The Fibonacci Project

DISSEMINATING INQUIRY-BASED SCIENCE AND MATHEMATICS EDUCATION IN EUROPE

FIBONACCI NEWSLETTER
ISSUE N° 03 - OCTOBER 2011

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Halfway trough the project

Fibonacci is starting a new school year, which will be rich in events, with especially the 5 training sessions on the common topics and the second European conference in Leicester in April 2012. Active twinning and tutoring between centres will help prepare the next phase of the project: the entry of 24 new players (TC3s).

This Newsletter focuses on Inquiry-Based Mathematics within Fibonacci, with insights into the role of the Scientific coordination for Mathematics (University of Bayreuth), the teaching of mathematics in early Childhood Education (University of Patras), the House of Maths in Vienna, the art of Inquiry and Discovery as part of an educational strategy (IMIBAS, Bulgaria), and Inquiry-based mathematics in secondary schools, with the case of Brussels.

We wish you all a successful 2011-2012 school year!

NEWSLETTER CREDITS

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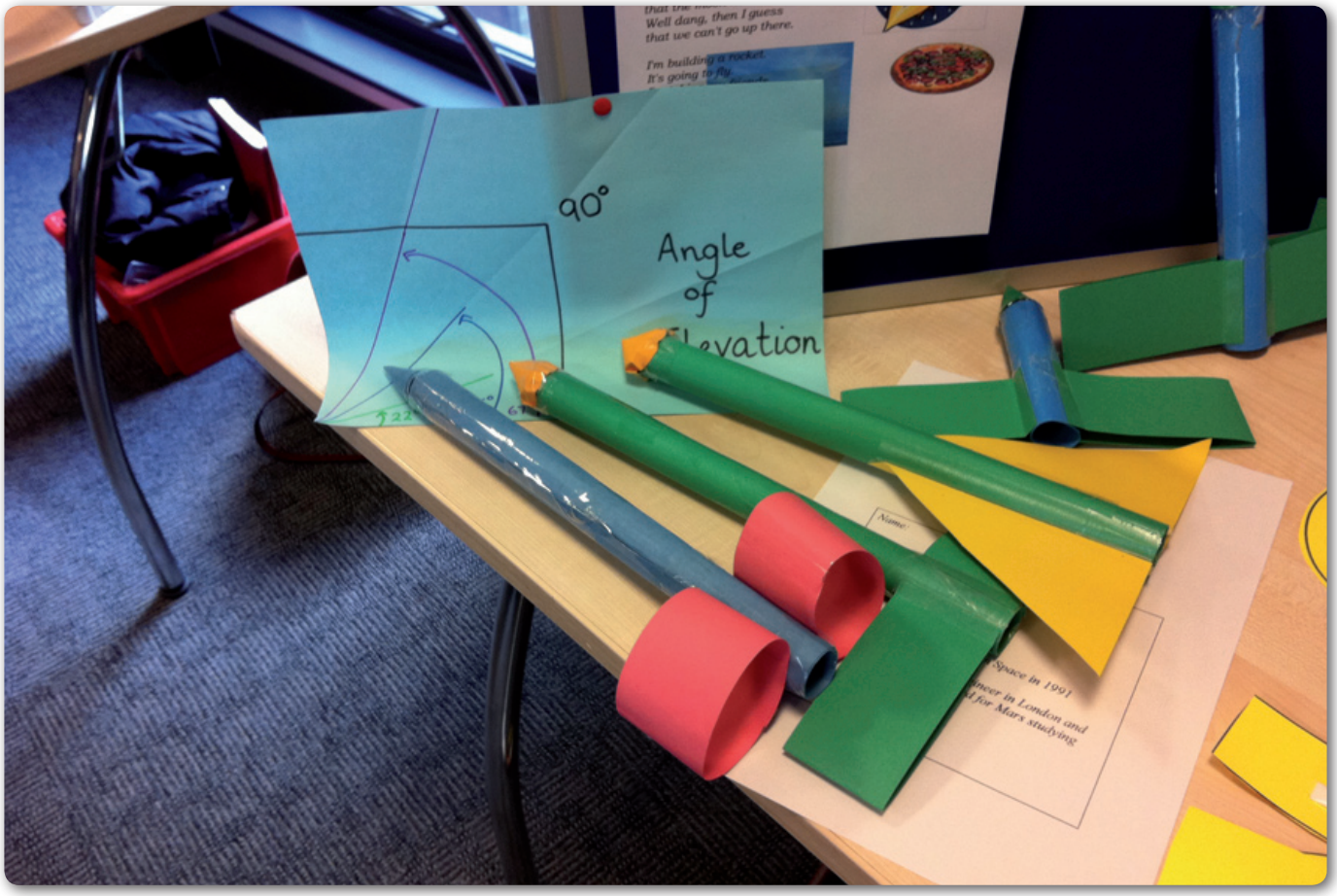
WITH THE SUPPORT OF

EUROPEAN COMMISSION

SEVENTH FRAMEWORK PROGRAMME

Integrating Inquiry Across Curricula
The University of Leicester, 12th – 15th September



This workshop brought together around 40 teachers and teacher educators from across Europe to explore how to make effective links between science and mathematics and different school curriculum areas in order to support learning in each subject, using quality inquiry methods. The programme was planned around four main themes: *the nature of science, integrating science and mathematics, integrating language teaching in science (and mathematics), the use of technology*.

Teachers from the Leicester centre presented posters about work in their schools in a lively session on the first evening. Representatives from the other Fibonacci centres involved in the 'Cross Curriculum' Topic (Amsterdam, Dublin, Luxembourg, Tartu, Nantes, Romania, Leicester) contributed sessions reporting their areas of activity. Invited speakers from beyond the Fibonacci Project led sessions on topics ranging from the use of Leicester's Botanical Gardens to develop mathematics and science teaching, to Poetry and Magnetism and colleagues from the Royal Statistical Society Centre for Statistics Education ran a workshop on their exciting 'Experiments At School' project, which involves students across the world in producing and sharing data from science experiments.

Keynote presentations were given by Professor Michael Reiss, from University of London Institute of Education, on The Nature of Science, and from Rosemary Feasey, a leading expert in primary science, on *Linking Out-of-School Activities to a Cross Curricular Theme*. Following on from Rosemary's presentation, participants had an opportunity to try out practical activities at Snibston Discovery Museum and Country Park.

