



Get out of the Classroom

Quality criteria guide
for environmental education activities



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Get out of the classroom

There are phrases easily related to situations we have experienced or that we are familiar with. If we think about our time both as students and as educators (lecturers, teachers, environmental or activity instructors), we can probably relate the phrase «Get out of the classroom» to an experience, often not completely positive, accompanied by an order meaning separation from classmates, isolation, loneliness and loss of time, amongst other things.

«Get out of the classroom» is the name we have decided on for this quality criteria guide for environmental education activities and projects specifically to be undertaken outside the classroom. Environmental education has always considered that which is outside the classroom and school as a unique resource, stimulating, real, innovative and essential for the production and contextualisation of learning. Catalonia has a long tradition of this type of activity used by many educators in both formal education (teachers) and less formal fields (social and activities instructors). It is a way of understanding education as a lifetime's work,

incorporating reality, the surroundings of the educational centres being a tool and a location where what is learnt has significance. The **Get out of the classroom** activities are, therefore, a good opportunity to observe, experiment with and analyse the territory we must get to know and where we need to perform our activities.

The quality analysis of the environmental education and sustainability activities designed, proposed, undertaken and evaluated by us as educators ourselves, was the basis of the work, reflection, exchange of experiences and projects for improvement that are reflected in this collective document. **Get out of the classroom** is, and aims to continue to be, a process of ever-essential improvement, vindicating the important role of this kind of activity related to new developments in the process of teaching and learning, which incorporate an analysis of the complexity of the world around us, to imagine and act upon these things, right now, to make a more sustainable future possible. This kind of education is difficult to experience if you stay inside a classroom.

Lluís Pagespetit
SCEA (Catalan Society for Environmental Education)

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The guide that you are beginning to read is the result of collaborative work between colleagues; work carried out through the analysis of and reflection on practice, participated in by our group of environmental educators who design, undertake and evaluate environmental education (EE) activities addressed at the general public from schools, families and other groups in Catalonia. The analysis of our reality and the relationship with the kind of education we want have led us to analyse and debate documents which have served as a reference throughout this year of work. Documents discussing educational criteria and quality such as *Non-formal environmental education programs: Guidelines for excellence*¹ (NAEE, 2004), those applied in eco-schools in *Eco schools: trends and divergences and Quality criteria for EDS-Schools: Guidelines to enhance the quality of Education for Sustainable Development*² (Mogensen et al., 2005), or those which appear in the ADAPDEA evaluation tool in *Avaluació de les activitats relacionades amb l'educació ambiental que es promociónen des de l'Ajuntament de Sabadell* (Sanmartí, Castelltort, 2003).³

This debate has been promoted by the SCEA (the Catalan Society for Environmental Education), a non-profit association which was started in 1985 with the aim of boosting an up-to-date education contemplating socioenvironmental problems and contributing to the education of people capable of analysing and responding to these problems. The SCEA brings together pro-

fessionals and people interested in the world of environmental education, from different backgrounds and very diverse fields, with the common aim of working for sustainability from an educational perspective. It is a meeting place for debating, sharing and discussing EE approaches and their application in different fields and contexts. The Environmental Education Forums which are called every two years, the assemblies and the working groups are spaces created by this organisation which bring us together to share experiences; spaces where, as environmental educators, we analyse our professional practice and look for common ways to improve what we do. This is an internal process of continual growth and evolution which also tries to establish frames of reference and analytical tools to help the development of EE as well as sustainability programmes and other initiatives carried out in our country.

An important group of members of the entity, we carry out EE tasks in different facilities (public and private) in service companies and various administrative bodies. We implement programmes and activities addressed at schools, with reference to formal education, and at other groups (families, associations, children and young people participating in their free time), if we consider non-formal and informal education. We are a heterogeneous group of professionals that normally carry out different educational activities in specific places and outside the classroom. For some of us this means many years of dedication, practising different

1. NAEE (North American Association for Environmental Education). <http://www.naee.org>.

2. Finn MOGENSEN, Michela MAYER, Soren BREITING. Austrian Federal Ministry of Education, Science and Culture, 2005.

3. Alba CASTELLTORT i Neus SANMARTÍ. Autonomous University of Barcelona, 2003.

educational approaches, successes and failures, the results of permanent training which has been more or less self-taught, whilst for others, this is new work full of challenges and doubts, in which it is difficult to find the relationship between the frameworks existing in EE and their practical application. For some, the challenge is how to show off the territory where they work, for others it is how to help people learn by appealing to the participants through relevant activities, including dialogue and action in any environment, for yet more it is mediation and collective participation to confront certain environmental problems: a heterogeneous and complementary group which analyses what it is doing and how to improve it.

In 2001 the Council for Environmental Education Centres (the field in which the SCEA works, created in 1991 to bring environmental education centres together) published the *Manual of the Council of Centres*, which sets out the quality criteria essential for EE centres, for aspects relating to infrastructure, staff and the activities themselves. This manual was also the result of a working group that now intends to:

- Analyse the accuracy and effectiveness of environmental education activities, especially those undertaken outside the classroom.
- Provide a framework of quality criteria to facilitate the design, implementation and evaluation of the educational projects and activities that are being carried out.
- Present and illustrate these criteria, clearly and specifically, in a guide that can be used to train teachers and environmental educators.

In order to do this we decided to identify and specify those criteria we consider a good environmental education activity should take into account, criteria related to the objectives, content, methodology, evaluation, organisation, resources and territory where the activity is to be undertaken.

In environmental education the most important thing is the process, which in this case has been re-

warding and participatory. We hope the result will be useful, not only for us, who needed it, but also for our colleagues, new professionals who want to work in the field of environmental education, teachers of formal education who use but also often create activities, technicians from public and private institutions that perform, assess and decide which types of EE programmes and activities are to be carried out, and educators in general.

This guide is also an invitation and a push for educational centres and teams to review their activities, and develop and/or specify their own list of quality criteria. This document should help when reflecting on the educational processes taking place.

We are grateful, finally, for the dedication of the centres where we work, as they were both the participants and the places where we discussed many of these criteria with our colleagues.

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The purpose of this guide is to provide an organised set of quality criteria, applicable to all EE activities in formal education (schools) as well as non-formal and informal teaching (e.g., in families, other organisations and leisure activities).

The criteria are illustrated with a collection of activities, currently being conducted by various facilities and institutions, which bring many of these criteria together. The purpose of the guide is not to bring together a wide and varied range of activities, but to show how the criteria are used in practice. It is a guide to quality criteria and not to EE activities.

Catalonia has a long history of educational projects for both developing and achieving environmental education objectives. From the 1960s

to the present day there have been extensive and wide-ranging initiatives (public and private) related to the understanding of the environment. Today's society, our environmental problems and the world of education are obviously not the same as in the sixties. Environmental education has been continuously adapting, with varying success, to these changes, not really modifying its reference targets, which are still valid, but changing the way it goes about achieving them: the methodologies and strategies used, and the resources available.

When we began the work we considered why we now needed a reference framework of quality criteria. The answer to this question is represented by the four following points:

1. Activity quality is an issue that different facilities are debating in their working groups to improve their increasingly diverse practice targeted at ever-changing audiences (e.g., in formal education, families, leisure activities, public groups, technicians from State institutions, museums and local government).
2. In recent years, a wide range of activities has been developed regarding the understanding of a more global environment and action related to environmental problems such as consumption and management of resources, which have become the new «issues» in environmental education.
3. Activities involving direct contact with the natural environment are decreasing and commitment to environmental causes is based on a knowledge which is more virtual than real (via the internet or the media).
4. It is necessary to once again recognise the value of cognitive and emotional ties to one's surroundings which include experiences that cannot be substituted in the classroom, by a game or with a television programme: adventures of discovery in a landscape where the most important thing is the relationship between the individual and the environment.

The main purpose of the guide is to:

- Define quality criteria for EE activities.
- Give examples of EE activities that take into account these criteria.
- Create debate in EE centres and facilities regarding the quality of their activities.
- Provide material to be used in the initial and ongoing training of environmental educators.

For this reason we have written this guide, which arises from a collective need to have quality criteria for our activities. During the process the need to establish quality criteria for broader

EE programmes and campaigns was realised, but we understand that this is yet another challenge, which must be met through further work and in a different guide.

The *Quality criteria guide for environmental education activities* is a working tool and support for teachers, trainers, environmental educators, as

well as all those who design, use, carry out and evaluate EE activities.

What's in it?

- **30 quality criteria** for EE activities organised by field: criteria relating to objectives, content and purpose, methods, evaluation, resources, territory and organisation and planning. Each criteria is presented in reference format including a definition of the criteria, examples of how to use it in a specific educational approach to enable better understanding, and indicators to facilitate evaluation of the activities.
- A **collection of EE activities**, also presented in reference format, which are examples of real activities being carried out in Catalonia and which meet defined quality criteria. The criteria used are indicated and the three most relevant for each activity are highlighted.

This section is not an extensive collection of EE activities but a wide-ranging sample that can help other environmental educators see different types of activities, methodologies and various teaching strategies.

- **What not to do: one image and a thousand words.** A humorous section looking at bad EE teaching practices. The images suggest educational situations that the environmental educators discuss using authentic examples of where similar things happened.
- **Key questions when designing or selecting an activity:** an easy-to-use tool to facilitate an understanding of the relationship between quality criteria and educational practice. This section is particularly addressed at environmental educators, teachers and educators in general.
- The process that each working group followed to produce this guide. A road that opened the door to reflecting on our own educational practice, which we invite all schools to continue doing by reviewing this proposal, or even creating their own list of criteria.
- A **glossary** defining some words which have been reviewed within the context of the work in order to provide a common conceptual framework.
- A collection of **related literature** and resources that may be useful should you wish to delve more deeply into some of the topics dealt with.

How to use this guide

This guide to criteria may have different uses depending on the profile and needs of the person who uses it. It is a recipe book of dishes prepared with some very special ingredients (criteria, indicators and activities), but which any cook or chef should adapt to their taste and according to what they have in the fridge.

This guide helps us define an **educational philosophy** and collectively put together the road map of our educational practice. It allows us to specify the purpose of our work and visualise the implicit values that go along with it.

The guide is a tool for **evaluating** our activities. We understand evaluation as a driving force for the improvement of quality, a continuous exercise that lets us analyse what we are doing and identify any necessary changes. We want to focus on results and check whether the objectives we set have been met, but we also want to see how the activity progressed and what obstacles were encountered. The system of criteria and indicators that we propose is valid for each of

us. It is an instrument open to new contributions, but which allows regulation via self-assessment of the teaching-learning processes used. A way of starting, provoking and making qualitative modifications, with the possibility of different stakeholder participation (e.g., groups of educators, teachers or the target audience of the activity).

This guide is also an **educational tool** as it can be used in training courses for environmental educators, where the students and teachers have to design, carry out and/or evaluate activities; courses in the field of education (initial or continual), aimed at instructors (informal education), environmental educators, Pre-school and Primary education, Secondary school teachers and educators in different fields of continual training.

The guide contains all the necessary elements for **choosing and designing** EE activities:

The **principal ingredients** of this recipe are the 30 quality criteria we have selected.

The **criteria** are tools for evaluating and understanding the activities, on one hand the EE goals, so we talk about the participation and education involved in the activity and its complexity; and on the other hand the points of view and values of the working group, such as the importance of going outside to do activities or links to the local area.

The **indicators** provide clues about the aspects under consideration when evaluating the results of the activity, whether or not the criteria has been fulfilled. We are not trying to give an exhaustive list of indicators, but rather provide some which are concrete and specific, to function as the initial incentive to make the most appropriate selection for each situation. The indicators are not only a quantitative measure of the outcome; they are sometimes qualitative and descriptive statements which guide us in the right direction.

The collection of **activities** is another necessary **ingredient** in our cooking. We suggest

educational projects which are currently being carried out in Catalonia, and highlight how they meet certain quality criteria. These are authentic examples which apply the criteria and they are presented in such a way that it is possible to adapt them to other realities and contexts.

In one of the latter sections of the guide are some key questions to orient us in our educational practice. We propose questions which, from the off, provide the activities with a certain level of quality, whether we are users (teachers, technical staff of councils or other educators) or professionals who design, carry out and evaluate those activities (environmental educators).

We hope this recipe book and its main ingredients will enable you to cook up some good environmental education.

Bon appetit!



5

Quality criteria for environmental education activities



Why these fields?

The identification of the implicit and explicit criteria, inspired by the values of EE, which guide the current teaching-learning processes in Catalonia, was our starting point.

Initially each member of the working group of the guide suggested those criteria used in the design and implementation of the activities carried out in their facility, company and/or organisation. From this first list of common criteria, the most relevant ones were selected and prioritised.

A set of more than fifty criteria constituted the framework of the initial document that small groups then began working on. Each criteria was

defined and those which were related were grouped together. A debate arose which served as training for the members of the working group and which incorporated the reading of various documents on quality criteria, cited in the bibliography.

It was the moment to specify in which fields the agreed-upon criteria should be situated. It was not an easy process and various existing models were discussed, principally those proposed by Michela Mayer¹ and Neus Sanmartí.²

The final decision was to use six areas that the SCEA working group considered to be distinct:

- **Objectives, content and purpose:** this includes the criteria relating to the purpose of the educational activity and the aims and EE values that we have in common.
- **Method:** this includes the criteria relating to the way the activities are carried out and the strategies used.
- **Evaluation:** this includes the criteria most related to the results.
- **Resources:** this includes those criteria relating to any support material used to aid the learning process.
- **Territory:** this includes the criteria relating to the physical space where the activity is carried out.
- **Organisation and planning:** this includes the criteria concerning the external organisation of the activity and those affecting its optimal implementation.

1. MAYER, M. *Criterios de calidad e indicadores en educación ambiental. Perspectivas internacionales y ejemplos nacionales e internacionales a la vista de la Década de las Naciones Unidas de la Educación para el Desarrollo Sostenible. Ponencia inaugural de III Jornadas de educación ambiental de la comunidad autónoma de Aragón 24, 25 and 26 March, 2006.* Zaragoza: CIAMA, La Alfranca, 2006.

2. SANMARTÍ, N.; CASTELLTORT, A. *Avaluació de les activitats relacionades amb l'educació ambiental que es promociónen des de l'ajuntament de Sabadell.* Autonomous University of Barcelona, 2003.

List of quality criteria

Objectives, content and purpose. Ensure that the...

- Objectives are well defined.
- Objectives meet the needs of the target audience.
- Content is well defined.
- Content to be worked on is up-to-date and socially relevant.
- Activity is based on the concept of learning as a socialising process.
- Activity looks at different future scenarios.
- Activity takes into account the complexity of the issue.
- Activity relates to the everyday life of the participants.

Method. Ensure that the activity...

- Uses participative strategies.
- Promotes cooperative learning.
- Facilitates critical thinking.
- Uses different techniques and methods to allow it to be adapted to different realities and groups.
- Incorporates a sequenced learning process.
- Is action-oriented.
- Evokes emotions and empathy.
- Uses practice to prompt theory building.

Evaluation. Ensure that the...

- Evaluation is a necessary part of the learning process.
- Activity incorporates the tools to allow regulation and evaluation
- Activity provides space to enable personal learning and self-evaluation.
- Objectives are evaluated.

Resources. Ensure that the...

- Resources utilised facilitate the development of the activity.
- Creation and use of resources is coherent with the sustainability criteria.
- Activity makes careful use of data and information.
- Resources allow for different learning paces.

Territory. Ensure that the activity...

- Is contextualised in time and space.
- Stimulates an emotional link with the surrounding area.
- Is undertaken in an appropriate place, taking into account sustainability criteria

Organisation and planning. Ensure that the...

- Group leader and activity leader work together.
- Student/educator ratio is appropriate to the type of activity and the characteristics of the group.
- Activity is well described.

Criteria: one by one

OBJECTIVES, CONTENT AND PURPOSE

CRITERIA

METHOD

EVALUATION

RESOURCES

TERRITORY

ORGANISATION
AND PLANNING

What is the goal of the EE activities to be undertaken outside the classroom? This is one of the questions which has accompanied the development of EE in Catalonia.

The objectives and purpose in this field were specified in 1975, in the Belgrade Charter, where the EE objectives were defined related to helping people become aware of environmental issues, acquiring knowledge, attitudes and skills to address and resolve these problems, providing the ability to evaluate and boost action via participation and collective responsibility.

Having objectives which are clear and appropriate to the characteristics of the time and place where the activity is carried out is the nucleus from which all of the learning process stems. Defining these objectives is one of the most important challenges for any educational proposal and is the result of work incorporating the principal challenges of current education in our society. A challenge that is not always easy.

1. The objectives are well defined.
2. The objectives meet the needs of the target audience.
3. The content is well defined.
4. The content to be worked on is up-to-date and socially relevant.
5. The activity is based on the concept of learning as a socialising process.
6. The activity looks at different future scenarios.
7. The activity takes into account the complexity of the issue.
8. The activity relates to the everyday life of the participants.

The objectives are well defined

A good activity depends in the first place on a clear definition of the objectives which must be understandable and written simply. They must be equally well understood and shared by both the participants and the educator. The quality objectives should be: specific (not so general as to be confused with a declaration of intent, nor so concrete as to be confused with activities), measurable (assessable so that the knowledge acquired can be recognised), achievable (so the students acknowledge that they are appropriate to their ability and level), realistic (they can be carried out taking into account all of the factors, e.g., time, space, group characteristics).

For example

If the objectives of our activity are as broad as «Change the world», «Raise awareness» or «Respect nature», it is difficult to measure the results and evaluate the degree of achievement of these objectives after a specific activity.

From another point of view, it is necessary to take into account the fact that two different, well-defined objectives can be developed from the same activity, for example, an activity in-

volving the observation and description of the sounds of a motorway may respond to very immediate objectives: to distinguish between subtly different elements (different vehicle sounds). The same activity, in contrast, could have more general objectives: to enable active participation in a debate (for which it is necessary to understand the subtle differences between opposing arguments).

Activity indicators which facilitate the evaluation of this criteria

- The objectives are formulated simply and in plain language.
- The objectives of the activity are explicit and shared with the participants at some point in the activity.
- The objectives are assessable and include evaluation criteria.



The objectives respond to the needs of the target audience

The objectives must incorporate the learning needs and interests of the participants, who must feel actively involved in the activity. The participant is the protagonist of the learning process proposed by the educator, who accompanies them in the execution and reflection. In order for the activity to be successful, the interests of the participants must be similar. Those responsible for the group (normally the teacher) and the environmental educator who develops the activity have the responsibility of incorporating the interests of the participants, as they know the group and the territory and have the appropriate educational tools. Having as much information as possible about the group that will do the activity (e.g., origin, educational level, interests, previous ideas on the topic to be dealt with, presence of students with special needs or reduced mobility) is a necessary tool when helping tailor the proposal to each group.

For example

The activity must be designed taking into account how to identify, from the beginning, the previous ideas (both individual and collective) and the most important interests of each group by, for example, using a grid in which, at the beginning of the activity, the participants can write down everything they know about the topic, or location where it is carried out, whether they know the objectives of the activity and if it is clear to them what they would like to get to know and learn by carrying out the activity.

Another way is to use the same environment beforehand to discover and move around the space so that the educator can discover the interests and knowledge level of the group and the participants can interact and explore the environment. Explaining the objectives of the activity will allow the regulation and control of that which we propose as a group, and also respond to the interests of certain minorities within the group.

Activity indicators which facilitate the evaluation of this criteria

- The target group has a degree of involvement and decision-making power in the development of the activity
- The cultural perspectives, needs and interests of the participants have been collected and incorporated into the activity.
- The start of the activity involves a space to identify interests and specify the objectives and content of the activity.
- The description of the activity clearly defines the target audience.
- The description explains that there are different study options to be chosen once the needs have been identified.

ACTIVITY No.

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It is important that the content to be used is well-defined and that the participants are aware of it. Some necessary properties of the content, which are also valid for the objectives, are: specification, precision and definition. Avoid excessive content in a single activity: an educational proposal must have basic or minimum content, which must be limited, and other content that can be added according to the interests of the participants. It must be possible to evaluate the basic content.

All these essential aspects that the objectives propose for an activity must be linked to basic content that will develop them. It is necessary to keep in mind that EE field trips are a good opportunity to apply any new knowledge in a different and more exciting context.

An activity includes different types of content: conceptual (what to know), procedural (how to do it) and attitude (how to act). Specifying the basic content, prioritising it and putting it in sequence are important tasks in the definition of the learning objectives which the activity aims to develop.

For example

A quality activity must combine different types of content. For example, if it is a listening activity to analyse birdsong, content related to attitude can be developed (e.g., respect for the birds that are communicating, for the people who are trying to listen to them, being capable of listening to the sounds and discriminating their subtleties).

In the same situation it is important to work on procedural content (e.g., analysis and dichotomous classification of characteristics and comparative features) and facilitate learning of

conceptual content (e.g., bird characteristics and the purpose of the song).

In the case of activities that propose the collection and graphic representation of data to draw conclusions, it is essential that the class has previously learnt these procedures, as it would be impossible to do this in only one session. Encouraging the teachers to remember, present and use certain content (especially procedural) before going out can be a good strategy to improve learning and allow better time management.

Activity indicators which facilitate the evaluation of this criteria

- The relationship between the objectives and the content is clear.
- The different types of concepts are balanced.
- The criteria for selecting the minimum content are defined.
- The content of the activity itself and the necessary content to be pre-learnt are differentiated.
- The content is sequenced according to the characteristics of the activity and the target group.



The content to be worked on is up-to-date and socially relevant

The content of the educational activities must deal with local and current issues, which are meaningful and socially relevant. The content should be extrapolated to more global environments and different local realities.

The basic ideas can be presented via a real situation in a contextualised way, so that they are useful and functional. The content should meet the challenges of EE.

Reality always provides meaningful data to work with in simulated situations, both when describing real cases and reflecting on how they can evolve towards future scenarios.

For example

One way of understanding and appreciating the function of a protected natural area is by knowing the specific plans of action being carried out in that area. The didactic use of this allows the joining of reality and the current situation. For example, in a protected natural area economic resources are

used to: preserve chestnut trees, specify public use of a track or design an itinerary. The management of the most relevant socioenvironmental problems can be used as the context for the various contents that we seek to study in a protected natural area. Reality is the learning scenario.



Activity indicators which facilitate the evaluation of this criteria

- The content deals with relevant local issues and updated information is used.
- The various types of content guarantee the achievement of the forecast learning objectives.
- The different types of content obtained are necessary to analyse and explain situations in different environments.
- The updating of content is undertaken periodically and systematically.

The activity is based on the concept of learning as a socialising process

Education is not based on the transfer of information, but rather on the development of social abilities and capabilities that must be acquired. Learning is a process in which the learner interacts with the environment both individually and collectively. One of the most commonly used definitions of EE is that which states «the objective of EE is to facilitate relationships between people and the environment and between the people themselves».

As some authors say, «values are acquired, not taught». One of the key activities of EE is the opportunity to experience certain situations in a group, requiring value judgements, taking a stance, and conflict resolution, and which allows the acquisition of collectively constructed values

There is no one single approach and solution to socioenvironmental problems, nor is it within the scope of a single individual to solve them. There are many possible answers. It is necessary to have the tools and strategies to enable a democratic dialogue between different individuals and/or groups to allow debate and the selection of those we consider the best or most feasible.

For example

The activities have to be designed in a way that incorporates group work. It is a process which aids the development of social abilities and capabilities.

One way to deal with conflict is through role-play. Games are a social activity (Vigotsky, 1933) and EE often uses games as a teaching strategy. Specifically, role-play can involve all of the possible points of view in a situation. In this strategy,

more than looking for a single solution, the most important thing is the process and the dialogue that is established between the different arguments, discussion and exchange of ideas. This kind of game has its own rules, but it is necessary to remember it is more enriching for the participants to argue the point of view most different from their own.

Activity indicators which facilitate the evaluation of this criteria

- The educator and the participants consider the diversity of opinions in a conflict as an educational value.
- The activity includes the use of social learning abilities: e.g., listening, debating, communication of ideas, cooperation.
- The quantity and quality of the interaction between the participants.



The activity looks at different future scenarios

The future has no unique predetermined direction and is influenced by what we and other people do. Understanding that there are different possibilities for the future, learning from the past and mistakes is part of learning.

Scenarios of a more sustainable future are diverse and uncertain, involving risk but also offering many possibilities for the performance of specific acts dependant on what is decided in the present.

For example

After analysing and describing an ecological succession, there are various possible scenarios for the evolution of a territory; what a forest will be like in a hundred years, dependant on the different actions carried out there in the present.

Introducing debate on the energy we will need in 25 years allows us to open the topic and approach it without fear from a broader perspective enabling us to design the future. Specific aspects that generate conflict, such as HTC (high tension cables), the Ascó nuclear power station

and reservoirs, may make it difficult to deal with the entire subject, though they may be used as a starting point.

It can be very interesting to tackle our environmental history: how, in the past, certain human societies had various options available, and their decisions led them to take a particular path, be it right or not. For example, we can assess what it means as well as the changes provoked in society and in us ourselves if we abandon work in the forest, farming or mining.



Activity indicators which facilitate the evaluation of this criteria

- The activity seeks relationships between the past, present and future to obtain a historical perspective.
- The activity works on future perspectives, looking for several possible ways for development and change.

The activity takes into account the complexity of the issue

«Complexity» is not synonymous with «complicated.» The environment is a whole and not the sum of its parts. A holistic view allows us to give equal importance to its elements and the relationships between them, and it is important to keep this in mind to justify our actions.

Authentic systems and situations that we are able to use reflect the interaction of various factors and components. The perception of this varies depending on the perspective of each agent involved. Therefore, an understanding of the complexity must come from different disciplines and points of view. Its approach should be cross-disciplinary.

Asking good questions about socioenvironmental issues is often more important than finding answers. The question should be formulated around a visible and significant fact; it should be specific and allow the participants to be able to construct an interpretative model.

For example

On an excursion to the forest, we may ask ourselves about the chestnut trees, the family it belongs to, or the type of leaf it has. But we can also ask: «Why has this tree died? Why is it sick? What was the chestnut tree used for in the past, and what is it used for now? How can it be cured? How much is it worth? Why is it endangered? If it did not exist, how would the landscape change?» These are questions that focus not only on the elements themselves, but also on the relationships between them, on different future scenarios, or on which actions can be taken to solve the problem, as well as incorporating the view of complexity.

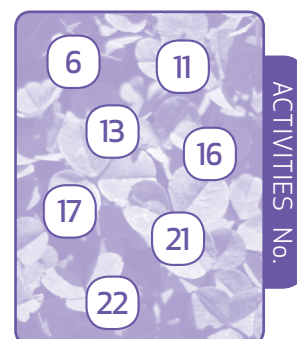
Another example is the use of role play to debate, for instance, the construction of a road: it is necessary

to analyse the affected territory and predict any impact: the physical environment, the biocenosis, the tangible and intangible cultural heritage. It is necessary to determine the economic aspects, the variation in use, travel time, new opportunities, and social and political changes. Participants must be engaged in the analysis from different perspectives and backgrounds, looking at both the elements and their interactions, approaching the problem from different disciplines.

These questions address the complex dimension of reality based on the interests and expectations of students. They should be formulated prior to the activity with the participation of groups of similar ages.

Activity indicators which facilitate the evaluation of this criteria

- The problem must be understood before a solution is sought.
- The quantity and diversity of disciplines involved.
- The learning is based on research into the relationships and interactions between the different elements.
- Uncertainty and unpredictability are accepted as an enriching tool to find unique solutions.
- The solutions are presented as optimal but not unique possibilities.
- Questions about the environment as a starting point are encouraged.



The activity relates to the everyday life of the participants

Environmental education focuses on learning and all the things surrounding it, so everyday life is a source of learning and experiences.

The learning we transmit must be functional so that the participants can apply it to other situations and contexts, finding it useful in their daily lives.

The activity must therefore take everyday life into account in order to use it in the implementation and contextualisation of the learning process.

For example

A visit to a community garden in the neighbourhood may focus on various aspects: the organisation of the garden, the traditional and ecological farming practices, the intergenerational exchange of knowledge, the visualisation of life cycles, the influence of seasonal changes on the rhythms of plant development, an appreciation of the primary sector, getting to know where the food we eat comes from, the knowledge of a product that may have never have been tried, or reflection on how we eat and how to improve our diet to be healthier. If the principal ideas be-

hind how to create a garden on the balcony or at school are explained, the participants have the possibility of replicating the experience at home.

Researching the environment allows us to determine that certain environmental problems are directly linked to our everyday lives, both those of particular current relevance (energy, consumption, nutrition, health, water quality), and those more indirectly related (dormant problems that will be important for future generations, and of unpredictable severity, such as the loss of biodiversity in a river).



