards science, potential community participation, teacher training and all types of local resources for science teaching.

- Ensure and facilitate contact between schools and the local institutions in the local community board, and coordinate joint events and activities.
- Participate in the management of agreements and budgets and coordinate these issues with all local partners.
- Work together with the local trainer in the development of training and activities in schools.
- Plan initial and in-service training of the teachers.
- Be responsible for supplying the teachers and pupils with material and resources.
- Be responsible for the local key issue implementation.
- Promote and provide contents for the Pollen E-centre, and encourage its use by the actors of the project.
- Take care of communication internally (in the Seed City) as well as externally (journalists, international contacts, etc.).
- Implement the Pollen evaluation protocols in schools and ensure data collection.



Role of the Seed City community board

The Seed City community board is where all schools and stakeholders work together to improve science education in the city. It will enable consensus on the goals and resources necessary for the project, and will ensure that all efforts will be undertaken in a converging manner. It will create original partnerships between educative bodies and representatives from the private sector (companies, associations, etc.) so as to broaden the pupils' access to concrete applications of science. In some way, the children may be part of this community board: they can discover what its goals are, how it works and who its members are. This board will hold meetings periodically. Stakeholders should be encouraged to invite individuals or institutional actors who may be interested in promoting science education in the city.

Role of the national coordinator

The national coordinator of Pollen is in contact both with the local and European coordination bodies.

BASIC WORK TASKS FOR A POLLEN NATIONAL COORDINATOR

- Relations with the European coordinators (participation on the Steering committee, facilitation of information, feed-back on the Seed City).
- Financial management for his or her country.
- Gathering all national resources and supports for the success of Pollen.
- Follow-up of the correct implementation of Pollen in the Seed City.
- Annual report for activities and finance.

- Local coordination team implementation.
- Helping with the implementation of the local community board and establishing the sub-contract terms with the local actors.
- National awareness and dissemination about Pollen.
- Key issue implementation.
- Tools and evaluation protocols translation and dissemination.
- Resource translation or creation, and subsequent dissemination.

Role of the general coordinator

The general coordination, in the case of Pollen, falls to the Ecole normale supérieure (France).

BASIC WORK TASKS FOR THE GENERAL COORDINATOR

- Contract issue and administrative relations with EC.
- Financial management.
- Follow-up of the correct implementation of the Pollen project in all countries.
- Steering committee organisation.
- Global report.
- Field visit organisation.

- Annual seminar organisation.
- Newsletters.
- E-centre design and management.
- International communication and dissemination about Pollen.
- Tool coordination.
- Evaluation coordination.



Development of a strategic plan for the programme

For a successful school development programme, it is important for every level in the school district (in the Seed City) to be involved. Therefore, it is important that, at every level, for almost every position, all involved parties and people focus on the following questions:

- WHAT are we going to do in the municipality/school district/ teaching team, in order to achieve Pollen's aims?
- WHY have we become involved? What will we gain? Why have we chosen this path?
- FOR WHOM are we investing in this competence and development?
- WHICH of us will participate? What is our mission? What can I/we contribute?
- WHAT CONDITIONS are required? Long term financing? Support from the university or industries?

- WHEN do we begin? What are our future plans in terms of timeline and content?
- HOW will we work?
- FOLLOW UP and EVALUATION; what, how, when, etc.
- HOW to schedule and organise the teacher training.
- HOW to plan the project development in the Seed City.
- WHICH strategy to choose in order to involve an average of 50 classes during the project?

One important part of the strategic work is to define what components, or parts, could be built into the programme.

- The strategic planning model consists of different elements. Together, they form the system needed to create and sustain a school development programme in science.
- Five complementary components are the foundation of the reform model. They are:
 - learning units and materials
 - professional development
 - material support
 - pupil and programme assessment
 - administrative and community support

Description of the different components of the strategic plan

Learning units and instruction materials are central and crucial for a successful inquiry-based hands-on approach for primary science education.

Learning units and materials, each focusing on a different area of science, lie at the heart of an effective and sustainable science education programme. The units must be research-based and should be developed in collaboration by teachers, scientists and researchers in the field of educational science, field tested with students, and evaluated. Example of (freeware) learning units are available to download in English on this website. The learning units should provide developmentally appropriate opportunities for children to expand their understanding of science concepts and phenomena, acquire skills, and develop positive attitudes towards science. When working with units, the pupils must be challenged with a variety of learning styles and given opportunities to apply what they have learned to real-life situations. It is also important that the units offer opportunities for pupils and teachers to



integrate science learning with other subjects. A basis for classification (metadata) and a selection of science learning resources focused on primary schools are described in the database available at the Pollen E-centre (www.pollen-europa.net).

Teachers or trainers from all Pollen countries are encouraged to share new units (elaborated in the Seed Cities) with other partners, through the Pollen website. They can send the chosen units to the national coordinator for that purpose.

Professional development

Professional development is the process through which a Seed City prepares its teachers to teach hands-on inquirybased science. Professional development programmes need to focus initially on helping teachers to become familiar with fundamental science concepts, learn how to use inquiry-based hands-on science materials, and develop effective classroom management techniques. Later, attention can turn to helping teachers acquire in-depth science content knowledge, developing further understanding about an inquiry-based approach to learning, developing appropriate methods for student assessment, and integrating science with other subject areas.

More development on this issue can be found in the Pollen guides for trainers and teachers that can be downloaded from the Pollen E-centre. They consist of methodological guidelines with descriptions of basic principles, the teacher's role, planning of activities, classroom organisation, the development of mathematical and language skills, etc.

Organised science material support

Pupils who engage in a hands-on inquiry-based form of science need a variety of science materials - from microscopes to plastic droppers to washers. The Seed Cities need to consider how the pupils and teachers will get their materials to be able to perform experiments. Some kind of material support system is needed to ensure that the students and teachers have access to science materials throughout the school year. One example is that, when a unit is completed, the teacher returns the material to a science material support centre, where it is supplemented and then ready to go to another class.

It is crucial to plan the material support component carefully, because a well-functioning and cost-effective system is essential for a successful science education programme. A list of scientific material (with contents and availability) will be included in the resource database at the Pollen E-centre.

Pupil and programme assessment

Assessment for learning is one of the most important purposes of assessment. It is not the only purpose and is to be distinguished from assessment of learning, which is carried out for the purposes of grading and reporting.

A system is needed to provide appropriate tools for teachers to use to assess student learning. Many times, the focus is on summative assessment, but it is important to give the students and the teachers strategies for formative assessment. The approach to assessment is more about assessing for learning and development and less about traditional testing, such as paper-pencil tests. Assessment for learning (formative assessment) is the process of seeking and interpreting evidence for use by pupils (learners) and their teachers to decide where the pupils are in their learning, where they need to go and how best to get there.