Delegates participated enthusiastically in the activities, and the opportunities for social contact, and gave some encouraging feedback: 'I *had the great opportunity for professional growth and to make contacts. I collected a lot of interesting ideas to think about.' 'Thank you for the wonderful, engaging and interesting days in Leicester. I appreciated so much every activity and every moment with the other participants.' 'I really enjoyed the three days and made some fabulous contacts. I also learnt some science!'*.

Janet Ainley
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The Fibonacci Project

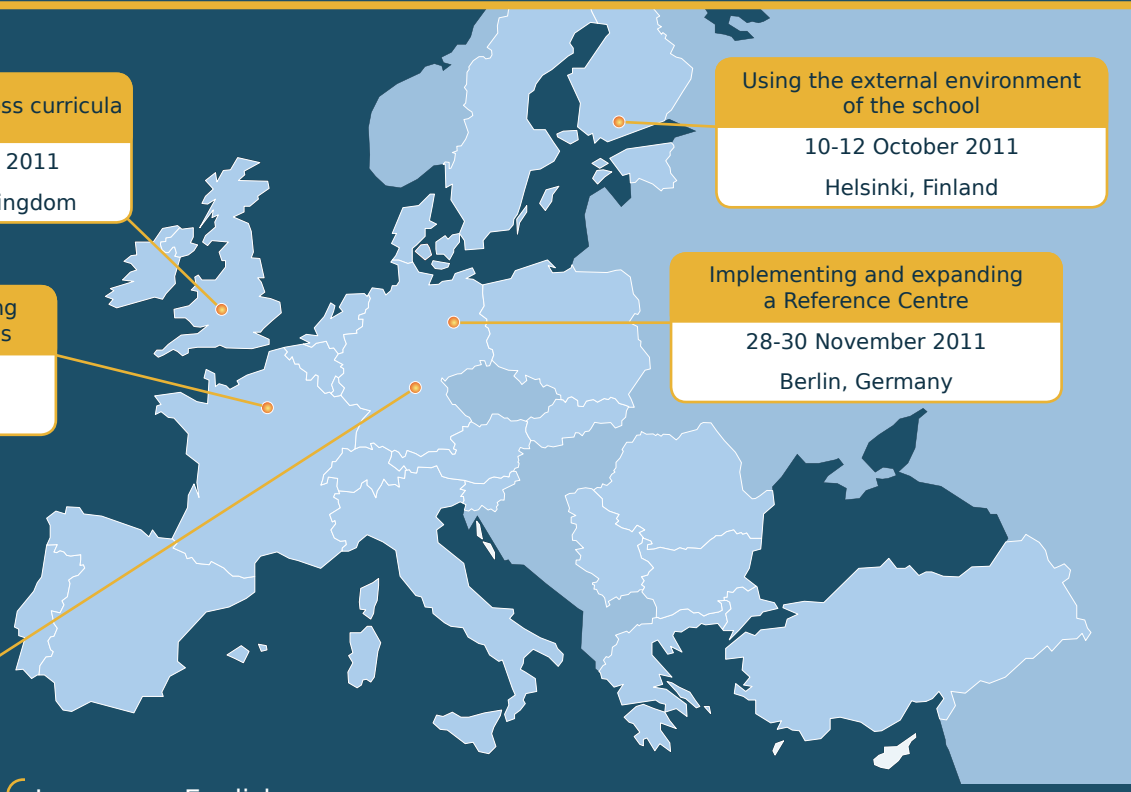
EUROPEAN UNION

SEVENTH FRAMEWORK PROGRAMME

DISSEMINATING INQUIRY-BASED SCIENCE AND MATHEMATICS EDUCATION IN EUROPE

If you are a senior teacher, a trainer, a project coordinator, a researcher, a policy-maker or an educational expert, the Fibonacci project invites you to participate in the following events on Inquiry-Based Science and Mathematics Education (IBSME):

5 European training sessions from September 2011 to March 2012



Integrating inquiry across curricula
12-15 September 2011
Leicester, United Kingdom

Using the external environment of the school
10-12 October 2011
Helsinki, Finland

Deepening the understanding of inquiry in natural sciences
21-23 March 2012
Paris, France

Implementing and expanding a Reference Centre
28-30 November 2011
Berlin, Germany

Deepening the understanding of inquiry in mathematics
15-17 February 2012
Bayreuth, Germany

Language: English
60 participants per session
No training fees
Information and applications: <www.fibonacci-project.eu/sessions>

A European Conference on 26-27 April 2012 in Leicester (UK)

«Bridging the gap between scientific education research and practice»

This conference aims at exploring strategies for improving inquiry-based science and mathematics education through research and evaluation of innovative practice

Information and applications: <www.fibonacci-project.eu/leicester>
Contact: <fibonacci2012conference@leicester.ac.uk>

Discover more resources on IBSME on our website:

www.fibonacci-project.eu

THIS PROJECT HAS RECEIVED FUNDING FROM THE EUROPEAN UNION'S SEVENTH FRAMEWORK PROGRAMME

Greenwave Europe 2011

2011 has been a successful year for the Greenwave Europe project, with data being recorded from the southern reaches of Portugal and Greece to the shoreline of the Baltic Sea and on up to the north of Sweden.

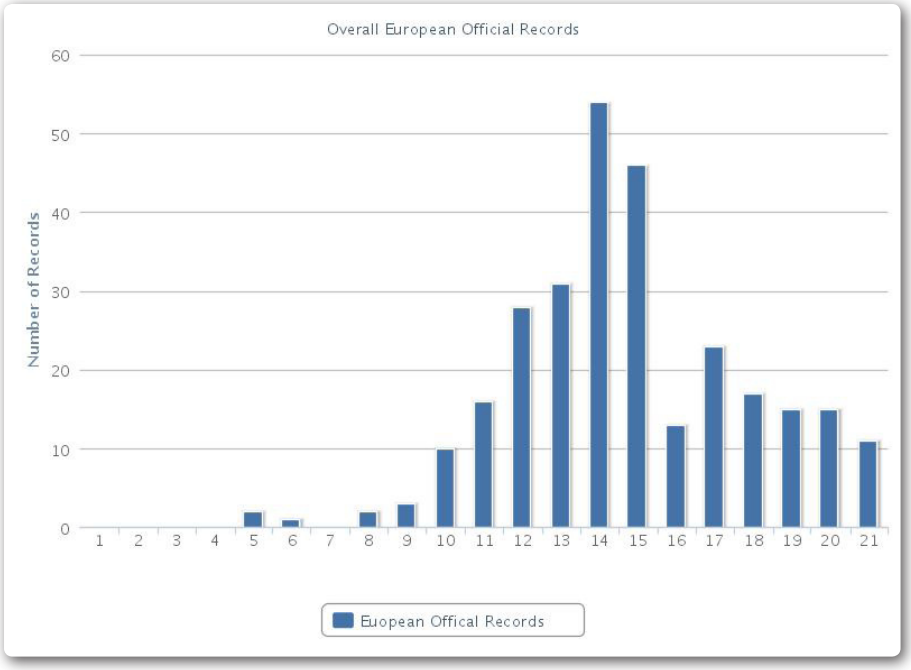
The project has had the benefit of enthusiastic participation from 231 schools throughout the continent.