Activity indicators which facilitate the evaluation of this criteria

- Use of everyday examples and best environmental practice in the pedagogical approach of the activity.
- Application of the concepts learnt to everyday life.

METHOD

The method is inherent to any educational proposal. The moment we start designing an activity, it is because we want to achieve certain goals through it. And in order to do so it is necessary to think carefully about the way we will do it.

The choice of a method is influenced by our concept of what the teaching-learning process must be and what the purpose of education is. The method refers to the different strategies we use so that people learn, the relationships and behaviour that we facilitate, and the working norms that we establish.

Based on what we think about what the role of and relationship between different players in the group should be (educators and students, and in our case also the heads of the group) and how this influences the learning process, we design our activity one way or another, create relationship and exchange scenarios, or make different groupings.

There are many methods for learning (e.g., problem solving, logical reasoning, critical thinking, experimental methods, synthesis, analysis of situations, interviews, bibliographic research and case analysis) which people can reflect on and acquire knowledge from in a broad sense. There is no one ideal method. All of them could be. The important thing is choosing which best fits each case, to achieve the goals that we have set. The same is true of the resources and materials.

Another important aspect to consider is our follow up of the process, i.e., the type of assessment that we do, when we do it, who does it, and what use is made of the results.

CRITERIA

- 9.** The activity uses participative strategies.
- 10.** The activity promotes cooperative learning.
- 11.** The activity facilitates critical thinking.
- 12.** The activity uses different techniques and methods to allow it to be adapted to different realities and groups.
- 13.** The activity incorporates a sequenced learning process.
- 14.** The activity is action-oriented.
- 15.** The activity evokes emotions and empathy.
- 16.** The activity uses practice to prompt theory building.

The activity uses participative strategies

Participation plays an important role in any educational activity because it places participants at the centre of the learning process and gives them the power to make decisions. Participating means sharing responsibilities and engaging in collective action. One cannot learn to participate if one does not take part, so the right conditions must exist to make this possible (e.g., listening and expressing points of view, taking responsibility, dialoguing and reaching agreements), and the moment, channels and ways to do it must be established.

For example

In an activity, a fixed budget and various proposals for environmental action in a protected natural area are presented; participants must choose two options. From what they have learnt previously, each one draws up their proposal, which must be agreed upon with other colleagues, first in small groups and then at group level. It will be necessary, therefore, to compare arguments and ways of thinking and reach consensus. Often what happens is that we realise making decisions that everyone likes is rather complex.

Certain activities that have developed identical participative strategies (e.g., teamwork, division of responsibilities, or seeking consensus) may end up using different communication strategies to encourage greater participation: each group chooses that which they consider the best format to present the results to the rest of the group, through murals or other art forms, such as talks, discussions and role-playing, and everyone participates in the design and/or execution.



Activity indicators which facilitate the evaluation of this criteria

- The activity includes its own participative strategies: learning to listen, expressing views, discussions, making decisions and taking responsibility.
- The activity is designed so that participants take part in the decision making process.

The activity promotes cooperative learning

When cooperative learning is discussed, it is done considering that there are group situations which must be organised, to facilitate the resolution of and collaboration in certain tasks, as well as for reaching agreements.

This learning occurs not just in a working group situation; the objectives of the participants must be closely related, so that each participant can only achieve his/her goals if the others also achieve theirs.

At this time not only the content of facts, concepts and procedures is worked upon, but also the values associated with life in the community: cooperation, responsibility, solidarity, flexibility, etc. Groups should normally be heterogeneous to ensure rich, diverse and productive cooperative work.

For example

If you want to work cooperatively in groups, the activity must have a scheduled time for the organisation and distribution of tasks both between groups and within the same group, a time when everyone does what they have agreed to do, and later, a period of exchange and discussion of the results. Depending on the type of activity and our objectives, we can form groups in different ways, considering that this is always an important decision that will positively or negatively affect the development of the activity.

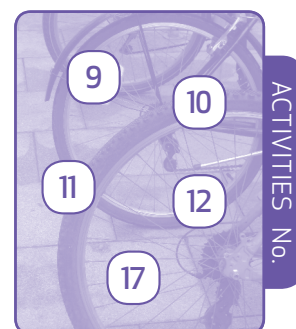
Participants can be grouped by affinity, because they have already created a small working group to carry out activities outside the classroom, by interest, at random, by diversity or the way they complement one another. Using materials, con-

cepts and/or instructions related to the development of activities for groups can also serve to provide information. For example, give a section of a story or a text relevant to the activity to each participant, who must then find the rest of the text (information) from the other students. All those who have the same story or text form one group, which will then need to read the text to start the activity.

Group self-evaluation is a good indicator that this method allows the identification of the cooperative path they have followed, from where they started to where they have arrived, overcoming the typical difficulties of group organisation. The educator must make this evident, regardless of the results and outcomes generated by each group.

Activity indicators which facilitate the evaluation of this criteria

- The proposed method requires group work.
- Each group has to carry out different tasks within the activity.
- Each group member has a specific task to undertake.
- To be able to obtain certain conclusions from the activity or final results, the information from the different groups is necessary, as all the data is complementary and essential.



The activity facilitates critical thinking

One of the most important goals of education is for people to acquire information and analytical skills which allow them to reflect on the different facts, circumstances or information they come across. In a world characterised by an excess of information (often contradictory and rarely neutral), thinking for oneself and having one's own opinion about an event are characteristics of critical people who do not take the veracity of all the information received for granted, but look at the hidden arguments and values in information.

It is important to remember that as we advance in our research we will find answers to some of our questions, whilst generating new ones.

Critical thinking should be combined with the language of possibility, which focuses not only on the analysis of what reality is like, but also on the possibility of changing it.

For example

Considering a complex environmental problem as a conflict of interests may be an interesting educational resource. One way of learning to analyse theoretically objective statements is looking for arguments for and against socioenvironmental problems appearing in the media (such as the controversial Bracons tunnel or the River Ebro water transfer) or a well-known local problem, and preparing a debate in which each

position must be represented. The groups can conduct interviews, do bibliographical research or analyse news appearing in the media.

In the debates we should take the opportunity to differentiate one type of critical thinking (being against everything and everyone, as if it were the fault of others) from a more positive critical approach (searching for causes and solutions from others as well as oneself).



Activity indicators which facilitate the evaluation of this criteria

- Arguments from the various positions and viewpoints regarding a specific event are presented.
- Participants are encouraged to look for arguments for the different positions about a particularly important socioenvironmental event in their territory.
- Participants are encouraged to seek examples of what is or was useful in other situations, to imagine new possibilities and alternatives.

The activity uses different techniques and methods to enable its adaptation to different realities and groups

If an activity contemplates the application of various learning methods it will allow the educator to adapt it to different groups, achieve the objectives in different ways and keep the participants motivated and interested in learning. The educator must adapt the methods to the level of the group, space available and educational purposes prioritised. The list of learning methods and techniques is very broad: e.g., cooperative work, research and inquiry, experimentation, interviews, talks, self-study tutorials, case analyses, debates and simulation games.

When choosing which method to use, it is necessary to have the best possible knowledge of the methods utilised by the group, so that they fit in well with the proposed activity.

For example

Experimental learning refers to learning to investigate following the steps of the experimental method: asking questions, creating hypotheses, designing tests or experiments, collecting data (e.g., observing and measuring), obtaining results, comparing them and reaching conclusions.

In order to achieve certain environmental goals when we enter a forest or carry out an ac-

tivity on research into fauna or the discovery of a territory, diverse methods can be used according to the maturity and interests of the group: a) approaches (non-guided exploration without a pre-defined method), b) discoveries (exploration using defined methods and topics); c) investigation (experimental method, using defined or to-be defined methods).

Activity indicators which facilitate the evaluation of this criteria

- The existence of different methods within the activity.
- The educator knows the scope and function of the methods used.
- The methods are the most suitable to achieve the objectives.



The activity incorporates a sequenced learning process

The teaching sequence is the result of ordering, based on certain criteria, objectives and content to be achieved in the teaching-learning process, together with other elements such as the type of activity, role of the educator or group dynamics. Identifying the options available to order the activity will help in the recognition of the various learning proposals and choice of the most suitable according to our educational purpose.

The criteria used to sort the content are that: it can be assimilated by the recipients; the degree of difficulty is progressive (low to high); it starts with simpler, specific activities, advancing on to more abstract and complex ones; it prioritises the content which is most meaningful to the participants; the various elements making up the content are not isolated and are logically linked to one another.

For example

To study the phenomenon of the action of water on the relief and landscape so that the participants can learn conceptual content such as the morphology of a river, practical content such as experimental techniques, and attitudinal content such as group work, the following sequence can be followed:

- Start by observing a scale model of a landscape where a river is the protagonist.
- For groups, continue with experiments analysing the specific phenomena produced by the action of water.

- Phenomena are to be related to reality.
- In a river students can observe some of the phenomena they experimented with in the workshop.

This sequence follows the criteria of observation of experiments prior to the analysis of reality. It could have been done the other way round, from the observation of reality to the use of experiments allowing us to understand certain phenomena related to the action of water.



Activity indicators which facilitate the evaluation of this criteria

- The activity is sequenced and follows sequencing criteria.
- There is the possibility of organising the activity differently.

The activity is action-oriented

EE enables people to act. The focus on action learning enables work on the knowledge of the effects of environmental problems, their causes, the various alternatives and views, and which strategies for change are available.

The activity includes as one of its goals, or sometimes, as the main purpose, the preparation of action that has direct influence on environmental issues. A reflective action entails significant learning processes, regarding rational knowledge and emotional or affective knowledge (e.g., increased confidence in individual and collective action, learning from acquired experience)..

For example

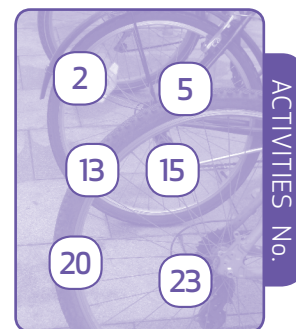
Whilst visiting a nature reserve, large quantities of accumulated litter are detected in a specific area (e.g., a water reservoir) and the different causes of this are analysed (e.g., generation and management of waste). Groups are organised to coordinate action to improve the environment. A litter collection is carried out and an inventory is drawn up of the amount and type of waste found. The action ends with the communication of the activity and a report sent to various local organisations, including proposals to improve and

prevent this situation. Time is allocated for the evaluation of the results of the action and the related learning.

The majority of commitments related to education and sustainability that a school decides to pursue involve carrying out specific acts; for example, if a group of students make a class commitment to minimise climate change during the school year, they may decide to encourage walking to school or the use of public transport.

Activity indicators which facilitate the evaluation of this criteria

- The educational value of the action is taken into account.
- The recipients participate in the design of the action to influence a problem, and local and global effects are reflected upon.
- There is a space for reflection on the effects of the action taken.



The activity evokes emotions and empathy

The activity should motivate and excite participants. When working with emotions it is good for the participants to analyse their own feelings and the feelings derived from their relationships with other people and the territory, making so-called comprehensive training (reason and emotion) possible.

The knowledge of how to understand something and how to do something must be complemented with knowledge about how to behave and coexist, in order to equip people with the skills to understand themselves while at the same time knowing how to live with other people to address the challenges posed by society.

For example

An excursion to discover a particular natural area often leaves us with those specific moments that might be considered a little magical or special: the animal that suddenly crossed our path, the cold water in the stream, the landscape we could see whilst lying down in a meadow - emotions and sensations that contextualise learning and make sense of it. Discovery activities that use the senses as a basic instrument to spark a relationship with the environment facilitate this criteria.

From a story, students help a frog character understand what happens to him via experiments that they do. For example: «The frog cannot survive the frozen lake in winter, while the fish can, why? The frog, when out of water, is no longer

wet, why?» The students' affectivity for and empathy with the frog motivate them to understand concepts about water.

Decision making also depends on the emotions of the participants. An activity that aims to work on how to live together through consensus may be proposed to small groups, where each group has a list of ten possible things that could be saved in a flood, of which only four can be saved, and they have to agree on and prioritise them. How do they do it? Why do they choose these things and not others? Which criteria are used in the choosing? What differences are there with the other groups? Are all of the participants satisfied?



Activity indicators which facilitate the evaluation of this criteria

- The use of various tones and volume of voice during the session associated with emotions and affectivity.
- Ability to identify the emotions that the activity has produced.
- In the activity there are times when participants express their opinions, feelings, etc.

The activity uses practice to prompt theory building

The practical activity carried out (e.g., experimentation, handling something or an itinerary) must entail a learning process that facilitates the acquisition of knowledge, creating connections with the theory.

It is important that from the theorisation of an activity the participants are able to identify the specific learning being acquired, what they have learnt and what they can use in other situations and realities.

For example

A good example is a workshop on water in which the participants, at their own pace and independently, experiment with different phenomena and properties of water, from which they draw conclusions that can be used in their everyday lives.

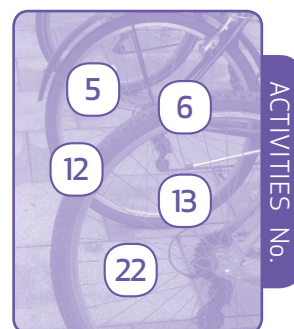
Using observational techniques allows, from a specific experience in a determined environment, questions to be asked about the elements observed, their relationship with other elements or the identification of a particular environmental situation, all of which may prompt the need

for information to understand what has been observed.

After an EE experience, it is interesting for participants to relate it to their peers (e.g., through the school magazine, website, blog or a field diary) and explain if they had a good time and what they learnt. Teachers and educators can intervene to help select what information may be of interest to other groups, and to describe the application of the theoretical knowledge in other contexts.

Activity indicators which facilitate the evaluation of this criteria

- The activity provides a space in which the participants must make abstractions from their practice.
- The activity relates practice to other situations.
- In the activity there is a time to talk to the participants about what they have learnt



EVALUATION

CRITERIA

- 17.** Evaluation is a necessary part of the learning process.
- 18.** The activity incorporates the tools to allow regulation and evaluation.
- 19.** The activity provides space to enable personal learning and self-evaluation.
- 20.** The objectives are evaluated.

Evaluation is an essential element in any learning process. The quest for quality must be at the core of environmental assessment programmes, along with the goals and strategies pursued.

Without evaluation we have no frame of reference, and we cannot identify the successes, mistakes and that which should be improved in our educational proposals, nor what we have learnt by implementing them.

Evaluation, throughout the process, identifies the best educational strategies of the activities, and the advances produced by the various proposals and resources used, but it also serves for participants to identify their strengths and difficulties in learning. Thus, the responsibility for evaluating educational proposals is shared with the participants.

EE activities must provide adequate time and space for participants to independently evaluate themselves and regulate what they learn. For this autonomy to be feasible, the methods and objectives of the activity must be shared from the very beginning.

Evaluation is a necessary part of the learning process

An evaluation of the activity should help identify where the participants begin as well as their evolution. At the same time, it should allow us to identify the obstacles and difficulties in the learning process, facilitating a change of variables and the incorporation of new strategies to make it more effective. It is necessary to have continuous assessment throughout the educational process to regulate the learning, which implies acceptance of the fact that each planned and designed activity can always be improved, meaning that one is prepared to modify or change them if necessary.

For example

Diagnosing initial and final positions of trends, perspectives, interests and knowledge level of a specific theme is a key aspect in the learning process itself.

At the beginning of the activity we should ask ourselves what we would like to learn about, identifying our knowledge gaps and stating what we think we already know. We must specify that the evaluation of the activity should allow us to

analyse whether the activity has been implemented successfully and has helped us to meet our expectations. At the end of the activity participants may repeat the questions and self-evaluate.

Enabling participants to use one indicator that allows them to be aware of their own learning process, during the activity itself, is a good educational strategy.

Activity indicators which facilitate the evaluation of this criteria

- There is a systematic evaluation at the end of the activity (e.g., a questionnaire or interview) to collect easily interpretable data.
- There is critical and reflective educational practice, with educators who habitually investigate their own practices.
- There are continuous research-action practices, in which an activity is modified and directly and continuously improved, based on the results of the evaluations performed and corroborating written reports.
- The activity is related to a larger project or programme (e.g., an annual school programme or agenda21 programme).



The activity incorporates the tools to allow regulation and evaluation

The activity must have a predefined set of mechanisms that allow it to be regulated and evaluated in order to incorporate suggestions for improvement.

These tools must be consistent and appropriate for the fulfilment of the objectives and purpose of the evaluation, on the one hand, and the time when the evaluation takes place, on the other. The tool designed must meet certain requirements that guarantee its quality: reliability, validity, acceptability and usefulness.

Recipients can participate in the definition of measurement procedures, results and interpretation of the evaluation, using criteria which are agreed upon by all.

For example

There are different ways to assess an activity. Examples include satisfaction surveys, initial evaluation questionnaires following the KPSI model, and examples of group results: statistical and/or visual (e.g., target boards, range of colours) representations..

These tools must allow us to collect information on how the activity has been implemented, as quickly and easily as possible.

Educators constantly adapt and regulate, from direct observation, what happens in the activity, but at the end they should be able to use

tools to assess the dynamics, the material, the place, the degree of difficulty and the vocabulary used in the proposals, the time allotted and the time required, as well as the methodology, among other things.

Visual representations allowing an easy analysis of the evaluation results are those which give the best results in continuous evaluation during the execution of a programme of activities: colour stickers, thermometers, «traffic» lights, target boards and coloured post-its, with comments, displayed on the walls.

Basic criteria that can be observed in many activities.

Activity indicators which facilitate the evaluation of this criteria

- The information about the activity programme includes time and objectives for the evaluation methods.
- The dynamic when the participants pool information must be creative and participative.
- The evaluation tool is pre-designed so that it is very adaptable to other contexts

The activity provides space to enable personal learning and self-evaluation

The activity should emphasise «learning to learn», intentionally providing spaces for reflection and dialogue designed to foster self-control and autonomy in participants, helping to train people able to regulate their own learning processes.

It is important that the evaluation criteria of the activity are explicit and shared with the participants, so that they become regulatory criteria and not just tools of control (success/failure of the activity).

Self-evaluation is a strategy that requires its own tools and space.

For example

Participants must know what is expected from them, and the educator has to specify this so that they can direct their efforts in the right direction. These instructions should be adapted to each different context.

To facilitate self-assessment, a specific place should be found within the activity, so that participants can make a mural or write down their impressions and emotions, what they have learnt

and what they liked/disliked, in a notebook that will accompany them every day.

The final evaluation activity, relating to periods of continuous assessment, may be oral via the collection of information from individual and group assessments, using various strategies, such as letting people take turns speaking (to be minuted by the group leader) or written down individually by each student, and/or by each small group.

Activity indicators which facilitate the evaluation of this criteria

- The participants are aware of the learning purpose and objectives of the activity, and they agree with them.
- There is specific space within the various stages of implementation of the activity, intended for reflection on what and how the participants are learning.



The objectives are evaluated

The evaluation should refer to the objectives of the activity, which should be easily assessed using the tools chosen for this purpose. Information and measures of what happens in the activity shall be collected, but an evaluation of the degree of achievement of the objectives must be also carried out. A good activity is perhaps not the most appropriate for achieving the objectives established, and therefore it may stop being a good activity in the specific context proposed.

It must be noted that most activities are specific acts and there may be differences between where we want to get to and where we really arrive.

It must also be remembered that the framework of this evaluation should be specified together with the values that inspire the educational activity and that often this is not defined or included in the explicit objectives of the activity. EE, in which values are very important, should also be aware of the «hidden curriculum» (not explicit in the activity) that is unintentionally included (e.g., the role and attitude of educators throughout the activity, the materials and resources used in an educational proposal that incorporates sustainability criteria, the kind of language used in the relationship/communication with the participants).

For example

Having the programme of activities defined along with a list of the objectives that will be evaluated identifies, clarifies and regulates both group and individual learning. This document must be available for the group that performs the activity.

Related to the values that are transmitted and not explicitly included in the objectives of the activity, one must take into account the fact

that, for example on an outdoor excursion, the initial moment in which the participants are welcomed is as important as the most elaborate activity proposed. The moments prior to the main activity (e.g., group breakfast, arrival, and group formation) are also part of the activity and must follow the same values that are intended to be transmitted throughout the excursion.

Basic criteria that can be observed in many activities.

Activity indicators which facilitate the evaluation of this criteria

- There is a relationship between the objectives and variables to be evaluated.
- The interpretation of the results of the programme/activity is strongly associated with the initial presentation activity.
- The evaluation stage is participatory for the entire group.
- The evaluation stage presents a method for regulation and exchange of ideas among the participants in the programme.

CRITERIA

- 21.** The resources utilised facilitate the development of the activity.
- 22.** The creation and use of resources is coherent with the sustainability criteria.
- 23.** The activity makes careful use of data and information.
- 24.** The resources allow for different learning paces.

EE activities are often considered to be educational resources that facilitate, bring one closer to and contextualise both reality and territory in formal and non-formal education.

In this area are included the quality criteria related to educational resources, understood as the tools used which have an effect on the implementation of the activity. These resources can be physical (e.g., a field notebook, video or text) or conceptual (e.g., simulation, example) and help, facilitate, stimulate and provoke learning.

The territory itself has often been considered the principal resource available, but the quality criteria relating to this are grouped in a section dealing specifically with territory.

RESOURCES

The resources utilised facilitate the development of the activity

A resource is a tool that helps, encourages or facilitates learning. It should be adequate to the purpose for which it was created and the public to which it is addressed.

An educational resource is not in itself an educational purpose. It should be easy to use not only for the educators who have created it, but also for anyone else who has to utilise it. The resource must include all the information on its use, and any supplementary explanation should be avoided.

The resource should be motivating, innovative, creative and exciting; it should use various teaching methods and avoid the systematic reproduction of the same type of activities.

For example

It is important to contextualise the use of the resource. A good resource misused (at an inappropriate time in the learning sequence, with a group it is not appropriate for, or in a non-specific situation), may become a lost opportunity.

For example, incorporating a well-designed and easy-to-use tree observation guide, suitable for users of a specific age, may become less use-

ful if the individual or group has not previously worked on observational techniques, and it may end up as a tool that does not facilitate identification of the different species, the whole reason for its existence.

The same resource can be used at different moments and in different activities. What we must define is why we use it.



Activity indicators which facilitate the evaluation of this criteria

- The resource includes clear instructions for its use and for the objectives it can help achieve.
- The skills necessary for the proper use of the resource are something to work on with the participants before the activity.
- The resource contains a glossary including concepts which need definition.

The creation and use of resources is coherent with the sustainability criteria

EE and sustainability are obviously much more than specific content to be attained through certain learning processes. They are a way of looking at the world and a way of acting.

It is very important that everything which is part of a teaching-learning process is related to and consistent with the values and criteria used in this process. It is considered important to use sustainability criteria in order to:

Understand the real need for the resource. It should meet the needs and priorities of the target audience, and the creation of resources which are unlikely to be used later on and represent an unnecessary expense should be avoided.

The resource should be rigorous in its design and implementation, and any expense and use of materials resulting in learning contrary to the basic criteria of sustainability should be avoided.

For example

The extent of a given resource should be appropriate to the overall timing of the activity. For example, notebooks for students which are very long and propose a series of questions and activities that are impossible to perform correctly within the timing constraints of the activity

should be avoided. Many times these types of resources are created to be used more as an advertising tool for the facilities, museums, town halls etc., than for students, which serve to justify their cost. The number of activities and proposals offered is not an indicator of quality.

Activity indicators which facilitate the evaluation of this criteria

- The resource is necessary to help achieve the objectives and content planned for the activity.
- The number of proposals/activities included in the resource is appropriate for the time and space available to carry out the activity in.
- The creation of resources takes into account sustainability criteria (e.g., materials used and purchase of products).

Basic criteria that can be observed in many activities.

ACTIVITIES No.

The activity makes careful use of data and information

Many projects and activities are accompanied by or require the use of data that should be verified with reliable, updated and accurate sources of information. Whenever possible, and depending on the subject, this information should be directly related to the territory where the activity takes place and, if applicable, it should be accompanied by the references it was gathered from..

Some information about local or global environmental issues is collected from different points of view, and the data is interpreted differently. The diversity of the information used enriches the resource.

For example

The conditions for achieving certain objectives may sometimes depend on a changing variable (e.g., climate, the presence of a fruit or an animal), and these conditioning variables may even disappear meaning the objectives of an activity may not be achievable with the available resources. Sometimes we stubbornly keep them, no matter what the price.

It is autumn and the aim of the activity is to discover the fruits of the chestnut tree:

chestnuts, but the activity is carried out in an environment where there are no chestnut trees, or they have produced few chestnuts this year, due to the lack of rain, poor soil quality, or a fungus that has affected productivity. Instead of explaining why there are no chestnut trees in this forest or why they are sick, we bought some chestnuts and threw them on the ground so the participants could find what they expected. We distorted reality and did not contextualise learning.

Activity indicators which facilitate the evaluation of this criteria

- Amount of data used and references consulted.
- The most relevant data used must be updated.
- The authorship of the resources and data used is provided.

The resources allow for different learning paces

A resource is designed and created for a particular group, to whom it is addressed, a group with specific characteristics and needs and that, in our case, we do not know. For this reason it must be designed with a standard abstract group in mind which, moreover, is not homogeneous. However, it should be remembered that in all groups we will find:

- The standard group comprising the majority of members of the group and which our resource is principally designed for.
- Some participants who may require a specific type of activity at a given time: more procedural or for reinforcement, etc.
- Other participants who will ask for more complex proposals (e.g., further elaboration or expansion). The resource may include some tasks that the participants can do without the help of educators, which could complement the work done by the rest of the group.

It is not a matter of preparing three different types of resources, but of responding to the diversity and varying degrees of learning that exist within all groups. For all of this to run smoothly it is very important to work with the heads of the group (e.g., teachers).

For example

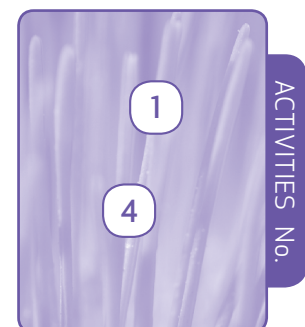
In a discovery excursion to explore an ecosystem there may be participants who already know what will be worked on, because they have made several excursions into the forest with their families or because their personal abilities are different. It is necessary to ensure that they have new learning experiences appropriate to their interests, without interfering with the normal implementation of the activity, and do this via, for example, the educator giving them a guide to the vegeta-

tion (and fauna) so that they can recognise new plants in the ecosystem, information that can be used later at group level or not.

In tasks to be carried out in small cooperative groups, the profile of the members and their different rates of learning must be taken into account. In formal education, teachers know their students and, therefore, are those who can provide the information for the creation of these working groups.

Activity indicators which facilitate the evaluation of this criteria

- Criteria for formation of the working groups.
- Quantity and quality of the support and expansion material available for the activity.
- Planned talk with the heads of the group to discuss the diversity of learning paces and any specific needs of the participants.



TERRITORY

A territory is a determined physical space having certain geological, natural and patrimonial characteristics where the social life, economic activity and political organisation of a specific community are undertaken. These traits enable the differentiation of one territory from another.

When designing an activity, it is important to take into account the particular reality of the territory where it is to be implemented and, when possible, depending on the subject to be studied, it is recommendable that the place where the activity will be undertaken is close to the participants so that emotional bonds are established, ensuring continuity of future action.

The territory chosen for the development of an activity must respond to the objectives and contents to be studied, which must be known by the educators in advance.

CRITERIA

- 25.** The activity is contextualised in time and space.
- 26.** The activity stimulates an emotional link with the surrounding area.
- 27.** The activity is undertaken in an appropriate place, taking into account sustainability criteria.

The activity is contextualised in time and space

The activity must take into account the complexity of the territory visited, its social, economic and environmental reality. In order to understand the current complexity of a specific territory it is necessary to consider many elements and the relationships between them.

The contents to be worked on during the activity must be integrated into the location where it will take place. They must be updated and based on real, verified data.

For example

The activity takes place in a territory where a future project with implications for the local population is being prepared, such as the building of a new road or a track for a high speed train. It is interesting to analyse the environmental impact. By analysing documentation, carrying out direct observation and approaching the local

community, the main effects (positive and negative) of the construction can be assessed. The participants can also be encouraged to propose measures to reduce any unwanted effects and suggest indicators that would serve to monitor the ramifications of the action in the mid and long term.

Activity indicators which facilitate the evaluation of this criteria

- The space and timing of the activity are defined.
- The activity uses real, current, familiar contexts.
- The activity raises complex questions.
- Problem solving and case analysis are used as methods.



