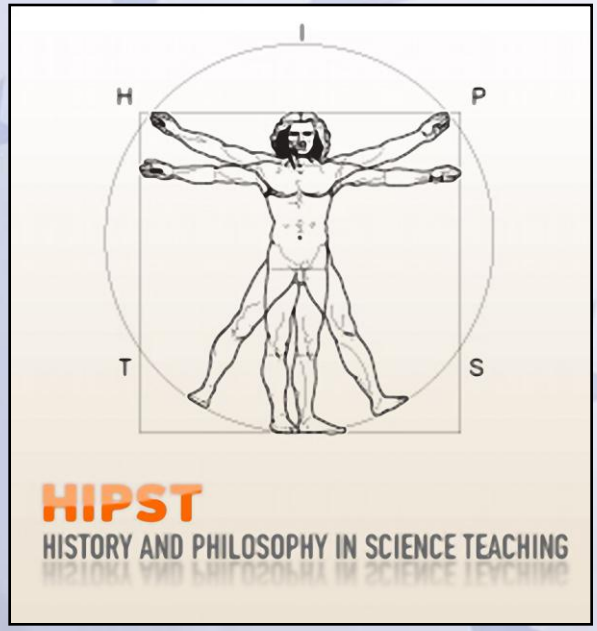
HIPST – A Quick Overview



EU-Project HIPST

History & **P**hilosophy
in **S**cience **T**eaching

Goals and Methods

- Collaborative development of case studies for HPSST in thematic working groups
- Enacting student-centered activities and explicit reflection on the Nature of Science
- Foster scientific literacy including learning about the Nature of Science
- Promote context- and inquiry-based teaching
- Implement HPS in „standard“ science teaching

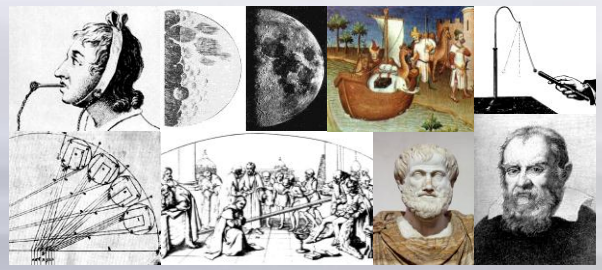
Overview

Exemplary Results

- **Innovative Methods for learning with & about HPS**


- **Collaborative Development Methodology**

- **The Case Studies**




Methods & Media

Methods of Learning and Students‘ Activities

- **Staged reading**
  of adapted or fictitious dialogs
- **Role play sequences / freeze sculptures**
  reenactment: controversies / social situations
- **Inquiry sequences**
  with historical replicates

- **Creative writing tasks**
  Interviews, Letters to the Editor etc.
  involving reflection on NoS/PoS
- **„Reflection Corner“**
  Guiding and scaffolding abstraction
  onto various NoS tenets
  (2-phase reflecting & discussing,
  tasks, activities)

Students may experience difficulty in abstracting from their school context to envisage their work as something other than school work.

Their understanding of doing science through laboratory work may be limited by the fact their experiences occur in the context of schooling.

(Loughran e.a. 2003)

Development Methodology

The process of developing case studies in teacher-researcher-groups: 4 Issues

Gathering options and restrictions on both sides

Exploration, Immersion & Storyline

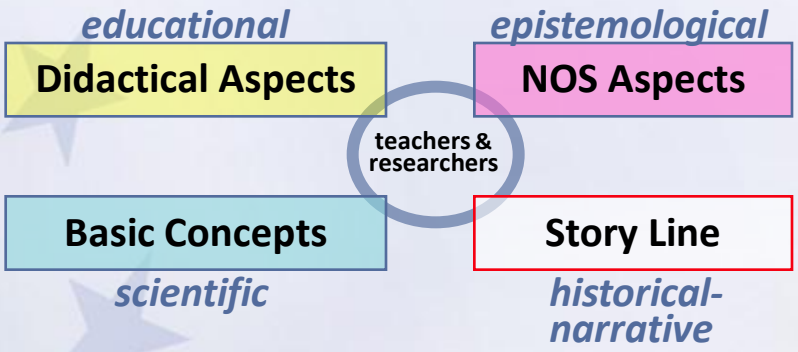
Discussion & Didactical Structuring

- Level One: Storyline
- Level Two: Basic Concepts
- Level Three: NoS - Aspects
- Level Four: Didactical Considerations

Professional Development of Teachers through instruction and simulation

Development Methodology

Four Perspectives on Development Work

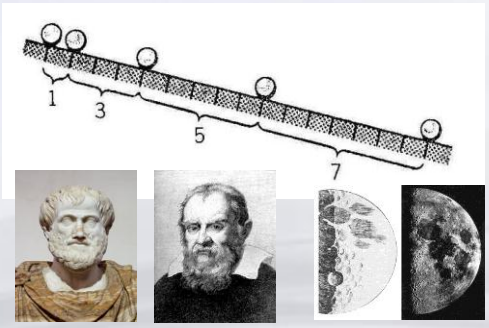


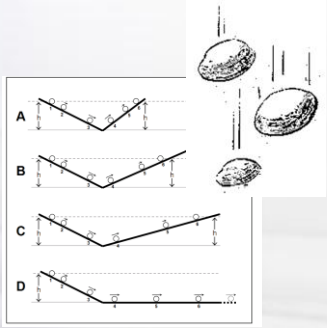
Case Studies

Core ideas and Status



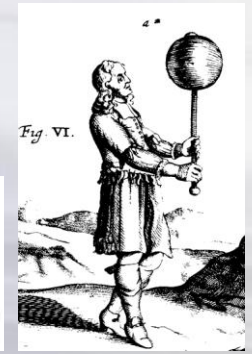
- **History of refrigeration technologies**
  Exploring the interrelation of technology, culture & science (grades 5-6)
  in preparation by teacher