As a participative research-action project, the participants have a key role in the assessment of the project. In this sense, the local Seed City community board will have evaluation as a main function, in order to improve work and produce information for other Seed Cities. The local coordination team will also gather evaluation data at the beginning, during and at the end of the project, according to the framework given by the general coordination board. They will send periodical reports on the work made and their key issue development.

At all times, local dissemination actions will take place, such as posters in schools, occasional dissemination activities (posters in the city), press invitations and reports. More information about evaluation frameworks and tasks will be provided throughout the project.

Administrative and community support

The planning and implementation of a science programme entails the support of a broad range of stakeholders in the Seed City. This is critical to the success of the programme. These individuals should share a vision of what is needed to create an effective science education programme in the city. Equally important is the need to establish an infrastructure that will support the programme.

To be effective and stronger, science education programmes need to have the support of leaders from the school administration and from the school board in a Seed City, as well as the support of leaders and different groups in the community. Keeping parents informed about the science programme is an important part of building community support.

Other strategies to strengthen community support include creating partnerships with local colleges and universities, business and industry, museums and science centres, and other organisations and institutions. On the didactic level, children in a school may want to make a concrete experiment by using a university laboratory; another example could be a local nature worker asking children to help him or her analyse city's river water by taking samples. As citizen and young "scientists", children should be involved in city concerns (pollution, traffic, disabled people, etc.) and try to put forward scientific solutions.

On the political level, institutions should become progressively involved in the development of a science education local curriculum. For example, scientists and science educators can team up with teachers to lead professional development programmes. Another example is that of a corporate leader, who may serve as a spokesperson for science education reform with the business community.

Working together, these individuals and groups can form partnerships that will improve the quality of the project and ensure a sustained commitment to science education. This partnership may be formalised through an agreement signed by all partners for the whole duration of the project, thus guaranteeing its continuity. *Please see annex 4 for a suggestion regarding such document*.



Starting the project in the city



The first year

These guidelines can be used after the first year but, of course, some strategies have to change over the years. Some of the activities have to be excluded and other activities have to be included. The main milestones for the Seed City are presented on page 22. The development of the project will have two main blocks: the school work and the community work. This is only an artificial division, given that in practice both aspects will be closely intertwined.

School work

The school work will then have the following sequence:



Community participation

Some ideas to enhance community participation

- Make a list of all possible actors to involve in the project, and possible contributions to it. Involve different actors
 in the state of the art process.
- Public presentations. Invite teachers, parents, entities and companies to public debates on science education.
- Show what the children are doing to the community. Talk to neighbourhood associations to organise small exhibitions in their centres.
- Make people enjoy science. Involve teachers in organising "fun science" activities during popular festivals (not only "Science weeks").



Other points to be aware of:

- A. Relationship with city council.
- **B.** Relationship with national coordinator.
- c. Relationship with other European local coordinators through E-Centre.
- **D.** Relationship with European Seed City coordinator. P.A.U. Education is in charge of Seed City coordination. Local coordinator will receive several phone calls to be sure that the process progresses appropriately.
- **E.** Visibility of project in the city.

Science education community board meetings

As Pollen is a participative project, teachers, children, scientists, parents, etc., should have a presence at the Seed City community board meetings:

- By making concrete, official written demands to some stakeholders to help them develop their experiments.
- By collecting suggestions for community activities in the schools that can be presented by teachers or some children.
- By the presence of children, parents, or the city council permanent representatives on the Local Board (in this case, experience shows that their numbers should be high to make them feel more confident; some group dynamics, led by educators, will make it easier to motivate the children to come up with ideas).

	SOME SUGGESTIONS FOR THE ORGANISATION OF MEETINGS
Reserve place	
Think of meeting contents and communication issues	 There should be a balance in time given to different topics A meeting should not go on for too long (no more than two hours, and even less if many children are present) Some group dynamics can help break monotony and facilitate communication
Send a letter	• A letter with main points to be dealt with in the meeting with time enough to introduce changes if suggested
Prepare materials and information in advance	 Make a list of things needed and prepare them in advance
Prepare the place	Be sure you have all material availableDepending on the time, prepare some snacks
Conduct the meeting	 The coordinator should prepare in advance participative dynamics for the meeting, although it is necessary to be flexible should these need changing Coordinator manages the meeting; avoid excessive intervention of some stakeholders Conflicts can be redirected by trying to find common points in different opinions Reach some clear conclusions at the end; read them and make sure everybody agrees



Organisation of Community activities

Objectives:

- Motivate schools.
- Communicate to the city Pollen's results.
- Engage citizens and stakeholders in science education.

Community activities may be at different levels, from a single one-school-based outdoors activity to an exhibition at the town hall to be visited by anyone. One of the main dates to be aware of in the calendar is Science Week, usually celebrated throughout Europe. That week can provide a good chance to show children's discoveries and work.

The coordinator and trainer can suggest to the Local Board some of these activities and motivate some stakeholders or schools to organise them; committees should be formed to help them – even if people on the committees do not belong to the Board.

The coordinators' introductory activity

After the constitution of the science education local community board, the development of an initial evaluation (state of the art) and the definition of common goals with local stakeholders, schools and trainers, coordinators continue developing a long-term and short-term strategic plan for the science education programme.

Some questions to be answered by the coordinator with the trainer

- Which learning units should the programme start with and continue with?
- Planning: How many teachers will participate in the programme? How are they elected?
- Organising the introductory training. Who will participate? Is there an opportunity to market the science programme for universities, local companies and municipal councils?
- Organising the in-service training, e.g. unit training.
- If necessary, organise the material support. Premises for material handling. Who performs various tasks? Who manages transport?

Coordinator plans and organises the training

The Seed City should recruit trainers as soon as possible. Experience has shown that teachers who are well trained to teach inquiry-based hands-on science seem to be successful trainers for teachers. It is important that the trainers and the coordinator work closely together when it comes to teacher training and also have connections with the educational research field.

Professional development of a school development programme in science education

The professional development programmes described here do not focus on the content of the professional development. This is presented in *Guide for the Seed City Trainer*. Here, we focus on the coordinator's role in managing the professional development programmes.



Presentation of Pollen-Introductory training for teachers and other stakeholders

This introductory training will be designed by the training and local coordinators, in conjunction with the national coordinator.

