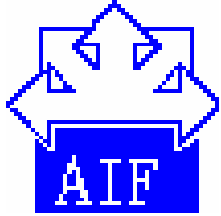


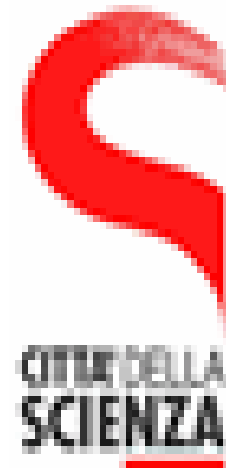
**Associazione
per
l'Insegnamento
della Fisica**



**Associazione
Nazionale
Insegnanti
Scienze Naturali**



**Divisione
Didattica
Società Chimica
Italiana**



**Museo
Leonardo
da Vinci
Milano**



***ISS Project
Insegnare Scienze Sperimentali
(Teaching Experimental Sciences)***

***Action-research aimed at setting up new labs finalised to the
permanent updating of science teachers
in partnership with the Ministry of Education***

Timetable

- **2004 Teachers' Associations plan the project**
- **2005 Museums join - plan is revised**
- **2006 Ministry joins**
- **Guidelines are agreed upon**
- **Documents are defined**
- **INDIRE Platform is initiated**
- **Regional working groups are appointed**
- **Teacher Centres and tutor teachers are selected**
- **National Seminars for the tutors are held**
- **Operative phase starts: trials, evaluation, diffusion..**

Aims: Ist phase

- **Trying out the project hypotheses and models**
- **Trying out and validating materials for teachers and pupils**
- **Setting up innovative labs, using low-cost materials when possible**
- **Promoting the connection of local school networks to wider network environments**
- **In connection with INVALSI, producing indications for evaluating non-traditional activities (special labs, out-of-school visits etc)**
- **Exchanging and comparing experiences internationally.**

Tutor Competences

- **Producing Lab indications, suggesting activities, identifying scientific subfields in view of further curricular developments, establishing cross-subject connections (maths, language...)**
- **Subject-informed didactics: overcoming difficulties, structuring concepts and learning, constructing concept nets, rethinking teaching from an epistemological point of view**
- **Teaching methodologies (starting from experiences, recognising the worthfulness of procedures, discussing with pupils...)**
- **Evaluating outcomes**

Guidelines for the curriculum

- **Vertical continuity from primary to secondary school;**
- **Transverse coordination between school subjects;**
- **Cultural and social relevance of science learning;**
- **Significant learning;**
- **Historical perspective of the development of scientific knowledge;**
- **Tight connection with maths and ICT.**

Main features

- Decisive role of **hands-on experience** in structured and unstructured situations in the **lab**, in the **classroom**, in the **environment**, in **technology**;
- Appropriate use of **different communicative modes** (body, voice, written, graphic, numeral...) both when **first building** and when **progressively organizing** knowledge;
- Connecting learning with the roots of **personal experience** and **common knowledge**;
- Gradually adopting the **points of view** of the **different sciences** by taking the observed phenomena **to pieces** and putting the pieces **together again** according to explicit aims;
- Gradually becoming aware that in science knowledge grows through the **construction of models**.
- **Reflecting**, as individuals and as a group, on the **meaning** of ones **own learning** in ways proper to ones age.

First tutors' seminars (in Milano and Napoli) Programme

- *Curricular continuity and “verticality”;*
- *Extended meaning of the lab in teaching;*
- *Acting as tutors;*
- *Guidelines and criteria for tracking down/producing/
commenting/communicating experiences;*
- *ISS in the present school scenario;*
- *How to organize seminars;*
- *Formal and informal learning;*
- *OECD-PISA/INVALSI*

*4 days of group-work with facilitators and discussants on the
Project and on exemplary topics (light, color, vision;
transformation; environment)*

*International connections through the PENCIL Project
with similar institutions across Europe*

ECSITE (coordinamento)

The National Marine Aquarium
(Plymouth; UK)

Museo di Storia della Scienza (Firenze)

Exploradôme (Paris)

Heureka (Vantaa, Finland)

Nemo (Amsterdam)

Deutsches Museum (Munich)

Experimentarium (Copenhagen)

Pavillion of knowledge (Lisbon)

Città della Scienza (Napoli)

The Bloomfield S.Museum (Israel)

Cité de l'Espace (Toulouse)

Technopolis (Mechelen, Belgium)

Universeum (Gotheburg)

Indire (Italia)

European Schoolnet

Università FedericoII (Napoli)

King's College (London)