For the Greenwave 2011 observations, 17 Fibonacci countries indicated from the outset that they would partake in the Project, with up to 25 classes per country: Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Netherlands, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden and United Kingdom.

Of these 17 countries, only 14 countries, with a total of 246 teachers actively participated in Greenwave Europe 2011.

The following information is based on these 246 teachers and their sightings logged to the site.

- Participants submitted a total of 1888 official records of a range of species and information on weather conditions
- In addition 1640 photos were submitted to the website.



Overall Official Records for Greenwave Europe 2011

- This data was used to generate maps and charts showing the arrival of the signs of spring in Europe.

This chart from the website contains an overview of all of the Official Records for species that were recorded around Europe during spring 2011. The horizontal axis represents the week number with week 1 commencing on the first of January. The number of observations peaked in week 14(April 4th to 10th) as can be seen from the chart above.

Serbia, Romania and Slovenia were the most active countries in the project in 2011.

Of the various species, the horse chestnut, the frogspawn and the swallow were observed in the most countries.

General Feedback on the project

The significant value of the project was the involvement of teachers of different fields (biologists, physicians, IT specialists, chemists, teachers in primary schools and pre-school teachers...) in teamwork.

Greenwave inspired teachers to try innovative approaches, for example using different types of instruments for measuring temperature, wind speed or rainfalls, and making classroom-wall posters simultaneously with the publication of data on the website. Also, they studied insulation of the Earth with their students.

The Project enabled pupils to develop capacity for analysis and synthesis and the ability to notice important details. Most importantly, it gave them the opportunity to practically apply their knowledge. Also, pupils have tried themselves in using a digital camera and processing images (using Picture Manager and similar software).

Thanks to the feedbacks of the participants, some improvements and new features will be added to the project in 2012:

- Ireland will be included in next years results
- Results will be available for all involved by the end of the first week of June
- Schools will be able to upload pictures to a new gallery section on site
- It will be clearly indicated that anemometers are for design & make purposes only and cannot be compared to other schools or classes
- Translations of the presentation video will be available, with the help of the Fibonacci partners to translate.
- The project will be open to all Fibonacci school, without limitation per country.

From the Greenwave website: <**www.greenwave-europe.eu**>, June 2011.

Follow-up seminar in Aabenraa, 29th-31st March 2011

Aabenraa in Denmark was a central meeting point for the Fibonacci partners in March.

With the support of the University College South Denmark, an internal seminar was organised to ensure the follow up of the activities. Practice-based workshops and sessions on the inquiry-based approach in science and mathematics were held. They enabled the partners to get to grips with the concrete aspects and the diversity of approaches in inquiry. Issues related to the local implementation of the project and the twinning of the centres were also tackled. Our guest speaker, Jens Dolin, Head of the Department of Science Education at the University of Copenhagen, arouse a very high interest in the audience with a conference about the 'Problems and Possibilities in Inquiry-Based Science and Mathematics Education'. The partners could also discover the Centre for Educational Resources in Aabenraa which is part of a national network in Denmark.

About 70 participants from the different Fibonacci centres took part in the seminar, with the scientific committee of the project and the external evaluators.

The seminar showed that the implementation of the project is progressing well, with a great commitment and creativity of the centres, and dissemination gradually taking place (in terms of resources, practices, and new teachers involved). The partners were encouraged to enhance their Fibonacci activities towards their main regional or national authorities to ensure the sustainability of the project.

The participants could have a flavour of the Danish educational tradition with the Folk High School as host organisation of the seminar, and of the South Jutland culture with excellent evenings and specialities offered, near the Aabenraa fjord.

The 5 European training sessions planned from September 2011 to March 2012 will be a good follow up to this seminar regarding the concrete implementation of the inquiry-based approach in the classroom.

What is the situation halfway through the project?

The activities implemented so far have laid solid foundations to design and implement a dissemination process of IBSE and IBME based on the Reference Centres, according to the external evaluation of the project. At a local or regional level, the project is implemented in different forms and models with regard to the coordination of the activities, the professional development and follow up of teachers, the development of resources and the community involvement. The final target of 2,500 teachers is nearly reached at this stage and more than 48,000 pupils are involved in the project, exceeding the initial estimate of 45,000 pupils. At a European level, the collaboration between the Reference Centres and the Twin Centres also takes different forms, in an open and constructive way, the relations being characterised by peer learning. As a result, the Twin Centres have been able to develop or improve the professional development of their teachers. Common work among the partners through the five major topics on IBSE and IBME is leading to the five European training sessions organised between September 2011 and March 2012. Resources for Implementing Inquiry in Science and Mathematics (an updated version of the Starting Package documents) have been worked at by the Scientific Committee and will soon be available. They will contribute to share a common frame and terminology on IBSE and IBME among all the partners.

Scientific coordination in mathematics

The scientific coordination of the Fibonacci project has the responsibility for some special issues aiming at a common approach in this large-scale project. It does not mean to bring a ready-made concept to all participants but to enforce fruitful cooperation and development of inquiry-based methods.

In the first step, the so called starting package was prepared by the scientific coordination. Several articles give general information and a common base for all participants and interested people. All materials of the starting package are available for free on the Fibonacci website <**www.fibonacci-project.eu**>.

Meanwhile, the scientific coordination in mathematics can offer a growing number of documents which vary from background knowledge to proposals for classroom teaching on inquiry-based science and mathematics education. You'll find more information in the section "SINUS international" in this newsletter.

A second important task of the scientific coordination is to provide scientific consulting for the Reference Centres and Twin Centres. Through several visits and regular contacts with our partners we got deep impressions about the high competence and conscientiousness/seriousness of the work done by the project coordinators and the involved teachers and trainers. An important goal of the Fibonacci project is to develop strategies for dissemination and exploitation of inquiry-based methods on a European level and in the long term. We are on a good way to achieve this goal together, sharing, discussing and evaluating the various experiences (positive and negative), materials and concepts.