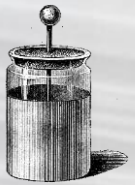




- **“Moving bodies”**
  A case study for enhancing conceptual understanding of early mechanics with HPS (grades 7-8)
  evaluating 1st round, preparing 2nd

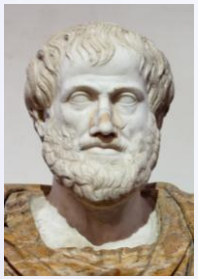


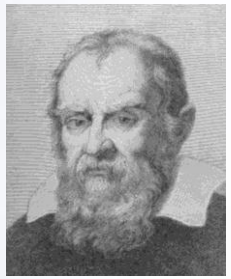


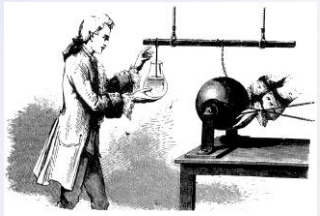



- **History of electricity**
  Multiple case study on the development of core concepts of electricity (17th-18th century) (grades 8-10)
  currently running

Products & Outcomes

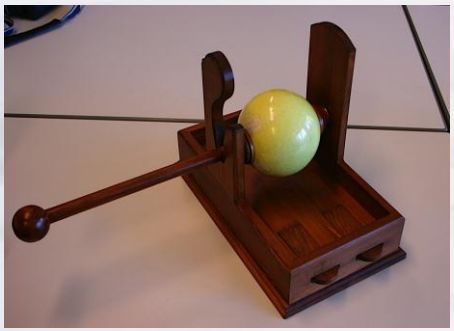






Media and Instruments

- Videoclip on Einstein's refrigerator
- Dialog between Aristotle & Galileo (filming in progress)
- Role-play instructions (Leyden Jar: Franklin/Symmer/Lichtenberg)

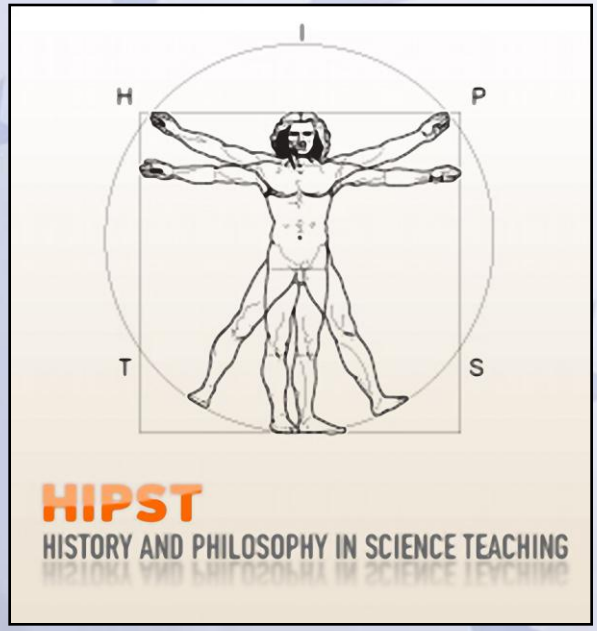


- Electrical (Franklin) Bells (18th cent.)
- Sulphur Spheres according to Otto von Guericke (ca 1650)
- Transmission of electricity according to Stephen Gray (ca 1730)
- Inclined plane according to Galileo (mobile)

Case Studies – One Example

History of Electricity - Episodic Structure

	Story Line	NOS Aspects	Didactical Aspects	Basic Concepts
I	[1600] William Gilberts electric experiments	classifying phenomena; science & technology; scientists' mindsets	Inquiry: "destroyed lab diary"; task: "interviewing Gilbert"	electrostatic attraction; separating electric from magnetic phenomena
II	[1660] Otto v. Guericke and the sulphur-globe	producing phenomena; peculiarities of scientific apparatus'	Instrument maker: "designing & promoting a scientific apparatus"	electrostatic repulsion
III	[1730] Charles dú Faye	law vs. theory; exploration and induction	Inquiry: "Test for two electricities?"; "laws – found or invented?"	two sorts of charges; transferability & conservation of charge
IV	[1730] Stephen Gray	evolving experimental set-ups; guiding function of hypotheses	Guided inquiry: "Gray off the track"; "letter to the editor"	isolators & conductors; moving charges; electrostatic induction
V	[1770] Martin Berschitz & Georg Christoph Lichtenberg	"being scientific" - scientific community and separating science & non-science	Freeze-sculpture: "That's a vintage Lichtenberg!"	
VI	[1780] Franklin, Symmer, Lichtenberg	controversies in science; extrarational evidence & acceptance of theories	Role-Play "Convention of Franklinists & Symmerists"	voltage from charge diff. voltage from work electrical circuits



Thank you very much for your attention!

We'd like to thank our collaborating teachers:

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