

# **GAME OF ORIENTATION USING CARTOGRAPHY IN OUR NATURAL PARK IN ALCALA DE HENARES, MADRID (TEACHERS AND STUDENTS FROM “ISIDRA DE GUZMAN SECONDARY SCHOOL”).**

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## **ABSTRACT**

THE MAIN OBJECTIVE OF THIS ACTIVITY IS TO ENJOY THE LEARNING OF CARTOGRAPHY, LIVING NATURE AND GROUP WORKING.

This activity is part of an European Project: Socrates Comenius 1.1 titled: “Leisure Time Activities in Our City” that our school is carrying on for its second year. Teachers and students at secondary schools from Spain, Romania and Lithuania schools are involved in this project.

It is important for our students to have a clear idea of Alcalá de Henares, the place where they live and where they will probably work, encouraging free time activities according to their age.

Our aim is to encourage healthier and more useful leisure time activities among our students through:

1. The use of orientation techniques, learning and interpretation of a scale topographic map sheet. This will prove useful to achieve more self-confidence when using a map in the middle of nature, promoting, at the same time, activities such as: foot tracking, mountain climbing and other country sports.
2. Works with a mixture of different ways of expression: maps, graphs and sketches, in order to learn how to use the cartographic language, that is: concepts of planimetry, location of geographic coordinates, the scale, volume representation in a map as well as general ideas about orientation and trigonometry.
3. Multisubject activities which combine the learning of Cartography, Geography or Trigonometry with the use of a compass, the Geodesic vertex or horizon overview. We think that all these activities may provide some environmental education, equality between sexes and peace subjects.

## **DESCRIPTION OF THE ACTIVITY**

Didactical & Pedagogical and funny. It consists on a series of mainly practical sessions, together with some theoretical sessions indoors (it is necessary to have some previous sessions before going out to the Natural Park).

Students will be divided into several groups at the entrance of the Park. Each group will be given a map with a particular track. Along the track they should be able to find the points in the track where there are hidden messages. Each message will give information of a direction or length, which contains a piece of information they should keep in mind. The track will finish at the Muslim Castle of the Ancient Town of Alcalá, where the teachers will show them the mind building as soon as the students give them the information achieved during their track. When everybody has completed their tasks, teachers and students will join to have lunch and then go back along the old garbage dump way.

This activity can be adapted to different ages and played as a game, where teachers and students would play their part living their own adventure.

## **1. FRAME OF REFERENCE**

This game has been carried out by pupils and teachers from Isidra de Guzmán High School, Alcalá de Henares, who are participating in a Comenius Project (included in the European program: SOCRATES) entitled: "LEISURE TIME ACTIVITIES IN OUR CITY". The final conclusions from the survey about leisure time activities passed to students from Lithuania, Bulgaria, Rumania and Spain, show us the lack of knowledge and little interest towards the geographical and historical surroundings of their city. Perhaps not so much in Bulgaria. After a year working in the project, the activity in the Natural Park deals with cross cultural information and provides a wider knowledge of their city helping, at the same time, to improve social abilities, open air physical activities and geographical as well as spatial orientation.

### **1.1. Location, socioeconomical and cultural context**

Our High School is located in Alcalá de Henares, a city which belongs to the metropolitan area of Madrid. Nowadays, its population, approximately 200.000 people, features the economical and social reality of Madrilenian influence. Yet it used to be one of the most important cultural centres in Europe during the Modern Age. At the end of the XV century, Cardinal Cisneros, who became regent of Spain, founded a University in this medieval villa. After a few years, this University became one of the most important centres of the Castilian Renaissance, competing with Salamanca. The city highlighted between the XVI and XVII centuries, from that moment onwards, the university declined together with the rest of the city. Wars and crisis ruined part of the beautiful buildings which decorated the city. From those times, a very important historical centre remains, being justly declared as Human Patrimony by the UNESCO.

By the time of the city splendour, when Juan de Austria, Ignacio de Loyola and Saint Teresa de Jesús, still walked down its streets, Miguel de Cervantes Saavedra, our most important Universal Spanish writer, the author of Don Quixote, was born in Alcalá de Henares. As a matter of fact, this year we celebrate the IV Centenary of the publication of the first part of Don Quixote. That is why, there are lots of activities outdoors and indoors taking part in Alcalá de Henares, honoring Cervantes and his genial novel.