To supplement this internal work the expertise of international experts is added through recruitment of competent speakers, meetings in conferences and other contacts. In particular we cooperate with other European projects (e.g. Scientix, Primas, Pathway, S-Team) to use synergy effects.

Finally we want to offer again our assistance to all Fibonacci partners but also want to ask for contributions, bringing as much competence and experience into the final concept as possible.

SINUS international – materials for inquiry-based mathematics education available in English language

The Rocard report and several EU calls led to a strong perception of the German SINUS project also in non-German-speaking countries. In order to make the goals, contents, ideas, approaches and results of SINUS internationally known and transparent, in particular for mathematics, the Federal Ministry of Education and Research (Berlin) financially supported English translations of selected documents. There are also included examples of primary and advanced education

As the ideas of SINUS (<**http://www.sinus-transfer.eu/**>) are also basic ideas of the Fibonacci project, for example in great detail verified in the basic patterns, every Fibonacci Centre received a number of printed versions of the three booklets "Towards New Teaching in Mathematics" and in addition the booklet "SINUS Bavaria - Exploring New Paths in Teaching Mathematics and Science".

Meanwhile, there are also digital versions of articles available in English language with free access for all interested people. Additional articles are in preparation to be published part by part on the website <**www.sinus-international.net**>. We will keep you informed about new publications.

If you are interested in printed versions of the booklets "Towards New Teaching in Mathematics" and "SINUS Bavaria - Exploring New Paths in Teaching Mathematics and Science" please contact us via e-mail:

<**dagmar.raab@uni-bayreuth.de**>.

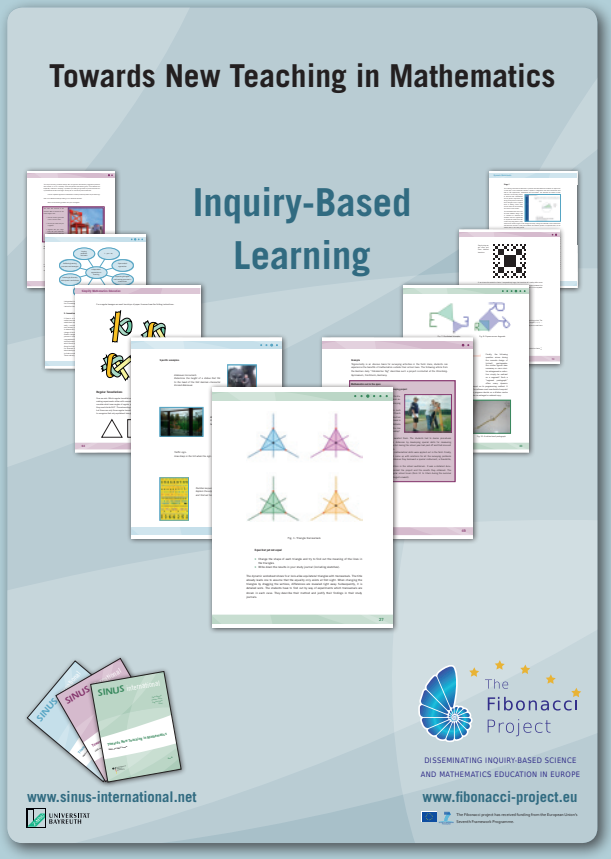
The Fibonacci project gets high recognition in Bavaria – RC Bayreuth cooperates with the Bavarian Ministry of Education

As a result of the great success of the SINUS project, there is also a high acceptance of the follow-up project Fibonacci in a great number of ministries and institutions all over Germany.

Especially the Bavarian Ministry of Education gave its commitment to financial and personal support for spreading the Fibonacci project all over Bavaria. A team of about 40 teachers will work in so called "tandems". Each tandem will be responsible for a set of schools, training and supervising

the involved teachers. Until now already 158 mathematics and science departments of schools have applied for participation, starting in September 2011. It will not be possible to participate as a single isolated teacher, for effectiveness and sustainability reasons. The Reference Centre, University of Bayreuth, will supervise the work; the coordination will be done by the State Institute for School Quality and Education (ISB) in Munich.

The kick-off meeting of the Bavarian tandems will take place from October 4-6, 2011, at the University in Bayreuth. Besides the organisational planning there will be several workshops about inquiry-based teaching and learning in mathematics and science. The science part will be supervised by Franz X. Bogner (University of Bayreuth). He is the European coordinator of the EU project Pathway which is also focused on inquiry-based methods and is specialized in science education. There is a long lasting fruitful cooperation between Peter Baptist, scientific mathematics coordinator of the Fibonacci project and Franz X. Bogner, as they have a shared responsibility as CEOs of the Centre of Mathematics and Science Education (Z-MNU).



Teaching mathematics at pre-school level: University of Patras

The University of Patras - (TC1) - (Laboratory of Science, Mathematics and ICT Education (LoSMICTE) of the Department of Educational Sciences and Early Childhood Education) is training future early-year teachers through theoretical and practical courses.

We have appreciated for a quite long time the valuable contribution that inquiry-based learning may have to the scientific literacy of young children. Working in the context of Fibonacci, during the academic year 2010-11 we established our 'teacher-network' and developed Teaching and Learning sequences in the context of IBSME in the sub-domains of physics, biology and mathematics.

The 30 members of the 'teacher-network' got familiar with our inquiry-based, natural sciences and mathematics didactic units, and were prepared to integrate them in their own practice through a series of seminars and workshops that we offered. Moreover, they were fully supported during the implementation phase in their classrooms.

Below, we present a general description of the mathematics didactic units that were developed by our colleague K. Zacharos and his post-graduate students.

Practices for measuring length and capacity in Early Childhood Education

The measurement of attributes – such as length and container capacity – constitutes an interesting aspect of mathematical training in early childhood education.

The goals of teaching measuring for the pupils in early childhood education are:

- ★ to understand the measurement process
- ★ to familiarise themselves with the practical uses of units of measurement
- ★ to build and use non-conventional measurement tools and
- ★ to make numbers correspond to quantities

The measurement process

The measurement process in early years can take, in general, two forms:

The first one requires *direct comparisons* of the magnitudes to be measured

For example:

- ★ two objects under comparison are equal in length when their ends correspond
- ★ to compare directly the capacity of two containers by asking children to use practices of 'filling' and 'emptying' the content from one container to the other one that is empty

In the second case, the measurement processes are indirect and require the mediation of suitable units or measurement tools.