The activity stimulates an emotional link with the surrounding area

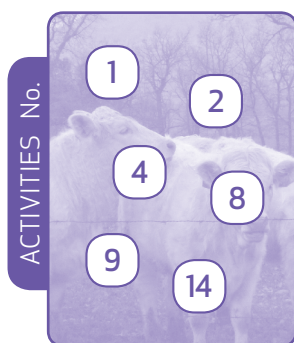
The activity enables the participants to have the opportunity of experiencing something through physical, intellectual or spiritual exercises that make them feel involved with and responsible for the surrounding environment. This experience, based on affectivity, must be ultimately satisfying both personally and collectively. It creates an emotional bond, interesting participants in the environment where the activity takes place and can be the starting point for further activities in the same location, giving continuity to the project.

To achieve this, the activities should be participatory and experience-based, must be associated with one or more acts and the place where it is carried out should be familiar or significant to the participants.

For example

The activity takes place in a section of the river near to where the participants live and different parameters are analysed in order to evaluate the state of its health. From the results, different action is proposed that could be performed at individual or collective level to maintain or improve the condition of the river. It is proposed that

the conclusions of the study are disseminated at local level (e.g., to families, organisations and local government). Furthermore, if the contributions reach those responsible for the territory in a structured way and through the appropriate channels, an easier and more productive management can be achieved.



Activity indicators which facilitate the evaluation of this criteria

- Dissemination of the findings of the study to the local population.
- The degree of satisfaction and interest level of the participants.
- The activity is experience-based.
- Active involvement of participants in their territory.
- The activity can take place in a different location, depending on where a group comes from.
- Specific subsequent action is planned related to the activity.

The activity is undertaken in an appropriate place, taking into account sustainability criteria

The activity must be carried out in a place where its objectives can be met, considering the best time of year and other variables that may influence its implementation. To do this, the educator must know the territory and choose the site where all the programming (prior work, field work and subsequent work) will take place. Only then can the educator integrate and time the activity in the location it is to be carried out (e.g., travel, stops, and resources in the environment that participants can see or handle).

In choosing the site, provided that the objectives of the activity permit, it is necessary to boost the resources of the territory in order to promote a coherent and sustainable implementation. Sustainability criteria must be applied in the management of the activities (e.g., information, booking, coordinating personnel and equipment, reporting) and the implementation itself (e.g., use of environmental resources, impact of frequency/concentration of activities, waste, collection of samples).

For example

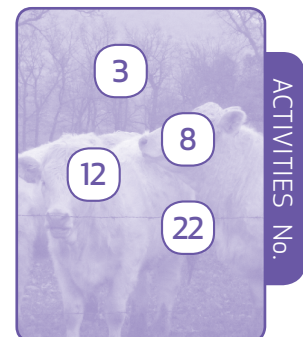
If the ecosystem of the beech forest is to be discovered, the activity must be developed in a beech forest and the best time of year to visit should be assessed, so that the observations and deductions that participants make in the field agree with the content intended to be transmitted. For example, if you want to show what the fruit is like, it is

important to do the activity in the autumn; if, by contrast, you want to focus on the leaves, the best time is spring and summer.

Knowing the territory well allows us to decide how to time the activity in the chosen location, so as to benefit most from the resources it offers us.

Activity indicators which facilitate the evaluation of this criteria

- There is a relationship between the elements observed in the place where the activity is carried out and the content to be worked on.
- Every year action is taken to improve the environmental management of the area where the activity takes place.



ORGANISATION AND PLANNING

Planning is anticipating how you want to relate objectives to content, resources, space and method, systematically organising all the elements that can influence the outcome of the proposed learning process. Importance must be given to issues such as the student/teacher ratio, the different educational value that various stakeholders may assign to the same proposal (degree of importance) or the relationship between the activity and the syllabus at each educational stage.

An activity in which significant preparation time is devoted to organising and planning allows the most accurate identification of any aspects that may need improving.

CRITERIA

- 28.** The group leader and activity leader work together.
- 29.** The student/educator ratio is appropriate to the type of activity and the characteristics of the group.
- 30.** The activity is well described.

The group leader and activity leader work together

This criteria refers to the activities carried out by class groups. Promoting active participation of the teachers who solicit the activity is important to facilitate the integration of the educational proposal in the programming of the course. This means that the activity enables the structuring or application of content previously worked on in the classroom, or the introduction of new themes.

The prior and subsequent collaboration of the group leader and the educator who accompanies them should help adapt the activity to the needs of the group.

For example

A set of strategies to promote this relationship can be followed: at the beginning of the course meetings are held with teachers or other people responsible for the groups, there is sharing of materials, preceding activities are conducted at the school, etc.

In formal education, if an activity outside the classroom is not to be incorporated by the teacher of the group, it should not be undertaken. The activities proposed to schools by municipalities, public organisations and other institutions must

ensure that in some way the main target group (the teachers in charge) will make use of them in their annual programme. The economic, social, and energy cost requires that this criteria be clear, whether the activity is free for participants or not.

If we intend to work as a team, we must consider how to distribute tasks among various people in positions of responsibility. All of the teachers should have a clear role at each point in time during the activity. At preceding meetings this should be discussed and agreed upon.

Activity indicators which facilitate the evaluation of this criteria

- Activities are proposed to be carried out at school before or after the visit.
- The type of contact established with the teachers.
- The incorporation of the activity into the school's annual programme.
- The roles of all of the different people in charge are planned.
- There is a time for meetings between the leaders of the group and the environmental educator.



The student/educator ratio is appropriate to the type of activity and the characteristics of the group

The ratio is the percentage of adults and children that ensures the safety, prevention of risks, individualised attention, tutoring staff and best possible organisation of the group. The optimum ratio of participants per educator depends on the type of activity. The minimum and maximum ratios are important because they determine the dynamics of participation, concentration and form of communication utilised, among other things. The ratio is very often conditioned by the available human and financial resources and whatever is established by law. For this reason, activities are very often carried out with fewer environmental educators than would be appropriate for the characteristics of the activity or the needs of the group. A good activity may run into problems because this criteria is not taken into account.

For example...

The Council of Centres, in its *Manual for Environmental Education Centres*, proposes that in field trips and stays the maximum number of participants per educator shall be between 1/15-18, and that in very well-organised activities it can be as high as 1/25. For other types of activities, in each case, that which is best for the participants should be analysed in order to be able to specify the proposed ratio.

Ratios according to legal regulations

Schools: (published in the *Diari Oficial* of the Catalan government on June 12, 1998, Department for Education)

- 1-day excursions:
 - 1/15 (children aged 7-10);
 - 1/20 (ages 11-17).
- Excursions with an overnight stay:
 - 1/12 (children aged);
 - 1/15 + 1/20 (ages 13+).

Teachers, instructors and environmental educators are considered to be responsible adults.

Leisure: Presidential Decree 337/2000

- 1-day excursions / with overnight stay:
 - 1/10 (all ages).

Activity indicators which facilitate the evaluation of this criteria

- In the activity description there is a section regarding the appropriate ratio.

The activity is well described

The activity description should include certain relevant aspects: the timing of various tasks throughout the session, the use and needs of space, materials and resources to be utilised, the appropriate ratio for the activity, and a definition of the roles of each party (participants, educators and group leaders). A description of the implementation of the activity and any possible evaluation tools should also be included.

For example

Sometimes the activity is explained to other educators who also have to carry it out, and the implementation process and results are very different. Writing an activity carefully allows the specification and definition of relevant aspects that are implicit for some educators, as when it comes to undertaking

the activity, not everyone understands the same thing.

For an activity to be described accurately, it must be designed and presented in an understandable way. The descriptive profiles of the activities presented in this guide are a good example.

Activity indicators that facilitate the evaluation of this criteria

- There is a written description of the activity.
- Aspects such as timing, ratio, space and materials needed, the role of each player, the implementation of the activity as well as evaluation tools are described.

Basic criteria that may be observed in all the activities.

ACTIVITIES No.



6

Collection of activities



Index of activities



ACTION: Carrying out an activity which favours the environment as the result of previous reflection.



DISCOVERY: Getting to know new aspects of reality.



EXPERIENCE: Allowing the participants to experience a situation outside their everyday reality.



RESEARCH: Experimentation, stemming from a prior question, following a specific method, recording data and looking for results, to provide an answer to the initial question.

1	Let's explore the Collserola	60
2	Looking after the Earth, looking after the Collserola	64
3	Oil and the olive tree	68
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5	The responsible consumer	75
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AREA				AGE							
											
ACTION	DISCOVERY	EXPERIENCE	INVESTIGATION	PRE-SCHOOL (3-6)	INITIAL CYCLE OF PRIMARY EDUCATION (6-8)	MIDDLE CYCLE OF PRIMARY EDUCATION (8-10)	FINAL CYCLE OF PRIMARY EDUCATION (10-12)	ESO (OBLIGATORY SECONDARY EDUCATION) (12-16)	BACCALAUREATE (16-18)	ADULTS	
											1
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- ☐ Criteria met by the activity
- ☒ Criteria highlighted by the activity

CRITERIA: Ensure that the...

		ACTIVITIES				
		1	2	3	4	5
		Let's explore the Collserola	Looking after the Earth, ...	Oil and the olive tree	In the forest with our five senses	The responsible consumer
OBJECTIVES, CONTENT AND PURPOSE	1	Objectives are well defined.	☒	☒	☒	☒
	2	Objectives meet the needs of the target audience.	☒	☒	☒	☒
	3	Content is well defined.	☒	☒		☒
	4	Content to be worked on is up-to-date and socially relevant.	☒	☒	☒	☒
	5	Activity is based on the concept of learning as a socialising process.	☒		☒	☒
	6	Activity looks at different future scenarios.		☒		
	7	Activity takes into account the complexity of the issue.		☒		☒
	8	Activity relates to the everyday life of the participants.	☒	☒	☒	☒
METHOD	9	Activity uses participative strategies.		☒	☒	☒
	10	Activity promotes cooperative learning.	☒	☒	☒	
	11	Activity facilitates critical thinking.		☒		☒
	12	Activity uses different techniques and methods to allow it to be adapted to different realities and groups.	☒	☒	☒	
	13	Activity incorporates a sequenced learning process.	☒	☒		
	14	Activity is action-oriented.		☒		☒
	15	Activity evokes emotions and empathy.	☒	☒	☒	
	16	Activity uses practice to prompt theory building.		☒	☒	☒
EVALUATION	17	Evaluation is a necessary part of the learning process.	☒	☒	☒	☒
	18	Activity incorporates the tools to allow regulation and evaluation.		☒		
	19	Activity provides space to enable personal learning and self-evaluation.	☒	☒	☒	
	20	Objectives are evaluated.	☒	☒		
RESOURCES	21	Resources utilised facilitate the development of the activity.	☒	☒	☒	☒
	22	Creation and use of resources is coherent with the sustainability criteria.	☒	☒	☒	☒
	23	Activity makes careful use of data and information.		☒		☒
	24	Resources allow for different learning paces.	☒	☒	☒	☒
TERRITORY	25	Activity is contextualised in time and space.	☒	☒		
	26	Activity stimulates an emotional link with the surrounding area.	☒	☒	☒	
	27	Activity is undertaken in an appropriate place, taking into account sustainability criteria.	☒	☒		
ORGANISATION AND PLANNING	28	Group leader and activity leader work together.	☒	☒	☒	
	29	Student/educator ratio is appropriate to the type of activity and the characteristics of the group.	☒	☒	☒	☒
	30	Activity is well described.	☒	☒	☒	☒

LET'S EXPLORE THE COLLSEROLA

1



Discovering the environment

CRITERIA	
Objectives, content and purpose	1 ●
	2 ●
	3 ●
	4 ●
	5 ●
	6
	7
	8 ●
Method	9
	10 ●
	11
	12 ●
	13 ●
	14
	15 ●
	16
Evaluation	17 ●
	18
	19 ●
	20 ●
Resources	21 ●
	22 ●
	23
	24 ●
Territory	25 ●
	26 ●
	27 ●
Organisation and planning	28 ●
	29 ●
	30 ●

Educational level/target audience: Pre-school and initial cycle of Primary education.

No. of participants: From 25 to 100 students. Ratio: 1 educator/25 students.

Duration:

Preparation: Preliminary meeting with those in charge (2 hours) and work with the students at the centre (1 day).

Implementation: Work with students in the Collserola mountain range (1 day) and subsequent work with students at school (1 day).

Necessary space: Classroom and natural area located near the target audience.

Resources and materials:

- Teacher's dossier with content to work on before and after the visit to the Collserola Natural Park.
- Folder containing materials about the Collserola Natural Park and the activity so as to prepare the field trip at school (e.g., bird and plant identification guides, the Collserola Natural Park guidebook, a poster of the natural environments of the park, the story *La reineta del pantà*.)
- Giant model of the Collserola Natural Park.
- Observation tools (magnifying glass and a «monocular»: an empty tube to focus the sight on specific elements of the landscape).
- The Collserola conta contes pack: 30 stories about the park and the environment in general.
- The film «*El nostre bosc*».
- Giant puzzle of the Collserola Natural Park.
- Drawing material.
- A «sensory trail»: a signposted route of sensory discovery through the forest, in which the participants must use the sense marked on the sign to discover the elements of the forest.



Objectives

- To discover and get to know the closest natural area (in this case the Collserola Natural Park).
- To exercise sensory perception by handling objects and following an itinerary.
- To develop respect for the environment and its elements.
- To be fulfilled by exploring the great diversity of living creatures and objects in the nearby environment, through observation with a magnifying glass.
- To describe orally, or in a written form, the facts observed and/or experienced in the natural environment.
- To get to know the wider world and recognise the new concepts and attitudes learnt.

Content to be highlighted

- Knowledge of the different elements of the natural environment: materials, objects, animals, plants, landscapes, etc. Recognition of initial knowledge.
- Experience of the environment and its perceivable qualities.
- Observation of the characteristics of elements of the natural environment through various techniques: e.g., drawing, games, handling of objects.
- Respect towards the environment as well as the materials, utensils and equipment used.

How to do the activity

«Let's explore the Collserola» is discovery of the natural environment. It is a project that each teacher can adjust to their needs. There are activities to do before the excursion (in class), different projects to carry out on the day of the trip to Collserola Park, and several activities to do back at school once the participants have explored the park. It is the teacher who chooses from all the possible projects and who encourages (who di-



rects) the activity with their students, both in the classroom and in the park.

Method

- Working in direct contact with the natural environment.
- Structured observation and handling.
- Following a signposted route through the forest.
- Working on the environment using a physical representation of it (giant model and/or representation of the landscape in a puzzle).

1. Preparation

Preliminary work with those in charge of the group

A preliminary meeting with the heads of the groups must be organised, to present the proposal, explain the objectives and introduce the different activities and resources that can be utilised. The teachers, after the meeting, can adapt the proposal for their groups and objectives, choosing, with the advice of the educators, from all the resources the programme offers.

Preliminary work (at the educational centre)

- Carry out different activities to find out the students' prior ideas regarding the Collserola and natural areas in general, and from these ideas start to introduce new information about the nearest natural environment and, specifically, about the Collserola. Some projects to choose from are: drawing what they imagine the Collserola is like, reading

books and stories (using the «*Collserola conta contes*» pack, building a scale model with clay, reporting (written or spoken) on the behaviour they consider appropriate in a natural area.

- Prepare different proposals for the excursion to the Collserola. For example: observing pictures and other images of the place they will visit or explaining the activities to be done that day.

2. Implementation

Working on the Collserola: in the natural environment

1. What is there in the Collserola? 30 minutes

This is the moment to remember and go over the information worked on at school and put it in context. Students watch a film (*El nostre Bosc*), which combines a naturalistic view of the park with a more social one (human behaviour and use of the park).

2. Collserola from afar: a planned itin- 1 hour

erary in the area of the farmhouse and fields of Can Coll (with points of interest marked), complemented by different didactic resources (magnifying glasses and «monocular» tubes). Combination of panoramic observation of the mountain range with observation of specific places to discover different aspects of a natural area.

3. Collserola up close: excursion into 1 hour

the Collserola forest following the «sensory itinerary». The objective is for students to immerse themselves in the forest, becoming one with it. In one section of the itinerary teachers are encouraged to leave the students on their own so they are less guided in their discovery.

4. In addition: several proposals to 30 minutes

reinforce the work carried out and contextualise the objectives of the activity (e.g., stories, games, puzzles, drawing materials, giant model of the park).



3. Evaluation and follow up

Can Coll EE Centre

Written evaluation of the field trip by the group leaders.

After the excursion (at school)

Carry out different proposals to strengthen the ideas, knowledge and attitudes to the natural environment worked on during the excursion. For example: observation, description and comparison of images of landscapes and natural environments differing from the Collserola, or compilation of all the information on the excursion: written or oral (summary or mural).

Carry out different proposals to evaluate whether or not the objectives of the activity have been achieved. For example: observe the drawing made before the excursion and redo it to observe any changes.

Suggestions and didactic advice

- This proposal is based on the Collserola Natural Park, as it is the nearest natural area for students visiting the Can Coll environmental education centre. Most of the activities can easily be adapted to any other natural area,

as long as it is the closest to the group and offers at least the minimum facilities necessary to carry out the work proposed (e.g., equipment).

- In the Teacher's dossier is a description of all the proposals included in the programme. This can be requested from the Collserola Park *Centre de Documentació i Recursos educatius*, (CDRE. Tel. 93 692 29 16 - cdre@parccollserola.net)
- The «*Collserola Conta Contes*» pack can be borrowed from the CDRE of the Collserola Park.
- To see the schedule, content and sequence of work at different times, check www.parccollserola.net, section «*El curs al Parc*» (worksheet *Treballem Collserola*).

To find out more...

CONSORCI PARC DE COLLSEROLA. *Ocells de Collserola 1 i 2: guia multimèdia*. ALOSA-CPC. Collection of identification sheets and multimedia CD.

— *Les papallones de Collserola, pas a pas*. Consorci Parc de Collserola, 2002. CD.

— *El nostre bosc*. Consorci Parc de Collserola, 1993. DVD, 13 min.

PATRONAT METROPOLITÀ PARC DE COLLSEROLA. *Plantes de Collserola: 1 & 2. Els arbres, arbusts i lianes més freqüents*. PMPC-ÀMB, 1991. (23 + 23 worksheets). «Fitxes d'identificació» collection.

— *Parc de Collserola: llibre guia*. Barcelona: PMPC, 1995. 251 p. (Out of print. Available at CDRE).

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RASPALL, A.; LLIMONA, F.; NAVARRO, M.; TENÉS, A. *Guia de Natura del Parc de Collserola*. Barcelona: Consorci del Parc de Collserola, 2004. 238 p. + 2 maps + CD-ROM. ISBN84-69-3165-X.

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LOOKING AFTER THE EARTH, LOOKING AFTER THE COLLSEROLA

Action activity

2

CRITERIA	
Objectives, content and purpose	1 ●
	2 ●
	3 ●
	4 ●
	5
	6 ●
	7 ●
	8 ●
Method	9 ●
	10 ●
	11 ●
	12 ●
	13 ●
	14 ●
	15 ●
	16 ●
Evaluation	17 ●
	18
	19 ●
	20 ●
Resources	21 ●
	22 ●
	23 ●
	24 ●
Territory	25 ●
	26 ●
	27 ●
Organisation and planning	28 ●
	29 ●
	30 ●

Educational level/target audience: Pre-school and Primary education.

No. of participants: Minimum 25 students, maximum 225.

Duration:

Preparation: meeting with the heads of the group (2 hours).

Implementation: Preliminary work at school (minimum 3 hours), work in the Collserola (one day) and work at school afterwards (minimum 2 hours).

Necessary space: classroom and natural area.

Resources and materials:

- Dossier for the teachers and materials for work prior to and after the activity.
- Motivational video to present the proposal.
- Mobile library.
- The «Collserola, un lloc en el món» exhibition.
- Posters.
- Worksheets or tools for the students on the day of the excursion (these will depend on the task to be performed. For example, tools to repair paths or collection and separation of litter).



Objectives

- To encourage the participation of students, teachers and parents in positive acts towards the environment.
- To raise awareness about environmental problems and the impact of human activities on the natural environment.
- To use different techniques to improve the environment.
- To collaborate in the maintenance of the Park.
- To develop respect and commitment to conservation.



Content to be highlighted

- Environmental issues and the need for specific acts to resolve problems.
- Principles to move towards a sustainable society.
- The elements, threats to and importance of the Collserola Park as a protected natural area.
- Maintenance work in a protected natural area.
- The implementation, through joint work, of action in favour of the Earth.
- The importance of individual and collective participation in the resolving of various environmental problems.

How to do the activity

«Looking after the Earth, looking after the Collserola» is an action activity involving collaboration with the Collserola Park in a maintenance task or the improvement of an area. This joint participation serves as a catalyst for the group to plan and implement an improvement project «for the Earth» at the centre or in their neighbourhood.

The activity is to be implemented in five phases:

1. Joint planning between park educators and school teachers in order to define the goals and process to be followed with the students.
2. Introduction of the environmental issue at school.
3. Direct participation of the students in maintenance activity in the Collserola Park.
4. Undertaking of a school activity to look after the Earth.
5. Joint evaluation of the programme by teachers and park educators.

Method

- Use of educator-teacher-student dialogue to work on environmental issues.
- Consultation of information sources.
- Participation-action in a maintenance or improvement task in the natural environment.
- Design and implementation of an act to take care of the Earth (e.g., gardening, improvement, classification of waste) by the school (involving teachers, students and parents together).

1. Preparation

Prior to the excursion

1. Planning meetings with teachers.
2. Visit to the school: audiovisual session with a park educator and work adapted to the level of the group.



- a. «Un jardí per a les papallones» (Pre-school, ages 3-4). A story about the Can Coll farmhouse and another about butterflies. Presentation of the activity to be done at the centre: help in the maintenance and improvement of the garden for butterflies. Making of a poster of the garden, with flowers and butterflies, at school.
 - b. «La bola del món» (ages 4-8). Video to introduce the need for action. Game about the diversity of life on Earth. Explanation of the activity to be done when going to the park.
 - c. «Cuidem la Terra» (ages 8-12) Video introducing the principles of a sustainable society and the need for action. Explanation of the activity to be done when going to the park.
3. Looking at the «Collaboration Day with the park» posters.
 4. Complementary activities:
 - a. Visit to the mobile library. A tool to start talking about environmental issues.
 - b. Visit to the «Un lloc en el món» exhibit (12 panels). Aimed at children over 7. Resource

to work on the concept of the need for action.

- c. Action game (ages 8-12).

2. Activity in the Park

Work in the Collserola: 3 hours

This is an excursion to the Collserola in order to take part in some of the management and maintenance tasks usually carried out at the park, together with the park technicians.

Organisation of the day:

- Presentation of the educators and technicians of the park, and of the activity to be undertaken.
- Participation in some of the management and maintenance tasks usually carried out at the Park (e.g., gardening, cleaning, improvement of paths). This job is done over 3 hours in groups (e.g., classes), although for some specific tasks smaller, complementary groups will be necessary (e.g., to fix a path requires a group to collect soil, one to carry it to the path and

yet another to place it and pack it down). The park educator will organise the work for each class. The tutors for each level will collaborate to coordinate between the different working groups.

Work in the Collserola: 45 minutes in a work room

Closing event to find out what work has been carried out by all of the participants and thank students and teachers for their participation. Each group explains to the others what they have done, the difficulties encountered and the objectives of their task. Presentation of certificates to thank each class and their teachers.

3. Evaluation and follow up

After the outing

«A future project»: at school an activity to take care of the Earth is to be carried out. For example: putting a garden in an area of the school yard where there was none before, organising an exhibition to show parents the work done and the reasons for doing it. Project tutored by park technicians.

Joint evaluation of the activity between teachers and park educators.

Suggestions and didactic advice

- This activity can be adapted to Secondary education.
- To see the schedule, content and sequence of the work at different times, check www.parc-collserola.net, in the «*El curs al Parc*» section.
- In the Teacher's dossier you can find the description of all of the proposals included in the programme. This can be requested from the *Centre de Documentació i Recursos educatius* of Collserola Park (CDRE. Tel. 93 692 29 16 - cdre@parccollserola.net).

To find out more...

BOUTTIER-GUÉRIVE, G.; THOUVENOT, T. «Ajudo el meu planeta». A: *Protegir la natura i salvar els animals*. Barcelona: Blume-Greenpeace-WWF, 2008. 140 p. book. ISBN 978-84-9801-214-9

BROWN, L. R. [et al.]. *The state of the world*. Barcelona: Centre UNESCO Catalunya. Annual edition. Book.

FUNDACIÓ SERVEIS CULTURA POPULAR. *Protegim el nostre planeta*, I & II. Barcelona: Fundació Serveis Cultura Popular, 1992. VHS tape. 13 min. + 13 min. + 13 min. + 13 min. + brochure. DVD.

HOUGH, Rich; THE GUARDIAN. *You can save the planet*. Bellaterra: Lynx, 2008. 176 p. book. ISBN 978-84-96553-46-0

LEAN, G.; HINRICHSSEN, D.; MARKHAM, A. *Atles del Medi Ambient* Barcelona: Enciclopèdia Catalana, 1991. 192 p. book.

MYERS, N. (coord.) *The Gaia Atlas of Planet Management*. Madrid: H. Blume, 1987. 272 p. book.

RASPALL, A.; LLIMONA, F.; NAVARRO, M.; TENÉS, A. *Guia de Natura del Parc de Collserola*. Barcelona: Consorci del Parc de Collserola, 2004. 238 p. + fold out maps + CD-ROM book, map, cd-ROM. ISBN 84-69-3165-X

SEAGER, J. *State of the Environment Atlas*. Madrid: Ed. Akal, 2000. 129 p. book.

SMITH, D.J.; ARMSTRONG, S. [il.] *If the world were a village. A book about the world's people*. Símbol editors, 2002. 32 p. [Col. Simbolet] Book ISBN 84-95987-02-3 UICN, PNUMA i WWF *Cuidar la Terra: Estratègia per al futur de la vida* Societat Història Natural de les Balears, 1992. 31p. book.

UNESCO – PATRICOM *Un món per fer França*: UNESCO – PATRICOM – DNDP, 1995. VHS tape, 32 min. video.

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OIL AND THE OLIVE TREE

3

Experience in the rural world

CRITERIA	
Objectives, content and purpose	1 ●
	2 ●
	3 ●
	4 ●
	5
	6 ●
	7 ●
	8 ●
Method	9 ●
	10 ●
	11 ●
	12 ●
	13 ●
	14 ●
	15 ●
	16 ●
Evaluation	17 ●
	18
	19 ●
	20 ●
Resources	21 ●
	22 ●
	23 ●
	24 ●
Territory	25 ●
	26 ●
	27 ●
Organisation and planning	28 ●
	29 ●
	30 ●

Educational level/target audience: 5-9 year olds.

No. of participants: Maximum 75. Ratio 1 educator/12 students.

Duration:

Preliminary preparation in the classroom: 2 hours.

Field work: 6 hours (from 10am to 4pm approx.).

Necessary space: The Picamoixons cooperative oil mill, neighbouring orchards, Civic Centre and work room.

Resources and materials:

- Durable material: scissors, trays, basins, cloths, cups, mugs, spoons, sieves, cardboard box, educational posters (drawings of different parts of the mill, produced by Cel Rogent), 4 identification keys (material prepared by Cel Rogent). Simple key cards to identify the hazel, the carob, the almond tree and the olive tree), pestle and mortar and oil bottle.
- Consumable material: salt, water, aromatic plants, olives, leaves and twigs of an olive tree, oil, vinegar, glass jars, fresh bread, student's dossier (dossier prepared by Cel Rogent, including drawings of the landscape, the four crop trees, the different fruits and leaves, the work of the farmer in the olive tree field and the oil mill. This dossier has spaces for notes about specific observations).
- For the oil mill visit it is recommended that participants wear protective clothing.





Objectives

- To appreciate the work and richness of the primary sector.
- To get to know, visually and experimentally, where oil comes from and how it is obtained.
- To observe the various orchards and specifically the olive tree.
- To learn how the crop is harvested and which products are obtained.
- To appreciate the immediate environment and the resources that it offers.

Content to be highlighted

- Knowledge of the primary sector in Tarragona: dryland (non-irrigated) crop fields.
- The work of farmers in the cultivation and harvest of olives.
- The production of oil in a mill and the preservation of olives.

How to do the activity

1. Preparation

For the activity to work well it is necessary that prior to it, at school, the students:

- Investigate the olives and the oil which are in the market: observe them (colour and size), taste them and ask questions (how many olives does it take to make a litre of oil?).
- Do experiments with olives and oil to get to know their properties. Prove that oil and water do not mix, and find out what an olive is composed of by squashing it.

The educator must make a prior visit to the fields to see which farmers are harvesting and where they will be at the time of the excursion.

