Lapses by students and writers indicate the continuing existence of obstacles to learning

Gabriel Gohau

Geological facts were at first understood as narrating a progressive or regressive linear history (Buffon). Then, Hutton reinterpreted these facts as a reflection of a cyclical succession of the same phenomena which involved, in particular, a repetition of orogenesis. However, students often account for the formation of mountains by attributing it to single ancient event. Similar ideas are found among writers and film-makers, showing how difficult it is to conceive a cyclic history of the earth. Even contemporary science stumbles on this problem for want of being able to build a model that can reconcile repetition with irreversible advancement.

Seismic activity, volcanic eruptions and the inside of the earth: conceptions of students from 8-10

Jean-Charles Allain

Tackling ideas about seismic activity and volcanic eruptions with young people aged 8-10 in primary school presents challenges in transposing this information into a format that is instructionally effective for this age group. How does one make modern scientific data and knowledge accessible, simplify it without misrepresentation and present it without reinforcing pre-existing obstacles? Students' initial conceptions about the subject matter are collected and analysed in order to determine difficulties, confusion and developing concepts.

Vulcanism from primary school to school teachers' initial training

Michèle Laperrière-Tacussel

In both geology and biology, teachers encounter the same types of answers from primary school upwards. Do these levels correspond with readily identifiable student conceptions in these different answers which teachers should take into account? What possible obstacles to learning are reflected in these different levels of answers? This article, which presents the results of research conducted for a DEA de Didactique de Disciplines Scientifiques, tries to find an answer to these questions with regard to the topic of vulcanism.
Didactic guidelines for teaching vulcanism and the internal workings of the earth from primary to secondary school

Christian Orange

On the basis of historical or epistemological references, we make some tentative suggestions about the main shifts in thought that need to occur when learning about vulcanism and the inner workings of the earth. These shifts imply the abandoning of previously held notions. This leads us to distinguish between (a) discontinuous learning that necessitates breaking with former ideas and which for teaching purposes can be translated into "obstacles as objectives" and (b) “normal” learning that is so described because it proceeds in a manner that is consistent with a chosen scholarly paradigm.

You said crystal? I think glass

Hervé Goix

Our objective is to take account of student understandings in the teaching of geology to 14 years' old pupils. A large part of our course is organised around the four concepts represented by the words crystal, rock, magma and earth. The present article covers students' conceptions that we have collected. We describe them using the same modalities as were used to collect these conceptions. They are then related to different formulations, organised into a network, of linked concepts. The aim of this presentation is to relate the conceptions of students, the obstacles that have been spotted and the possibilities of overcoming them.

Conceptions on the geological map held by 17 years' old students

Pierre Savaton

The geological map used to be an important tool for teaching geology before its place in school books was gradually taken over by models and schemas concerned with the teaching of the theory of tectonic plates. Despite the fact that this type of map is still a geological object and tool which is highly representative of knowledge and techniques used in earth sciences, such maps risk becoming totally unfamiliar to students of geology. The optional science class for 17 years' old students, in which a third of the programme is dedicated to geology, presents an ideal opportunity for studying the conceptions connected to the geological map and its construction, and comparing them to the reality of the geologist.

Cartoons acting as catalysts for the reactivation of learners' conceptual networks

Pascale Corten-Gualtarl
Anne-Marie Huynen

Following the trend of research on graphic representations of scientific concepts, we examine cartoons published in scientific journals for a wide public in concern with their potentialities of communicating scientific ideas. A
previous study, using semiologic tools, analysed two cartoons related to genetic engineering. We presented them to pupils that had already followed a course on genetics. We describe here the mechanisms they use when decoding the message and conclude that they definitely lead to a reactivation of the pupils' conceptual networks on genetics.

We then propose various functions that cartoons might fulfil for teaching purposes. They could be used as a help for students to express their understanding of scientific knowledge and as an assessment tool. More basically, they could play an important part as a mediation between teachers' language and the formation of mental images of biology concepts by students.

Traduction Richard Lowe
Anne Vérin