The introductory training objectives

• The teachers reflect on attitudes towards science subjects and technology, test work methods used in the learning units, orient themselves on the basic concepts of the science education programme, and learn to understand ways in which the programme supports the schools participating in Seed City.

Target group

- The primary target group is new teachers in the Seed City.
- The secondary target group is other participants in the Seed City programme, for example, headmasters, school officials, chief education officers, development coordinators, representatives from local companies, universities, etc.

Presentation-Introductory training content

- The teachers reflect on what characterises a pleasurable and meaningful learning of natural science, as well as discuss issues regarding the school curricula objectives in natural science.
- The participants test work methods by actually performing experiments from the learning units, as well as considering and discussing what the pupils may learn through performing these experiments. They also demonstrate how the objectives in the learning units are attached to the objectives on the national level.

The Pollen project and local science education programme is presented

- The learning units, education, curriculum management, programme coordination, possible cooperation with companies, universities, etc.
- The chief education officer and school officials, among others, participate in presenting the Seed City objectives.
- Local representatives from companies and higher education demonstrate their view of learning natural science/technology. They present a subject that is relevant to education in natural science/technology with reference to the learning units, and present ways in which the schools, industry and universities or colleges can participate.

Time

Introductory training consists of 3-4 hours.

Some recommendations for planning an introductory training programme

- Testing new work methods in the learning units: reflect on attitudes and work methods related to the natural sciences.
- Presentation of the local science education programme: The learning units, education, the coordinator's assignment and management of teaching/learning materials.
- Introduction of local partners: Participation from universities, companies, chief education officer, etc., approximately 45 minutes.



Implementation

The coordinator is responsible for the introductory training. The coordinator and a trainer may implement the training together. As a matter of course, the educator and the coordinator cooperate in all parts of the implementation.

CHECKLIST ON INTRODUCTORY TRAINING				
The coordinator	The trainer			
 The coordinator makes initial contact with the trainer well ahead of the scheduled training. 				
 Arrange/book premises with standard equipment and according to requirements set forth by the educator. 	 Inform the coordinator about specific requirements for premises, such as furniture, audiovisual equipment, and anything needed for conducting the requisite experiments. 			
 Before the introductory training session, inform the teachers/participants via invitation or equivalent about the agenda and timeframe of the training. Invite chief education officer, school officials etc. to the introductory training. Invite local companies and university leaders and educators to participate in the introductory training and cooperate in the Seed City science education programme. 				
• Inform the trainer before the training about time schedule, etc., along with other participants and/or guests.	 Ask for number of participants. Adapt the training to the needs, experience and interests of the group attendees. 			
 The coordinator is responsible for the schedule during the introductory training. Produce an information leaflet on local activities. The information leaflet is distributed to the teachers at the introductory training (or thematic training). During the introductory training, the coordinator should explain clearly how the science programme works in the Seed City, and should assist with the training. The coordinator is responsible for ensuring that an evaluation is carried out. 				

Standard equipment, including audiovisual equipment, normally available at training premises: premises suitable for performing experiments and with access to water.

- Whiteboard/ordinary blackboard, felt pens, etc.
- Over-head projector or data projector.
- Flip-chart with a stand.
- Tape, sticky-tack.

Produce an information leaflet on the science education programme in the Seed City. The information leaflet is distributed to the teachers at the introductory training. Some suggestions for the content of the information leaflet:

- Background and description of the science education programme, for example, training meetings during the school term, material management, etc.
- Define the delegates from the Seed City participating in the programme e.g. headmasters, school officials, person responsible for development, etc.
- Inform about what is included in the coordinator's assignment.
- Try to facilitate cooperation with companies and/or cooperation with universities.

-	
	H.

	EVALUAT	ION OF INTRODUCTORY	TRAINING	
NTRODUCTION TRA	INING 2006			p.o.l l e.n. 🌟
eed City of				
 Write what kind of 	teacher you are:			
 I have received a g such as informatio 	eneral view of how the n about the unit trainir	programme is organised for and how the learning ur	or the coming autumn i nits and instruction mat	n my municipality, erial will be
distributed and org	anised. <i>Mark with a cro</i>	ss on the line.		
0	()	()		
Totally agree	-	-	-	Totally disagre
What basic ideas ir	the science programm	ie do you think have becon	ne clearer during the int	roductory training?
In a general sense,	I know the coordinator	's function in my municipa	ality. Mark with a cross o	n the line.
Totally agree	O	()	()	Totally disagre
• What additional qu	uestions would you like	to ask the coordinator?		
Tips and advice for	upcoming introductor	y training:		
inpo and advice for				



Unit training for the teachers

Regardless of which learning units are used, unit training for the teachers is fundamental so that teachers have the possibility to prepare for hands-on teaching of inquiry-based science. An important process is to decide the goals for the unit training and which contents the unit training should cover.

CHECKLIST, UNIT TRAINING				
The coordinator	The trainer			
 The coordinator makes initial contact with the educator. Make contact well ahead of time. 	 Send letter from the trainer to participating teachers. Suggestions for letter content: Who you are and your background. Why you and your pupils work with the learning units. Why you work as a trainer. The objectives for the thematic training day. Describe the programme you have chosen as the assignment. Your expectations for the day. 			
	• Send letter from the trainer to participating teachers, via the coordinator.			
• Make sure that complete experimental material and manuals are available well ahead of time.				
 Arrange/book premises with standard equipment, and according to the educator's requirements as well. Arrange for coffee, lunch, and possibly, refreshments. 	 Inform the coordinator about specific requirements regarding, for example, furniture, audiovisual equipment and other special equipment. 			
• Give the educator general information about the participating teachers' earlier experiences of natural science.	 Make inquires about the participating teachers' earlier experiences. Adapt the programme and materials to the group's background. 			
 Inform the teachers via invitation about the thematic training day and time schedule and whether lunch is included. 				
• Distribute letter from the educator to the participating teachers well ahead of the thematic training day.				
 Inform the educator before the training day about the time schedule, as well as any other participants who may attend and how many there are. 	• The trainer is responsible for the time schedule during the training day.			
• The coordinator is present and assists during the thematic training.				
• The coordinator is responsible for ensuring that an evaluation is carried out.				
	 After the training day, send a report to the municipal coordinator (at the latest, one week after completed training). 			

Standard equipment, including audiovisual equipment, normally available at training premises:

- Premises suitable for performing experiments
- Access to water (does not apply to all programmes)
- Whiteboard/ordinary blackboard, felt pens, etc.
- Over-head projector or data projector
- Flip-chart with a stand
- Tape, sticky-tack

Continuous professional development for teachers

Teachers are also given repeated opportunities to share their classroom experiences during the school year. This professional development is carried out in collaboration with local trainers, industry representatives, colleges and universities. Focus on more in-depth knowledge about inquiry-based science materials, science concepts and phenomena, methods for assessments, teaching strategies to be more student centred, questioning strategies, using science to improve language skills, etc.