2. Implementation

Morning: Olive orchards and harvesting

Head towards the area where olives are being harvested to look for the farmers who are harvesting. On the way, you can stop for a snack. 20 minutes

After the snack, make a brief presentation and explain what will be done during the day. Observe and make an initial survey of the surrounding landscape: Where are we? What can we see around us? What do farmers do with the stones? (Observation of the terraces) What can we hear? (Often, apart from birds, we can hear the sound of the machines used by the farmers to collect the olives, and the bells in the bell tower of Picamoixons. These sounds can be used to find out what is in the surroundings)

Give a field guide to each student and continue down the road again. 15 minutes

Along the trajectory observe the different crops. Occasionally stop and ask questions about the different trees which can be seen in order to help in the observation: How are the trees planted? Are they all the same? How many main trunks do they have? What shape are the trunks? And the leaves? Some drop their leaves in autumn and others don't. Continue listening to the sounds. 1 hour 30 minutes

Stop in an area where the four typical trees of the region can be seen at the same time: almond, hazel, carob and olive. Organise into groups and, with the help of the simple identification keys, observe the trees and identify them. In order to do so, situate each group in front of the trees with the four identification keys and their field guide. Each group, with the help of a teacher or educator, takes one of the keys, reads it and looks at the picture. On each page there is a characteristic of each tree; if one of these does not cor-

respond to the tree they have in front of them, they should discard that key and take another. The name of the plant is found on the last page of the key which correctly describes all of the characteristics of the corresponding tree.

Once the name is discovered, record it in the dossier, and note down its characteristics: what the leaf is like, what the fruit is like, what it is used for, how the tree is planted (singly or in rows). In the dossier there drawings illustrating different fruits and leaves, so the students can circle the one which matches them best in each case.

This process is to be carried out four times, until all the groups have observed and identified the four trees.

Next, with all the group together, observe the olive tree carefully. Spend more time on this tree and study it more comprehensively. The students then explain what has grabbed their attention regarding the tree. If necessary, they can be helped with questions. What colour are the olives? Are they all the same? Are they similar to the ones you usually eat? Pick up bark and leaves, and talk about the tools needed to collect the olives (are they collected one by one?), as well as the tasks performed during the year by the farmer (do farmers collect olives throughout the year? What do they do during the rest of the year so that the trees produce fruit? Use their ideas to go into ploughing, fertilising, weeding and harvesting.

On reaching the harvesting area, without stepping on the olive collecting nets, students watch closely how the farmers harvest, which steps they follow and which tools they use.

The participants carefully perform the farmer's tasks using manual tools.

When the activity is over, the group goes back to town to have lunch at the Civic Centre.

The return journey on foot may take 15 minutes.

Afternoon: the mill and the preservation of olives

Explanation about the mill and experiments. 30 minutes

The students sit in a circle and the guide explains how the mill and its various parts work, using drawings and simulations:

- 1st. In order to understand how the olives and leaves are separated, one box and two sieves are used (with holes of different size). By sieving the mixture first through the filter with bigger holes, and then through the one with smaller holes, students can see that big leaves remain in the first filter, olives in the second and smaller weeds get caught below.
- 2nd. Using a pestle and mortar, the process of crushing the olives with conical stones is simulated. Students see how the oil is separated from the rest of the juices produced by the olives (simulated with water).

Visit to the mill. 30 minutes

The group visits the mill, remembering what has been explained beforehand. It is important not to disturb the workers, not get dirty or slip on the floor!

Due to lack of space at the mill, it is necessary to divide the students into groups of 10 to 12 individuals; while one group is visiting the mill, the others remain at the Civic Centre colouring



in and labelling the drawing of the mill included in the dossier. After this, the groups change over.

Preservation of olives. **20-30 minutes**

Back at the Civic Centre, we ask ourselves: can the olives just collected by the farmers be eaten? After tasting the fresh olives, four working groups prepare 4 jars of preserved olives, which the students will be able to taste in class in the second term.

1. Olives are selected.
2. The brine is prepared in a container (one part of salt per 9 of water).
3. The jar is filled with the cleaned and selected olives.
4. Aromatic herbs are cut.
5. The aromatic herbs are put in the top of the jar.
6. The jar is filled up with the brine and closed.

Once finished, the materials must be collected and the tables must be cleaned.

Before leaving, students taste some bread from Picamoixons sprinkled with oil produced at the mill.

3. Evaluation

Students have a field dossier which allows them to record their observations and ideas.

A questionnaire is used to assess the degree of satisfaction of the teachers (e.g., an evaluation of activity dissemination, usefulness of the teaching guide, the prior session at school, the excursion, materials used, the educators' skills, the group of students and the space where the activity was carried out).

Suggestions and didactic advice

- If the activity is carried out with more than 25 students, the educators must be coordinated so that groups follow a different order in the sequence of activities.
- This activity requires advance knowledge of the degree of student mobility, in order to adapt it in cases of reduced mobility.
- This activity is subject to the olive harvesting season (usually the second half of November).
- To extend the activity, once at school with the students it is advised to:
 - Round up observations so that everyone can self-assess the notes taken. For this reason it is interesting to collect samples of fruits, leaves, photos, etc., on the day of the excursion.
 - With the help of a pot of preserved olives, remember what we know about these fruits.
 - Make a mural of the journey of the olives (from fields to cruet).

To find out more...

At the Reus Museum of Art and History there is a permanent exhibition: «The golden elixir», an exhibit explaining everything to do with the culture of oil. [http://museus.reus.net/mah/Descobrir cuina. Els orígens dels productes catalans](http://museus.reus.net/mah/Descobrir_cuina._Els_orígens_dels_productes_catalans). DVD by the Departament d'Agricultura Ramaderia i Pesca de la Generalitat de Catalunya i Edicions 62. FUIGUERAS, A.; CALVO, J. *L'Elixir Daurat. La Cultura de l'oli de la denominació d'origen protegida Siurana*. Els Fruits Saborosos. Edition and production: Pragma General d'Edicions, 2005. Sponsored by: Consell Regulador de la Denominació d'Origen Protegida Ciurana.

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IN THE FOREST WITH OUR FIVE SENSES

Discovering the environment

4

CRITERIA		
Objectives, content and purpose	1	●
	2	●
	3	
	4	●
	5	●
	6	
	7	
	8	●
Method	9	●
	10	●
	11	
	12	●
	13	
	14	
	15	●
	16	●
Evaluation	17	●
	18	
	19	●
	20	
Resources	21	●
	22	●
	23	
	24	●
Territory	25	
	26	●
	27	
Organisation and planning	28	●
	29	●
	30	●

Educational level/target audience: Age 6+. Easily adaptable to any other educational level, in both formal and non-formal education.

No. of participants: 15-20.

Duration: 2 hours.

Necessary space: any natural area.

Resources and materials:

- Blindfolds.
- Coloured cards (photocopies and cardboard with double-sided tape).
- Reusable plastic cups.
- Pencil and field notebook.
- Boxes for «What's in the box?»



Objectives

- To discover the forest using our senses.
- To encourage observation, sensation and perception as elements to facilitate learning.
- To promote interaction and the discovery of a new area.

Content to be highlighted

- The smell of natural elements.
- Colours and tones in nature.
- Textures and shapes of the terrain.
- Noise and silence.
- The fruits of the forest.

How to do the activity

1. Preparation 15 minutes

In a rucksack the educator carries a colour palette, a cup, a field notebook and a pencil for each participant, as well as two blindfolds.

Previously, the educator should have left 5 boxes at specific places in the forest, which will be used in the activities and which will be found during the excursion.

2. Implementation 2 hours

Before starting the trip, the participants are asked about the 5 senses and whether they are ready to use them to get to know a new place.

Along the route, 5 activities are carried out. In each, a different sense is used.

The order of the activities is irrelevant and depends on the places the educator finds most convenient.

- **Smell:** Each participant has a cup in which they must mix, for example, herbs, sand, leaves and fruit, to make their «cocktail» of smells. When everyone has their cup with the mixture pre-



pared, each one will close their eyes and try to identify their «smell» from among those produced by their classmates. To do so, the participants stand in a circle (maximum 8 people in each) and in turns each member is blindfolded. Each individual smells all the cups and chooses the one they think is theirs. In a circle, the participants can pass the cup around (cover, stir, smell and pass it) or bring it close to the blindfolded person. The purpose of the activity is to realise the number of different odours created and the elements that have been used. We can help the participants by pointing out that most leaves torn in half release more smell, and that they can stir the mixture using a twig.

- **Touch:** the «What's in the box» game consists of touching 5 elements in 5 different boxes. The boxes have a hole to put the hand through but which does not let participants see the objects inside.

These elements may be anything relevant present in the surrounding area, or related to the theme of the excursion (e.g., a wild boar's foot or jawbone, pine cones, wool, bark from a cork oak, gnawed pine cones). When everyone has touched all the objects, they are asked to say what they think is in the boxes.

- **Sight:** Participants make a «colour chart» of the forest. Each one is given a small piece of cardboard with double-sided tape. The purpose of the activity is for every student to stick little pieces of the surrounding vegetation on it including about 30 different colours or tones.



This is an individual activity, but all the members of the group must help each other by sharing (giving and receiving) colours they have found.

- **Hearing:** In a clearing within the forest, all the participants lie on the ground with their eyes closed. They must remain **silent** and listen to the noises of nature for 2 minutes. When the time is up, everybody explains what they have heard, in order from the first to the last sound heard, and to say what produced each sound (e.g., a bird, the wind, the leaves on the trees, a machine).
- **Taste:** Along the route, especially in autumn, the educator can introduce elements (fruits and flowers) to be **tasted** (e.g., chestnuts, beechmast, strawberry tree fruits, walnuts, blackberries, leaves and/or water from a spring). Which taste turns out to be the most familiar? How many ways can we eat or cook these things at home? Which animals in the forest eat these fruits? In this activity it is important that the educator takes advantage of what the students find.

3. Evaluation 15 minutes

Each participant writes down in their field notebook the elements they have discovered in this environment after carrying out the five activities: the thing which grabbed their attention the most and/or that which they liked the most or found most surprising. On another page they write the characteristics of the forest or place

visited and questions about the things they observed and handled.

Suggestions and didactic advice

The educators must give brief, clear instructions on the activity to be carried out and allow the participants to observe the environment. It is important that those accompanying the group (e.g., parents and teachers) and the educators themselves do the same discovery activities, at the same level as the participants.

The elements observed and discovered by the participants, especially those which lead to questions, expectations and interest, are to be used by the educator to introduce further topics or research proposals that explain, for instance, many of the adaptations and relationships between elements in a specific ecosystem.

This is an initial activity which is designed to be easy for participants, inclusive, collaborative and adaptable to any learning pace.

To find out more...

GILI, S. *Vivint el medi*. Barcelona: Graó.

FRANCO, A. J. «Explora amb els cinc sentits». A: Guix, number 333 (March 2007). Barcelona: Graó.

VAQUETTE, P. *Juegos para descubrir la naturaleza*. Martínez Roca. 1996.

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Simulation of shopping responsibly

THE RESPONSIBLE CONSUMER

5

Educational level/target audience: Primary and Secondary education. Adult public and families, leisure centres, civic centres, etc.

No. of participants: at schools, one class group; at fairs, people flow through the workshop.

Ratio: 1 teacher per class.

Duration: 1 hour for school groups.

Necessary space: indoor 15m², outdoor 15m².

Resources and materials:

- 4 barriers to delimit the space.
- A «supermarket» (real size products with cards corresponding to each item).
- 4 different shopping situations for the role play.
- Shopping baskets.
- Relationship of products with their point values.
- List of products with their point values.
- Paper and pencil.

CRITERIA	
1	●
2	●
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5	●
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7	●
8	●
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28	
29	●
30	●

Objectives, content and purpose

Method

Evaluation

Resources

Territory

Organisation and planning





Objectives

- To provide tools to develop criteria for shopping responsibly.
- To reflect on the importance of individual acts for environmental and social improvement.

Content to be highlighted

- Responsible consumption.
- Types of products and the social impact of their production.
- Environmental certification (e.g., recyclable, environmentally friendly) and social certification (e.g., fair trade).
- Application and interpretation of environmental and social criteria learnt.
- Interpretation of symbols.
- Planning a purchase in a specific situation.
- Awareness of the responsibility implicit in decision making.
- Raising awareness for environmental protection.
- Raising awareness for social justice.

How to do the activity

1. Preparation

The educator welcomes the public, presents the activity and context. Groups are divided and the shopping list to be used is given out.

2. Implementation

Each group is faced with 4 everyday situations where it is necessary to make a purchase. They must buy food, cleaning and office products. In each case, there are products that meet sustainability criteria and others less so, for example, when there is a need for tomato sauce, there are options such as tinned tomatoes, tomatoes in a polystyrene tray, and loose tomatoes.

The game is run as follows:

- The groups choose one of the 4 shopping situations.
- They plan their purchase, in accordance with their situation
- They take a basket and make the purchase in the «supermarket». For each article there is a single real-sized sample and, in front of them, the cards corresponding to the article. To buy the product it is enough just to take a card.
- Once all the necessary products for the chosen situation have been acquired, the group must check out at the till, where their purchase is analysed to see whether it has followed sustainability criteria.
- For the analysis, the purchase is scored based on a scoring table. First each product is given a score and then all the scores are added up.

3. Evaluation and follow up

Together, and once the scores for each group have been added up, the scores are analysed and the participants try to deduce why some scores are higher than others. The winning team is the one that receives the lowest score.



A debate must be generated about purchase sustainability criteria, including reflection on the following aspects:

1. Product packaging (e.g., with no packaging, reusable packaging, packaging that can be recycled better than another type, items are individually wrapped or not, etc.)
2. Origin of products (e.g., the product is locally sourced, is fair trade, etc.).
3. Content and labelling of products (e.g., the product does not contain phosphates, etc.).

If there is time, participants can make the purchase again, this time based on what has been discussed previously.

Suggestions and didactic advice

In this workshop, according to the educational level of the participants, the content related to responsible shopping can be adapted to include more or fewer ideas: waste, fair trade, local trade, toxic products, organic farming, ecolabelling, etc.

This is a workshop that can be carried out by teachers themselves with their students, without an educator; the materials can be lent out for a few days and the teachers, according to their educational programmes, can adapt the activity to their needs.

To find out more...

Magazines:

«Consumo responsable». In: *Educación y sostenibilidad*, no. 2 (Autumn 2007).

Guies d'educació ambiental. Ajuntament de Barcelona. SDEA, Servei de Documentació en Educació Ambiental. *Oficina verda*, no. 25.

Ajuntament + sostenible, no. 30.

10 estratègies per a prevenir els residus. Consumer guide, no. 32.

Canviem el codi: El comerç just i solidari, no. 33.

Som el que vestim, no. 34.

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A NIGHT OF ASTRONOMY

6

An evening with the stars

CRITERIA	
Objectives, content and purpose	1 ●
	2 ●
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	5 ●
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	7 ●
	8 ●
Method	9 ●
	10
	11 ●
	12 ●
	13
	14
	15 ●
	16 ●
Evaluation	17
	18
	19
	20 ●
Resources	21 ●
	22
	23
	24 ●
Territory	25 ●
	26 ●
	27 ●
Organisation and planning	28 ●
	29 ●
	30 ●

Educational level/target audience: Primary and Secondary education.

No. of participants: 12-15.

Ratio: 1/15.

Duration: 3 hours.

Necessary space: High up area with little light.

Resources and materials:

- Celestial planisphere.
- Binoculars.
- Telescope.
- Star maps.



Objectives

- To discover the night sky.
- To identify the circumpolar constellations and those visible from the observation station.
- To acquire basic knowledge about the Sun, the Earth, the Moon and the Solar System.
- To understand the vastness of the universe.
- To learn some mythology.

Content to be highlighted

- The Sun and the stars.
- The Earth and the Solar System.
- Satellites, the Moon.
- The constellations and celestial orientation.
- The telescope.
- Mythology.

Presentation of the activity

This astronomy activity aims to provide participants with a basic understanding of the night sky, its complexity, how it is organised and how it can be observed, while at the same time inviting further reflection on the universe.

How to do the activity

1. Preparation 15 minutes

Before starting the activities it is necessary to prepare the observation equipment, telescopes and binoculars, and keep an eye on the weather reports and forecasts of cloud cover.

In the case of telescopes, it is necessary to devote some time to focussing them and getting them ready, so as not to delay the activity once it has started. It is important to have steps or stools for children who cannot reach the eyepiece of the telescope.

It is also necessary to prepare all the material for the celestial planisphere workshop: guides, books, records, mythological stories, etc.

2. Implementation

The main concepts are initially dealt with: the concept of stars and planets, the planets of our Solar System, satellites, the movements of the Earth and the Moon, eclipses, other celestial elements, comets, nebulae, meteors, galaxies and clusters, briefly describing the universe. 30 minutes

With the help of a Sun-Earth-Moon simulator, the positions and movements of the Earth around the Sun and the Moon around the Earth are shown, to explain the Sun's influence on the Earth and the seasons in the astronomical year. 30 minutes

Next, in a brief **workshop** a celestial planisphere is produced, and its function and rules of use are explained. There are many models on the market: for children it is recommended only to use those incorporating the circumpolar constellations and some from each season. For Secondary school students, it is good to use one that has the right ascension and declination grid coordinates. It is also a good idea to use blank celestial planispheres, where there are no names of constellations, which requires the participants to make an extra effort. Prior work on shapes, principal stars and their positions is necessary. 30 minutes

It is recommended that a piece of red cellophane be cut to cover the light if later, during the observation, the celestial planisphere is to be observed and correctly oriented.

For good **observation of the stars and planets**, a quiet, high location with little light must be found. 1 hour

It is advised that first the Big Dipper/Plough be located, and from this, the Polar Star be located to the north. Now the celestial planisphere can be oriented to see which constellations are to the west and east. It also a good idea to locate the circumpolar ones, Ursa Major (the Great Bear) - Ursa Minor (the Little Bear - Polar) and Cassiopeia. Also Cepheus and the Dragon can be placed. Then the constellations corresponding to the season of the year can

be observed. The winter sky is more spectacular and features stars of greater magnitude. The line of Sirius (Canis Major) – Orion's belt – Aldebaran (Tau) – Pleiades (Seven Sisters) should be easily observable.

In summer the famous triangle with the Swan, the Lyre and the Eagle is easy to spot.

Finally, to end the observation, participants can use the telescope to search for Jupiter (summer and early autumn) or Saturn (winter). In the first case some celestial equators and the 4 Galilean moons can be seen, and in the second case the ring can be clearly distinguished and, depending on the quality of the telescope, the Cassini division as well.

During the observation, the mythological stories associated with the constellations can be told; the easiest ones in winter are the stories of Orion, Taurus and the Pleiades. In spring, Hercules with his twelve tasks and the Lion, along with the Corona Borealis and the legend of the Minotaur can be used. In summer, tales of the eagle that ate Prometheus's heart, and the Swan, which was the animal that Zeus turned into in order to seduce humans can be told. In autumn, Pegasus, Perseus, Andromeda, Cepheus and Cassiopeia will allow educators to tell the story of how Andromeda was tied to rocks to be devoured by a sea monster and how Perseus saved her.

These activities can be accompanied by various games:

Constellations handkerchief games 20 minutes

On A5 cards, the shapes of the constellations are marked with stickers. There are two teams placed opposite one another with a handkerchief on the floor between them. The name of a constellation is called out, and the person who recognises it first must pick up the handkerchief without being caught as they run back to their team.

«Fish» for the planets in our Solar System game 30 minutes

Several complete sets of cards of the Solar System planets are scattered around and the participants have to search for them at night.

Once there are no more cards to find, they must try to complete sets grouping the Sun and the 8 planets. They can exchange repeats until one team has more complete sets than the others. The game helps to remind them of the planets and moons in our Solar System.

Search for constellations game 20 minutes

Posters with the constellations (Cassiopeia, Big Dipper/Plough, Little Dipper, Cepheus, etc.) are hidden in the forest. Some star coordinates are given to each participant, and with the help of the celestial planisphere, children are grouped according to the constellation they belong to. Once all the members of the constellation are together, they can go to search for the constellation poster.

To close the activity, the Mas d'en Pedro EE Centre has a very large round metal fence where LEDs are lit showing the different constellations observed, so that, through a projection, participants can review the constellations and the composition of the Solar System.

3. Evaluation and follow up

Before closing the session it is recommended that there is time to talk to the participants to see what they have learnt, what they remember and what they liked the most. It is a good idea to ask what stars or constellations they remember, going round without repeating each other. In the end they will discover that they have learnt about 25 or more different celestial bodies.

Suggestions and didactic advice

The winter sky offers more easily observable elements; therefore it is important to bring warm clothes against the cold or damp. Carrying a star map and a constellation or mythology guide can



help remind you of explanations and answer any questions the participants may ask.

It is recommended that the telescope have an 80 mm lens or greater if it is a refractor, or a mirror of 114 mm or greater if it is a reflector.

It is highly advisable to carry binoculars, as the Mizar and Alcor complex, the Orion Nebula, the clusters of the Hyades and the Pleiades can be seen without difficulty.

And additionally...

To extend the activity, further work is possible, such as:

- Construction of models of the planets of our Solar System according to size (scale) and colours (images).
- Games with torches, games of locating stars by their coordinates, etc.
- Construction of celestial planispheres with fluorescent paint.
- Use of illuminated celestial or planetary planispheres, to remember the position of the stars.

To find out more...

<http://www.maspedro.cat/webescola/cel.htm> (Resources for schools –in Catalan–, Mas d'en Pedro EE Centre. Cubelles)

<http://www.astrored.org> (Astronomy website and store)

<http://www.solarviews.com/span/homepage.htm> (Information on the Solar System)

<http://www.astroava.org>

<http://www.mallorcaweb.net/masm/indexcast.htm> (Information on constellations and stars, in Spanish)

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GETTING TO KNOW RUBBISH BETTER

7

Classroom activity

CRITERIA	
Objectives, content and purpose	1 ●
	2 ●
	3 ●
	4 ●
	5 ●
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	7 ●
	8 ●
Method	9
	10 ●
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Evaluation	17 ●
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Resources	21 ●
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	23 ●
	24 ●
Territory	25 ●
	26 ●
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Organisation and planning	28
	29 ●
	30 ●

Educational level/target audience: Primary and Secondary education, Baccalaureate and same-age groups from non-formal and informal education.

No. of participants: 25.

Duration: 1 hour.

Necessary space: Classroom.

Resources and materials:

- Table and chairs.
- Whiteboard.
- Computer and, preferably, projector.
 - Educator: usage plan, PowerPoint presentation, material for the different parts of the activity (worksheets), activity evaluation sheets.
 - Group leader: activity evaluation sheets.



Objectives

- To provide the tools for thinking critically about waste.
- To introduce the cycle of materials and waste.
- To encourage selective separation.
- To promote responsible consumption and the prevention of waste generation.

Content to be highlighted for each level

- Primary education. Initial cycle
 - Generation and types of municipal waste.
 - Concept of «Reduce, reuse and recycle» and getting into the habit of doing so.
 - Appreciation of the importance of selective collection.
 - Reflection and critical attitude towards the excessive generation of waste.
- Primary education. Middle cycle
 - Municipal waste management and treatment facilities.
 - Relationship between the different types of waste and their treatment.
 - Recognition and differentiation of strategies to reduce, reuse and recycle.
- Secondary education
 - Recycling processes: identification of the raw materials for producing different products and the presentation of these products.
 - Encouraging teamwork.
 - Encouraging interest in the various waste treatment facilities.

How to do the activity

1. Preparation

The educator arrives at the centre about 10 minutes early to assess the prior knowledge of the group and think of any last-minute adaptations of the activity. Alternatively, the head of the group has helped in this regard when arranging the activity.

10 minutes

Alternatively, the head of the group has helped in this regard when arranging the activity.

Welcome the group: presentation of the educator/s, objectives and duration of the activity.

2. Implementation

The theoretical part is explained using visual support (adapted to each educational level): images, charts and diagrams are shown to facilitate understanding by the participants and encourage their participation (approximately 40 min.).

40 minutes

Activity adapted to each educational stage and level:

- **Primary education:** Three spaces are defined in the classroom. Each space is identified with a sign: recycle, reuse or reduce. On the screen a sentence appears describing an action related to everyday waste generation. Participants, with no help from the teacher or educator, must decide which category these actions belong to and move on their own or in small groups to the corresponding space.

Each group must justify and convince classmates who are not in their space that they have made the right choice. Students are given the option to change their mind based on the debate generated. Finally, the educator explains and justifies the appropriate category.

- **1st and 2nd year of Obligatory Secondary Education (ESO):*** Groups of 4-5 participants are formed and given a sheet with the following concepts: waste, container, facility and action (the 3R's). The screen shows images of different kinds of rubbish and the groups have one minute to fill out the table. Repetition of the activity varies according to the level of the groups and the time available. At the end, the tables are corrected together and a winning group is chosen (the one that has completed the most lines correctly).

*The difficulty of the type of rubbish dealt with and the number of repetitions of the activity will depend on the group and time available.



- **3rd and 4th year of ESO:*** Groups of 4-5 participants are formed and given a sheet with the following concepts: waste, raw material, container, facility, final product and action (3R's). The same instructions as in the previous activity are followed.
- **Baccalaureate:** Images of an imaginary town are shown; there are several simultaneous situations that involve the generation of waste, e.g., industry, town and crop fields. Groups of 4-5 people are formed and each is assigned a situation to work on, without the other groups knowing what it is. Each group identifies the waste generated by their own activity, its impact on the environment, the waste collection system that would be most appropriate, and what further treatment would be suitable. To continue the activity they must complete a request form for the pertinent administrative department to build the required treatment facility, which they must justify. Finally, each group presents their situation and justifies their request. The other groups can participate by saying whether it seems okay or if it goes against the interests of other groups, in a way which generates debate, the ultimate goal of which is reaching a consensus to determine which facilities are the most appropriate for the municipality.

The places referred to in the activity must be always relevant for the participants, e.g., schools, homes and leisure areas.

Suggestions and didactic advice

Primary:

Relevant stories, e.g.: *El Melquíades, l'inspector i el club 3R. Una història sobre deixalleries i Isaac Brossa a la masia dels avis. Un viatge al compostatge*. Educational dossiers for guided visits to waste management facilities: exercises 1, 2, 3 and 5.

Secondary:

Educational dossiers for guided visits to waste management facilities: exercises 1, 2, 3 and 5. «Una perspectiva metropolitana: el cicle dels materials i de l'aigua» dossier. Activity recommended for social and environmental sciences activities/studies, and cross-disciplinary studies. Dossier «Una perspectiva metropolitana: el cicle dels materials i de l'aigua».

To find out more...

To prepare the activity or for further work: use the appropriate educational proposal for the group choosing from the catalogue at the EMA – AMB website.

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*The difficulty of the type of rubbish dealt with and the number of repetitions of the activity will depend on the group and time available.



Discovery of the river and game

RETURN OF THE NAIADS

8

Educational level/target audience: ages 8 to 10.

No. of participants: 20. Ratio: 1 educator/20 students.

Duration: 12 hours.

Preparation: Preliminary work (5 hours).

Implementation: Excursion (4 hours) and further work at the school (3 hours).

Necessary space: Area near a river.

Resources and materials:

- «El retorn de la nàide» story, designed and published by the Department of Environment of the Generalitat of Catalonia.
- Student's dossier.
- Method guidelines for the teacher.
- Dichotomous identification key for trees.
- Dichotomous identification key for macroinvertebrates.
- Trays, brushes, magnifying glasses, transparent jar, colours.



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Objectives, content and purpose

Method

Evaluation

Resources

Territory

Organisation and planning

Objectives

- To get to know the «naiad» freshwater mussels and their ecosystem, introducing some of the relationships between living organisms and the environment.
- To promote the development of personal skills and group work in assessing the environmental quality of the river environment.
- To appreciate the importance of preserving and maintaining the river environment and water quality.

Content to be highlighted

- Anatomy and life cycle of the «naiad» freshwater mussel.
- The river ecosystem.
- Water quality. Pollution and waste.
- Relationship between human activity and the environment.
- Identification and classification of organisms based on observation.
- Data collection through surveys and field records.
- Representation of information on a map.
- Concern for the status of endangered species and their habitat.
- Appreciation of teamwork.

How to do the activity

1. Preparation. Preliminary work before the excursion 5 hours

Block 1. What is the «naiad» like?

- Text reading and picture observation (story). Students should become familiar with the anatomy of the «naiad» and relate its functions and organs of nutrition and reproduction.
- Comparison of the «naiad» with other organisms, e.g., similarities between the whale and the «naiad» (filter feeders), similarities between humans and «naiads» (omnivorous

diet), similarity between a tree and a «naiad» (concentric growth).

- Handling of «naiad» shells. Students will handle the «naiad» shells supplied by the Garrotxa Volcanic Zone Natural Park (PNZVG). The exercise allows the exchange of information between students in small groups. They can be asked questions such as: Which is the largest shell? The youngest? The oldest? Is the largest also the oldest? And so on.
- Use of simple dichotomous keys to identify different organisms. This exercise can be done in small groups, and students learn to classify different molluscs (resource loaned by the PNZVG). To identify and classify each of the samples, a model of a simple dichotomous key will be used.