A century before Cervantes was born Antonio de Nebrija, the author of the first Spanish Grammar, died here. He used to be a teacher at the University of Alcalá de Henares, also called Complutense (Alcalá was called Complutum when Hispania still belonged to the Roman Empire).

Apart from the above mentioned, this city has a natural area of high ecological interest. It is placed by the river Henares, a natural way for the communication between Tajo and Ebro river valleys. In the South, there is 200 a 300 metres depression between the river valley and the plain, full of deep gullies and ravines. That is why, this area has been preserved safe from the urban development, becoming a refuge for wild animals and plants. The authorities declared this area "Natural Park", as "Los Cerros".

The quarter where it is placed our school, belongs to an expanding area, with new house buildings which have improved its image of previous year. Low middle class families live here, together with migrants coming from Eastern Europe and Latin America, who looking for a better life. The fact that our students show a lack of interest and incredulity, towards cultural and ecological values in their city, isn't a new thing for teachers, neither is focused on Alcalá de Henares. It also affects many new cities which are growing fast because of the influence of a bigger city, as Madrid.

## **1.2. Academic Context: Comenius Project**

The European Project Comenius (as a part of the Socrates project actions), pretends the improvement of the school education quality, reinforcing the European dimension, as well as international cooperation among schools, helping, at the same time, to develop the professional people involved directly in the teaching activity. It involved also encourage the learning of languages and crosscultural Knowledge.

Our High school: Isidra de Guzmán, collaborates with three other countries: Bulgaria, Romania and Lithuania. We are the coordinatory institution. This give us the opportunity to work in the classrooms with subjects of common interest to all of us. With this game, our objective is to exchange experiences, as well as to cover elements of diversity in the school.

Our objectives are, mainly:

- Improve the knowledge of our city and other cities, mainly their cultural resources.
- Develop work projects and activities related to culture: music, sports and other subjects connected with leisure time activities, as a way of integration for young people of any condition of nationality.
- Give our students the opportunity to communicate, meet other people and get to know themselves better.
- Encourage tolerance and respect towards other people realities, nationalities and cultures.
- Introduce teachers ourselves into a new dimension which will make possible to contact other institutions acquiring useful experiences.

## **2. BACKGROUND: ACTIVITIES FROM PREVIOUS YEARS RELATED TO THE ORIENTATION GAME. CROSSCULTURAL SUBJECTS.**

It is interesting to point out that to make this activity possible, students are supposed to acquire a certain maturity and domain of orientation techniques (as for example using a compass, reading maps, the understanding of level bends or topographic shaper, etc).

For this reason, during several academic years, our school has developed some activities previous to this orientation games (4<sup>th</sup> year E.S.O.), introducing gradually those concepts related to theory and practice from different activities, carried out by different school Departments, as the game is considered a crosscurricular.

## **3. PREVIOUS: ACTIVITIES OF COURSES RELATED TO ORIENTATION GAMES. INTERDISCIPLINARY NATURE.**

It is interesting to notice that in order to perform this activity; the students will need to acquire a certain level of maturity and have a good knowledge of the orientation technique (that includes compass utilization, compass reading, interpretation of contour lines and topographical sections.

To achieve that in the school, during the years previous to the development of the orientation game (4<sup>o</sup> de E.S.O.), these concepts have been slowly introduced at a theory-practical level through several activities performed by the different departments. The Departments involved in this activity are, as main contributors the Geography and Physical Education with the collaboration of the Mathematical and Science department.

Driven by the Physical Education department in 2<sup>o</sup> de E.S.O, the scope of the orientation activity is explained using the school. The step-by-step orientation, which goal is to initiate the child/teenager with no previous knowledge in this activity. In 3<sup>o</sup> de E.S.O the explanations are reinforced performing a "Orientation Competition"(as it was included in Comenius project and executed by professor Oscar López Orol). The physical activity in the natural environment has a critical importance in order to achieve improvements in the learning process that could be transferred. Besides, these activities in a natural environment, away from the day-to-day school

routine, are very valued by the students as they are normally in a city environment when spending their spare time.

Besides the compulsory theory based on activities in 2º y 3º de la E.S.O, the Department of Geography offers other type of practical activities directly related with the creation, interpretation and reading of maps (contour lines, topographical sections, etc). In 3º E.SO. a 3D prototype of Alcalá de Henares and its geographical natural environment is created. In 4º E.SO, due to the 400 Anniversary of El Quijote, it will be created a map with the itinerary and the route along La Mancha followed by its main charismatic character. Both activities will be directed by the responsible of the Department of Geography: Carmen Pascual. In addition, in 3º E.SO, the teacher Ana Martín will develop another activity named: “Trip around the world”, including the drawing a map about the way chosen by the students for this trip.