University courses for teachers

In collaboration with colleges and universities, the science programme designs university-level courses aimed specifically at the teachers in Pollen with focus on the scientific concepts and phenomena built into the learning units. These are courses that cover more in-depth content knowledge.

Training for trainers

Develop a training programme that addresses the educators participating in the programme.



Timetable for the Seed City

M35	Annual report					Local evaluation
M30		Training sessions (2-3)			Local dissemination	
M24	Annual report	Key issue implementation				
M21						Local evaluation
M18		Training sessions			Local dissemination	
M12	Annual report			Materials to schools		
6W	Evaluation initial data collection	Strategic plan for the city	Training sessions for teachers	Resources: translation & adaptation or creation		Local evaluation
M5	Evaluation protocols ready		Tools publication on website: Guides for coordinators, trainers and teachers		Booklet available in national languages	Resources & material database
M1 to M4	Constitution of the Seed City Community Board	Cross visits	Local presentations	State of the art	Booklet translation in national languages	Public awareness about Pollen

NOTE: M= Month.



Annex 1. The NTA programme

A Swedish School Development Programme for Learning and Teaching in Science and Technology. Compulsory school, Kindergarten - grade 9



Abstract

The NTA programme

The NTA programme (NTA is the Swedish acronym for Science and Technology for Children) has been a regular programme since 2004. It was run as a project from 1997-2003 by the Royal Swedish Academy of Sciences and the Royal Swedish Academy of Engineering Sciences. The NTA programme has two divisions: NTA P&S (*NTA Production and Services*) and NTA R&D (*NTA Research and Development*). NTA P&S is a cooperative economic association, started by the participating municipalities. The academies established a new project, entitled NTA R&D.

NTA PoS provides curriculum units consisting of guides for teachers and students, experimental materials and services, professional development programmes, e.g. training for NTA trainers, seminars and conferences for NTA coordinators, follows up and assesses the units and the services, markets the NTA programme and has an ongoing network with members of the association.

NTA R&D adapts, improves and develops new and existing units on the basis of research and experiences of participating teachers and students in the NTA programme. A research programme is being designed for practice-orientated research in educational science, using the NTA programme and the participating municipalities as an arena for such research.

In February 2006, 54 municipalities and 10 independent schools were members of the NTA Programme, including approximately 3,000 teachers and 48,000 students.

The Swedish NTA-programme and its framework

The US National Academy of Sciences, in cooperation with the Smithsonian Institution, has founded the National Science Resources Centre (NSRC). Its aim is to improve the learning and teaching of science in the school districts around the USA.

The Swedish NTA programme is to a large extent developed and organised around a number of components (e.g. curriculum development, professional development, organised material support, community and administrative support, assessment, etc.) that were inspired by the NSRC. Some details of the original concept have been changed and adapted to Swedish circumstances and the Swedish National Curriculum and syllabuses.

Curriculum development

The NTA programme is presently centred on 15 thematic experimental units. The NTA units are translated and adapted from the American *Science and Technology for Children curriculum*. Students make inquiries while discussing and documenting what they do and their findings. The teaching sequence often involves brainstorming, making predictions, observing or performing experiments, and applying knowledge to contexts outside school. Units also help the teacher to follow what students learn. A unit takes 10 to 12 weeks to complete and consists of a number of assignments connected by a common theme. All units are tested in several versions in multiple classrooms.

The Swedish adaptation of NTA units

Although the American and Swedish systems are quite similar, there are differences in culture and pedagogic approach that have to be taken into account in the adaptation of the programme. Consequently, the success of the project to some extent



depends on the adjustment of the text of the manuals and the illustrations to better adapt the activity in the Swedish classrooms. Thus, although there are no fundamental differences between the STC and the NTA units, the ways in which they are presented and used will differ in some respects.

Organised material support

Another component is the organised material support that supplies the teacher with all the material needed for a unit (experimental material and written instructions for the teacher and sometimes also for the students). When the unit is completed, the teacher returns the material to a centre, where it is supplemented, and is then ready to go to another class.

Continuous professional development

High-quality professional development is essential for effective science education. As teachers' understanding of science and pedagogy increases, they become more able to engage students in the sciences.

Local development support

In the participating municipalities, the NTA programme makes it possible to create a long-term plan for school development, also involving the local industry and institutions for higher education and research. In each participating municipality, a local coordinator for the project is appointed. Municipalities also evaluate the progress of the NTA project locally.

Services - support to school development

The Professional development programmes in the NTA Programme

Continuous professional development for teachers

Every teacher using a unit completes one day of training in that thematic area. Teachers are also given repeated opportunities to share their classroom experiences. Professional development is also carried out in collaboration with local educators (experienced teachers), industry representatives, colleges and universities. The one-day unit training gives teachers an understanding of an NTA unit through work with the unit assignments (lessons), consideration of didactical issues, and emphasis on observation, reflection and documentation as development tools.

University courses

In collaboration with the Stockholm Institute of Education and Linköping University, a 5+ 5 point university-level course, entitled Science and Technology, has been created. Among other things, the course involves planning and carrying out a local development project for NTA instructors, prospective NTA instructors, coordinators and teachers.

At Stockholm University, in the Department of Physics, a partly web-based, 5 point course entitled "Physics – how things work" was initiated in 2003; the course is aimed specifically at NTA teachers. During 2003, Linköping University offered a university course specially designed for NTA teachers. The teachers studied the scientific concepts and phenomena built into the NTA units.

The professional development programme entitled The Leadership Institute for NTA trainers was conducted to meet the municipalities' needs for local NTA trainers who would train their colleagues and support the municipalities' work with continuous professional development, and who would help municipalities make use of the possibilities for development inherent in the NTA programme.

The Leadership Institute for NTA trainers took four days, as well as requiring time for reading, working and planning. The goals of the course included: understanding why the schools teach science and technology, understanding the role of the experiments, acquiring deeper knowledge of and insight into the NTA concept's basic ideas and qualitative aims in relation to the national curricula and syllabuses, and understanding the issues of adult education.

Professional development for NTA municipality coordinators

The NTA coordinators are key persons in the municipalities, particularly as developers of teaching and learning in science and technology, working at a central level in the municipalities. The NTA coordinators participated in two two-day seminars during 2004. Important aims of these seminars are to build networks in which participating municipalities could share experiences, as well as to develop and improve the project strategies for long-term school development. In close collaboration with the NTA coordinators, the project also worked specifically on elaborating, anchoring and formulating its strategy for school development. Another important focus of the seminars was to increase the understanding of the strategies to improve professional development for teachers locally in each municipality.