The process

Teachers will have to try and highlight the major role of activities that are carried out within a playful structure

for the development of forms of mathematical thought. At the same time, the communicative framework is created by the teaching situation, a story that enables the transfer to an experimental atmosphere, as well as the development of the students' degree of autonomy.

Measurement of length

Length measurement is a typical case of linear measuring, which is offered as an introduction to measurement practices in preschool.

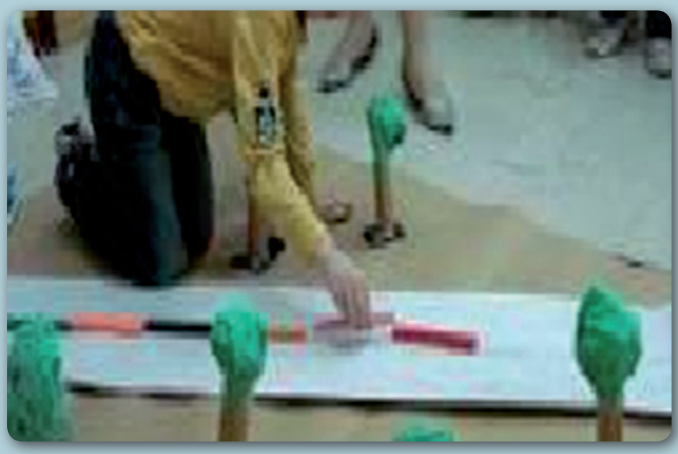
I. Direct comparisons

In the initial stages of acquiring skills in length measurement, children make direct comparisons. In this case two objects under comparison are equal in length when their ends correspond.

II. Indirect comparisons

Using units of length: In indirect comparisons the mediation of suitable units or measurement tools is required.

In this case we offer different kind of units (e.g. sticks, footprints, toothpicks, rope, etc) to compare objects in length. Children have to compare the arithmetical results and to decide about the suitable unit for the comparison (see Pictures). The teaching activities are set in the context of a story about a prince that has to save the princess who is prisoner in a castle. In the story the prince has to measure the distance across a river and build a bridge, the height of the window of the princess and so on.



Covering the length with sticks

Covering the length with footprints

Unit iteration on the length

Measurement of capacity

The concept: The term *capacity* is used to describe the ability of hollow objects to contain liquids or materials characterised by 'fluidity' (for example sand, rice, etc).

The teaching plan is set in the context of a farm and its animals and may include three phases:

I. Direct comparison

- ★ The children are asked to compare the capacity of two dissimilar containers.
- ★ The *aim* in this phase is to help children find and process the parameters that will allow the construction of the concept of capacity.

II. Indirect comparison

The *aim* here is to get children to use measurement units of capacity.

- ★ Children are asked to choose the largest between two or more unequal, full containers by using small cups as measurement units.
- ★ If we have to feed, for example, chickens, the following question could be posed: "How many chickens can we feed with each container?" "Is it possible to feed more chickens with one of those containers?"

III. Indirect comparison- The construction of a measurement tool

This phase of the teaching intervention aims at constructing a tool with which to measure capacity.

- ★ A cylindrical, oblong container and a felt-tip pen are presented.
- ★ According to the story with the chickens, the following question could be posed:
- ★ "How much should we fill this container with corn to feed two, three, four, ... seven chickens?"
- ★ In this case the children are called to construct and grade a measure instead of having to fill the container cup by cup each time (see picture).

Construction a measurement tool of capacity

Hands on! in the House of Maths (HdMa), Vienna

Maths becomes a real adventure for small and big scientists at the House of Maths (Haus der Mathematik, HdMa), located at the University of Education in Vienna, Austria (Pädagogische Hochschule Wien).

Touching is a must!

This slogan refers to the philosophy of hands-on activities: The touchable presentation of mathematical problems, which encourages students to find a new, discovery-driven and playful approach to maths. Special exhibits present maths as a touchable, versatile and understandable science.

Different learning environments provide a creative and active access to maths: There is a room showing the "History of Mathematics" and you also find a "Discovery-Area", which is full of hands-on exhibits and games. One of these is the exploration-table "Fibonacci sequence":

1, 1, 2, 3, 5, 8, 13, 21, 34, 55, ...

Users can experience and discover the Fibonacci numbers in different contexts, e.g. by building a Fibonacci spiral or by modelling the rapid increase of an imaginary rabbit population with wooden coins. Solving Fibonacci's so-called "rabbit problem" may be difficult in its abstract, mathematical form but is much easier and more accessible when it is presented as a hands-on exhibit. The famous Fibonacci numbers are also hidden in nature: visitors can discover them hands-on in fir cones, sunflowers, a nautilus fossil and a cactus-plant.

The University of Education of Vienna seeks to best integration of the new ideas and options which the House of Maths offers into the education of future primary and lower-secondary teachers. Each semester, students get the opportunity to acquire more profound and practical knowledge concerning hands-on activities by attending the explainer-programme provided at the House of Maths. They will increase their skills by applying hands-on philosophy, didactics, maths and knowledge-transfer by presenting mathematical issues to groups of school-kids during their visit at the House of Maths.

see also:

<www.hausdermathematik.at>
<www.phwien.ac.at>

contact: Gordan Varelija (<gordan.varelija@phwien.ac.at>), Petra Ilias (<petra.ilias@phwien.ac.at>)

Sailing to your own America

(or how the art of Inquiry and Discovery is being promoted in Mathematics Education in Bulgarian schools)

