

Senior Cycle Physics – Making an Impact



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Teachers Making an Impact

- Teacher as generators of real knowledge about what works in teaching and learning (NCCA, 2009a).
- Network of schools and teachers, learners, NCCA, NCE-MSTL.



Project Aim

To contribute to the draft revised Senior Cycle **Physics** syllabus by designing, implementing and evaluating **teaching and learning activities** that;

- **Align with and reflect** the teaching and learning approach (Inquiry-Based Learning),
- that **embed** the ‘**key skills**’ and **operationalise** the **learning outcomes**,
- probe for a **deeper understanding** of physics from students.



NCE-MSTL

National Centre for Excellence
in Mathematics and Science Teaching and Learning

NATIONAL CENTRE FOR EXCELLENCE
IN MATHEMATICS AND SCIENCE TEACHING AND LEARNING

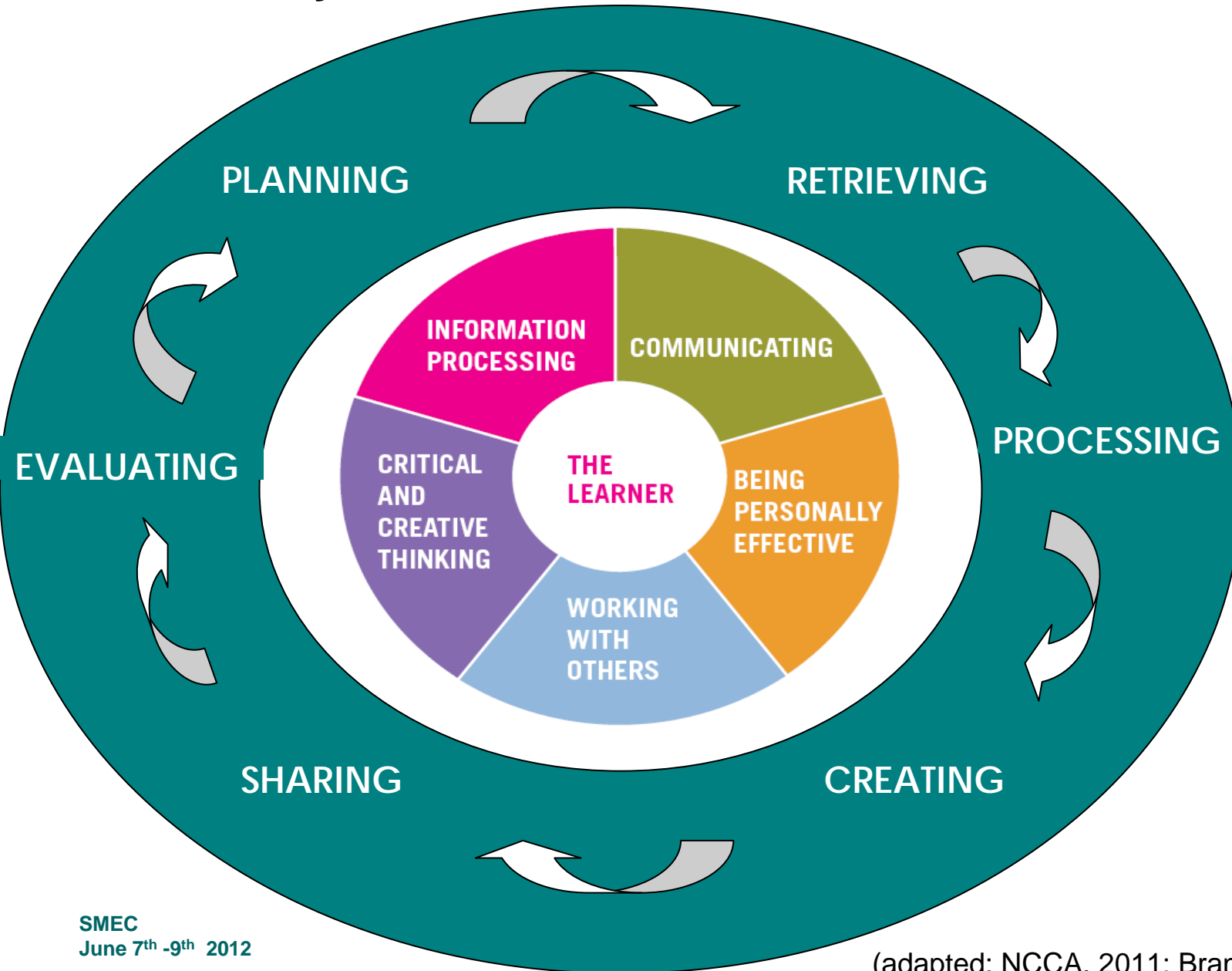
- SMEC**
June 7th -9th 2012

Syllabus Aim

- stimulate and sustain interest and enjoyment in physics
- Develop an understanding of fundamental principles underlying physics phenomena
- Illustrating how humanity has benefited from the study and practice of physics
(NCCA, 2012)



The Key Skills Framework & IBL Process



Project Focus

Asteroids, Impacts and Craters



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Learning Outcomes of Scientific methods

Students learn about	Students should be able to
1.1 Application of scientific method	<ul style="list-style-type: none"> • apply their knowledge and understanding of science to develop arguments or draw conclusions related to both familiar and unfamiliar situations • use secondary data sources; locate and comprehend relevant information from books, scientific publications, internet, databases and other resources • make judgements and draw informed conclusions pertaining to the reliability and validity of data • use observations as the basis for formulating a hypothesis
1.2 Scientific process skills	<ul style="list-style-type: none"> • identify variables and select appropriate controls • design, manage and carry out experimental and non-experimental investigations; select appropriate measuring devices; use scales and units accurately, being aware of limitations and errors • collect, organise, interpret, present and analyse primary and secondary data • describe relationships (qualitatively and/or quantitatively) between sets of data; recognising the difference between causation and correlation