Products - support to school development

The NTA project finished the adaptation of 14 units in June 2004. These units have been adapted and field-tested in three versions. Each unit consists of: Guide for teachers, Guides for students, Experimental material for 30 students, Professional development – one day for each unit.

Table 1	1. NTA	units	now	in use	4
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Grade	NTA unit	The students investigate		
K-2	Solids and Liquids	solid objects and liquids.		
K-2	Comparing and Measuring	different methods of measuring length.		
K-2	Changes	changes of everyday substances.		
1-2	Balancing and Weighing	size and weight by making a scale.		
1-3	Soils	soils and decomposition.		
2-3	The Life Cycle of Butterflies	study insect biology by raising butterflies.		
3-5	Plant Growth and Development	the life cycle of plants by growing plants.		
3-5	Electric Circuits	how circuits work and can be used.		
4-5	Chemical Tests	the properties of substances to identify them.		
4-6	Motion and Design	mechanics by making a toy car.		
5-6	Measuring Time	astronomy and make time measuring device		
5-6 (7)	Food Chemistry	the basic nutritive substances in food.		
5-6 (7)	Floating and Sinking	what causes floating and sinking.		
6 (7) Magnets and Motors		different kinds of magnets and their use.		

NTA in grades 7 – 9 (Secondary School)

During 2002, the project began a preliminary study of NTA in grades 7-9 (secondary school). The aim was to see how services and products can be designed to support continued development of teaching and learning in science and technology in these grades as well. The unit has been field-tested and improved continuously from 2003 until now. The final version is to be distributed in August 2006.

Evaluation and follow-up

Evaluation of the NTA programme is carried out continuously. Many diplomas and several master's theses based on the NTA programme have been written and some professional researchers are actively working in the field. The results so far are overwhelmingly positive. The University of Linköping carried out two evaluations of the NTA programme during the academic year 2001/2002 and 2002/2003. NTA is a great idea. We don't do things just out of boredom but because we want to learn and at first we got to use our imagination and that was fun. Evaluations of pupils' and teachers' learning and development in the NTA programme, Science and Technology for All.

Here are some conclusions from the summary of the evaluation.

- Pupils and teachers feel happy with the NTA programme. The material fills a gap and teachers and pupils have great opportunities to develop within it.
- The pupils have an opportunity to learn about and understand science, not just facts but also processes and ways of seeing, discovering and describing. They develop their ability to communicate about science with the help of words and terms.
- Among the participating teachers, science is no longer seen as particularly difficult and demanding and their view of the area has been broadened. Many teachers testify that they have changed their way of asking questions and talking to the children in the classroom. They now ask more open-ended questions. Here we feel we must advise caution. Questions and instructions that are too open-ended can be very confusing to the pupils, and it is essential that the teacher be present and able to support and sum up.
- The collaboration between teachers in the working teams can be developed in a similar fashion in the future. The NTA concept has the potential for development that can be put to better use in the future. Our opinion is that the teachers in future projects should be given more time to discuss and learn more about what science means, about what the essence of science is.

Closing remarks

The municipalities, teachers and students appreciate the NTA programme as a whole. The municipalities make use of the NTA programme as a learning support for students and a development support for the teachers. To a great extent, the NTA programme helps the municipalities reach the goals specified in the curriculum and the syllabuses. Each municipality uses and develops the NTA programme in its own way and in terms of its own goals, prerequisites and needs.

In reports and meetings the municipalities reported:

- that the NTA coordinator is a key person in every municipality
- that the ongoing professional development of the teachers is a central part of the NTA programme
- that work to create ties is crucial to how the NTA programme will develop in the municipalities
- that establishment of collaboration with industry representatives and higher education bodies is an important part of the NTA programme
- that regional networks of participating municipalities enrich the development of the NTA programme in the municipalities.

Annex 2. Presentation of a Pilot Centre in France

Ecole des sciences, Bergerac

The *Ecole des sciences* was implemented in Bergerac (in the southwest of France) in 1996. Since then, it has enabled the training and coaching of dozens of teachers in the school district, and has become a model for other pilot centres in France. The following document is a short description of its activities and resources.

The École des sciences, coaching and management structure of a local system

To implement a renewed scientific education in classes, training teachers of the *École des sciences*, with the Education District Inspection of Bergerac, created a coaching system for teachers and schools of the town. They used this same system afterwards for the benefit of surrounding rural schools.

For Bergerac's schools, this coaching began in the experiment room of the École des sciences.

From 1997 to 2001, training teachers held in this room all the second and third cycle classes of the town. Each class came for 10 to 15 two-hour sessions. During the first sessions, the training teacher led the activities while the class teacher observed. The latter could then familiarise him or herself with the inquiry-based process, the use of the equipment and the experiment exercise book. Progressively, he or she took part in the activities with help from the training teacher. Now, training teachers still guide teachers who come to the *École des sciences* for training, and sometimes visit them in their classrooms to help. They still receive experienced teachers at the *École des sciences* in order to devise new resources, or receive teachers newly appointed to the schools of the town who wish to familiarise themselves with the process and the contents.

For young pupils from pre-school who needed quick changes in their activities and who would have had problems coming to the *École des sciences*, the training teachers went to visit them in their classrooms, in order to guide their teachers in the same way.

At the same time, to ensure the transfer process in the classes from the *École des sciences*, the training teachers advised the schools for the purchase of basic equipment and the implementation of experiment rooms based on the *École des sciences* example. They also created and still manage the borrowing system for the equipment and document kits for the classrooms.

They also regularly visit schools to help build new projects related to sciences, implement the experiment exercise book for whole classes, and plan activities for different cycles.

For rural schools surrounding Bergerac, a new system was created, because it was impossible for whole classes to come to the *École des sciences*. The idea is to use the already existing school networks, and to organise, in each network, regular meetings with the teachers. Since 2002, the *École des sciences* training teachers have visited each network several times in a school year. During each meeting, they explain one working theme and its teaching process. They give some equipment to the teachers. Between two meetings, the teachers will work upon the theme with their classes, in order to discuss with the training teachers the problems they encounter. In each network, a voluntary teacher manages the coordination and contacts with the *École des sciences*, and manages the material kits. On the website, a part has been allocated to each school network to facilitate contacts between training teachers and teachers of the school network.