The importance of assisting the art of Inquiry and Discovery as part of an educational strategy is well grasped by the Bulgarian writer George Markov: "*You are quite aware that it was Columbus who discovered America but you still insist on discovering it for yourself because you feel that it is not just America's existence but its very discovering that is important to you...*" Providing mathematics teachers and their students with learning environments in which they could experience the magic of sailing to "their own" America, real or imaginary, was a challenge the Fibonacci team of IMI-BAS faced with enthusiasm and dedication. *Our acts were stimulated* by the University of Bayreuth - a very experienced and supportive Reference Centre. The Inquiry-Based Mathematics Education (IBME) has been promoted in Bulgaria on two levels – nationally and locally, in major regional centres. On national level the promotion instruments were workshops, seminars and special sections of the national conferences organized by the Union of Bulgarian Mathematicians. On local level IBME was promoted and supported by multiple training and/or presentation sessions organized in 12 Bulgarian regions with the help of the Local Boards. Altogether more than 900 teachers have been exposed to such events. After an intensive period of developing more than *50 dynamic scenarios* (<**www.math.bas.bg/omi/Fibonacci/archive.htm**>) appropriate for implementing IBME in all 12 grades, organising bi-weekly *Fibonacci Seminar* at the premises of IMI-BAS, launching a competition among teachers for developing mathematics modules based on dynamic software, and stimulating the submission of articles in *Mathematics and Informatics Journal* (published by the Bulgarian Ministry of Education), the IMI-BAS team identified 25 "ϕ-teachers" (Fibonacci Project teachers) who are capable and willing to help other teachers in applying the IBME approach. The support for these teachers and the joint work with them is the major task now for the Fibonacci Team in Bulgaria. Parallel to the activities described above, efforts were applied to further develop a specific brand of "beyond class IBME" where high-schools students are encouraged to work on their own research projects, the results of which are presented at special sessions organized by the so called "High School Students' Institute of Mathematics and Informatics". This is where they experience "the mathematics which is beautiful, limitless, full of life and art, and science; the one that allows you to dream, to experience wonderful moments, to feel the *dynamics*" – in the own words of the involved students.

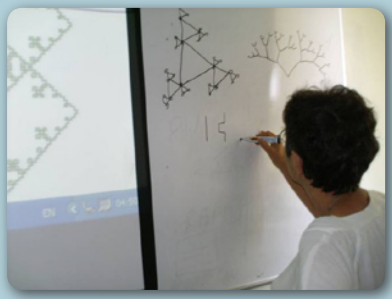
Working creatively as a team

You could investigate also this case...

Stimulating the exploratory spirit is a serious challenge for the teacher educators...

Everything might have been said but our Fibo- mentors are not tired to say it again...

Modeling in the style "no threshold, no ceiling"



Playing with fractals in a static and dynamic mode!

Inquiry-based mathematics in secondary schools – the case of Brussels

The TC1 (resource centre) in Brussels is located at the EXpérimentarium(Xp), the Physics Museum, of the Free University of Brussels (ULB) <**www.experimentarium.be**>. Previously, in the Pollen project we worked only with primary schools. In the Fibonacci project we have trained and tutored 14 classes in 4 primary schools and 6 classes in secondary schools.

The approaches at primary and secondary schools are very different.

In Belgium, primary school teachers are generalists with very little training in science. Their main training is based on many psycho-pedagogic training hours and also French and Mathematics. Concerning science, the programs impose them to practice the scientific approach for subjects such electricity, phase transition, etc. Because of the little training they receive they are not very confident with science and they want very practical **in-service training** in which they can practice and understand experiments that they will use later with their pupils. Somehow, their demand is quite clear. Proposing the IBSME is also facilitated by the fact that primary school kids are naturally curious.

For secondary schools teachers, the expectations are not so clear: they feel really stressed by the curriculum which is somehow ambiguous: they are expected to teach applying the scientific approach, while evaluation is mainly based on more "classical science", on formal definition and terminology. This makes them feel very insecure. When we proposed them to teach a subject on the basis of experiments, they believed that they would have to remake their lecture in a classical way, so they argued that they did not have enough time. Because they learnt this way, it is difficult for them to realise that a concept can be understood by experimenting. For curricula where IBSME has been introduced, no clear instructions have been given to evaluate the understanding and the methodology acquired.

Another difficulty for secondary school teachers is the fact that teenage students are less curious. They want to be captivated by short experiments. Teachers are afraid to have to manage a group of students that have to speak and to move to do their experiments. This is why, when training secondary school teachers, we propose challenges.

An example of quite straightforward challenge lab that we have used with secondary school teachers is the following : give the students a quantity of an unknown liquid contained in a tube, a list of liquid densities, a flexible tube, a ruler and a pressure sensor (+ computer) and no more. They have limited time (40 minutes) to identify the liquid and provide the answer by a measure of the liquid density.

The test might be more difficult than it seems since they have to make several pressure measures at different depths in the liquid to be able to draw a graph (pressure vs. depth) and to obtain a good estimation of the slope of that graph (ρ.g). A deliberate technique we use in these activities is to « forget » to ask them to draw a graph or to calculate anything. The need to answer the question should be enough to guide the students to recognize the tools to use.

You can see in this picture how the participants are led to discuss the problem together and use every ability in the team.

These descriptions apply more to the general education system. We have also proposed methods from Fibonacci in a technical school where teachers are less stressed by the evaluation process and where the IBSME approach seems particularly well adapted for students who have already a bias to a more practical approach.

Dissemination actions at a european level

The Fibonacci project was represented in the major European event of Scientix and in meetings related to the ProCoNet network to disseminate information on the project, exchange information among the projects and discuss topics of mutual concern in the widespread dissemination of inquiry-based science, technology and mathematics education.

Scientix European Conference, 6th-8th May 2011, Brussels

The Fibonacci project was represented in the Scientix European conference organised by European Schoolnet, in cooperation with DG Research of the European Commission. About 370 attendees from 37 countries took part in this first major European event to discuss the current challenges for science education: teachers, researchers, policy-makers and other stakeholders.

The Fibonacci project had the opportunity to be presented in several ways:

- ★ in plenary session;
- ★ through an exhibition stand, with scientific experiences for schools presented by the Free University of Brussels / Experimentarium, which very much interested the teachers visiting the stand;
- ★ in the posters' session, through two posters: 'Promotion of Science with Fibonacci and Scientix' about primary schools' experiences in Slovenia, and 'Towards New Teaching in Mathematics' by the University of Bayreuth.

Several partners actively took part in sessions. Mateja Gračič, a Fibonacci secondary teacher in Slovenia shared her experience in the round table on teacher participation in European projects. Volker Ulm, coordinator for the University of Augsburg, made a presentation on systemic innovations of science education via in-service teacher education. Wim Peeters, coordinator for the Dienst Katholiek Onderwijs, presented some recommendations on how to raise interest in MST at an early age, with the Secure project. Philippe Léonard, from the Free University of Brussels, presented an experiment about Galileo and the practice of archery: exemplifying the basis of classical physics.

The conference was a good opportunity to network with the participants, other EU projects, and DG Research's representatives.

