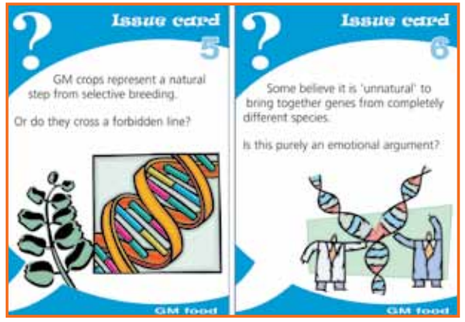
DEMOCS

PATHWAY



Summary:

Enabling teachers to run the DEMOCS game with 11-18 year old students.

Aims:

To learn about the use of the DEMOCS game to help students to inquire about controversial issues in science, and to understand the balance between scientific evidence and people's interpretation and judgment upon that evidence.

Main activities:

Workshop to facilitate teachers in running the DEMOCS game with their students.

Narrative:

The DEMOCS game provides a way to understand the evidence which underpins controversial issues in science education, and then to understand the enablers and barriers to that scientific evidence being understood by the public more widely. By passing through a series of stages in the game, each of which requires decision-making based on science, the nature of science, and the impact of science on society, students come to understand that scientific progress cannot take place outside of its society, and understand more about the role of scientists in making their findings and the implications and benefits of their findings more accessible to the public at large. This project aims to facilitate teachers and trainee teachers in running the game with their students, and in using it to support students' understanding of the nature of scientific inquiry and the implications of such inquiry in society.

Methods of learning/training:
Participants attend a workshop in which they play a DEMOCS game and are taught how to use the game with students.

End user:
Trainee teachers and teachers from 11-18 comprehensive schools.

Involved actors:
Teacher trainers, University researchers (who are generally the same people) and education officers from the Sanger Centre Genome Campus.

Location:
Faculty of Education and Sanger Centre.

Languages available: English

Where to find the application:
An example is to be found here: www.neweconomics.org/publications/democs-for-schools-gm-food. Other examples are available on the same site.

Evaluation parameters:
Teachers complete formal evaluation questionnaires, and their implementation of the DEMOCS game is monitored in situ, with evidence drawn about its efficacy from their students.

Duration:
This can be relatively open-ended, but it would generally 2 – 4 hours.

Optimum number of participants:
5 per group, but it can be undertaken with up to 100 participants.

Teachers' Competencies

1	subject matter/content knowledge	x
2	nature of science	x
3	Multidisciplinary	x
4	knowledge of contemporary science	x
5	variety of (especially student-centred) instructional strategies	x
6	lifelong learning	x
7	self-reflection	x
8	teaching/ learning processes within the domain	x
9	using laboratories, experiments, projects	
10	common sense knowledge and learning difficulties	x
11	use of ICTs	x
12	knowledge, planning and use of curricular materials	
13	Information and Communication Technologies with Technological Pedagogical Content Knowledge	

Mapping best practices with main principles

1. Building interest in natural science phenomena and explanations:

By playing the games, students are forced to understand the scientific knowledge behind the game, and to engage with it by being presented in a real-life context which is relevant to their everyday lives.

2. Building up informed citizens: Students understanding the nature of Science & Science in society:

The aim of this game, as outlined above, is to understand the relationship between science and the way in which scientific discovery is assimilated by society at large.

3. Develop multiple goals:

- **understanding big ideas in science including ideas of science, and ideas about science**
- **scientific capabilities concerned with gathering and using evidence**
- **scientific attitudes**

Each game focuses on one big idea in science, and asks students to assimilate and take judgments on evidence (and aspects purporting to be evidence), to develop their understanding and attitude to particular scientific discoveries, to understand how others form their attitudes on scientific discoveries, both in particular and more generally.

4. Understanding students' concepts and learning style about of science phenomena:

This game exposes children's misconceptions and beliefs about particular aspects of science and enables pupils to come to understand the nature of scientific evidence.

5. Relevance of the content to daily life of students:

The content is set within contemporary issues in science, which are frequently reported in the news.

6. Understanding science as a process not as stable facts. Using up to date information of science and education:

The games provide up to date information about science, and they provide some sense of the history of scientific discovery in each context.

7. Activities for gaining knowledge, not for entertainment, nor for simple imitating of results:

These activities enable students to build knowledge collaboratively, and to test their understanding of science, and the influence of their own ethical framework on the acceptance of scientific discovery.

9. Assessment: formative ~ of students' learning and the summative ~ of their progress:

By monitoring students' contributions, and by examining the outcomes of each group's game, it is possible to take judgments on students' understandings of science, and to intervene in such understandings where appropriate.

10. Cooperation among teachers and with experts:

By running this training with the education officers of the Sanger Centre Genome Campus, and with Faculty of Education lecturers, teachers are enabled to gain expertise both in the science addressed, and the educational benefits to be derived from participation in the games.