The École des sciences and its international action

As a La main à la pâte pilot centre and partner of the Académie des Sciences, the École des sciences in Bergerac receives foreign visitors. They come to get acquainted with this specific system and to observe science sessions in classrooms. The training teachers of the *École des sciences* have also been asked to organise Main à la pâte training courses in Brazil, Argentina and Cambodia, which created new links between local teachers and the École des sciences.

Assessment and prospects

After seven years, the efficiency of the *École des sciences* is proven: in Bergerac, more than 85% of the classes are regularly taught sciences according to the principles of La main à la pâte and the new curricula. In the nine schools of the town, four are working almost on their own. The other five are still in need of some coaching, depending on the years.

For the *École des sciences* team, it is now important to strengthen the school networks around Bergerac and design actions for the whole Dordogne region. For the moment, the training teachers of the *École des sciences* are needed by other districts, which want them to come and explain the system implemented in Bergerac, or to show the resources produced by the École des sciences. Moreover, all the documents designed in Bergerac (activities for the classroom and training documents) are published online and can be downloaded from the École des sciences website.

The *École des sciences* was founded in 1996, as a joint initiative of the municipality and the Local National Education services of Bergerac. They wanted to help the town's primary schools to implement a new way of teaching science, according to principles designed by La main à la pâte. This town of 30,000 inhabitants, in the south of the Dordogne department, has nine primary schools and nine nursery schools, employing 125 teachers for nearly 2000 pupils.

When it was created, the municipality of Bergerac donated the premises of a recently closed school and paid 21,000 euros for its rehabilitation. The National Education Board assigned two full-time teachers and one teaching assistant. One of selected teachers has a background in natural sciences, the other has a background in physical sciences. In 2000, the École des sciences was given the opportunity to become part of La main à la pâte pilot centres network, recently created by the Académie des sciences with the financial support of the Interministerial Delegation to the City and Urban Social Development. As such, it received a 6,000-euro subsidy.

Now, the *École des sciences* is a departmental resource centre for scientific teaching, as well as a piloting and leading structure for the whole local school teaching support system of Bergerac. It is under the authority of the Education District Inspector in charge of science. Its consolidated budget is about 62,500 euros. This budget is split between the salary of the National Education staff (about 56,400 euros) and general operational costs (6,100 euros) and it is paid by the municipality, which also supports the transport of pupils to the *École des sciences*. A 1901 Law Association, "Les amis de l'*École des sciences*", was founded in order to receive financial aid.

The Media Library

A place for teachers and pupil information

Right beside the experiment room, the media library has approximately 500 documents, papers, audio tapes and videos about science and technology history, scientific phenomena, pedagogic and didactic science. Teachers can come individually, in order to consult and borrow documents for their personal work or to use with their classes. They can also come in with their pupils for research purposes. The classes received in the *École des sciences* are always given time to work in the media library, to research a scientific question or to check a result obtained during an experiment.

Since 2001, this media library has been a branch for the Teaching Resources Department Centre of Périgueux, which is in charge of enriching the library.

The Experiment Room *A training tool*

This room was designed to give teachers a model of research and inquiry-based process implementation in a convenient place with convenient tools. Since 1997, this room has received, each year, about thirty different classes with their teachers, coming for several two-hour sessions, in order to learn about science with training teachers. It also receives teacher groups for training. On an annual basis, it is occupied for 600 hours. It receives about 150 teachers and 750 pupils.

The room plan chosen was used as a model for the creation of other experiment rooms in Bergerac's schools. Currently, as a result of a rehabilitation programme for schools launched by the municipality, six out of nine schools have an experiment room. Four-pupil large tables can be used to experiment in small groups and also to write and read documents. A forum space is dedicated to meetings between teacher and pupils, where they can discuss, raise ideas and compare results. A "common" table is used for the current equipment and documents. A fixed board is used to write down elements for the session or to pin up the different groups' work. A mobile board is used at the end of the session to summarise the different work and to recall previous work when starting the following session. Along the walls are shelves to store equipment as well as cultures and breeding.

The Experiment Library

A place set aside to manage the equipment

In this place the centre's equipment is stored, as well as the 35 material kits. These kits were made with the teachers and tested within their classes. They cover all the themes in the science and technology curricula. Each set theme contains the entire equipment for one class, documents for the different teaching sequences and documentation about scientific questions on the theme.

Priority is given to Bergerac schools for borrowing the material kits, for a six- to eight-week period. Kits can also be borrowed from network schools near Bergerac. Reservation is made on the *École des sciences* website. Each material kit is generally borrowed six times during the school year. Creation, maintenance and shipment of the kits is carried out by the *École des sciences*. Thanks to this loan service, schools are do not need to deal with equipment management. It also gives the municipality, which is responsible for school equipment, the opportunity to use its investments as well as possible.

The Website

To publish the Centre's productions

In 1999, the *École des sciences* created a website, linked to the national *La main à la pâte* website. This website gives the *École des sciences* an opportunity to publish its own resources beyond Bergerac. The address is: http://www.perigord.tm.fr/~ecole-scienc

For now, the website has four distinct parts:

- Activities. This part proposes teaching sequences on the different standard themes, with complete equipment lists.
- Teaching Resources. This part gathers instructions for the activities, with more information and bibliographic references about *La main à la pâte* and the standards, documents about the experiment exercise book and its use in classrooms, documents about the experiment room and how it should be laid out, as well as equipment lists with detailed prices.
- Exchanges. This part gathers cooperative projects such as 'l'Europe des découvertes', 'Sciences en ligne'. It also gives users the opportunity to register on a departmental mailing list, or to put questions to scientists.
- Networks. This part gathers the minutes of the meetings of the Departmental Piloting Committee to the reforming plan for scientific education, the official texts, as well as an explanation of the system implemented in Bergerac.



Annex 3. Presentation of a Pilot Centre in France, Perpignan La main à la pâte's Pilot centre in Perpignan

As early as 1998, the Pyrénées-Orientales region became involved in the La main à la pâte operation, setting up a programme to support renovation efforts in science education for all of the primary schools within its perimeter. Located in the South of France, the department is home to a large metropolitan hub of 110,000 inhabitants, Perpignan, encased in a rural setting. Around 35,700 children are enrolled in primary education, in 122 pre-schools and 183 primary schools. Altogether, 2,000 instructors are responsible for them. Since 2000, the Pyrénées-Orientales region has been part of the La main à la pâte pilot centre network. The system is built on two essential components: a network of partners deeply involved in supporting science education in the classroom; and the provision of "resource" people in the sciences.