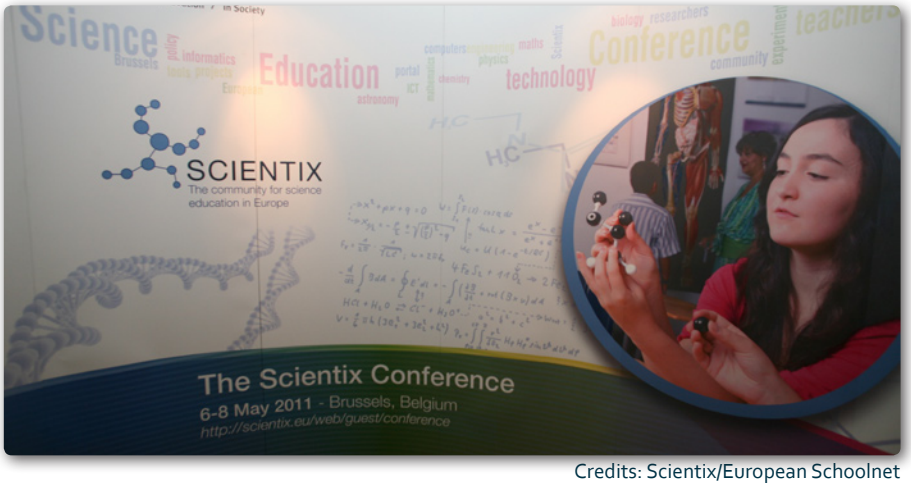
As mentioned in the summary of the conference, "several common themes emerged from the conference talks (...). Together they form a set of recommendations to the Scientix stakeholders for the months to come: participation in public dialogue, engaging in scientific endeavour, teacher training, collaboration and community building."

More information about the conference and the presentations can be found at: <**www.scientix.eu/web/guest/conference**>

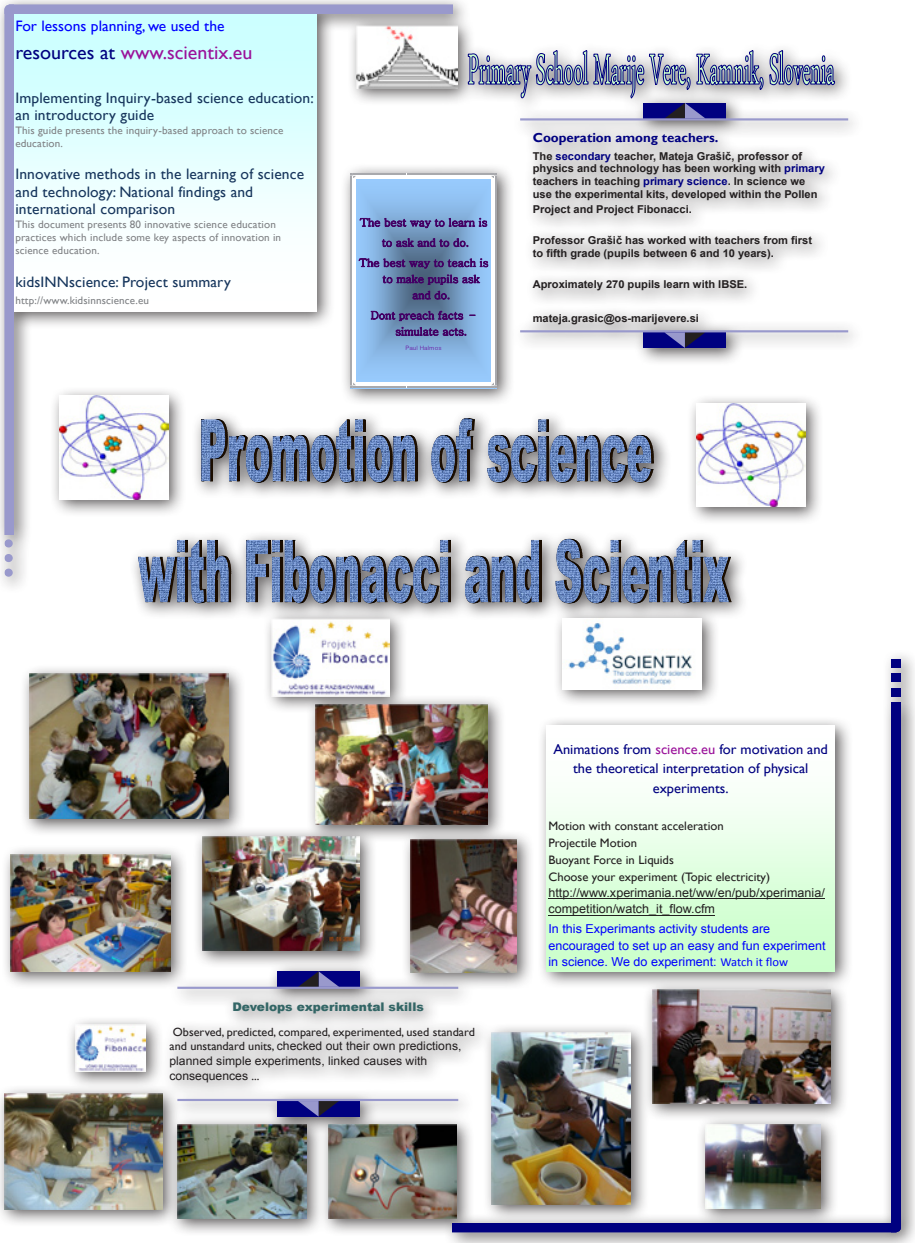
and the video of the project at: <**www.scientix.eu/web/guest/conference/projects-videos**>.

The Fibonacci Stand at Scientix conference, 6th-8th May 2011, Brussels

Credits: Scientix/European Schoolnet



Credits: Scientix/European Schoolnet



Poster of Mateja Grašič, a teacher from Slovenia, 'Promotion of Science with Fibonacci and Scientix' at the poster session

ProCoNet meetings

ProConet is a group of FP7 and other EU-funded projects in STEM Education (Science, Technology, Engineering, Mathematics) which meets to discuss topics of mutual concern in the dissemination of inquiry-based learning. It has been formed on the initiative of the coordinators of S-Team and Primas projects, after previous informal meetings. On the eve of the Scientix conference on 6th May, the group met in Brussels to prepare a report to the EC with recommendations for achieving the objectives of Europe 2020 strategy in STEM Education. The report was sent to the EC in June. The group recently gathered at the ESERA conference on 6th September in Lyon, and at the University of Freiburg on 19th-21st September 2011.

PRIMAS Conference, 27th June 2011, Brussels

A representative of Fibonacci took part in the conference of PRIMAS '*Towards Europe 2020: Inquiring minds - innovative pedagogies in mathematics and science education*'.

