

Improving the Teaching and Learning of Science (Grade 2 - University 2) using Units of Historical Presentation

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Units of Historical Presentation

Units of Historical Presentation (UHPs)

Forms of historical presentation (case studies, biographies, dramas, stories) designed for learners of all ages to encourage the classroom portrayal of science as a creative, human activity.

These units connect directly to science curriculum documents, integrate disciplines, contextualize science, and include instructional strategies guided by contemporary theories of learning.

System B: The Individual Learner as Part of a Classroom and School Community

Identify the risk and protective factors which influence teacher's efficacy and attitudes toward science;

Identify the characteristics of instructional strategies, curriculum content and pedagogical orientations which contribute to student success;

Resource development and capacity building – professional development of teachers;

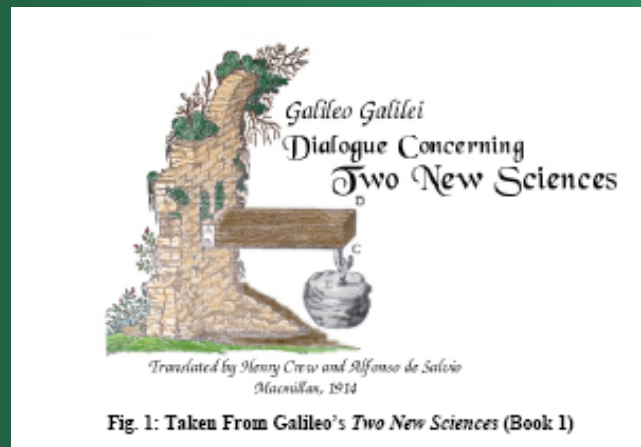
Develop partnerships, outreach and knowledge dissemination:

Resources and Capacity Building

- Grade 5 Weather Curriculum and Grade 4 Light Curriculum (both represented in papers in the October 2007 issue of CJMSTE)
- Under development: Pendulums, People and Time (Topics in Science 40S) unit, S2 Weather (Red River floods), Slotin radiation story, Snow Crystal, Fats and Oils in Canada, Blood Transfusion, Diabetes, Refrigeration, The Mosquito
- Summer course and the teacher-leader project.
- Conference (UHPs in the Science Classroom, 2005) and Symposium (Understanding the Nature of Science, 2007)

Large Context Problems

- From Intuitive Physics to Star Trek
- Motion and the Pendulum
- The Physics of the Large and Small
- Wind Energy
- Journey to Mars!

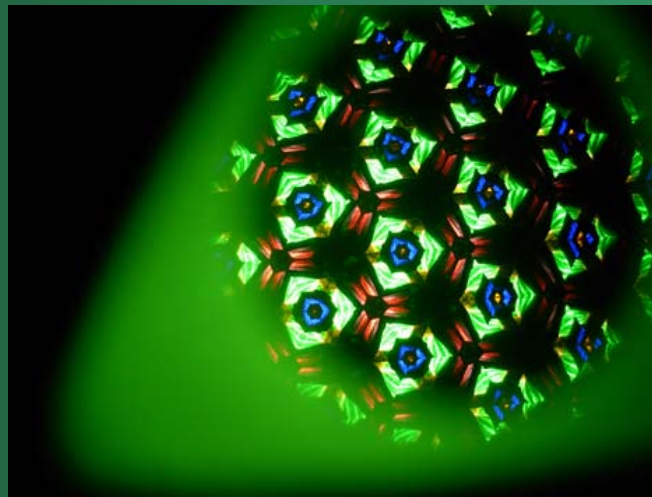


Partnerships, outreach and knowledge dissemination

- *Plenary Session Science Stories: A Spectrum of Considerations for Learning In and About Science with Michael Clough and Joanne Olson, Iowa State University, Ninth International History, Philosophy and Science Teaching Conference in Calgary, 2007)*
- Physics textbook project focused on the historical representation of the photoelectric effect with Mansoor Niaz, Universidad de Oriente, Venezuela.
- Millikan Project with Peter Heering, Carl Ossietzky University, Oldenburg, Germany.
- Middle Years science stories project with Rick Connor, University of New South Wales, Sydney, Australia.
- Sci-Ed.org, Science-Stories.org websites