Directed by the Science Department, in the Geology section, there is a initiative to create a practical case about Contour Lines and Topographical Sections for the students of 4º E.SO to work on it thoroughly in order to assimilate the main concepts previously learnt.

With the initiative of the Maths Department at secondary school, the student in 1º E.S.O acquire the basic concepts in geometry (angles, distances, geometrical figures...) in order to be able to use the compass. 2º ESO is focussed in developing dimensional vision in the student by using geometrical figures in 3D. At this moment the Physical Education Department realizes the activity called “Orientation Step by Step”

#### **4. OBJETIVES AND CONTENTS**

Our main aim is introduce student in the orientation techniques and in the maps interpretation. This provides student security and fluency to stay in natural areas promoting that they enjoy trekking, climbing, etc. At the same time they acquire respect and care habits to nature.

The objectives are:

##### **4.1 Didactical objectives of the game:**

- To provide a global vision of Alcalá de Henares. Tried to student appreciate the place where they live and will probably work, in order to be easier develop their rights and duties of citizen.
- To appreciate the natural and archaeological heritage, mainly the Alcalá de Henares heritage, with the commitment to conserve it and improve it. This patrimony is a enjoy supply and a resource to knowledge human development and to individual and collective sensibility.
- To show a tolerant attitude to different ideas and to other cultures, and to be respectful with the idiosyncrasy of the countries and their archetypes, their customs, and their objects.
- To promote the natural knowledge in order to student learns that is an optimum place to leisure activities. This nature leisure activities are healthy and appropriate to their ages.
- To know the main orientation techniques and map interpretation, help to a good appreciate and conserve of the studied items.

##### **4.2 Didactical contents of the game**

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- To know the main orientation techniques and map interpretation, help to a good appreciation and conservation of the studied items.

### **A)Conceptual**

- During the activity students learn basic vocabulary about geography and archaeology
- Study of the topographical map. Reading and comprehension of sheets. Basic concepts of orientation.
- Geographical and geological units of the Alcalá de Henares environment. The slopes landscape.
- The ecosystem of the natural park. Different vegetables and fauna .
- Basic concepts of archaeology. Archaeology work techniques. The case of Alcalá de Henares.
- Alcalá de Henares history: Prehistory settlers.
- Alcalá de Henares history: The Moslems of Qalat'abd al Salam.
- Urban development of the city in the XX century and their natural park. From rubbish dump to preserved area.
- Future dangerous. The road network infrastructure.

### **B)Procedural**

- Reading and interpretation of the sheet of the national topographical map of Spain relative to Alcalá de Henares. It works with aerial photography and other type of map.
- Introducing to the archaeological work. Location remains.
- Compass orientation techniques. Basic courses.
- Clear and organized presentation work, using different expression ways, maps, graphics, sketches, etc.

### **C)Attitude**

- Rigorous critical and scientific curiosity
- a) Interest to meet other cultures and learn their particularities, technological discoveries, cultural expression ways, etc
- b) Recognition and critical evaluation of achievements and insufficiencies of contemporary society.
- Assessment and nature conservation

- a) Respect and archaeological expression assessment of other societies and legacies located in Alcalá de Henares. These are important expressions of our experience and collective memory, so it has been insured their conservation.
- b) Assessment, respect and enjoyment of the diversity and wealth of our natural heritage, so it has been carefully conserved.

- Tolerance and solidarity

- a) Tolerance, respect and assessment critical of attitudes, beliefs, ways of life, etc, of persons or groups of other societies or other cultures.
- b) Refuse of dogmatic or ethnocentrism thinking ways.
- c) Respect and assessment of the historical and cultural diversity of Spain as a distinctive reality and enrich of our collective heritage.

The next transversal subjects we'll have specially worked:

- Environmental education
- Peace education
- Education to the equality between women and men
- Leisure education
- Consumption education

## ACTIVITY DESCRIPTION

The activity will be carried out with secondary students, adapting the activities to the participating students, going from first year of E.S.O. to fourth year of E.S.O. Some theoretical classes will be given indoors to the participating groups by the involved teacher for the activity. Students will be taught the theoretical aspects which later on they will put into practice, in order to achieve contents and abilities correctly: location of geographical co-ordinates, easy sketches design, orientation practice indoors, at school, first approach to the natural park...etc.