The event was preceded in the morning by a presentation of the ProCoNet projects to the Primas Consortium.

More than 100 participants attended the event to discuss a major issue on how innovative methods of teaching can be made sustainable. "In summary, the meeting recognized three important factors necessary to support the European objectives towards 2020 of bridging the gap between education and work:

- ★ Improving students' dispositions towards mathematics and science by continued support for dissemination of inquiry-based pedagogies so that teachers might better motivate student learning
- ★ Continuing collaboration between researches and stakeholders across Europe
- ★ Support for actions beyond the lifetime of projects, such as PRIMAS, to sustain and develop further the innovations they introduce."

(Primas Newsletter July 2011).

Coming events

Fibonacci Science Fair will be organised at the Faculty of Education in Ljubljana, Slovenia, on January 31st, 2012. Various experiments and activities will be prepared by the students, future kindergarten teachers. Kindergarten pupils and their teachers from Ljubljana and surroundings will be invited. This will be the second event of this kind.

Second European conference, 'Bridging the gap between scientific education research and practice' Leicester, 26-27 April 2012

The preparations for this conference are currently in hand: formats for submissions and evaluation of different types of presentations are being developed. Professor Barbara Jaworski, who has held the roles of Chair - British Society for Researching into the Learning of Mathematics, Chair European Society for Research into Mathematics Education & Editor-in-chief of the Journal of Mathematics Teacher Education will give one Key Note talk. We hope that each of the European Common Topics groups will give a presentation. There will be sessions on carrying out research as well as presentations on Practice & Research.

Call for Contributions

Researchers and practitioners are invited to present their work at the conference. Individuals or groups may make presentations about:

- ★ Research they have carried out
- ★ Innovations in in-service or classroom practice they have trialled
- ★ Reviews of theory and other research

Work can be presented as

- ★ Oral presentations of 1 hour (40 minutes talk with 20 minutes discussion)
- ★ Oral presentations of 30 minutes (20 minutes talk with 10 minutes discussion)
- ★ Posters.

Key dates

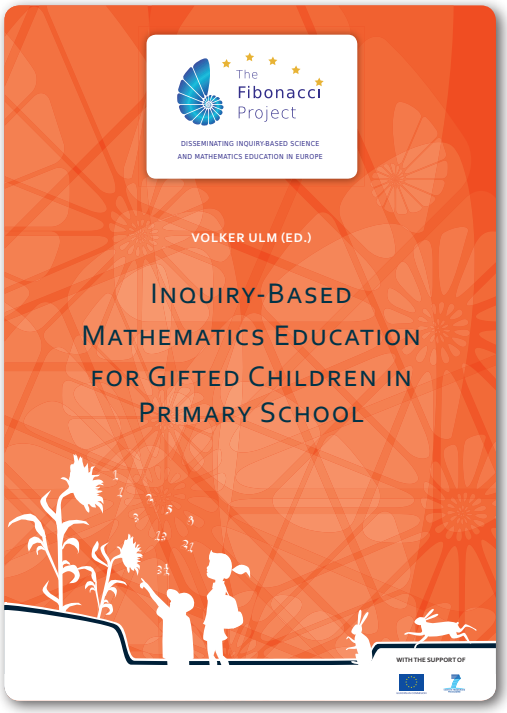
31st October 2011: Submission of abstracts

1st December 2011: Corresponding author informed of outcome of review process

Submissions

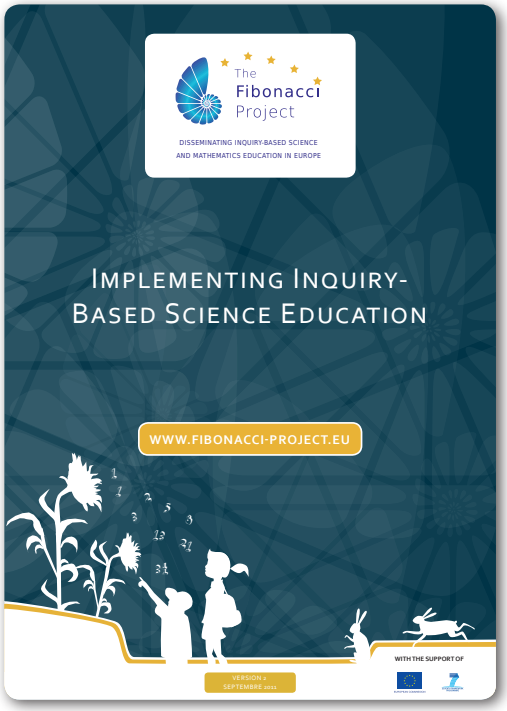
Potential contributors need to submit a one-page abstract describing their contributions by 31st October 2011. Abstracts should be sent to Tina Jarvis (<**jar@le.ac.uk**>) with the Abstract Submission Form. There is also an abstract template available.

New resources



Inquiry-based Mathematics Education for Gifted Children in Primary School, by Volker Ulm (University of Augsburg)

This book has been written for primary school teachers who would like to challenge mathematically gifted pupils with a particular interest in matrhematics. The model that is presented in the book can be useful for supporting and assessing pupils' needs and mathematical achievement at school, because it offers a detailed perspective on phenomena like «thinking», «giftedness», «ability» and «performance» in mathematics as a subject. It also provides teaching materials needed to use this model in school.



Implementing Inquiry-Based Science Education guideline, updated by Wynne Harlen

Following the last Scientific Committee meeting in Aabenraa in March, the Implementing Inquiry-Based Science Education guideline has been updated by Wynne Harlen, and is now available. It will be part of the «Resources for Implementing Inquiry in Science and Mathematics», formerly known as the «Starting Package». The other guidelines, on «Inquiry-Based Mathematics Education» and on «Developing a center for science and mathematics education», will also be updated.

What is the Fibonacci Project?

The ambition of the Fibonacci Project is to contribute to the dissemination of inquiry-based science and mathematics education throughout the European Union, in ways that fit with national or local specificities. It defines a process of dissemination from 12 Reference Centres to 25 Twin Centres, based on quality and a global approach. This is done through the pairing of Reference Centres selected for their extensive school coverage and capacities for transfer of IBSME with 12 Twin Centres 1 and 13 Twin Centres 2, considered as Reference Centres-in-progress.

Started on 1st January 2010 for a duration of 3 years, the project is coordinated by the French *La main à la pâte* programme, with a shared scientific coordination with the University of Bayreuth (Germany).

This project has received funding from the European Union's Seventh Framework Programme for Research and Development