1.3 Societal aspects of scientific evidence	<ul style="list-style-type: none"> • critically examine the scientific process that was used to present a scientific claim • appreciate the limitations of scientific evidence

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(NCCA, 2012)

Physics Behind Asteroids, Impacts & Craters

- Energy (conservation of energy)
- Newton's Laws
- Mass, Density, Volume
- Collisions
- Gravity
- Trigonometry



Project Approach

- **Action Research**
 - Data collected: pre survey, interviews, student written work, classroom observations, video (Class & Workshops), teacher written work.
- **Seven Physics teachers** - invited to participate in this project.
- **Senior Cycle students (5th year)** studying Physics - **target student group**.



Workshops

Workshop number	Detail
1	<p>Introduction to the project</p> <p>Hands-on interactive session – trying out possible activities.</p> <p>Informed planning session</p> <p>IBL elements</p>
2	<p>Further planning & discussion of teaching and learning activities</p> <p>Developing assessment activities</p>
In-class	Classroom Implementation
3	<p>Reflection on the project after implementation</p> <p>Reflection on the assessment questions developed & further development</p> <p>Feedback session</p>



A large, circular, textured object, possibly a fossil or a piece of ancient pottery, resting on a light-colored, mottled surface. The object has a dark, irregular border and a lighter, textured center. A small, dark, rectangular object is visible near the top edge of the main object.

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Learners Making an Impact



Findings

- The development of teacher skills in **designing, developing** and incorporating **activities and tasks** that embeds the **‘key skills’** and **operationalise** the **learning outcomes** within the Draft Syllabus.
- The **students’ understanding** and **‘key skills’ development** of the topics throughout the course of the ‘Impact and Crater’ activities.
- The use of **Inquiry Based Learning (IBL)**



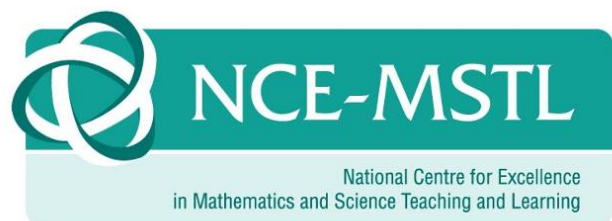
Findings

- Report
- Teacher Resource Material
 - - Tasks and Questions that complement the Revised Physics Syllabus
- Professional Development Framework



Acknowledgements

Physics Teachers, students and Schools
who participate in this project



www.nce-mstl.ie
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