As soon as students are well prepared, they will perform the activity. It will start early in the morning and will take place along the rest of the morning. Students will go to the National Park entrance and will be divided into groups, previously selected.

Each team will be given a map where there will be a precise route they are supposed to follow. Along the route, some points will be pointed. There, there are hidden messages which will point out the direction and distance where the information hidden must be kept. The end of the track is the Muslim Castle of "La ciudad Vieja", where a teacher will show them the remaining ruins, only in case students have given him or her the information requested. Once every team has finished, they will go together to have lunch and will go back along the old rubbish dump.

Depending on the age and motivation of students, it will be possible to add some piece of imagination as if it was a role game, where they are the adventure performers and the teachers act as well.

## TIME SEQUENCE

- Activity introduction ,compromise of participating. Half a session.
- Planimetry general ideas. One session.
- Geographic co-ordinates. Exercises about the map. One session.
- The scale. Exercises about a map. One session.
- Volume representation of a map. One session.
- General orientation. <one session.
- Orientation practise within school. One session.
- Geographic surroundings and sights from Alcalá. Photo slides. One session.

- Natural Park, landscape and wild life. Photo slides. One session
- The sketches. Development and practice introducing some orientation elements. Two sessions
- Prehistory in Alcalá. The importance of archaeology. Photo slides. One session.
- Muslims in Alcalá. Photo slides. One session.
- Performance of the Orientation game. All day.
- Activity report. Half a session.
- Urban development of Alcalá in the xx century. The rubbish dump placed in what we know nowadays as the Natural Park. Future projects for the Natural Park and the threatening conditions of a future motorway. One session.

Evolution. Half a session. (All sessions are 50 minutes timeThe activity will realize with secondary student, it is adapted to their ages, and it's appropriate for the first and the lasts(4º) courses of ESO.

## **EVALUATION**

The correct implementation of maps and compass should be regarded through the correct routes and arrival to the finish. During the track, the teams will be matched out by the teachers to avoid any problems.

During the game in “Alcalá la Vieja”, each student should draw up a sketch of the wall area pointing out the most important ruins. This material, together with the notepads where students have already taken notes during the theoretical classes, will be the base for the teacher's evaluation. The positive evaluation will be based on the correct achievement of the following evaluation criteria.

- Know how to read and locate the main points in the National Topographic map sheet corresponding to Alcalá de Henares.
- The correct definition of basic geographical and archaeological ideas.
- Recognize the main archaeological ruins and the Natural Park valuable things.
- Some Knowledge about the evolution of Alcalá de Henares throughout History.

## **METHODOLOGY CRITERIA AND DIDACTIC RESOURCES**

King into consideration the activity nature and objectives required, we would like to have a dynamic activity if possible. That is why we pretend to give short explanations mixed up with practical exercises , where to put into practice all that has been taught.

We would also try to combine, in case it is possible, theory with a lot of audiovisual material (photo slides, powerpoint presentation...). According to this line, we would lide to work in open air activity as much as possible. The good location of our school, close to the Natural Park maker it easier. In order to respect other class-sessions at school, we will only go out once, working on the practice indoors, at school or around it.

During the class sessions, it would be necessary for students to have their own notepad specific for this activity that notepad will be personal and students will write down the theoretical explanation, there. At the same time, the notepad will be used for exercises in class. So, it has to be easily handled to take notes, make sketches, drawings, etc. During the outings with the group-students will be provided with a hand out taken from a National Topographic map 560-II.

As we can see, throughout the medieval procedures, we will try to encourage the students learning participation an deduction as a basis for the future. Not less important, students will be able to take notes, make schemes, drawing maps, etc.

## **Biography**

Name:	Elena Zapatero Cabañas
Born:	13th September 1972
1991-1996	Studies at Complutense University of Madrid Licensed in Maths
1999-2001	Scholarship at the National Geographic Institute of Spain (Madrid).
Since 2001	Teacher at Secondary School: "Isidra de Guzmán" Teacher at the University of Alcalá; Maths Department
Since 1998	Doctoral Candidate at the University of Alcalá (Madrid): Science and Technology of the Cartographic and Geodetic Engineer.
Sphere of work:	Educational Challenges on the didactical of Maths, Statistics, G.I.S., Remote Sensing, Cartography and Geodesy. Classification of satellite images. Remote Sensing. Member of Commission of Maps for Children (ICA)

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