The network of partners was established in 1998, through a convention signed by the School Board, the University of Perpignan and the University Teacher Training Institute in Montpellier (Perpignan site). Over the years, other partners joined the core members, including: the laboratories at the National Centre for Scientific Research (CNRS) present in the department (responsible for the Odeillo solar oven, the Prehistoric Era Museum in the Tautavel, the Marine Reserve in Banyuls-Cerbère, the Natural History Museum in Perpignan, etc.), science-based associations, the local Educational Documentation Centre (CDDP), the local authorities (cities of Perpignan and Pyrénées-Orientales General Council).

In 1999, a "science" project leader with powers at the departmental level was appointed to give momentum to the initiatives under way and help share practices and resources. In all nine constituencies, "reference" science instructors were established. Their tasks were numerous: helping schools set up science projects, providing occasional support to colleagues in carrying out educational programmes dedicated to science, and managing material temporarily housed by the constituencies. When appointed, they received an investiture letter, describing their role with the schools and their colleagues. During the time of their mission, they were granted a moveable quarter-time paid leave.

The system's steering committee is composed of scientific partners and scientific "resource" people. Headed by the School Board Director himself, it plays a major role in coordinating and regulating the system, launching new initiatives and projects and organising science-related events.

System Components

Supporting Science in the Classroom

Support can be provided in a variety of forms:

- Through students. Every year, volunteer students enrolled in third- or fourth-year biology degree programmes at the University of Perpignan provide their help for eight three-hour sessions. The work they perform is accepted as contributing to university credits, as part of a pre-professional programme recognised by the IUFM. Before becoming involved in the classroom, the students are given a 20-hour training programme in science education. A science support charter has been drawn up to specify the respective roles of the students and teacher in the classroom.
- Through the educational departments of local science institutions. Run by instructors on secondment, the educational • departments at local science institutions are on hand to help primary schools put together projects in their fields of activity and research. The Tautavel Museum offers activities that put children at the heart of the scientific approach to prehistory. The Odeillo Solar Oven holds live events on light. The Marine Reserve in Banyuls-Cerbère runs workshops on marine ecosystems and pollution in the marine environment. The Natural History Museum in Perpignan has set up workshops on water, tectonics and volcanism. The respective departments provide instructors with documents to complete their courses. They also organise tours for children, which help either launch or conclude the several weeks devoted to a given topic in the classroom.

1

Training and Instructional Support for Schoolteachers

Since 1999, the sciences have been cited as one of the top priorities in the Annual Training Plan in the Pyrénées-Orientales region. Every year, two three-week training sessions are offered to the instructors. The sessions focus on such topics as delivering presentations, running workshops and experimenting using existing resources. Twenty to twenty-five instructors attend each session on a voluntary basis. Since the start of the operation, around 300 instructors, or just over 15% of the instructors in the department, have received long-term training in the inquiry-based approach and the scientific content in the curricula. IUFM professors and school counsellors jointly run the sessions.

In each constituency, every year, instructional events are organised: the three three-hour sessions are open to 20 to 25 instructors. The sessions are scheduled over the year so that the instructors can implement, between each session, what they have learnt and subsequently come back to discuss the problems encountered with their colleagues and training coordinators. Instructor demand for taking part in such sessions has grown considerably, even doubling in certain constituencies. In any given year, 180 to 230 instructors take part in the instructional training programmes on science and technology. Classified as short-term ongoing training, they are run jointly by "reference" instructors and teams at the constituency level.

Lending educational materials and tools to the schools

The department's Science Resource Centre, housed in the Perpignan CDDP, lends materials rarely found in schools for two weeks to one month: telescopes, microscopes, computer-operated microscopes, etc. It also lends, for six-week periods, educational toolkits, inspired by the "Insight" kits used in the United States of America, which contain educational documents and equipment on a specific topic.

In each constituency, materials (soldering tools, binocular magnifying glasses, microscopes, etc.) and educational teaching kits (electricity, temperature, magnetics, solar power, etc.) can be borrowed from the "reference" instructor. From the viewpoint of the system management, the aim is not to offer "turnkey" resources, but raise awareness about them so as to bring out needs and motivate the schools to buy basic material, while encouraging instructors to create their own educational tools.

Information Tools for Schools

A website (Lamap 66) was created in 2001, arranged in six sections: institutional initiatives, scientific activities in the classrooms, network players, resources and equipment available at the department level, group-based projects (presentation, registration procedures and opportunities for work and sharing), and science education news in the Pyrénées-Orientales region. The site receives around 1,000 hits per month. One person is employed part-time for maintenance. The site is hosted by the CDDP. A newsletter, Scientissimo, published by the Academic Inspectorate, comes out twice a year. It reports on the past and upcoming events, describes experiments carried out in the schools, and announces new productions present on the Lamap66 site.

High-Profile Science Events

Each year, four or five lectures are given by renowned scientists (physicists, astrophysicists, biologists, geneticists, etc.) to the teaching population. Every two years, since 1999, a four-day event has been held at the Perpignan Convention Centre, exPOsciences. The event gives the public a look at the work carried out by schoolchildren from pre-school to secondary schools, in the form of interactive workshops. Some 40 workshops were held in 2003 and 2005, with nearly half of the projects carried out conducted by children in primary school. The CNRS laboratories and partner associations, also involved, hold live events for schoolchildren. In 2003 and 2005, exPOsciences opened its doors to nearly 4,000 young people from across the department, thanks to the free transport services provided by the City of Perpignan and the local transport council.

Lastly, as part of the Science Festival, a "Science Village" offered Perpignan schoolchildren the opportunity to meet with scientists, and a "Science Caravan" stops at a number of lower secondary schools in the department, offering children from the neighbouring primary schools the opportunity to attend live science events.



International Initiatives

As a pilot centre for La main à la pâte, partner to the French Academy of Sciences, the department sometimes hosts foreign delegations. Instructors and inspectors from Chile and China have come to learn about the system and attend science sessions in the schools. The Pyrénées-Orientales pilot centre also maintains steady relations with Spain, through the P.A.U. Education association. As part of this effort, exchanges take place between classes and instructors. Lastly, members of the steering committee have held training programmes in the inquiry-based approach in China, Morocco and Brazil.