How does the «naiad» live?

- Life cycle of the «naiad». Students should be able to reconstruct the life cycle of the freshwater mussels from observing the illustrations and reading the sentences (chronologically associating each picture with a sentence). Prior to this, they will have read the reference story. Working in small groups they will discuss which phrase best fits the illustration.
- Construction of a mobile representing ecological relationships. The arrangement of the pieces reflects the hierarchical order followed by the flow of energy in an ecosystem.

Each small group will have a set of three pages of pictures to cut out: one of plants, one of animals and one of the elements in a river. On the back of the pieces is written the name of the organism illustrated, and in the case of animals, the feeding type.

- Game of cards for working on cause-effect relationships (humans-environment):

The exercise links human activity (cause) to the disappearance of the «naiads» (effect). Students work in small groups, which are provided with a sheet and a set of cards. There are two types of cards: round ones representing

human activities, and square ones representing the impact of these actions. The game consists of identifying human actions that harm the environment.

2. Implementation 4 hours of the field excursion

Block 3. Where does the «naiad» live?

The field excursion begins by taking the group to a stretch of river near the school that meets the necessary requirements to enable observation, research, measurement taking, mobility of the group, etc.

Once at the location, a short introduction to the activity is given, talking about the parts of the river. Then, each participant is provided with a map which they have to orient by situating the cardinal points, and which they will use to locate the stretch of river to be examined, the school and different characteristic elements of the river environment contained in the map key (e.g., type of vegetation and other elements).

Next, the observation of the physical parts of the river starts with the help of various tools (colour, amount, odour, water transparency, substrate, etc.). The data is collected on the observation sheets.

Once this part is over, the participants observe the living elements of the river: vegetation and invertebrate and vertebrate fauna, with the help of several species identification keys, trays, magnifying glasses, etc. The data obtained is also recorded on the observation sheets.

From the observations, the participants have to draw conclusions about the general state of the river and relate human activities (causes) with impacts (effects) observed or inferred from the observation.

3. Further work 3 hours

(3 h minimum and expandable by the school according to their involvement in the project)



Block 4. Return of the «naiads»?

- Preparation of the map of the stretch of river near the school, where the information collected on the field trip will be shown in the key.
- Writing of a small report on the stretch of river analysed and a letter and report to be sent to other schools in the region which are involved in the same project. It is sent to students of the same level to favour a further exchange of information.
- Reception of letters and maps from other schools.
- Preparation of a wall map showing the state of the rivers in the Garrotxa region.
- «You act!» debate. Proposals to improve the river. Action to improve the state of the river and maintain and increase populations of «naiads» is discussed. The conclusions drawn can be sent to the PNZVG. The group may consider local action on the stretch of river analysed. Other classes of the school, parents and neighbours may join in too.

4. Evaluation and follow up

1. **Initial evaluation:** to be done before the presentation of the story and the beginning of the activities in order to find out what the participants know and what they value about the «naiad» and the river environment.
2. **Final evaluation:** this is done at the end of the activity to assess the attitudes and concepts



learnt using the same questionnaire as in the initial evaluation. «NAIA... WHAT?» and the «“NAIAD”?» questionnaire. It should be clear to the students themselves what they have learnt.

3. **Formative evaluation:** this should allow the assessment of procedural and attitudinal content in particular.

Also, a questionnaire is given out to evaluate the activity (achievement of objectives, procedures, resources used, performance of the educator, etc.).

Suggestions and didactic advice

This activity can be adapted to any stretch of river near a school with adequate accessibility.

To facilitate contact with other schools interested in the project, meetings can be arranged through the Educational Resources Centre or the Regional Council (Environment Department).

To find out more...

El retorn de la nàiade. Barcelona: Generalitat de Catalunya. Departament de Medi Ambient, 1998.

ALTABA, C. R. *Pla d'estudi i recuperació de les nàiades* (*Unio elongatulus* subsp. *aleroni*) del PNZVG. Minuartia Estudis Ambientals i Parc Natural de la Zona Volcànica de la Garrotxa, 1993 [unpublished].

BASSOLS i ISAMAT, E. «El musclo de riu: per a alguns un record, per a d'altres un descobriment». In: *Verntallat*, no. 36 (1996) p. 22-23.

BASSOLS i ISAMAT, E. «La història d'un musclo de riu molt viatger». In: *La Llúdriga*, no. 35 (1997) [Butlletí trimestral de Limnos, Associació per a la defensa del Patrimoni Natural de Banyoles i Comarca].

GIRÁLDEZ, S. *Programa de cria en captivitat i estudi reproductiu de l'Unio elongatulus aleroni* del Parc Natural de la Zona Volcànica de la Garrotxa. Parc Natural de la Zona Volcànica de la Garrotxa, 1994 [unpublished].

GIRÁLDEZ, S. *Projecte d'estudi i recuperació de les nàiades*. Minuartia Estudis Ambientals i Parc Natural de la Zona Volcànica de la Garrotxa, 1994 [unpublished].

All these documents are available at the Documentation Centre of the Can Jordà Natural Park. Telephone: 972 26 46 66.

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Gymkhana game: A protected space. A new concept

WELCOME TO THE PARK!

9

Educational level/target audience: Middle and final cycles of Primary education (ages 8 to 12). Easily adaptable to other levels.

No. of participants: 25 to 50. The participants are divided into groups of 6.

Duration: 1 hour 30 minutes.

Necessary space: Outdoor space large enough for groups to carry out the 5 activities without being able to see the other groups.

Resources and materials:

- «It can be done/it cannot be done» cards.
- Long rope (park boundaries).
- Tissue paper flowers and straws cut in half.
- Traditional glass wine pitcher (*porró*) from Catalonia (or similar).
- Wordsearch.
- A form to fill out, a clipboard and a pencil per group.
- Grid to control where each group will work.



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Objectives, content and purpose

Method

Evaluation

Resources

Territory

Organisation and planning

Objectives

- To get to know the immediate surroundings of an EE facility.
- To discover a new place and satisfy initial curiosity of recognising key elements.
- To understand the concept of protected natural area.
- To identify the purpose of a natural park through play.

Content to be highlighted

- Major protected natural areas of Catalonia.
- What can and what cannot be done in a natural park.
- Protection and conservation in a protected natural area.
- Need for creation of protected natural areas.

How to do the activity

1. Preparation 10 minutes

Groups of 6-8 participants are formed for the gymkhana, which must pass the various tests posed by the activity.

There should be 4 educators and/or teachers located in four different places within the chosen area but not able to see each other, carrying the necessary material for their test. Another educator, in charge of the dynamics of the activity (activity monitor), is placed next to a table which must be located in a central outdoor space for use as an office for reception of visitors.

2. Implementation 1 hour

The educator welcomes the group and tells them that, in order to visit any protected natural area, it is necessary to find out what the visitors already know and therefore they must pass 5 tests to start their visit.

Before the groups start, the educator says the visit will be done in small groups to show more respect towards the environment, and they are requested to fill out a form (official document) to be able to visit the natural areas nearby. This form must be obtained from the educator (activity monitor) who is acting as an administrative/technical officer responsible for the protected natural areas of Catalonia. In the document they must include, for example, the personal details of each group member, type of natural area to be visited, special interest in a particular topic deemed important for their visit, etc.

The educator (activity monitor) sends each group randomly to different places once they have filled out their official form, and controls the organisation of the activity, trying to get the groups to complete all the activities and carry out the tests without forming queues in each area. To manage this, once a test has been passed, the group must return to the centre of the game area, where the educator writes down which test they have done and indicates the next.

The game consists of **five tests**:

- **«It can be done/it cannot be done» test:**
In this test there is a list of different activities, including hunting, fixing up an old house, hiking, living, cutting a tree, photographing a flower and cycling, among others. Each participant receives 3 pieces of paper and 3 different activities which they have to read and put wherever they deem appropriate (individually). The three options are: it can be done in a protected natural area, it cannot be done in a protected natural area, and it depends on how it is done. Once everyone has placed their 3 actions where they deem appropriate, the educator goes through each possibility and reveals the number of actions that are in the wrong positions. At this time, the group can discuss what they think they may have individually placed wrongly and change the positions of



any actions they wish to. The activity ends with a brief explanation by the teacher on what the participants have resolved, clarifying doubts about the actions that generated the most debate and strengthening the idea that in a protected natural area many actions can be carried out depending on how they are done (e.g., regulation and circumstances of each action according to the protected natural area).

– **«The park boundaries» test:**

This game is played blindfolded. The educator is presented as the director of a protected natural area, the boundary of which is defined by a rope. They explain that it was necessary to create this protected natural area to preserve some particular heritage.

The educator asks if they know the names of protected natural areas; this is how to start and choose the first players who have to find the information office of the park. Within the space delimited by the rope, half the group are blindfolded, and the rest of the group stand outside, trying to guide them towards the «information office», which can be a classmate or the educator moving around the place. The purpose of the test is to show them that a protected natural area is a limited space.

– **«The plant habitats» test:**

One of the purposes of a protected natural area is to preserve vegetation and wildlife. In some natural areas the conservation and

preservation of certain endangered species is difficult and requires effort, resources, and immediate intervention and management action to ensure their survival.

In this case the teacher presents an endangered plant species (represented by a flower made of tissue paper), explains that it is one of the most important objectives for the park management and asks the participants to help preserve it. It is explained that each plant or tree has its own specific habitat and if it is endangered, it can only be relocated in another area with the same characteristics.

In order to help, each participant has to bring other similar flowers made of tissue paper (by sucking them onto a straw) from another habitat (somewhere far away from the protected natural area) to the park where the flower is endangered. If they drop the flower, they have to start again. It is not necessary for all the participants to bring a flower from one habitat to another and they can try as many times as the educator wants.

– **«Talking with a mouthful of water» test:**

As this activity takes place mainly in the Montseny-Viladrau area, a very representative element is used: water.

The educator raises the issue of water being a precious resource not to be wasted. With a *porró* each participant's mouth is filled with water and they must say a tongue-twister without dropping any. For example: Peter Piper



picked a peck of pickled pepper, if Peter Piper
picked a peck of pickled pepper, where's the
peck of pickled pepper Peter Piper picked?.

- «**Wordsearch, hieroglyphics...**» test:
This test is proposed by the activity monitor at any moment during the gymkhana to each group when they have just passed a test, before they tackle the next. Its content may be related to the names of protected natural areas, to elements characteristic of a specific protected natural reserve, or to the name of animal or vegetable species under special protection. It is a test that can provide information which, once this initial activity is done, will allow the educator to introduce concepts related to the protected natural area to be discovered.

3. Evaluation and follow up 15 minutes

All the participants must carry out the proposed tests with their group. After each test, the educator-activity monitor asks each group what they think they have done in that activity.

At the end of the game, each group is asked to say what they think a protected natural area is and what its principal functions are.

Suggestions and didactic advice

It is very important to coordinate the different tests well in order for the game to flow smoothly and prevent queuing for any particular test.

The acting skills of the educator in charge of the test (motivator) are very important to relate the fun aspect to the purpose (content) of the proposal.

To find out more...

«Espais naturals protegits». CEA Santa Marta. Col·lecció Guix 2, suplement no. 263. Barcelona: Editorial Graó.

ORTEGA, R. *Jugar y aprender*. Díada editora. In: Serie pràctica, no. 3. Universitat de Sevilla.

FELIU, M. *Així és el Parc Natural del Montseny: de l'Erola a l'Erola. Crònica d'una aventura*. Editorial Mediterrània. Barcelona. 2000.

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Investigation and research workshop

THE FORMS OF WATER

10

Educational level/target audience: Middle and final cycles of Primary education (ages 8 to 12).

No. of participants: Class group.

Ratio: 2 educators per class.

Duration: 1 hour 30 minutes.

Necessary space: The Agbar Water Museum workshop or similar.

Resources and materials:

- Shared material: Model showing the relief of a river basin, an electric socket, 4 tables for the students and 1 for the educators, cleaning paper, rubbish bin, sink for washing utensils, container for waste water, worksheets for students (for the experiments), a jugful of water per table, one cloth per table, projector with images of the 4 seasons.
- Material for the 1st activity: Landscape relief model, metal bucket, a steam cleaner, distilled water, extension cable, ice cubes, dispenser, cloth.
- Material for the 2nd activity: Mesh bag, ice cubes, infrared lamp.
- Material for the 3rd activity: Two pieces of Lego per student (14 per table), a bowl per table, freezer.
- Material for the 4th activity: A lidded jar per table, small stones for the jar, two pieces of chalk per table.
- Material for the 5th activity: a tray per table with 2 lines marked on it (this will be used to put all the material of the 4 independent activities on), 3 spray bottles (with a wide nozzle) per table, 3 stones of different sizes and weights per table.
- Material for the 6th activity: Sediment bottle made from a 1 litre glass bottle, sand and stones of various sizes.
- Material for the 7th activity: 4 plastic pipes cut in half lengthways, 2 cruets, 2 spray bottles, 4 trays to collect the water to be drained, water, 8 wedges of wood, gravel and soil, pictures of nature showing the phenomena to be dealt with, metallic blackboard.
- Material for the 8th activity: 2 watch glasses, salt water, fan, lamp, evaporated salt water.
- Material for the 9th activity: Model, photographs or drawings, Blu-tack cardboard, marker pens.

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Objectives, content and purpose

Method

Evaluation

Resources

Territory

Organisation and planning



Objectives

- To apply procedural strategies and develop relational and communication tools when investigating how the world around us works.
- To teach students through experiments and simulation of phenomena in the laboratory.
- To show the complexity of the natural world: to understand that when phenomena are analysed in the laboratory or classroom, we simplify and isolate situations that are interrelated with many others in real life.
- To arouse curiosity and fascination for the environment and interest in the observation of facts and phenomena.
- To promote the independence, participation, communication and creativity of students.



Content to be highlighted

- Landscape, relief and geographical features. Water as a geomorphological agent.
- The water cycle, states of water, evaporation, cloud formation, condensation and precipitation.
- The formation of aquifers and groundwater. Porosity and permeability of soils.
- Use of the scientific method in simulations of natural phenomena in the laboratory, representing reality.
- Encouragement of debate from observation and experimentation.
- Awareness of individuals as active agents in the shaping and changing of the landscape.

How to do the activity

1. Introduction 10 minutes

Educators and teachers meet the participants outside the classroom. The group is welcomed and the educators, the Cornellà Central Station and the activity are introduced. The stu-

dents are taken to the classroom and placed around a relief model. They are asked what they see, while some elements of the landscape are highlighted: the beach, houses, the river, mountains, the vegetation, etc.

Looking at photographs of a landscape over a year, they are reminded that the landscape changes with the seasons and this is related to the model and the changes that might occur.

Questions are posed for the participants to deduce where a river gets its water from, for example. To check this, the corresponding action is represented on the model.

2. Implementation

1. Making rain (activity 1) 10 minutes

Participants are asked what clouds are made of and how they are formed. From their answers, it is pointed out that clouds are formed by water droplets and that water reaches the clouds through evaporation. Students are asked what conditions must exist for water to evaporate: students answer, among others, «heat» and «wind» for it

to go faster. To prove what the participants say, the conditions that occur on the beach are replicated in the sea of the model: a watch glass with salt water is placed there, along with a fan and heat source.

The experiment is set off running. Students are asked what happens when the water has evaporated. How does it become a cloud? What conditions must exist for it to rain?

To illustrate the ideas produced by the students, a bucket is filled with 8 ice cubes and hung up, simulating the cold existing in the upper layers of the atmosphere. From behind this, an educator makes steam under the bucket with the steam cleaner. The condensation of the steam is observed as it forms droplets of rain falling in the river.

2. **Fusion** (activity 2) 5 minutes

While one educator introduces the role of solid water in the landscape and explains the formation of a river through the thawing of ice or snow, the other educator provides the materials necessary to simulate the thawing (mesh bag with 6 ice cubes) on the mountain of the model. Students are asked what is necessary for the thawing. When participants mention the heat of the sun, the infrared lamp is shown, which will replicate the effect of the sun. The results are analysed at the end of the workshop.

3. **Independent experiments** 20 minutes (activities 3-6)

Next, experiments related to the capacity of water to modify the relief and therefore the landscape, are made. The experiments are done in groups sitting at 4 different tables. Once the educator explains the procedure, the group leader of each table collects a tray with the material, including worksheets with step-by-step instructions for the 4 experiments. The educators walk round the tables solving doubts and provoking conversation so that the

groups understand the phenomena produced. The experiments done at each table are:

Activity 3: Weathering (water breaks things). It can be seen how the liquid water put in Lego pieces, when frozen, breaks them apart.

Activity 4: Erosion (water sculpts). It can be seen how a piece of chalk is eroded when shaken in a jar containing water and small pebbles.

Activity 5: Transportation (water moves). Stones of various sizes are moved by the force of water.

Activity 6: Sedimentation (water settles). After a bottle full of water and sand of different grain sizes is shaken, it is allowed to settle and the sediment is observed.

Finally, each group explains what happened in one of the experiments. The concepts of erosion, transportation, weathering and sedimentation should come up.

The sedimentation bottles are left on the educators' table to observe again at the end of the workshop.

4. **The river** (activity 7) 20 minutes

In this activity the course of a river is replicated; the process is observed and each group explains it briefly relating it to the previous experiments: has water reached the mouth of the river? And sediment? Where has the sediment settled? Can you see the path the water has followed? And so on.

Using photos of real natural forms and processes (stuck on the board at the beginning of the workshop), the educator talks about what happened in their river and what actually happens in nature. The material is collected up and put away.

5. **Into the sea** (activity 8) 10 minutes

In the previous activity the students were shown that water reaches the sea, but does it stay there? The students check what hap-



pened to the salt water left in the sea of the model at the start of the workshop.

As the preparation was carried out without explanation, now the students are shown what has been obtained and the concept of evaporation is explained: the educator passes the watch glasses around the tables and the participants observe how the water cycle starts once again.

6. Anthropogenic action (activity 9) 15 minutes

At this point a summary is made and the participants are asked what they think the factors defining a landscape are: there should be mention of relief, climate, vegetation, and finally, the presence of humans.

The model is observed and the students try to think what the differences with a real landscape are, what is missing, who else can change the landscape, etc. When the impact of humans is mentioned, they must be asked «how». What could be built on this mountain and so change the landscape?

Participants make proposals, and then are given a card where what they have said (e.g., cities and fields) is drawn. If what they have proposed is not drawn, they are given a plasticised sheet with no picture on it so they can write their idea down. When each table has a minimum of 2 cards, they have to think where it would make sense to build within the landscape represented in the model, place the information on it and explain the chosen location.

The model has a system that can change the landscape in some areas, from a natural

to an anthropogenic landscape. A well and a reservoir are placed where the students say and the city and the fields are rotated.

How the human action changes a landscape is observed. A brief reflection on the consequences of this action is made.

3. Evaluation and follow up

The evaluation and follow up of the workshop are continuous. Each section serves not only to provide new knowledge, but also to evaluate what has been learnt in the previous section and make a new reflection to continue.

Suggestions and didactic advice

This is a workshop focussing on method and the reflection of the students.

It is intended that students do experiments, generate debate among themselves, relate experiments to reality, etc.

To find out more...

CASTELLTORT, A.; SANMARTÍ, N. *Avaluació de les activitats relacionades amb l'educació ambiental que es promociónen des de l'Ajuntament de Sabadell (primera fase)*. Bellaterra: Universitat Autònoma de Barcelona, 2003.

CUBERO, R. *Perspectivas constructivistas. La intersección entre el significado, la interacción y el discurso*. Barcelona: Graó, 2005.

GARCÍA, J. *Educación ambiental, constructivismo y complejidad*. Sevilla: Díada, 2004.

Author

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Website: www.museumagbar.com





Researching the environment

THE GOI BRIDGE

11

Educational level/target audience: ages 9 to 13.

No. of participants: 50 maximum. Ratio: 1 educator/12 students.

Duration:

Preparation in the classroom: 1 hour.

Implementation: 5 hours 30 minutes.

Necessary space: Classroom with audiovisual means. A nearby permanent watercourse and a seasonal one. This activity is designed to be carried out around the Goi Bridge (in the Valls district, Catalonia), specifically at the Serraller ditch and the Francolí River.

Resources and materials:

- Durable material: Tape measures, thermometers, information sheets about freshwater macroinvertebrates (material prepared by Cel Regent), pH meter, light meter, audiovisual material («*Un viatge molt especial*» produced by Cel Regent, or «*Els rius inconstants*», by the Mediterrània Programme), chronometers, white plastic buckets, sieves.
- Consumable material: dossier for the participants (the dossier prepared by Cel Regent includes a map of the study area, an identification key adapted for the area, observation pages where students record the data collected), area maps and other information, sticky tape.

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Objectives, content and purpose

Method

Evaluation

Resources

Territory

Organisation and planning



Objectives

- To compare a seasonal watercourse (e.g., river, stream, ditch) and a permanent one (the Francolí River).
- To understand the general characteristics of the area and the living organisms residing there, and interpret the relationships between them.
- To understand the role and importance of each of the elements making up a landscape, classifying and differentiating them.
- To reflect on the influence of human activity on the environment and transmit positive attitudes towards this.

Content to be highlighted

- The water cycle and its erosive effect on the landscape.
- The main elements of the riparian forest.
- Use of a thermometer, tape measure, identification keys, etc.
- Interpretation and extrapolation of data.
- Identification and classification of plants and animals.
- Habitats and trophic relationships of living organisms found there.

How to do the activity

1. Preparation

A few days before the excursion a talk can be arranged with students at school in order to motivate them and raise important questions and concerns about the subject.

To stimulate this discussion, the educator collects the students' prior ideas about the river, through questions such as: What do rivers carry? What animal and plant species live near and/or in the water? What size are they? Why do they live there? What is the water cycle? Why is water important?



The audiovisual «*Un viatge molt especial*» (20 minutes long) is watched. The video refers to the journey undertaken by drops of water in nature, and shows the river and its elements as a part of this trip. If this visual material is not available, the episode «*Els rius inconstants*» of the *Mediterrània* TV programme or similar can be shown: www.edu3.cat/Edu3tv/Fitxa?p_id=17595.

2. Implementation

Situation and introduction

20 minutes

First, and to raise awareness of the current location and the route to be followed during the day, each student must use a specific map of the area (included in the dossier) to point to where the group is and the route that will be followed.

Then, using the field kit and divided into several working groups, students must collect data from each of the two study areas: the Serraller ditch and the Francolí River.

The Serraller ditch

2 hours 30 minutes

(watercourse 1)

In the morning the groups visit one of the watercourses and, at their own pace, each investigates and takes notes on the record sheets included in the dossier about:

- The characteristics of the water: name of the watercourse, location, date, weather, air and water temperature, visual state of the water,

materials observed at the bottom of the watercourse (it is necessary to look at the substrate, whether there is organic material or not), river width, water velocity, depth (at the deepest point), flow ($V * A * P * 0.8$), acidity or alkalinity of the water (pH).

- Vegetation: names of the plants, distance from the watercourse, type (tree, shrub, grass or liana), leaves (deciduous or evergreen), colour of the front and back of the leaves, and current vegetative state.
- Fauna: To identify macroinvertebrates, they must be captured with a sieve and put in a tray with water. With the help of the sheets on freshwater macroinvertebrates, their names are recorded, as well as their quantity (many, few, scarce), feeding habits (carnivore, herbivore, omnivore) and place where they live.



It is very important to be careful to put them back in their environment when finished.

The Francolí River (watercourse 2) 2 hours

In the afternoon the same measurements are taken and the same study is carried out in the other watercourse. This time, the work is much easier because the students are already accustomed to utilising the various study tools.

Conclusions 20 minutes

The results obtained from the two watercourses are compared and pertinent conclusions are drawn with the help of questions: did we see the same substrate at the bottom of the river and the ditch? Why? Did we find the same animals? What are the most common animals in each of the studied sites? What does the habitat of an animal depend on? What was the most abundant plant in each of the watercourses? What type of plant is it (tree, shrub, grass or liana)? What influences the types of plants found in a particular place? Would these observations be the same in another season? In a different decade? In a different century?

3. Evaluation

Students write down the results of their study and the ideas acquired in the field notebook. At the time of sharing and comparing the information gathered, each completes their work individually and all together they reach some common conclusions. This activity allows self-evaluation of the work done by the groups and the results obtained.

Finally, the satisfaction of teachers involved is measured in a survey which assesses the outreach of the activity, the usefulness of the didactic guide, the preliminary session in the classroom, the activities carried out during the excursion, the material used, the capabilities of the educator, the group work method used and the area where the activity was carried out.

Suggestions and didactic advice

- This activity has been specially designed to be carried out in the area of the Goi bridge (Valls). The route is 7 km long, including returning. However, it can be adapted to other places where there is a permanent watercourse and a seasonal one nearby.

- It is recommended that with coloured ribbons the educators previously mark the most representative plants of the area, which are to be found in the identification key.
- This activity requires prior knowledge of the degree of mobility of students, so as to adapt it in case of reduced mobility.
- To prepare activities at school before the excursion, it is recommended that students:
 - Locate the places to be visited on a map, identifying the water network of the area.
 - Acquaint themselves with botanical vocabulary (simple/compound leaf, entire/serrated leaf edge, opposite/alternate leaves, etc.) to facilitate the use of dichotomous keys during the excursion.
 - Become accustomed to using measuring instruments and their units (e.g., for temperature, distance, volume and flow).
- To extend the activity at school after the excursion, it is recommended that students pool all the work done.
- During the excursion, students must be careful when taking measurements.
 - Always use SI units of measurement (metres and seconds). To finish the activity, the flow can be measured in litres per second, so a more exact meaning of the result can be obtained.
 - If the stretch of watercourse studied varies significantly in width and depth, it is advised that three or four measurements be taken and the average be calculated.
- On the way to the activity, the teacher is advised to make students observe the landscape encouraging them with questions about what they are seeing. For example, when we cross a watercourse: Where does it come from? Where does it go? Have we seen

it before? When we see the margins eroded by the river: How was this margin formed? Has the river always run through the same place? It is important to make any necessary stops to meet the different interests of the group.

To find out more...

There is an extensive bibliography on the general concepts studied in the activity. Here are some specific books about the particular area referred to in the proposed activity:

CEL ROGENT. *Itineraris per Valls*. Proposta didàctica per al coneixement de l'ecosistema urbà. Valls: Ajuntament de Valls, 1995.

LLORACH, J. M. *La Vegetació*. Valls: Institut d'Estudis vallencs, 1996 («Per conèixer l'Alt Camp» collection).

DOMINGO, M.; CONCERNAU, J. M. *Els Ocells a l'Alt Camp*. Valls: Institut d'Estudis Vallencs, 1982.

VARIS AUTORS, *L'Alt Camp: marc físic marc humà*. Òmnium Cultural collection, 1983.

CEBRIÁN, L.; ALTÈS, P. *100 Fonts i safareigs de Valls*. Valls: Institut d'Estudis Vallencs, 2002 («Per conèixer Valls» collection).

PONS, J. A.; BARTOLÍ, M.; PUJALÀ, M. E.; FOLCH, R. *VÍDEO: Els rius inconstants*. Barcelona: Generalitat de Catalunya. Departament d'Ensenyament, 1990.

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Questions and answers to get to know nature

AN ORIENTEERING AND NATURE ITINERARY

12

Educational level/target audience: Middle and final cycles of Primary education (ages 8 to 12) and Secondary school (12 to 16).

No. of participants: 12- 15.

Duration: 3-4 hours.

Necessary space: La Ruca EE Centre. Fundació Pere Tarrés (Catalonia).

Resources and materials:

- Maps and sketch of the area (made by La Ruca EE Centre)
- Nature guides.
- Identification keys.
- Field notebook.
- Compass.
- «Green book» (in-house publication), etc.



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Objectives, content and purpose

Method

Evaluation

Resources

Territory

Organisation and planning



Objectives

- To learn orienteering and map reading techniques.
- To learn and understand the vocabulary of cartography and orienteering.
- To discover nature, vegetation and fauna, through a nature trail.
- To discover the environmental impact of forest ecosystems.
- To respect nature and the harmony of the location.
- To discover the human activities related to the countryside, forests and rivers.

Content to be highlighted

- The forest ecosystem: vegetation and fauna.
- Types of rocks.
- Watercourses and ponds.
- Margins of forests, insects, nests and burrows.
- Environmental impacts of human activities.
- The sense of direction.
- Using a compass and maps.

Presenting the activity

This activity incorporates a circular nature trail where the path must be followed using a map, an azimuth sketch and a compass. This activity, apart from dealing with natural aspects of the territory and the complexity of human activities

related to forest ecosystems, watercourses and crops, also aims to work on group cooperation, especially in the decisions about which paths to take based on the orienteering and cartographic notions they have learnt.