A Teacher Candidate's Experience in the Teaching of Science Using Historical Narratives and Stories

This study was designed to determine the effect of narratives and stories from the history of science in a teacher candidate's delivery of an instructional unit developed to address mandated learning outcomes for Grade 4 science and children's common conceptions and beliefs about light.



Research Questions

What observable factors affect the implementation of the historical elements incorporated in the science lessons of a Grade 4 unit about light?

Data Collection

Case Study - participant-observer

Results

Although well conceptualized for nine-year old students and well supported by the developer-researcher at the microlevel, the gap between the teacher candidate's implemented lessons and the lessons created for the instructional unit widened as the practicum moved toward completion. The result was a series of lessons in which the historical stories and narratives were dispensed in a distorted or abridged manner.

Integrating Science Curricula in the Middle School: Utilizing Historical Perspectives

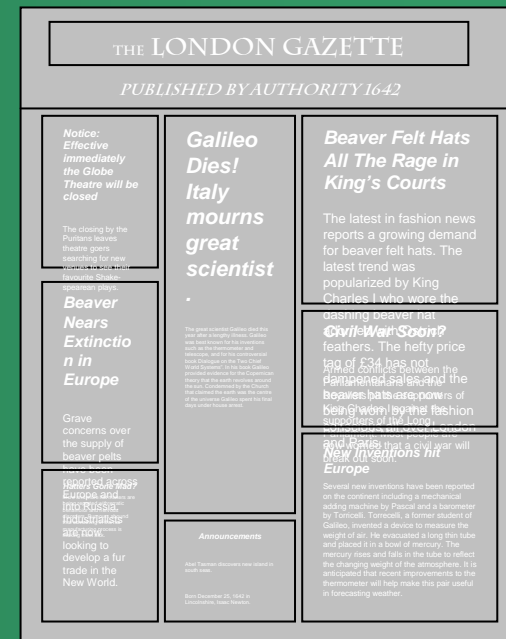


**Indiens avec Pierre Esprit Radisson et Médard Chouart,
Sieur Des Groseilliers, Fort Charles, 1671**

Lorne Bouchard, reproduit avec la permission de Compagnie de la
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We have also field tested the development and implementation of a curriculum designed with the storyline of the fur trade providing a coherent context.

As the storyline unfolds students experience the weather outcomes through daily life and travel, severe weather, the development of historical instruments, and forecasting. The module uses many units of historical representation such as reader's theatre, letters, and newspaper articles designed specifically for the unit.



Research Questions

- What factors can be identified in middle years science teachers as impediments and contributors to their science teaching?
- How is self-efficacy for teaching science of in-service middle years teachers affected by participation in a professional development program that links humanistic-contextual and scientific modes of thought?

Data Collection

- ✓ SETAKIST
- ✓ Open ended responses
- ✓ Focus group interview

Results

- The SETAKIST results were inconsistent.

Results – risks

- Difficulties with knowing and understanding the science concepts
- Lack of available materials for the science demonstrations and student activities
- Teachers had a lack of experience and self-efficacy with the required science demonstrations and activities.

Results – protective

- interdisciplinary nature of the weather-fur trade curriculum;
- teachers experienced a higher degree of satisfaction as they achieved greater effectiveness, realized how the curriculum was designed to “work”, and recognized that it worked as intended;
- Science kits, video demonstrations
- cooperation between the local school division and the CRYSTAL program, effective curriculum implementation required careful planning, collaboration between and among the mentors/researchers and the teachers, critical reflection, and the removal of pragmatic obstacles that impede educational objectives. .

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