System Funding

When the operation was launched in 1999, the Pyrénées-Orientales Academic Inspectorate was given around EUR 23,000 by the French Ministry of National Education (DESCO) to implement the Reform Plan on Science and Technology Education in Schools, and around EUR 7,600 by the City of Perpignan, which wished to be involved in the project. The Academy of Sciences, using the funds allocated to it by the Interministerial Delegation on Cities, paid the La main à la pâte pilot centre 8,570 euros between 2000 and 2005. Those subsidies helped buy equipment, fund the first training sessions and set up the website. Since that time, the Academic Inspectorate has provided for the bulk of the system's operating costs on its own, from training sessions to annual educational events, the full-time position for the department's "science" project leader, the part-time position for the assistant instructor responsible for the website, and the guarter-time paid leave for "reference" instructors. The Public Interest Grouping/City Contract allocates around 3,500 euros to Perpignan's schools in the priority educational zone that operate science projects. The General Council, meanwhile, provides, for each class in the department, two trips per year to educational sites. Perpignan University, the scientific institutions and partner associations, support science in the classroom by using their own funds.

Appraisal and Outlook

The system set up in the Pyrénées-Orientales region has begun to bear fruit. According to the Academic Inspectorate, 45 to 50% of the department's instructors now teach sciences using the inquiry-based approach. Moreover, an increasing number of instructors call upon "reference" instructors for advice or resources, and an increasing number of schools make sure that they buy basic scientific equipment.

The current objective is to consolidate the work under way in primary education by maintaining a dynamic with regard to the sciences, thanks to the lasting involvement of all the partners involved and a network established between the zones in the department to provide assistance and support in close conjunction with the schools. It is also to support and develop initiatives for lower grades in secondary schools, whether organising inter-level training sessions or having lower grades of secondary schools take part in joint projects.

ANNEXES

Annex 4. Copy of the agreement used by the national organisation, NTA Production and Service and the municipalities

(The Seed City, Stockholm, is one of the municipalities in the NTA programme)



Cooperation agreement concerning Natural science and Technology for (Children) All (NTA)

Between, on the one part, NTA Production and Service economic association (hereafter THE ASSOCIATION) and, on the other part, the participating municipality (hereafter THE MEMBER), the following NTA cooperation agreement has been made.

- 1. In order to create a purposeful long-term local development for natural science and technology in schools, THE MEMBER participates as an actor in the network of NTA actors coordinated by THE ASSOCIATION. THE MEMBER undertakes to act in accordance with this agreement as well as the attached document entitled "NTA strategi för skolutveckling"/"NTA strategy for school development" (Attachment 2).
- 2. THE MEMBER appoints an NTA coordinator as a contact person for THE ASSOCIATION, which in turn appoints a contact person for THE MEMBER. Contacts between these entities are primarily made by the assigned contact persons. THE MEMBER is responsible for ensuring that the NTA coordinator is provided with means for carrying out the assignment in accordance with this agreement.
- 3. THE ASSOCIATION organises seminars/training, with compulsory participation, for local coordinators. If the coordinator is prevented from participating, THE MEMBER is responsible for ensuring that a substitute participates. THE MEMBER bears its representative's expenses when participating in these seminars.
- 4. As a part of the NTA work, THE MEMBER buys the NTA units, NTA material boxes and NTA manuals for the chosen NTA units. Purchases are made annually at a fixed price from a supplier selected by THE ASSOCIATION.
- 5. THE MEMBER is committed to always use the latest available version of the NTA manuals. As a member in THE ASSOCIA-TION, THE MEMBER undertakes to participate in the follow-ups, evaluations and pilot testing requested and stipulated by THE ASSOCIATION. Reimbursement is not payable by THE ASSOCIATION for this participation.
- 6. THE MEMBER must ensure that NTA teachers are provided with complete NTA material boxes and NTA manuals before each new work period.
- 7. THE MEMBER is responsible for ensuring that each new participating NTA teacher carries out an introduction training course, which shall be conducted by a person well-versed in the NTA programme. THE ASSOCIATION arranges contacts with introduction teachers before starting the first training year.
- 8. THE MEMBER is responsible for ensuring that all NTA teachers using a project for the first time participate in a day's training. The training shall be conducted by an educator who is approved by THE ASSOCIATION. THE ASSOCIATION arranges contacts with educators before the start of the first two training years. All MEMBERS shall gradually organise a local group of educators.
- 9. THE ASSOCIATION offers annually a 4-5 day basic training course for educators. THE ASSOCIATION charges each educator a course fee.
- 10. THE MEMBER is responsible for ensuring that the NTA teachers are provided frequent opportunities to develop relevant competencies and exchange experiences.



- 11. THE MEMBER strives to create good cooperation between different local and regional actors, such as local companies, local/regional higher education bodies, etc. THE ASSOCIATION may support this work.
- 12. THE MEMBER undertakes, together with THE ASSOCIATION, to market and recruit new municipalities/free schools to participate in NTA.
- 13. THE MEMBER undertakes, to the extent possible, to be a mentor for new municipalities/free schools. THE MEMBER and THE ASSOCIATION shall come to special terms of agreement in order to cover the costs of new member mentorships/cooperations.
- 14. THE MEMBER is entitled to lend or sell toolboxes and manuals to other members.
- 15. This agreement is valid from 2005-01-01 to 2005-12-31. If not cancelled in writing by 30 September at the latest, before the period of agreement has expired, the agreement shall be extended by one year at a time. A member terminating the agreement shall at the same time announce its resignation from THE ASSOCIATION.

When THE MEMBER ceases to be bound by the terms of this agreement with THE ASSOCIATION, the right for THE MEMBER to use NTA material boxes and NTA manuals ceases. The same applies to the termination of THE MEMBER's membership 1) when the termination is initiated by THE MEMBER, 2) when the member is excluded according to THE ASSOCIATION's regulations, or 3) if THE ASSOCIATION cancels the agreement due to considerable breech of agreement by THE MEMBER.

This agreement has been prepared in duplicate—each party is provided with one copy.

For NTA Produktion och Service	For Municipality/Free School			
Stockholm,	Date	City		
	Signature		Signature	
		Clarification of signature		
		Title		



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Text: Kerstin Reimstad Design: Mercè Montané Edited by: P.A.U. Education Muntaner 262, 3° - 08021 Barcelona (Spain) Tel.: (34) 933 670 400 Fax: (34) 934 146 238 www.paueducation.com

For further information

Ecole Normale Supérieure (*La main à la pâte*) Raynald Belay [raynald.belay@inrp.fr]

Tel.: (+33) 01.58.07.65.97 Fax: (+33) 01.58.07.65.91 Royal Swedish Academy of Sciences Karin Bårman [karin.barman@kva.se]

Tel.: (+46) 8 673 97 20 Fax: (+46) 8 673 95 45

P.A.U. Education Miquel Àngel Alabart [miquel.alabart@paueducation.com]

> Tel.: (+34) 933 670 400 Fax: (+34) 934 146 238 www.paueducation.com



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