How to do the activity

1. Preparation

Initially there is a brief explanation of orienteering techniques and map reading by the educator, with practise exercises using the compass, topographic maps and GPS kit if necessary.

Afterwards the necessary materials must be prepared: compasses, maps, signs for the activity and questions, etc., and it is necessary to place the points of the itinerary, the azimuths, the questions and the tests along the route...

2. Implementation

This is a circular 3-4 km long nature trail hike through different ecosystems.

1 hour

Participants are grouped into teams and begin the excursion from different departure points: some groups start towards the right and others towards the left of the circuit.

The excursion is always carried out in small groups accompanied by an educator or alone and finding the educator at different points, depending on the degree of autonomy the groups are given.

Along the route there are signs indicating the direction to follow at each intersection, while at the same time the groups can check their sketch and map of the itinerary. With the help of a compass, the participants can navigate round the route. When they find signs with questions, they must answer them in their notebooks or do some kind of test, if applicable. The students must have prior knowledge of the use of a compass or must have done some orienteering exercises in the previous phase.

At different points along the route, such as in the sunny forest, the shady forest, at the stream, the pond, the crop fields, the farm and the farmhouse, there are signs with questions. They are asked questions in each place to help their discovery of nature, for example, to identify the species of tree or shrub present, with the help of the «green book» (in-house publication) or with a tree guide, distinguishing into trees, shrubs, plants or mosses; observing a burrow (which animal made it?, how was it made?, which way is it facing?); observing the margin of a field of crops; identifying some distant point; in the forest, trees, shrubs, birds; in the path, footprints, margins of forests; at the crop fields, birds, types of crops, human activities and visual impact.

In the open spaces, do «readings» **15 minutes** of the landscape in general, observe the geological formations, check the orientation and position of the sun; at the farm, observe the environmental impacts, the farm activities, the kinds of animals there, the architecture of the farmhouse; at the stream, look at the riparian vegetation, the invertebrates, the watercourse, the geology and topography of the river; at the pond, look at the uses it has, the vegetation and wildlife around it, the tracks and footprints, the birds, etc.

Also included in the route is interpretation related to orienteering: the students must mark on the map pylons, the shapes of an escarpment, an esplanade next to a crop, etc. All this content is translated into questions that participants will find at intersections or along the path indicated by signs posted in advance or signals on the map they are carrying. In some locations there may be tests or questions placed concerning environmental and visual impact issues, and the students asked to propose corrective measures.

These tests may include, for example, a simulation game to correct bad practice in the forest; matching elements of the environment by making a trophic network; game to

remember species they have just discovered, a colour palette (bookmark), etc.

This activity must be done on a path that has all the elements for work proposed, such as that around the La Ruca EE centre.



Suggestions and didactic advice

To do this activity the students must wear suitable footwear and comfortable clothing, especially warm clothing if done in winter.

The more distinctive elements the route offers, the more interesting it will be and the more learning will be acquired. It is important that the route is circular in nature.

It is essential to explain concepts and orienteering and cartographic exercises in a clear and understandable way through practical exercises.

And additionally...

To extend the activity, further work can be done such as:

- Modelling of the contours and relief of the trail.
- Creation of a mural, with a map of the route and the main features observed located on it.
- Workshop on plaster track casting, if footprints are found.
- Slideshow of the main features observed, where it is the group themselves who give ex-

planations of what they have learnt and look to recover any content that has been lost or not been properly understood (middle and final cycles of Primary education, and Secondary education).

To find out more...

There is an extensive bibliography on the general concepts studied in the activity. Here are some specific books about the particular area referred to in the proposed activity:

http://www.peretarres.org/wps/wcm/connect/peretarres_ca/peretarres/home/allotjaments
(info on La Ruca EE centre, in the Bages area)

Guides to discovering more about the forests and the streams:

PASCUAL, R. *Guia dels arbres dels països catalans*.
Barcelona: Pòrtic.

PASCUAL, R. *Guia dels arbusts dels països catalans*.
Barcelona: Pòrtic.

MASCLANS, F. *Guia per a conèixer els arbres*. Barcelona: CEC.

MASCLANS, F. *Guia per a conèixer els arbusts i lianes*.
Barcelona: CEC.

FUNDACIÓ PERE TARRÉS. *Quadern verd. Guia de reconeixement dels arbres*.

FUNDACIÓ PERE TARRÉS. *Quadern taronja. Guia de rastres i petjades*.

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Website: www.peretarres.org





Investigate and act

ECOSYSTEMS

13

Educational level/target audience: ages 10 to 12.

No. of participants: 50 students divided into 3 groups. Ratio: 1 educator/17 students.

Duration: 5 hour excursion (morning and afternoon); further work at school.

Necessary space: Natural area with different ecosystems.

Resources and materials:

- Set of 18 ecosystem cards.
- A3 ecosystem summary tables.
- Basket to collect small samples.
- Pencils and clipboards.
- Cellophane bags to collect soil samples.
- Three 1.20 x 3m. murals (made of wrapping paper).
- Coloured markers.
- Glue and sticky tape.
- Guides to the flora and fauna of Montseny.



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Objectives, content and purpose

Method

Evaluation

Resources

Territory

Organisation and planning

Objectives

- To discover the main features of three ecosystems in Montseny.
- To identify the parts of an ecosystem and the relationships between its different elements.
- To observe and identify the living and inert components of ecosystems.
- To discuss and debate the human role in the imbalance and alteration of a particular ecosystem and specify actions to aid its recovery.
- To understand how to express oneself and present a scheme showing the elements of a specific ecosystem and their relationships.

Content to be highlighted

- Ecosystem.
- Climate and soil.
- Fauna and vegetation.
- Shady and sunny forests.
- Relationship between the elements of an ecosystem.
- Use and abuse of resources.
- Landscape as valuable heritage.

How to do the activity

1. Preparation (any place in the forest)

The group of 50 participants are divided at random into three groups of 15 to 18 members. Each group, accompanied by an educator, will investigate an ecosystem. The students do not know what the three ecosystems are or what they will have to do.

2. Implementation

To introduce the concept of the ecosystem, each of the three groups, in different places, plays a co-operative game.

Each student receives a card describing a characteristic element of an ecosystem (in this



case ecosystems involving mainly alder, holm oak or chestnut groves). The card may refer to wildlife or vegetation, geographical location, climate or soil.

Each participant should check with their partners to find those items (cards) to which they think their item is related and which share the same ecosystem. For example, the ones holding cards about the holm oak, the sunny side of the mountain and the jay, should group together. It is important to encourage debate amongst the participants about who should be grouped with whom or not. All of them have to agree on the final grouping. It can be made easier if the educator says that those with the name of a tree are in separate ecosystems and should be situated in different parts of the area where the activity is being carried out.

This activity divides students into 3 sub-groups (each working on the characteristics of the alder, holm oak or chestnut groves). The educator uses this subdivision to introduce the three ecosystems that the groups will investigate and then the specific ecosystem to be observed and analysed by the subgroup.

Each educator should take their group to a distinct place in the ecosystem to be investigated and collect information, which later must be transmitted to the other two groups studying different ecosystems. The group collects samples of the vegetation and the educator introduces the wildlife that can be



found there. A soil sample is taken, relationships and adaptations of each element to its habitat are discussed, and environmental issues relating to each ecosystem are posed, such as the disease affecting chestnut trees (canker).

The students are divided into groups of 3-4 and each is given a blank outline (A3 summary sheet) to record the concepts that have been used along the route.

3. Evaluation and follow up

On arrival at the centre a large mural (one for each class and ecosystem) is made, which will be the summary of the three sites studied, with samples, data and images collected in the forest. Each group tells the rest (the other two groups) what they have discovered, what that ecosystem is like and how it works. Together they discover that relationships between elements allow the balance of any ecosystem and that the difference between one ecosystem and another is simply its composition of elements.

4. Further activity at school

The group has to identify an imbalance in an ecosystem near their school, analyse the causes of this imbalance (usually related to human action) and propose action that favours its reduction and/or elimination.

An action is chosen and the details for its implementation are decided: for example, an

awareness campaign for families, a day devoted to the recovery of a specific area, articles to be disseminated, letters, etc.

Suggestions and didactic advice

The cards to start the activity are in 5 different colours, each colour representing an element in the ecosystem. The activity is facilitated by the educator saying that each group must have at least one card of each colour.

During this activity it is important that the participants ask questions and the educator does not give a direct answer, but helps to find out why, either together or, when reaching the school, using library materials or internet searches.

It is important that each group makes the mural on their own in order to better explain it to their classmates.

Activity easily adaptable for students in the 4th of Primary education (middle cycle).

To find out more...

VAQUETTE, P. *Juegos para descubrir la naturaleza*. Martínez Roca. 1996.

PUJOL, J. *La vida al bosc*. Col·lecció Bivac no.2. Barcelona: Teide, 1985.

DEL CARMEN, L. *La recerca al bosc*. Col·lecció Bivac no.1. Barcelona: Teide, 1984.

DEL CARMEN, L. *La recerca al sòl*. Col·lecció Bivac no.4. Barcelona: Teide, 1984.

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Investigation (teaching pack)

THE ENGLISH OAK

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Objectives, content and purpose	1	●
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Evaluation	17	●
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	19	●
	20	●
Resources	21	●
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Territory	25	●
	26	●
	27	●
Organisation and planning	28	●
	29	●
	30	●

Educational level/target audience: ages 10 to 12.

No. of participants: 20. Ratio: 1 educator/20 students.

Duration: 18 hours.

Preparation: Preliminary work 14 hours.

Implementation: Field trip (4 hours). The Block 5 section can be done before or after the excursion.

Necessary space: Classroom + field trip to the English oak (*Quercus robur*) groves.

Resources and materials:

- Teaching pack: including activity guidelines for teachers, worksheets and resources for students.
- For field work it is necessary to have: an eighteenth century map of Olot, a present-day map of Olot, and an inventory of trees in different estates of the eighteenth century.



Objectives

- To recognise the elements making up the humid English oak groves of the Garrotxa Volcanic Zone Natural Park.
- To learn to identify an English oak.
- To work out the main problems affecting the humid English oak groves.
- To promote respect towards the environment and classmates.
- To encourage participation and teamwork.
- To facilitate the exchange of information and contact with other schools using ICT (Scientific-Technical Instrumentation).



Content to be highlighted

- Characteristics of the English oak.
- Environmental and climatic conditions of the English oak.
- Identify the parts of an oak: canopy, leaves, fruit and bark.
- Flora and fauna of the humid English oak grove.
- English oak groves around us.
- Human activity in the transformation of the landscape.
- Interpretation of maps, collection and sorting of data, formulating hypotheses.
- Teamwork.

How to do the activity

1. Preparation

(preliminary work) 14 hours

Block 1: What is the English oak like?

Treasure hunt: distinguishing images referring to parts of an English oak from those of other plants.

The teacher scatters the images provided (5 referring to the parts of an English oak and 5 to other plants) around the chosen location, using two different itineraries. The students must collect all of the images, but they must separate the pictures into two packs:

- those referring to the English oak;
- those not related to the English oak.

Then each group tells the rest what they have found: description of the drawings. Information is synthesised on a table drawn on wrapping paper.

Block 2: The travellers

Participants discover, while travelling around the map of Europe (England, Poland, Asturias, Cantabria, the Aran Valley and the Garrotxa), the groves of English oaks and their bioclimatic characteristics, to compare them afterwards and find out why the English oak groves in the Garrotxa area are exceptional.

From each place visited they must obtain a range of information to be written on their route map (e.g., gastronomy, architecture, traditions, landscape, knowledge and typical drinks).

Once the journey is finished, they must share everything they have discovered. This is why each group should choose one place from which to present the information to the rest of the class. Therefore, it is proposed that a map of Europe be made of wrapping paper and each group show the place visited and the characteristics of the English oak groves there.



Block 3: Who lives in the humid English oak groves? Role play

The idea is that the classroom has become an English oak grove. Three spaces are created and each represents one of three strata (tree, shrub and herbaceous plants). Each layer must be associated with different images related to vegetation and wildlife.

Three groups will be formed and, in rotation, will go through all the layers, paying attention to the names of the species found there.

Having seen the different strata, each group will choose one and, with the help of a coloured marker and images, will transfer the information on the biodiversity located in an English oak grove onto a mural, for display at the end.

Block 4: Farms and the English oak

Based on a manuscript from 1754, the participants must locate the various houses on the right side of the Fluvià River, when passing through Olot, and put on the different kinds of trees described in this document and the number there were.

- A key is written relating trees and quantities.

- Matching game.

This consists of 10 cards with pictures and 10 cards with text describing the different uses of the trunk, fruits, leaves and bark.

The class is divided into subgroups. Before starting to play, the cards that make up the game (images and text) must be face down. Then, the teams can take it in turns to turn two cards face up. If they match picture and text, the team can keep them; if not, they have to put them back face down and the other team has to pick two more, following the same procedure described above. The game ends when all the images are matched with the texts.

By the time the activity is over, the students will have discovered that people made use of absolutely every part of the English oak.

Block 5: Schools with English oaks

This block aims to use new technology so that students can come into contact with various other schools around the country with English oak trees, and thus learn about issues affecting the English oak elsewhere.

This block can be done before or after the field trip.

2. Implementation

The field trip aims to work on the 15 minutes problems suffered by the groves of English oak on the Olot plain. It starts with an original manuscript from 1754 showing the different types of trees that the principal farms in Olot contained.

From among this collection of farms, 1 hour the activity focuses specifically on the Bernat farm, one of the best preserved today. On a map of Olot the property boundaries of the farm are marked, and using a photograph of the pe-

riod, general differences with the present are analysed (e.g., political and social situation, economic activities, demography, landscape, technological advances).

The group goes round the farm **45 minutes** and comes to one of its boundaries. At this point an activity sheet is given out to each participant, who must locate the different elements of a key (mill, terraced crops, grass, different types of trees, holm oaks, oaks, alders, walnut trees, considering the orientation of the house) within the property.

The tour continues through other farms, to reach one of three oak groves still standing: the English oak grove of Parc Nou. During the excursion the participants can see how the city has expanded, the boundaries of the natural park and the location of other farms.

Once at the Parc Nou, the **1 hora 15 minutes** activity focuses on the observation and identification of the English oak (tree, trunk, fruit and leaves). Then an itinerary is followed to discuss current issues affecting the English oak, the uses it had in the past and has in the present, as well as proposals for its conservation.

3. Evaluation and follow up

Initial evaluation to assess the participants' prior knowledge level.

Bloc 0: Using memory

- Drawing of a humid English oak grove the way the participants imagine it is.
- Phrases with gaps. Participants must fill in the gaps with the appropriate vocabulary, which will help to supplement their prior knowledge.

The final evaluation focuses on the reports prepared by working groups and then sent to

other schools which also have English oak groves in their territory.

As well as this, a questionnaire is delivered for an evaluation of the activity (e.g., achievement of objectives, procedures, resources used, educator's performance).

Suggestions and didactic advice

As an extension to this research work, it is proposed that an acorn is germinated, and a study of the environmental conditions of plant growth is carried out.

This activity requires an English oak grove near the school.

To find out more...

BADIA, A; ESTRADA, R; VILANOVA, I. *Els boscos de Catalunya. II Part*. Barcelona: Publicacions de l'Abadia de Montserrat, 1983.

CEBALLOS, L; RUIZ DE LA TORRE, J. *Árboles y arbustos de la España Peninsular*. Madrid: Escuela Técnica Superior de Ingenieros de Montes, 1979.

MALLARACH, J. M.; RIERA I TUSELL, M. *Els volcans olotins i el seu paisatge*. Barcelona: Editorial Serpa, 1981.

MITCHEL, A.; WILKINSON, J. *Trees of Britain and Northern Europe*. Collins Pocket Guide. 2011.

RIERA I TUSELL, M. *La vegetació de la regió volcànica d'Olot*. Olot: Ajuntament d'Olot, 1979.

Webpage:

<http://biodiver.bio.ub.es/biocat/homepage.html>

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RESERVOIRS HAVE BEACHES TOO

Activity to improve a natural environment

15

CRITERIA		
Objectives, content and purpose	1	●
	2	●
	3	
	4	●
	5	●
	6	●
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Method	9	●
	10	●
	11	●
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	13	●
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	15	●
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Evaluation	17	●
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	19	●
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Resources	21	●
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Territory	25	●
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	27	●
Organisation and planning	28	
	29	●
	30	●

Educational level/target audience: age 9+.

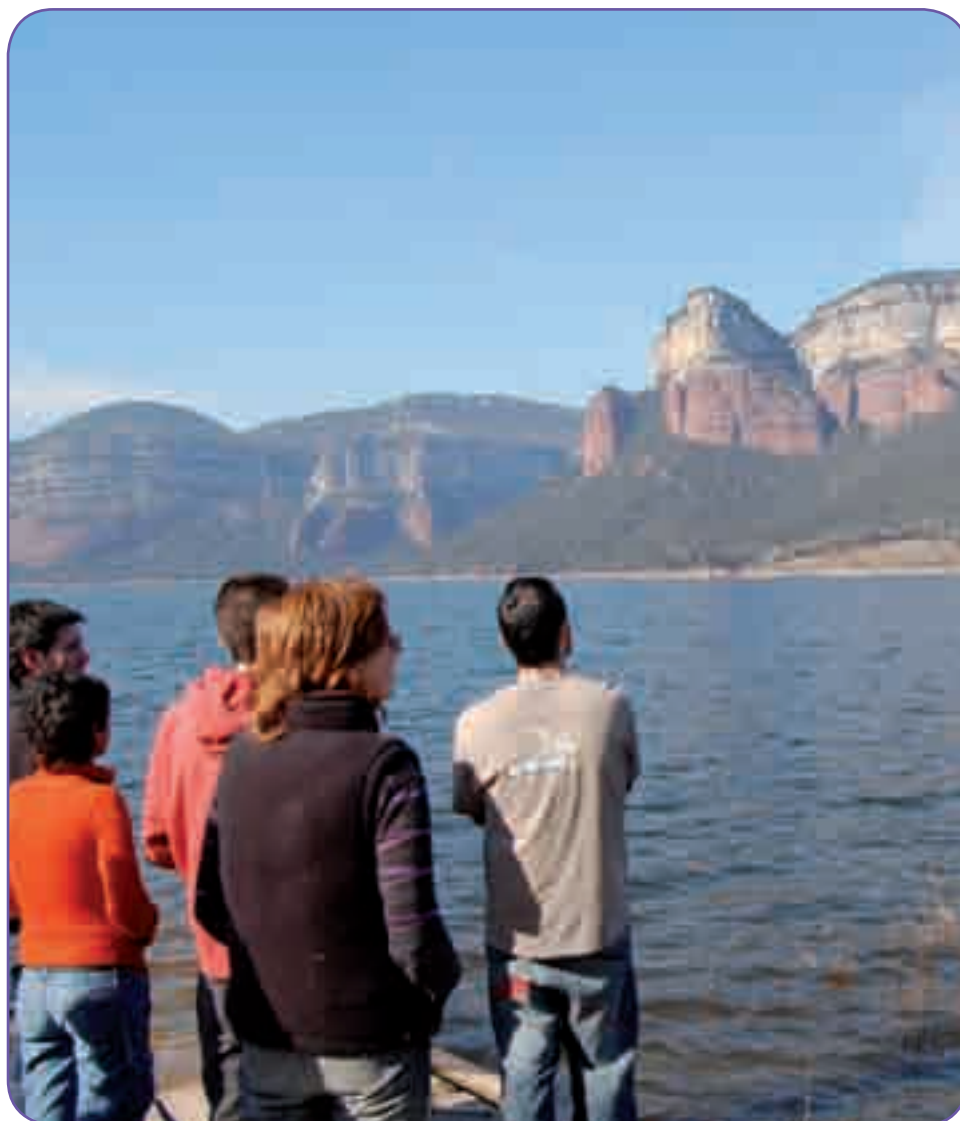
No. of participants: 20-30. Ratio: 1 educator/20 students.

Duration: 8 hours.

Necessary space: Natural environments.

Resources and materials:

- Tools (buckets, rakes, gloves, rubbish bags, etc.).
- Information and resources about waste.





Objectives

- To carry out an act facilitating environmental improvement in a natural area.
- To practice organisational skills in project development and personal skills at the service of others.
- To learn to interpret maps.
- To understand the impact caused by waste in a specific environment.

Content to be highlighted

- Organisation of a group intervention in a natural environment (e.g., consensus action, prioritisation of actions).
- Environmental impact and issues.

How to do the activity

1. Preparation 2 hours

The activity begins with a brief motivational itinerary to immerse the participants in the context, along the shore of the Sau reservoir, walking round it and discovering the quantity

and diversity of waste that the Ter River has accumulated on its margins over a long period.

The group is encouraged to reflect on the origin of the waste, debating whether or not it represents an environmental problem, and what the causes and possible consequences may be.

From the interpretation of reality, there arises the need to address in the short term the environmental problem of waste being dumped into the river, the accumulation of it in the reservoir and the impact of contamination. From the explanations and arguments produced by the group, participants agree on a joint representation of the specific problem. For example, it could be: «The way we live produces rubbish and results in its accumulation at critical points of our ecosystems. Acts on the beaches of the reservoir (local scale) are closely related to lifestyle, consumer products and how they are managed (global scale)».

The possibility and necessity of an act to improve this is proposed, goals are set (defined realistically depending on the time available and the number of participants involved).

As the scope and impact of the collective action are specified, the operational objectives of the action are made explicit (e.g., to clean up part of the margin of the reservoir, weigh the rubbish, quantify the types of waste found, notify the pertinent authorities and disseminate the action), but at the same time, the related learning objectives necessary to carry out the action (e.g., learning to interpret maps, learn to work cooperatively, reaching consensus, understanding the impacts of certain waste in the environment) are also stated.

2. Implementation 1 day

Planning and organisation:

Working groups organise an environmental improvement act, its scope and specific activities deriving from it. Each group takes responsibility for a specific part of the planning (e.g., material and logistics or security) and tells the other groups about the guidelines and considerations to be taken into account to properly prepare and plan the act.

The participants work on the map in groups, identifying critical points and a system of waste collection, creating intermediate collection points, preparing the necessary equipment (e.g., gloves, buckets and bags), agreeing on safety and risk prevention standards, as well as the timing of the action.

Acting:

The participants carry out their agreed tasks in working groups: they collect the rubbish from the margins of the reservoir, weigh it, identify it and separate the waste into different types.

Communicating:

It will be important to devote time to the communication and dissemination of the results of the environmental improvement act, as, beyond the usefulness of the action itself and the need to sensitise people, the participants are making

the effort to draw conclusions from the learning-by-experience during the act.

Different ways to disseminate this action can be chosen. One may be an «art» exhibition hanging the rubbish on a fishing net. Other creative alternatives are making «monsters» with waste elements, or naming these new «animal species» according to the nature of the hazardous waste. In this way «rare species» may be displayed, such as *Rubberus tyrus* or *Rubberus wheelus* for different tyres of vehicles recovered, or the dangerous *Sprayifera deodorantica* and *Sprayifera insecticida* for some of the many aerosol cans collected.

Likewise, we can visually communicate the weight data, possible sources, hazardousness and impact of the waste removed from the reservoir.

The activity ends with the communication of the action and reporting of the problem to different authorities and organisations (e.g., mayors, media, consortia), with proposals to prevent the periodic repetition of this problematic situation.



3. Evaluation and follow up

There is time for debate and reflection on the relationship between the environmental issues the group has acted upon, and the participants' way of life, critically analysing the shared responsibilities of each.

Time is allocated to the evaluation of the results of the act (e.g., success, achievements and problems encountered), but also the related learning, specifying changes produced on a personal level (e.g., the interpreting of maps and group work).

Suggestions and didactic advice

The cleaning up of the rubbish in the reservoir is only one example of an education-service project that can be replicated in many other contexts and situations (with other community needs and different environmental problems to solve).

A service-learning project includes five basic ingredients: (1) there must be a real service «to others» and a real impact on the environment, (2) there must be clear learning associated with the service; (3) a well-designed, planned and evaluated educational project; (4) requiring involvement of and a direct participation of the people involved; (5) there must be awareness of the project, its environmental and social utility.

Moreover, there are principles and criteria that help us improve the quality of education-service projects (e.g., social acceptance and justification of the service, very close ties between the service and the learning, appropriateness of the service considering the age of the participants; networking with other organisations; balance between individual and group participation).

To find out more...

Puig, J. M. (coord.). *Aprendizaje servicio. Educar para la ciudadanía*. Octaedro, 2006.

TAPIA, M. N. *Aprendizaje y servicio solidario*. Ciudad Nueva, 2006.

www.aprenentatgeservei.org / Guia «Aprenentatge servei i educació ambiental» guide. Fundació Catalana de l'Esplai.

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IMPACT

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	6 ●
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	8 ●
Method	9
	10 ●
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Evaluation	17 ●
	18 ●
	19 ●
	20 ●
Resources	21 ●
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	24 ●
Territory	25 ●
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Organisation and planning	28 ●
	29 ●
	30 ●

Investigation and research

Educational level/target audience: Secondary education and Baccalaureate.

No. of participants: 20-60.

Duration: 19 hours (3 mornings and 2 afternoons).

Necessary space: 10 ha of open space. 2 classrooms.

Resources and materials:

- Tools and guidelines for the collection and integration of information.
- Press clippings, books and media records on the territory and the disciplines associated with the object of analysis.



Objectives

- To establish a positive relationship with the new reference space.
- To debate arguments facilitating decision making about a particular environmental impact on the territory, based on the information collected
- To distinguish emotions and objective precision, and practise the conscientious use of both for making decisions.
- To understand different views on the same reality.
- To appreciate the maintenance of a non-degraded natural environment to improve quality of life and to contribute to its maintenance.
- To encourage participation and responsible attitudes in teamwork.

Content to be highlighted

- Factors, elements, characteristics, structures, processes and links, characteristic of the different divisions of a given territory.
- Abiotic, biotic, and cultural heritage elements that are differential and/or prioritised indicators of the territory.
- Determination and use of quantifiable parameters, elements and processes, which are comparable across sectors.
- Overview of a certain geographic area.

How to do the activity

1. Preparation

The starting point is an assumed future impact on a given territory. A road is to be improved to enable travel from one point to another in a natural and rural area. This is to facilitate the access of both local people and visitors.

There is already a road, but the three options are: to open two new routes, modify the existing one or leave everything as it is.

2. Implementation

To decide what to do, a study of environmental and social impact must be conducted in groups.

Data on a number of elements is collected (e.g., type of road, danger of erosion, plant communities, forest condition, aesthetics, wildlife and vegetation, agricultural/livestock structures, housing, cultural heritage) to predict any impact. 4 hours

A small survey of several people who live in this area is carried out. 1 hour

The data obtained from field work is pooled and analysed to quantify the impact for each of the variants. The results are expressed graphically and numerically. 3 hours

From these results, a decision has to be made and arguments constructed. 2 hours

A scheme (in groups) and an artistic drawing (individually) of possible solutions are designed, and the capacity is calculated. 3 hours

It is necessary, moreover, to make a poster or brochure in a language other than that of the participants, explaining the options under discussion. 2 hours

Working in the classroom, the participants prepare the data for analysis, make technical reports, finish the dossier and their personal diary, prepare the oral presentation and the debate. 2 hours

On the last day all the information is shared. 2 hours

3. Evaluation and follow up

The dossier and the personal diary prepared will help to make a follow up of the work done.

The debate can be used to evaluate the communicative resources of the participants as well as their rhetoric and dialectic ability, and their attitudes and skills related to communication, respect and feedback.



Suggestions and didactic advice

Groups must be between 4 and 8 people to carry out the tasks without difficulty.

Students must perceive the usefulness and importance of research to make the most accurate decision every time and encourage rich debate with elaborate arguments.

And additionally...

Before tackling the project to be analysed, an overview of the global environment and the population in the territory in question must be given, to provide the necessary context.

To find out more...

Guide for global overview of the specific territory under study, for example: *Guia del parc del Montnegre i el Corredor*. Barcelona: Diputació de Barcelona, 2007. Territory teaching pack. For example: *Dossier de la malleta del riu Tordera*. Centres de Recursos Pedagògics de la conca de la Tordera, 2005.

«Forma't relaxadament», collection of didactic sheets. Escola de Natura del Corredor:

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Investigating the environment

TRANSECTS

17

Educational level/target audience: Secondary school and Baccalaureate.

No. of participants: 20-60.

Duration: 4 hours of fieldwork, 2.5 hours at school.

Necessary space: Linear transversal path through different vegetation assemblages. Classroom.

Resources and materials: Tools and guidelines for work.



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Objectives

- To promote curiosity and knowledge of the plant communities in a territory.
- To encourage the habit of systematic observation and data collection.
- To facilitate an understanding of the relationships between different factors, elements and dynamics that interact in complex ways in the landscape, and how they vary and are distributed in space.
- To characterise the biotope and biocenosis of different communities present in a particular area.
- To encourage participation and responsible attitudes in teamwork.

