GEOschools Project teaching modules in Naturtejo Geopark: Teaching Geosciences in the Field - Geoparks and Geosites

Módulos de ensino no Geopark Naturtejo no âmbito do Projecto GEOschools: Ensino de Geociências no Campo – Geoparques e Geossítios

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Abstract: GEOschools is a European Union Comenius project whose target is to define a "Framework on Geosciences Literacy Principles" for the secondary school in Europe.
One of the products of this project is the teaching modules reflecting this framework. It will be presented "Teaching Geosciences in the Field: Geoparks and Geosites" module projected for Naturtejo Global Geopark. These are teaching modules, which include material for teachers and worksheets for the students use during fieldtrips.
The proposed approach is based on brainstorming activities around a key-question for each selected geosite that will promote on site observation and debate. Such a teaching approach will develop skills contributing for the education of a conscientious citizen.
"Teaching Geosciences in the Field: Geoparks and Geosites" in Naturtejo Geopark is a privileged area to explore the Geoscientific subjects and including Geodiversity, Geological Heritage, Geosites, Geoparks and Geoconservation. But also to promote interdisciplinary bridges with approaches in Archeology, Biodiversity and Culture.

Key words: GEOschools Project, geosites, Naturtejo Global Geopark, teaching module.

Resumo: *GEOschools é um projecto Comenius financiado pela União Europeia, cujo objectivo é definir uma "Framework com Princípios de Literacia em Geociências" para alunos do 3º Ciclo do Ensino Básico na Europa.*
Um dos produtos deste projecto são módulos de ensino reflectindo esta framework. Será apresentado o módulo "Ensino das Geociências no Campo: Geoparques e Geossítios" desenhado no Geopark Naturtejo, pertencente às redes europeia e global de geoparques, sob os auspícios da UNESCO. Estes módulos de ensino incluem material para os professores e para os alunos utilizarem durantes as saídas de campo.
A abordasgem proposta baseia-se em actividades de brainstorming à volta de uma questão central para cada geossítio seleccionado, que irá promover observação e debate. Esta estratégia de ensino irá desenvolver competências que contribuem para a educação para uma cidadania consciente.
O Geopark Naturtejo é uma área privilegiada para explorar assuntos de Geologia- e temas como Geodiversidade, Património Geológico, Geossítios, Geoparques e Geoconsercvação. Mas também para promover pontes interdisciplinares com abordagen s de Arqueologia, Biodiversidade e Cultura.

Palavras-chave: *Projecto GEOschools, geossítios, Geopark Naturtejo, módulo de ensino*

INTRODUCTION

GEOschools (http://geoschools.geol.uoa.gr/) is a European Union project supported by the Comenius Lifelong Learning Programme, focuses to "translate" geosciences into language and learning opportunities to be understood by school students.

The main goal of the GEOschools project is to define a "Framework on Geosciences Literacy Principles" for the general European citizens, to be applied at least for the revision of obligatory school curricula for secondary schools for the participant countries: Greece, Spain, Italy, Portugal and Austria. The key results to be issued during the development of the project are: a curriculum comparison research, students and teachers

interest research, a school geosciences dictionary (lexicon), teaching modules on specific subjects, a website and a newsletter(Fermeli et al., 2011).

FIGURE 2. *Field Trip with teachers in the Portas do Ródão Natural onument*

TEACHING MODULE. TEACHING GEOSCIENCES IN THE FIELD: GEOPARK AND GEOSITES

FIGURE 1 – Geology and Culture: traditional architecture in Monsanto Inselberg geosite

Naturtejo Geopark, European and Global Geopark under UNESCO since 2006, has about 170 geosites and a geological history with over 600 million years spread in 4627 km2. The selected geosites for the teachingmodule include protected areas, archeological sites, and walking trails. The module "Teaching Geosciences in the Field: Geoparks and Geosites" in Naturtejo Geopark is centered not only in the topic Geoparks and Geosites but also in Geodiversity, Geological Heritage,

Geoconservation, Nature Conservation, and Human Impact in the Landscape. It is a privileged site to propose interdisciplinary bridges with approaches in Archaeology, Biodiversity and Culture (fig. 1).

GEOSITE SELECTION

To select the geosites it was considered:

- scientific importance,
- didactical importance in Naturtejo Geopark Educational Programmes,
- teachers opinion (fig. 2),
- importance of the geosites in Portuguese textbooks,
- importance for cross-disciplinary approach.

FIGURE 3 – Naturtejo Geopark Educational Programme in the Penha Garcia Ichnological Park

Selected geosites:

- Monsanto Inselberg,
- Penha Garcia Ichnological Park,
- Ponsul Fault,
- Portas de Ródão Natural Monument (fig.2)
- Fossil Trunks,
- Portas de Almourão.

CONTENTS AND SKILLS UNDER THE "FRAMEWORK ON GEOSCIENCES LITERACY PRINCIPLES"

The "Framework on Geosciences Literacy Principles" is the main goal of the GEOschools project. It reflects the results obtained through a curriculum comparison research (Calonge, 2011a, 2011b) and students and teachers interest research based on questionnaires (Fermeli, *et al.* in this book). This Framework embraces the basic topics that every European citizen should study. For each general axis, the most important subjects to be developed and the main skills with related bibliography to support teachers was identified.

After the selection of the geosites, the teaching module was designed considering contents and skills for the secondary school from the "Framework on Geosciences Literacy Principles".

STRATEGIES AND TOOLS FOR ALL THE GEOSITES

For each geosite there are specific activities related with one key-question, where the students will be actively involved with.

- Monsanto Inselberg: How does the water shapes the landscape?
- Penha Garcia Ichnological Park: Which testimonies do we have about the past environments (fig. 3)?
- Ponsul Fault: How do the mountains are formed?
- Portas de Ródão Natural Monument: How does Geodiversity influences Biodiversity, human occupation and activities?
- Fossil Trunks: How these fossils do allow us to recognize climate changes?
- Portas de Almourão: What is the sustainability of the construction of a dam in this geosite?

CONCLUSIONS

The module is designed for teachers and it is divided in two main parts: one for teachers and one to be used for students. The first part presents the themes and geosites, the contents and the dexterities, giving also bibliography for each topic. There are also available tools that the teachers can provide, using common materials and PowerPoint presentations dedicated to all the geosites to use in classes to introduce the fieldtrip or to reinforce it after.

On the second part, teachers have a first worksheet to prepare the fieldwork in the classroom with specific activities to the students targeted to the Naturtejo Geopark. There is also one worksheet for each geosite to explore in the field.

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Abstract Book

3rd International GEOschools Conference: "TEACHING GEOSCIENCES IN EUROPE from Primary to Secondary School"

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