Content to be highlighted

Observe and get to know any variation in the following parameters in the different communities identified in a specific area:

- Measurement of environmental factors: temperature, relative humidity, light intensity at a height of 1.5 m, slope, orientation, thickness of useful soil.
- Description of the structure of the vegetation.
- Identification of the principal species.
- Description of certain previously selected features.
- Description of the vegetative state and appearance of a species which is an indicator and is present in all habitats.

How to do the activity

1. Preparation

The necessary tools (10X magnifying glasses, rules, pedometers, clinometers, trowels to dig with, thermo hygrometers, light meters) and guidelines for work should be prepared. All the material must be introduced to the participants, as they have to work independently, in small groups.

2. Implementation

Fieldwork to analyse and investigate *in situ* the different plant communities that can be found in a specific area: species identification, comparative analysis, adaptive strategies, detection and measurement of abiotic factors, concepts of biotope and biocenosis, etc.; and how these vary according to the topography, exposure, soil and human activity. 3 hours

After the data has been recorded, it is pooled and conclusions are drawn: each working group provides the others with their data, observations and ideas taken from the work, which are reflected in data patterns and synthesis by each participant. 2 hours

From this, the relationships between factors, elements, processes and adaptations are discussed in order to find links. 30 minutes

3. Evaluation and follow up

The debate ultimately allows the observation of knowledge levels and ideas produced by each participant, and their relationship with the group with which they worked.

The repetition of the activity in a different system allows the evaluation of whether the participants have assimilated the philosophy, method and procedures.

Suggestions and didactic advice

It is necessary to apply the most rigorous observation and data collection techniques.

The analysis of the situation and sharing of data by the students must be done when it is convenient for them.

And additionally...

A prior talk describing the environment and its history provides clues for participants to corre-



late various factors, elements and dynamics, and arguments (such as population evolution and the use of resources) that may not be worked on directly are introduced.

To find out more...

HUMPHRIES, D. *Field ecology*. Barcelona: Blume, 1974.
 PUJOL I FORN, J. *La vida al bosc*. Barcelona: Teide, 1981.
 Guide to the territory with a section on forest ecology, e.g., *Guia del parc del Montnegre i el*. Barcelona: Diputació de Barcelona, 2007.
 FERRÉS, LL. *El bosc mandrós*. Barcelona: Onda, 1988.

FOLCH I GUILLÉN, R. *La vegetació dels Països Catalans*. Barcelona: Ketres, 1981.
 BRAUN BLANQUET, J. *Fitosociologia*. Barcelona: Blume, 1979.

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FROM PLANES DE SON TO COLL DE FOGUERUIX

Itinerary

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Objectives, content and purpose	1 ●
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	4 ●
	5 ●
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	8 ●
Method	9
	10 ●
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	12 ●
	13 ●
	14
	15 ●
	16
Evaluation	17 ●
	18
	19 ●
	20 ●
Resources	21 ●
	22 ●
	23
	24 ●
Territory	25 ●
	26 ●
	27 ●
Organisation and planning	28 ●
	29 ●
	30 ●

Educational level/target audience: general public, 14+.

No. of participants: 15.

Duration: 8 hours (a whole day).

Necessary space: Outdoor activity.

Resources and materials:

- For the educator: identification guides (e.g., birds and tracks), binoculars, first aid kit, radio, bags for samples, topographic map.
- For the participants: suitable clothing and footwear, raincoat, water bottle, sunscreen, and a camera and binoculars are recommended.
- Depending on the season, add a sun hat or snow shoes.



Objectives

- To observe where medium and high mountain vegetation lives.
- To get to know the network of mountain refuges and what life is like there.
- To learn about the Special Protection Area for Birds within the PNAIESM and five emblematic species that live in this valley: the bearded vulture (*Gypaetus barbatus*), the capercaillie (*Tetrao urogallus*), the black woodpecker (*Dryocopus martius*), the boreal owl (*Aegolius funereus*) and the rock ptarmigan (*Lagopus mutus*).

Content to be highlighted

- Itinerary to enable the interpretation and understanding of the environment, walking from the centre to the refuge of the «Pla de la Font», at an elevation of 2015m, to learn what a national park is.
- Flora and fauna of different high mountain habitats. Pyrenean endemism, the Pyrenean desman (*Galemys pyrenaicus*). Glacial modelling.

How to do the activity

1. Preparation 10 minutes

The group meets and reviews the material necessary for the activity. An introduction to the route, distance, elevation and the main environmental observation points is given.

2. Implementation 2 hours

A route is followed stopping for explanations at least at the points marked on the following itinerary:

1. The imprint of ice 10 minutes

From here participants can interpret what the landscape was like some 50,000 years ago.

A small glacial tongue that crossed over the Coro Pass eroded this relief, leaving a flat area. The glacier dragged huge blocks of granite with it which formed the Comial, the small mountain where today there are forests of Scots pines.

2. The Canyet Observatory: 10 minutes the necrophagous birds

At this point on the southern slope of Mount Escobedo, there is a feeding area (*canyet*) that attracts a large number of vultures. These enclosed spaces are supplementary feeding points, that is, the wildlife technician in charge of the centre brings meat into this area in order to feed scavenging birds, such as vultures, including the majestic bearded vulture.

3. The mountain streams: 10 minutes the Pyrenean desman

The mountain streams are characterised by cold, clean waters.

In these waters there are many living organisms whose presence serves as a bioindicator of the quality of the river. One which is relatively unknown is the Pyrenean desman (*Galemys pyrenaicus*). This micromammal is characterised by a long snout, with which it catches small insects. Its fur is short and waterproof like the otter's, and it is about 15cm long. During the day it lives hidden among the stones in streams and this makes it very difficult to see.

4. The black pine forest 10 minutes

We have just entered a forest of black pines, trees that can be seen all along the route. The black pine is easy to identify by the dark brown colour of its bark and short, stiff black-green leaves, the branches forming dense groups as if they were brushes. The cones have characteristic scales that are elongated and fingernail shaped.

Its name refers to the dark colour of its wood, when compared to the other pine trees.

This tree is able to live in isolation up to 2700m, although it is grouped in forests from an altitude of 1600 to 2300m.

5. The marshes 10 minutes

The marshes are wet grasslands in areas where the ground water level is at the surface. Care must be taken not to sink into the soft moss and herbs. The amount of water contained in the marshes is very irregular; there may even be some ponds that dry up in dry, hot periods. This is a fragile ecosystem that must be protected.

6. The crossbill 10 minutes

The crossbill (*Loxia curvirostra*) is a bird that lives in these forests. It feeds on the seeds that can be obtained from various pine cones (red and black pines). Its crossed beak facilitates the opening of the cones. The males have a reddish coloration in their plumage, unlike the females, which have green tones. The breeding season is linked to the ripening of the pine cones.

7. The «pla de la Font i coll de Fogueruix» refuge: the National Park viewpoint 10 minutes

«Pla de la Font» is also known as «Còms de Jou», referring to the troughs used by livestock grazing in the mountains. The shelter is located at 2010m and is a good base camp for high mountain excursions.

Now we only have the last climb through the meadows that lead to Coll de Fogueruix (2120m), an excellent vantage point from where, using the orientation table, different ranges from the Sierra del Cadi up to Mont Valier can be observed. Note that in winter the viewpoint is removed to prevent deterioration.

After the data has been recorded, it is pooled and conclusions are drawn: each working group provides the others with their data, observations and ideas taken from the work, which are reflected in data patterns and synthesis by each

participant. From this, relationships between factors, elements, processes and adaptations are discussed in order to find links.

3. Evaluation and follow up 10 minutes

Once the activity is over, the participants must complete the evaluation sheet that will be provided by the educator and return it to the reception at the centre.

Suggestions and didactic advice

Complementary activities:

- Assess human impact on other areas around the world.
- Forest exploitation in the jungles of Borneo or the Amazon.

And additionally...

Visit to the *Casa del Parc Nacional*, in Espot.

To find out more...

Catalan Institute of Ornithology www.ornitologia.org
Conservation of the bearded vulture www.Gypaetus.org
Biodiversity poster collection by the *Obra Social Caixa Catalunya*.

Teaching material of the Living planet report, by UNESCO – Cat.

Documentary: *Baraka*.

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Les Planes de Son

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Simulation of an environmental impact

LOOKING AT THE LAND

19

Educational level/target audience: ages 16 to 18.

No. of participants: 20. Ratio: 1 educator/20 students.

Duration: 7 hours.

Preparation: Preliminary work (1 hour 30 minutes).

Implementation: Fieldwork (4 hours – or 6 if the activity is in the afternoon).
Further work (1 hour 30 minutes).

Necessary space: Fuller's earth quarry of the Croscat Volcano.

Resources and materials:

- Field dossier, method guidelines for the teacher, maps (wildlife, vegetation, soils, geology, topography and land use).
- Compass.
- Coloured pencils, protractor, table of impacts (previous work).



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Objectives, content and purpose

Method

Evaluation

Resources

Territory

Organisation and planning

Objectives

- To learn about environmental impact assessment.
- To learn about the geographical, geological, botanical, faunal and socioeconomic context of the Garrotxa Volcanic Zone Natural Park (PNZVG).
- To encourage active participation in the solving of social and environmental problems.
- To develop critical analysis of real situations, discussion and dialogue.

Content to be highlighted

- Learning about assessing environmental impact.
- Knowledge of the socio-economic and natural environment in the PNZVG.
- Interpretation of maps and data extraction to supplement a matrix of environmental impact.
- Orienteering and observation techniques.
- Formulation of allegations.
- Recognition of anthropogenic actions affecting the environment.
- Appreciation of the scientific and aesthetic value of landscape elements.
- Participation in decision making through public participation mechanisms.

How to do the activity

1. Preparation

(preliminary work)

1 hour 30 minutes

From a newspaper clipping entitled: «The Government gives green light to the reopening of the Croscat Fuller's clay quarries», the participants are presented with the following scenario: an environmental impact study presented by the «La Rocosa» company aimed at restarting mining in the Croscat Volcano is on public display.



A group of residents in the Garrotxa area believes the project could be detrimental to both people and the natural heritage of the region and they consider presenting an objection.

The participants should represent a multidisciplinary team (composed of a geographer, a botanist, a zoologist and a geologist) responsible for collecting information about the project and drafting the allegations necessary to defend the interests of local residents.

The aim of the preliminary work in the classroom (1h 30 min) is to allow the participants to understand the process of environmental impact assessment. The class is divided into teams of 4 people comprising the specialists: a geographer, a botanist, a zoologist and a geologist. The tasks to be performed by each team are the following:

- Based on the content of the news, participants must find out who the people involved in different phases of the environmental impact assessment are. An outline of the process will be provided. This exercise allows students to learn about the administrative process to be followed in any project with a potential impact on the environment.
- Writing a list of actions that, *a priori*, would have any effect on the environment, based on a photograph or a video of the old clay mining in the Croscat Volcano (available on the Tosca website: www.tosca.cat). For this exercise a table of impacts describing the action, the

element affected and the resulting effect (impacts table) can be drawn up.

This table should be taken to Croscat to be discussed in the field.

2. Implementation of the fieldwork

4 hours

The participants will make a tour around the Croscat Volcano environments in order to:

- Locate the Fuller's earth quarry expansion project on the map and see it in the field.
- Collect data on the abiotic (geography, geology), biological (botanical, fauna) and socio-economic (business) environment.
- Amend and expand the table of impacts in the field, elaborated in the preliminary phase, which could result from the reopening of the quarries.

To obtain this information, participants will use maps of wildlife, vegetation, land use, geology, topography and a compass. Each participant will have a dossier where they can gather all the

information collected and which later will be used to draft the objection.

3. Further work

1 hour 30 minutes

In subsequent work undertaken in the classroom, the participants will integrate all the data obtained during the fieldwork. Each team will write down their objections to the environmental impact study prepared by the promoter in order that the government can deny permission for it or force them to apply any necessary corrective measures to minimise potential impact to the environment. They will be provided with:

- The environmental impact study prepared by the sponsoring company.
- A model of an objection letter.
- Internet addresses where various legal texts can be obtained (e.g., the ZVG Protection Act and the Act of comprehensive environmental management).

The objections can be addressed to the Natural Park of the Garrotxa Volcanic Zone (PNZVG)



and senders are informed that they will receive a response.

4. Evaluation and follow up

What will be assessed in this activity is the presentation of the objection to the environmental impact study that will include the content of the preliminary and field work.

Also a questionnaire will be given with which to evaluate the activity (e.g., achievement of the objectives, procedures, resources used and performance of the educator).

Suggestions and didactic advice

Proposal for afternoon activity 2 hours

Objectives: To observe the preventative and corrective measures for environmental impact applied in the Parc Nou – Moixina zone.

Implementation of the activity:

The aim is to observe the corrective measures for environmental impact undertaken along the

route (no curbs, colouring of the verge, planting of native trees and shrubs, adaptation of irrigation and industrial structures). In summary, participants can observe the action that was undertaken in this sector in order to integrate the road into the landscape and facilitate the passage of wildlife.

This activity is intended to be carried out in the Fuller's earth extraction zone in the Croscat Volcano and surrounding environment, but could be adapted to any site affected by public works or human intervention.

To find out more...

http://mediambient.gencat.cat/cat/el_medi/avaluacio_ambiental

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Prevention and selective waste collection

WHAT CAN YOU DO?

20

Educational level/target audience: 6+. Groups with the same level of knowledge and comprehension of the issue.

No. of participants: 25, with the possibility of being increased in specific cases.

Duration: 1 hour.

Necessary space: classroom, hall or similar.

Resources and materials:

- Tables and chairs.
- Whiteboard.
- Computer and projector (preferably).
- Teacher: usage guide, PowerPoint presentation, material for the activity (worksheets and sample material), activity evaluation sheet. All resources can be carried by a single teacher.
- Group leader: activity evaluation sheet.



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Objectives

- To provide tools to allow critical thinking about the consumption (use, purchase and what happens after use) of everyday products.
- To understand the cycle of materials and waste.
- To encourage selective separation.
- To promote responsible consumption and prevention of waste generation.

Content to be highlighted

- Understanding of the concept of a product's life cycle.
- Reflection on the waste generated in the Barcelona Metropolitan Area (AMB).
- Analysis and evaluation of habits and waste management in the participants' countries of origin.
- Knowledge of waste management systems in the AMB.
- Reflection on the habits that promote waste reduction and recycling.
- Assessment of individual responsibility in waste management.

How to do the activity

1. Preparation

Arrive at the centre about 10 minutes early to assess the prior knowledge of the group and think of any last-minute adaptations of the activity. Alternatively, the head of the group has helped in this regard when arranging the activity.

Welcome the group: presentation of the educator/s, objectives and duration of the activity.

2. Implementation

Information is given on waste generation and the life cycle of materials via visual images, charts and diagrams to facilitate the understanding of the participants and encourage their participation. 20 minutes

Activity in which participants: 40 minutes

- Share their experience with regard to waste in their countries of origin or of reference: habits at home and management at urban level. Similarities and differences are considered in relation to what they know of Catalonia.
- In groups of 4-5, participants have to agree on which practices affect the environment and how they affect it (less/more, positively/negatively).
- Each group presents to the others the practices that affect the environment and how they do so.
- The waste management system of the EMA-AMB is analysed and compared with the experiences commented upon before.

3. Evaluation and follow up

Activity evaluation sheet.

Suggestions and didactic advice

In accordance with the information provided when arranging the activity, the workshop is adaptable to specific needs and expectations. Suitable for groups of immigrants or participants with different origins.

According to the characteristics of the group, it is recommendable to choose, from among the educational resources available in the EMA-AMB catalogue, for example:

- Manuals: Preventing waste at home and ideas which have an effect on us and the environment: consumption for the prevention of waste.
- «A metropolitan perspective: the cycle of materials and water» dossier
- Educational dossiers, guided tours of the waste treatment facilities: exercises 1, 2, 3 and 5.

To find out more...

Catalogue of publications and educational resources of the EMA-AMB, accessible through the web-

site and on request. The catalogue is organised by subject and type of participants (students, adults and technicians).

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Àrea Metropolitana de Barcelona
Entitat del Medi Ambient



INVESTIGATING THE FOREST

Investigation activity

21

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Educational level/target audience: adults (16+).

No. of participants: 8 groups of 5 people, maximum. Ratio 1/12.

Duration: 2 days of work at the facility + work in the classroom.

Necessary space: any forest that has suffered any kind of perturbation in the last 50 years + a classroom (at the facility and school).

Resources and materials:

- Dossier for the teachers to work on the subject before, during and after the activity.
- Four presentations (PowerPoint format) to help in the preparation of the activity: presentation of the project, qualitative aspects of the vegetation, quantitative aspects of the vegetation, and measuring of environmental factors.
- Worksheets for the students.
- Support material on the concepts and procedures dealt with.
- Informative and documentary material: Catalonia Forest Inventory, various studies on Mediterranean forests, wood prices, salaries of forestry professionals, map of habitats in the Collserola, etc.
- Various teaching resources: material representing the vegetation in a forest, to assess the incidence of perturbations, and the different perturbations affecting a territory, etc.
- Each working team will have a rucksack containing 1 atmospheric and 1 soil thermometer, 1 hygrometer, 1 light meter or similar, 1 compass, 1 clinometer or altimeter, 2 long tape measures, 1 20cm tape measure, 1 5m tape measure, 1 2m stick, 1 pot of dilute HCl, 1 garden spade.
- Other materials: topographical maps of the area, calculators, colours, computers with a calculation programme e.g., Excel.



Objectives

The activity serves to introduce the boys and girls to the scientific study of the natural environment, to encourage them to reflect on the management of protected natural areas and the territory in general, and to consider how to help conserve and improve it.

Didactic objectives

- To show how the use of forests has changed throughout history and the currently enforced management practices, as well as how complex this is, given the large number of factors involved.
- To adopt the objectivity inherent to research activities.
- To use various field work techniques to gain first-hand information about the forest.
- To analyse the relationships between the different elements of an ecosystem and to assess the impact that any intervention in the forest may have.
- To understand the landscape as a result of natural and human components.

Content to be highlighted

- Approaches to research. Use of techniques for the study of vegetation: working in plots, transects, etc.
- Collection and recording of data using specific measuring tools and observation.
- Processing and representation of data. Comparison with other studies. Elaboration of hypotheses and conclusions.
- Aspects defining the vegetation of an area: composition, structure, density, basal area and tree biomass, maturity, flammability and combustibility.
- Forest management. Analysis of different forestry activities carried out in a protected



natural area such as the Collserola: clearing, thinning, selection of regrowth, cleaning, controlled logging, etc., and their impact at environmental, economic and social levels.

- Simulation of different forestry actions on the ground.
- Development of the ability to act and intervene responsibly in the environment.

How to do the activity

1. Preparation 3 hours

The teacher and group leaders must take an active role. They must have detailed information about the activity before the actual implementation, and agree what and how it will be done, the organisation, everyone's role, etc. and where they will receive the resources and support materials.

During the activity, it is important to follow up the process with them and introduce, if necessary, any agreed modifications.

The preparation must include:

- The approach towards the research.
- The organisation of the work that the group and those in charge (teachers and educators) have to undertake and the timings.
- Work on the concepts, procedures and attitudes linked to the activity.

2. Implementation

An experimental method is applied to the study and analysis of the vegetation of a forest, the simulation of various forestry activities and the analysis of different assumptions.

Different elements making up the vegetation and the relationships between them will be analysed. The principal objective, however, is to detect signs that give us clues about the human activities carried out in the area in recent years and what influence they have had on the evolution of the forest.

All working groups go to the same forest but work on different plots. It is therefore very important to collect and integrate all the data to produce the final results, which can be compared with information from other forests, and conclusions drawn.

Phase I: Study of a current forest. Analysis of the composition, structure and maturity, the degree of flammability and combustibility

First, the composition and structure of the current vegetation of an area is analysed: stratification, cover, origin, plant distribution, state of trunks, etc. This work is complemented by the results obtained from a 10m long, 1m wide transect. The resulting structure will help the understanding of the degree of combustibility of the forest: a list of existing shrubs and vines will be made, including the approximate cover of each, which will allow a calculation of the degree of flammability of the forest.

Then trees will be counted and classified according to species, origin (seed or regrowth) and diameter, which will enable an estimation of the age and maturity of the forest and a comparison with similar forests.

Once the fieldwork is finished, it is necessary to prepare the data and represent it graphically and numerically. All the results must be reviewed and compared to detect inconsistencies. A summary of qualitative data

and the profile of the structure will provide an idea of the forest and its degree of flammability and combustibility.

With data obtained from the tree count, the tree density can be calculated, which is to be graphically represented. Participants must visualise what the tree population is like in our forest and the state of each species, if it has suffered some perturbation and how it has evolved afterwards. If it is compared with other forests, the time of the perturbation can be dated. Also the basal area and biomass of the trees can be calculated and compared with those of other Mediterranean forests, to discover the degree of maturity and deduce how it may evolve in the future.

Phase II: Simulation of forestry intervention. Analysis of different proposals for forestry intervention

Once the participants know what the forest is like and what has happened to it in the past, it is time to consider the future. To do this, simulation will be used as a teaching resource.

Three possible future scenarios will be analysed. Three deductions must be made: what the forest will be like if we do nothing, if we intervene to improve its structure, or if we make use of it for forestry. The idea is to see what each option will mean at an ecological, economic, historical and social level.

This case also involves fieldwork. The same plots are used. To see what the future evolution without perturbation will be like, the tree regeneration level must be observed. This, combined with what is already known about the current situation in the forest, will help us hypothesise about how this stratification will evolve and, consequently, the overall structure of the forest as well as its other features.

In order to analyse any forestry improvement or use, the plots will be regrouped into 2 zones, so that one of the two interventions is simulated in each.



Once the fieldwork has been completed, the students will analyse the results, observe the trees that are marked in each area, and decide why each is to be removed and what the global effect will be; they must find out which goal is behind the marking of each area. Here examples of the various forest activities are seen. A calculation of the economic cost is made, revealing some of the reasons why today, in the Collserola, there are few exploited forests. Issues such as the evolution of the use of firewood, the ownership of forests and their use will also arise.

Finally, there is an exercise in which students are invited to practice what they have learnt. The participants are presented with one list containing the action needed in a park and another with the consequences it may have. The idea is for individuals and groups to analyse them, compare them, select two and argue the case for these. This will make them aware of decision-making difficulties.

3. Evaluation and follow up

With the teachers:

- During the activity, there should be dialogue with the teachers about everything that is being carried out, to adapt the work programme.
- Before starting the second day, it is important to know what has been worked on

3 hours

in the classroom and agree on the work to be done.

- At the end, the teachers fill out a questionnaire assessing the educational proposal, which entails a thorough analysis.

With the students:

- At the beginning of the activity students write down three characteristics they imagine the Collserola forests to be like. This exercise is repeated at the end. They must compare their before and after responses and discuss the results together. It is important to see whether the activity has influenced their perception or not.
- At the end there is an exercise in which they say, individually and then in groups, what they have learnt from the activity.

Suggestions and didactic advice

A full description of this educational proposal can be seen in the teacher's dossier. This can be requested from the Documentation and Educational Resources Centre of the Collserola Park. (CDRE. Tel. 93 692 29 16, cdre@parccollserola.net).

To see the timings, content and sequence of different stages of the activity, check: www.parccollserola.net in the «*El curs al Parc*» section.

And additionally...

- Another activity, «Investigating fauna», can be carried out to analyse the relationship between the structure of the vegetation and the bird population of an area, and therefore the possible consequences to birdlife of any intervention involving the vegetation: fire, reforestation, urbanisation, use of abandoned agricultural areas, etc.
- Action can be planned in favour of a forest in the students' territory.

To find out more...

«Plantes de Collserola I. Els arbres, arbusts i lianes més freqüents». Set of 23 identification cards. Consorci del Parc de Collserola, 1991.

«Plantes de Collserola II. Els arbres, arbusts i lianes més freqüents». Set of 23 identification cards. Consorci del Parc de Collserola, 1991.

CREAF. (Centre for Ecological Research and Forestry Applications) «Forest Inventory of Catalonia» at www.creaf.uab.es/eng/index.htm

FOLCH I GUILLEM, R. *La vegetació dels Països Catalans*. Barcelona: Ketres, 1981.

FRANQUESA, M.; NAVARRO, M.; ARRIBAS, G. *Investigació sobre el bosc*. Barcelona: Patronat Metropolità Parc de Collserola, 1994. 32 p.

RASPALL, A.; LLIMONA, F.; NAVARRO, M.; TENÉS, A. *Guia de Natura del Parc de Collserola*. Barcelona: Consorci del Parc de Collserola, 2004. 238 p. + 2 fold-out maps + CD-ROM Book, map, CD-ROM. ISBN84-69-3165-X

VALLADARES, F. *Ecología del bosque mediterráneo en un mundo cambiante*. Madrid: Organismo Autónomo Parques Nacionales, 2008. 589 p.

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Discovery of the environment

DISCOVERING THE BEACH

22

Educational level/target audience: all ages.

No. of participants: 50 participants in groups of 12-15.

Duration: 3-4 hours.

Necessary space: beach with sandy and rocky areas, groyne type.

Resources and materials:

- Plastic trays, water bucket, tweezers.
- Homemade or bought identification cards, guides to the shore, worksheets, work dossiers, etc.
- Clothing, footwear and accessories for the wind.



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Objectives, content and purpose

Method

Evaluation

Resources

Territory

Organisation and planning

Objectives

- To learn about the coastal environment and marine ecosystems, particularly the beach and rocky shore.
- To identify marine invertebrates, discover their adaptations to the environment and the physiology of each species studied, as well as their culinary qualities.
- To learn respect for living organisms.
- To discover any environmental impact affecting the marine environment from the shore.
- To learn to observe, listen and interpret what is discovered.

Content to be highlighted

- The cycle of water and sand.
- Changes in the landscape, certain environmental impacts.
- The wind: a landscape-modifying agent.
- Marine debris, the remains of living organisms, invertebrates, birds and rubbish.
- Ecological relationships and adaptations.

Presentation of the activity

This activity aims to allow students to discover the ecosystems of sandy beaches and those with groynes, in a global and comprehensive way.

How to do the activity

1. Preparation 15 minutes

It is necessary to prepare the material: trays, Wellington boots, buckets, tweezers, marine debris identification cards, and have some marine debris available.

A wind rose should be drawn on the sand for the wind game.



Some seashore animals should be collected and kept in a bucket containing water for later observation.

2. Implementation

The activity begins with a moving 20 minutes game involving the whole group (50 participants) to learn about the wind rose. The wind is a crucial factor in the dynamics of coastal weather.

Game rules: a star-shaped design is proposed, where each arm is oriented in the direction of a wind (Tramontane [N], Levant [E], Ostro [S] and Ponente [W]). If the group is on the beach, thermal winds can be mentioned (onshore and offshore). If there are more groups, the intermediate winds can be added (Gregale [NE], Sirocco [SE], Libeccio [SW] and Mistral [NW]).

The children sit on the arms of the wind rose on the sand. Participants are called upon by Aeolus (God of winds in classical mythology). Whenever Aeolus touches the head of a child who is at the end of an arm, the whole arm (wind) gets up



and makes a complete revolution around the wind rose while saying its name.

Next, the participants are separated into groups of 12-15 and the discovery activity begins:

1. Sitting on the sand, the educator and the group start talking, and questions are raised: Where does the sand come from? How does it get to the beach? From here, conversation leads to the water cycle. It should be explained how the sand comes through watercourses (down the rivers, into the sea, and how the marine dynamics carry the sand to the beaches). The same applies to the cycle of waste. It is a good idea to comment on the presence of groynes and how these affect the dynamics of water, sand, and what social function they have. **10 minutes**
2. Then, trays are given out and marine debris is collected. Students spread out along the beach. **45 minutes**

Once they have walked around, the groups meet again, discuss the types of samples collected and pose questions such as: Is it an animal or a plant? Is it dead or alive? Which biological group does it belong to? What does it eat? Where does it live? What has happened to it? And so on. **30 minutes**

After students have collected marine debris, it is recommended that they draw a big square on the sand with smaller squares in-

side and try to classify their collections into large groups, discarding any repeats.

3. Finally, the area with groynes is visited, and the zoning is discussed briefly. Then, some typical invertebrates are observed. These animals will have been collected in the preparation stage, and one or two samples placed in each tray. Students should avoid entering the water as they can damage the sandy bottom. **40 minutes**

Sea urchins, sea cucumbers, hermit crabs, starfish and sea anemones can be observed *in situ*, but care must be taken not to damage them.

3. Other activities to add to the fundamental discovery.

Environmental impacts (poster and waste basket)

This is suitable for students in the final cycle of Primary education and Secondary school. A list of impacts is drawn up and possible solutions for their minimisation are discussed, either on a local or personal level. With the help of a poster or a drawing indicating the environmental impacts, the work is easier for the students. **30-40 minutes**

Implementation: Posters or pictures with different environmental situations are given out to pairs of students, who present them and try to identify them in real space. If littering on the beach is being discussed, it is good to have a group member carrying gloves and a basket, so they can collect the litter, which is then deposited into the corresponding container. This task can also be carried out by the educator with the help of children to avoid problems with any waste that may be hazardous.

4. Evaluation and follow up

At the end of the activity, the students are asked: *What have you learnt? Which discovery do you remember most? What did you like best? Can you remember something small, so-* **15 minutes**

something big, or something that surprised you?
And so on.

5. Final conclusions

The beach is a relatively unknown ecosystem, and most of the time it is only associated with leisure and swimming. The discovery of biodiversity and the outdoor work make this activity fun and rich in learning opportunities.

Suggestions and didactic advice

The study of invertebrates should be carried out on the sand, with the help of trays or buckets of water; the groynes can be dangerous. It is important to return the animals to the water and treat them with the utmost respect. We use them to understand the environment, but it is necessary to point out that they should be in their own habitat.

If the sea is rough it may not be possible to observe live animals; educators must think of other secondary resources (e.g., an aquarium, plastic animals, photos) to illustrate the content and objectives.

For initial and middle levels of primary students, it is recommended that material for reading and writing not be necessary during the excursion, as the water and sand make it difficult to work with paper and pencil.

And additionally... (more proposals for extension activities)

- **Landscape studies from the beach:** observation of the principal environmental impacts, the shoreline, the waterfront, construction works, spills, boats, a marina, breakwaters, etc.
- **Making a mural,** especially for students aged 5 to 7, in which they must create a beach similar to the one they discovered, on wrapping paper

using three colours: brown (sand), blue (water), and white (sky).

- **A slide show,** presenting the main features observed, where the group themselves explain what they have learnt.
- **Identification of marine debris,** with the help of guides, identification cards, images, etc. (middle and final cycle of Primary education).
- **Observation of marine animals with a binocular microscope,** star-fish and sea urchin skeletons, work on discovering life forms and adaptations to marine life (final cycle of Primary education and Obligatory Secondary Education).

To find out more...

<http://www.maspedro.cat/webescola> (Resources for school, Mas d'en Pedro EE Centre. Cubelles).

Guides for the discovery of the beach and the breakwater.

RIEDL, R. *Fauna y flora del mar Mediterráneo*. Barcelona; Omega, 1986.

CORBERA, J.; MUÑOZ, G. *Els invertebrats del litoral dels Països Catalans*. Barcelona: Pòrtic, 1991.

LLORENS, M.; PORTAS, F. *La platja*. Barcelona: Servei del Medi Ambient. Diputació Barcelona (CEM collection).

LLORENS, M.; PORTAS, F. *La vida a l'espigó*. Barcelona: Servei del Medi Ambient. Diputació Barcelona (CEM collection).

SINUÉS, H.; GÓMEZ, E.; VIVES, P. *Quadern Blau*. Publicacions Fundació Pere Tarrés. Publicacions del Consell Comarcal del Garraf.

VIVES, P. *El Mar, el viatge Romàntic. Tres itineraris per a conèixer el litoral del Garraf*.

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A day with the flock

THE RURAL WORLD

23

Educational level/target audience: General public.

No. of participants: 20-100.

Duration: 3 hours.

Necessary space: pens, fields and other spaces where the flock goes.

Resources and materials:

- Sheep, dogs and shepherd.
- Typical tools and objects used with the flock.
- Related references.



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22	●
23	●
24	●
25	●
26	●
27	●
28	●
29	
30	●

Objectives, content and purpose

Method

Evaluation

Resources

Territory

Organisation and planning

Objectives

- To bring the rural world closer to the general public.
- To raise awareness about traditional, sustainable livestock farming activities, which are closely linked to the land and their current decline.
- To become familiar with the vocabulary and lifestyle of mountain livestock farming.
- To get to know the mechanisms of communication between people and animals and their results.



Content to be highlighted

- Characteristics (visual, aural, tactile and olfactory) and the functions of each element of the flock and team.
- Sensory perception of the activity.
- Vocabulary and expressions of the shepherds.
- Links between the flock and the daily life of the participants.

How to do the activity

1. Preparation

As the flock and shepherd have their own pace, it is necessary to arrange the distribution of time and spaces beforehand, and plan for unexpected situations such as weather changes.

It is necessary to prepare the breakfast place (table set with dishes and sustainable, locally-sourced food).

2. Implementation

- Meet the participants near the farm.
- Walk to the farm and give a brief welcome including a presentation of the activity.
- Shepherds' breakfast banquet.
- Make an excursion around the farm explaining the different elements that make up the flock (e.g., spring lambs, yearlings, wethers, animals with their horns removed, rams, ewes, billy and nanny goats) and the characteristics and needs (e.g., space and equipment) of a flock of more 200-1000 individuals.



- Demonstration of how to herd the flock with the help of the dog.
- Reading of literary texts (fiction and poetry) on the life of the flock.

3. Evaluation and follow up

The participants' oral expressions and body language give an indication of the satisfaction produced in them by the activity, synthesis of their receptiveness to this shared experience.

Suggestions and didactic advice

To facilitate the dynamics of the group, it is recommended that there are at least two other people in charge, besides the shepherd.

And additionally...

A short explanatory dossier is given out to participants.

To find out more...

VILARRASA, S. *La vida dels pastors*. Ripoll: Arxiu Museu Folkloric de Sant Pere de Ripoll, 1981.

AA. DD. *Els pasturatges. Funcionalisme i aprofitament dels ecosistemes pastorals*. Barcelona: Servei del Medi Ambient. Diputació de Barcelona, 1984 («Quaderns d'ecologia aplicada» collection, 7).

AA. DD. *Diagnosi de la ramaderia al Parc Natural del Montnegre i el Corredor. El cas de les explotacions d'oví i cabrum*. Barcelona: Universitat Autònoma de Barcelona, 2004 (CD version).

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7

What not to do

One image and a thousand words

**WHAT AN ENVIRONMENTAL
EDUCATION ACTIVITY SHOULD NOT BE**



EXCURSIONS

In one of the activities that I consider most successful, as do the students – we have not changed it much in 20 years – they walk around the forest in groups without adults (they only run into them every once in a while), for a whole morning. Can we keep doing this in an excessively fearful and comfortable future society?

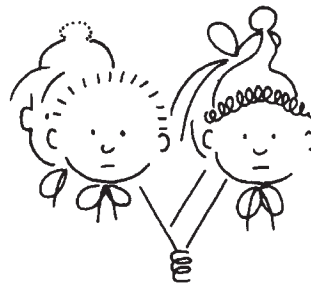
KIDS, TODAY WE ARE GETTING OUT OF THE CLASSROOM. WE'LL VISIT THE NEIGHBOURHOOD!



FOLLOW BEHIND ME, IN PAIRS



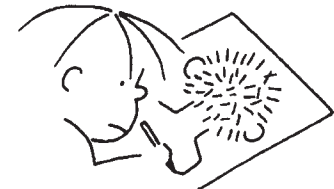
HOLD HANDS... AND DON'T GET DISTRACTED...



DON'T STEP OFF THE KERB.....



AND NOW LET'S GO BACK TO THE CLASSROOM. EVERYONE DRAW THE THING THAT GRABBED THEIR ATTENTION THE MOST



"DISCOVERY" EXCURSIONS

Frato

Often, due to our overprotective attitude we forget that handling and discovery are a good way of learning. As adults, we are so focused on superfluous aspects that when we have a chance to discover something interesting, we miss it.

The other day I went to a museum and in one of the exhibition halls there were 16 children aged 4, accompanied by four adults. I assume they were at the museum to do one of the activities that the institution has designed for this age group, but at that particular moment they were in one of the general exhibit rooms. The teacher was at the head of the line of students explaining what was in the room, basically to the two children at the front of the line. The other three adults were making sure that the children didn't let go of the rope. At that precise moment they were "learning" in a similar way to that portrayed in the cartoon above.



Juan Varela

As environmental educators, we should always find the perfect balance between what we know and what the students want to know. We are used to displaying all our knowledge, and students may see us as weird when it comes to animals/flowers/faeces (no matter how much fun we may think it is). We are "freaks". One day, with children in their 5th year of Primary school, after looking at and walking through a magnificent

coastal forest made up mostly of pine trees, near the Llobregat River delta, after talking about pine trees, sand, climate, fauna, problems and conservation, a boy was interested in some small plants growing on the pine needle leaf litter. They were all similar and had lots of bunched-together leaves, like the spokes of an umbrella. This was a major topic of conversation and discussion; they were the seedlings of those enormous pine trees they had been looking at. Some of them said that this was impossible, as pine needles are in pairs, and others said that it was possible, since pines grow that way, and so they found out that pine trees are completely different when they're young.

Amazing! They themselves discovered what they had to protect. It is never good for an educator to talk too much.

PARTICIPATION

AFTER SHRUGGING THEIR SHOULDERS FOR SO LONG, THE PEOPLE DEVELOPED A HUMP...

Participation requires power-sharing. We recently moderated a somewhat disappointing process: the person in power decided not to share that power because the participants did not want to share, they wanted to take control!



El Roto

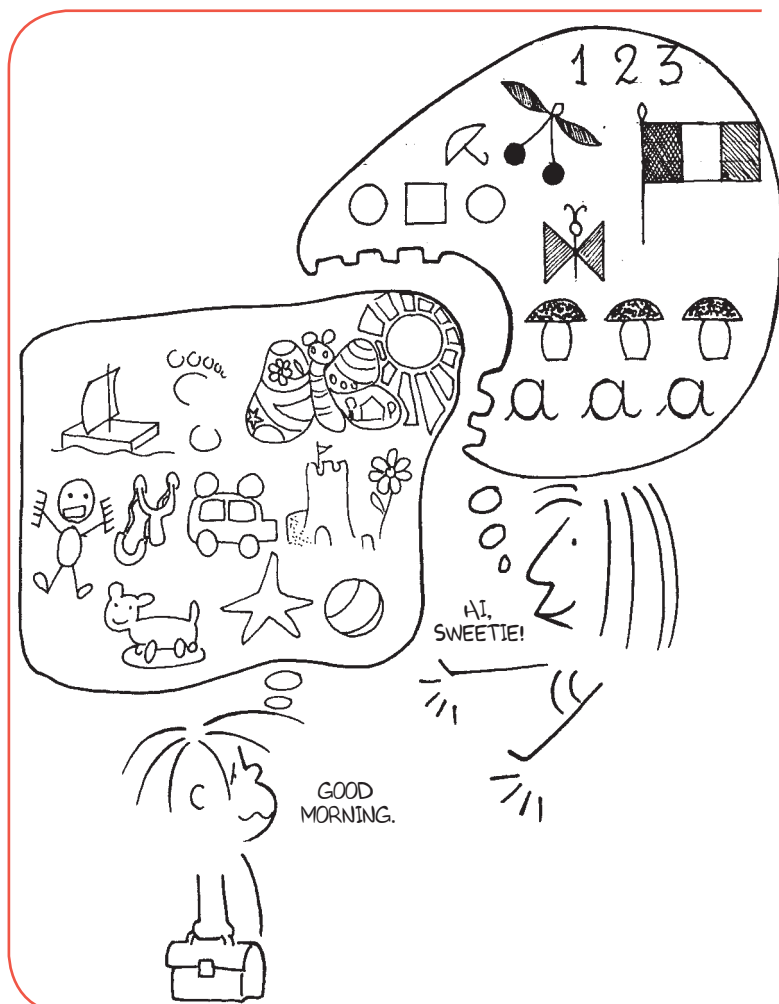
*I think I do this a lot, don't I?
I look at myself in the mirror.
It is an image I relate to many people around me. The eternal answer "I don't know", "let me think about it", "maybe", "it depends", and meanwhile, what do we do? I must be getting old.*

One day, before leaving for the forest, I asked a group of children if they knew what an ecosystem was. The question was almost a taunt, since the children were in their second year of primary school and I did not expect them to know. Once the question was out, a boy raised his hand quickly and said: "An ecosystem is an "echo" (that you hear in the mountains) and a system is... well, I do not remember exactly what system means". The best thing of all is that the goal of the excursion was not to look at ecosystems. So why did I do that?

DO WE UNDERSTAND EACH OTHER?

In meetings at school it is every day more difficult to talk about a specific educational topic. You may think that to all your colleagues a word means the same, for instance "participation", but each teacher understands something different and we waste a lot of energy trying to find a common concept that allows us to move forward.

WHAT NOT TO DO



Frato

We were sitting with a group of young children on the banks of the Sau reservoir. I pointed in the direction of the bell tower sticking out of the water, and a boy said: "A house-boat!" I said it wasn't, and I struggled to make them understand that it was a submerged town, and told them lots of stories about what had happened in the past. The next day, as we experimented with floating by throwing rocks, pine cones and sticks in the water, I asked them to think of things that would sink. To my surprise, many of the little kids answered "The house-boat!"

THE METHOD

When the activity ends, I often ask the students what they think about it, what they have learnt and what has grabbed their attention, but these are falsified meetings where I'm looking to hear what I expect them to tell me. It's a complete failure.



Not only have I done this many times, but then I try to excuse myself and tell everybody, including myself, that it is not possible to do the activity properly using "house" and "astronaut", and although I do believe in children participating, using "house" and "Mum" things will work better. Not controlling the end frightens me; at the end of the day, I just want to hear the same old story. But then I have the nerve to say I do things in a more participatory way.

The use of the senses to identify elements in the forest... the bird song, the rustling of the leaves... We go under the motorway bridge, straight towards the mountains. We end up identifying the sounds of the road, relating them to each kind of vehicle: motorbikes, by the roar of their engines; cars, by the friction of their tires; trucks, by their wind resistance.

Objective 1, achieved: to pay attention, listen, feel, identify and understand.

Objective 2, another day will be: to identify the elements in the forest.

Many times we ask a group about their prior knowledge on a topic, but we do not use it. It is only a way of justifying that we have asked them, but we do not take it into account. We use the method like a recipe, but do not follow its philosophy.

INDIVIDUAL LESSONS ARE OVER!
WE MUST BE ACTORS, NOT
SPECTATORS! BLAH, BLAH,
BLAH... LET'S INVESTIGATE!

I CAN DO... RESEARCH
I CAN PROPOSE...

FOR TOMORROW, EVERYONE MUST
BRING ME A PIECE OF RESEARCH
ON MESOPOTAMIA

MESO...?
MESOPOTAMIA?

MESOPOTAMIA?
WHO CAN HELP ME? WHERE IS THAT?
MAYBE DADDY...

Mesopotamia. A
region blah, blah,
blah, defined by two
rivers, blah, blah,
and the Tigris, blah,
blah, inhabited by
blah, blah, Assyrians
blah, blah...

(1974) Active school. 1: research

Frato

An autumn morning in the forest. Objective: to discover some of the secrets of the forest plants with 8-year-old students. Spectacular mushrooms are spotted first, but they are completely off the programme: red ones, yellow ones, there are dozens! All the children say "Wow!" Outcome: mushroom research day.

One day we decided to support a field trip to work on hurricanes! It was the topic that some 9-year-old students chose for their class project. The outcome was super-satisfying. But the initial anxiety was immense. Now, 15 years later, that school no longer works on freely-selected projects.

Active methods require the educator to have certain skills, including:

- Order: to sort out chaos without twisting it.
- Synthesis: to relate contributions and unexpected tasks to one another.
- Courage: to explore the unknown.
- Imagination: to connect the different interests of group members.
- Empathy: to encourage the dissidents towards a common research project.

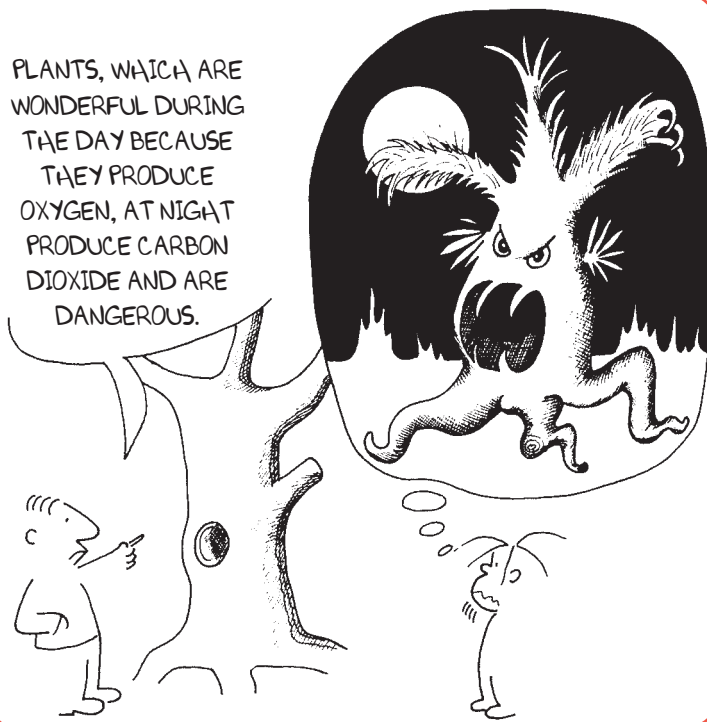
Do we really care about the expectations and prior knowledge of our young people? Or is it simply an excuse to instil in them what we really want to?

THE CONCEPTS

One morning in the Sierra Cavallera, we were walking on the rocky trails of the Caritat Mountain, on terrain of many changing colours, limestone, sandstone, conglomerate and quartzite. It was not the vegetation, the sky or the relief that changed; it was the rocks we were treading on. Those children in 4th grade taught me that rocks can be classified in many ways. I told them about the shape, the colour, the material they are made of and with them I experienced the noise the rocks make when trodden on, but I could have never imagined that rocks could be classified by the heat they retain: some are colder, some are hotter; it is just a matter of touching them. Since that day, rocks must be touched.

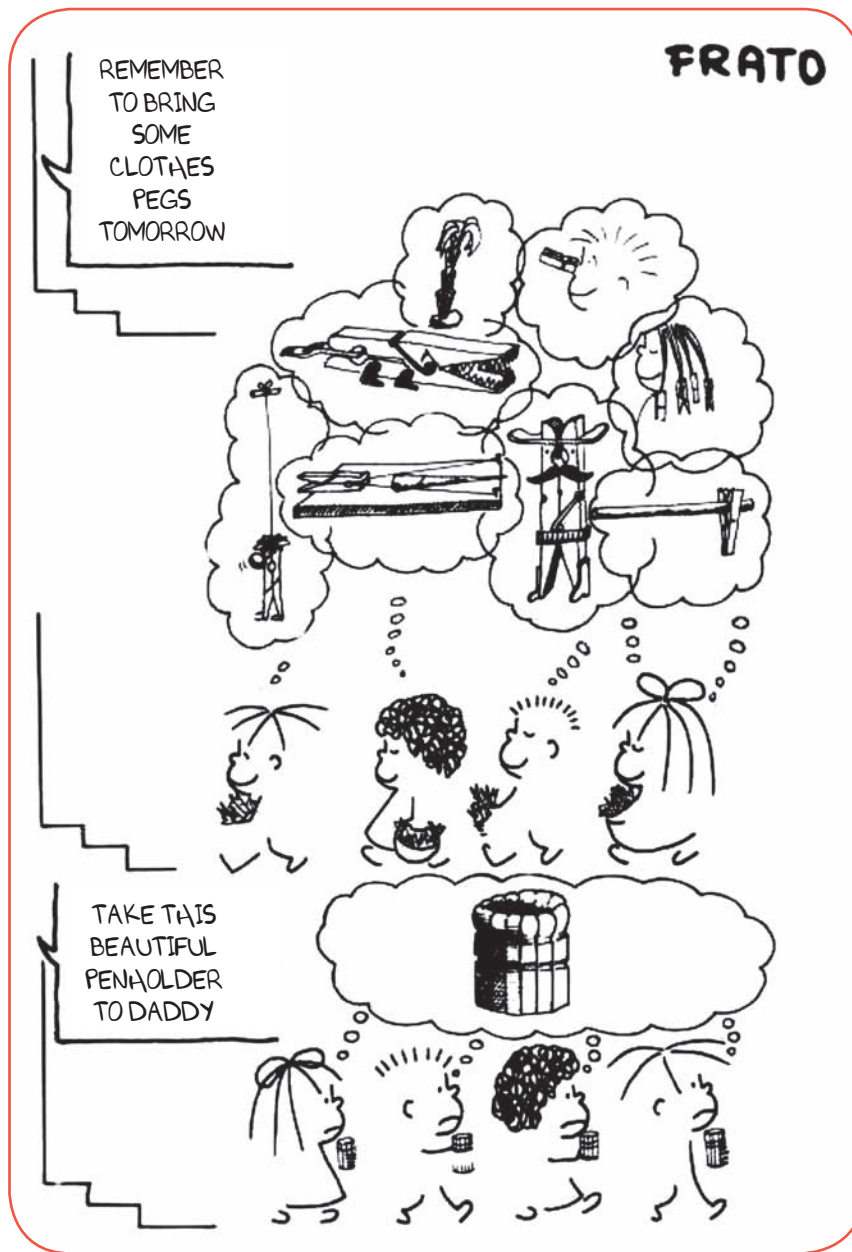


PLANTS, WHICH ARE WONDERFUL DURING THE DAY BECAUSE THEY PRODUCE OXYGEN, AT NIGHT PRODUCE CARBON DIOXIDE AND ARE DANGEROUS.



Frato

While having coffee, I told the teachers that we had a nest of Bonelli's eagles in the Can Salvans rocks. They asked me to tell the children what was going on there. I was so excited about this pair of stripe-tailed eagles that I said it would be great to see them. Many of them were completely fascinated. During the excursion, they did not stop asking where the eagles were. But we saw no trace of them. We kept walking and doing the activities as planned. When we were scattered around the forest, I suddenly saw the eagles flying past. "The eagles. The eagles!" Others called out to the rest. Everyone ran down to the meadow, some in fear, and when we all met up, we found out only five of them and a teacher had seen the eagles, apart from me. We went back to the forest to pick up everything we had left. It was a fun moment that made a lasting impression on them. From the school, the children sent me drawings of me and the Bonelli's eagles. What tails they all had! They managed to remember details they had not even seen.



Frato

The educator, between craft and art: these days making students understand phenomena is craft.

Helping them adopt a critical view and act on it is an increasingly necessary art.

We must respect the fact that not everyone thinks the same way we do and that the diversity of opinions and thoughts are a source of personal enrichment.

Do we really want our children to grow up discovering and analysing their environment or don't we? Isn't the process more important than the final result?

The day we finally understand this, we will understand our children.

CRITICAL THINKING



Frato

When I studied teaching I failed my philosophy exam in June but got a distinction in it in September. I was asked to explain the scientific basis which Aristotle used to prove that the sun revolved around the Earth. I had read a book, "Conjectures and constellations", explaining how Aristotle reached this conclusion. He was only a few minutes out in his calculations. I liked the book and will always remember it. I like it when established facts suddenly change; that's why I chose to work in environmental education.

They say science is always right, don't they? Then why does it permit conceptual mistakes? What does it give us? Who is right about socio-environmental issues? Scientists, sociologists or teachers? I like it when science gets it wrong or a technician cannot find a solution. Long live social intelligence!

The fact that scientific models are accepted does not mean that they are not rechecked, reasoned or discussed.

Doing "a night of astronomy" with children under 8 is really to touch upon innumerable personal theories. Some children aged 4 to 6 say that there are several moons: the one in Barcelona, the one in Mataró, and the one in Orrius (it's bigger and whiter). Others passionately argue why this is not so. A famous Greek astronomer was concerned about the size of the moon, and worked on this question for many years, until he reached the widely accepted conclusion that the moon is the size of a foot. It is good, and a lot of fun, to have children check this fact on a clear night at Nature school, knowing that men have "set foot" on the moon!

THE HIDDEN CURRICULUM

"You must respect animals and plants", said an educator to the students as she inadvertently crushed a fly with the newspaper.

An example is worth a thousand speeches.



Frato

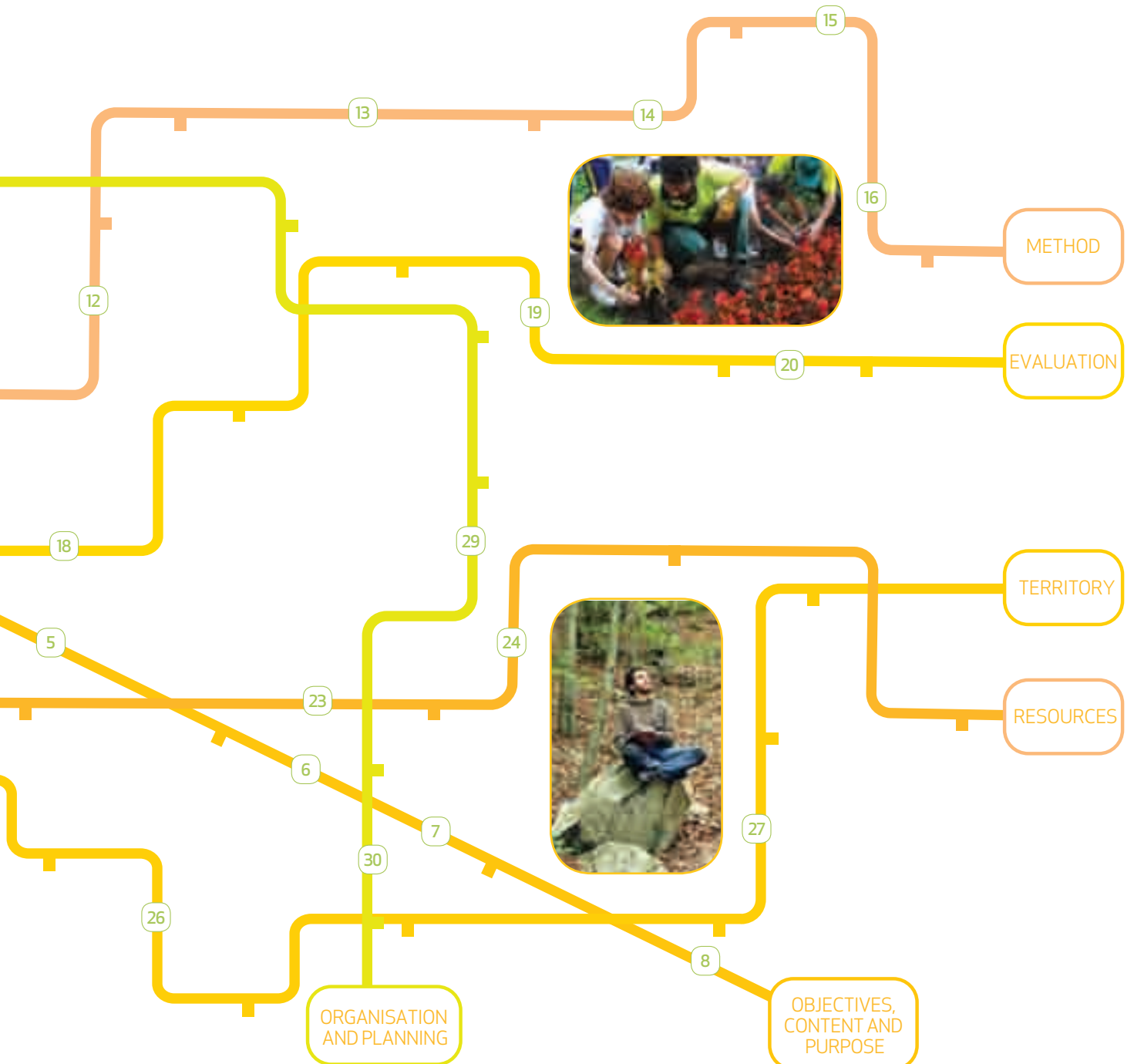
The passion implicit in the moment is an important part of what we can transmit to learners.

Who has never heard, shouted in desperation, the phrase "Will you do me the favour of shutting up?"



8

Quick guide to designing or choosing a good EE activity



1 CREATING AN ACTIVITY

Which environmental education activities should I design?

I am a Primary/Secondary school teacher, an environmental educator, or an activities instructor, and I want to design and carry out an environmental education activity.

There are 10 questions to raise before creating an educational proposal.
I should ask myself:

1. Does the activity meet the specific needs of a defined target audience?
2. Am I explicitly using quality criteria in this new educational proposal?
3. Will the activity facilitate the understanding of a certain environment which it is necessary to get to know?
4. Should the activity facilitate a relationship with longer-term learning processes (e.g., formal education programmes, syllabuses, annual programmes) and the people in charge of them?
5. Does the activity allow the incorporation of aspects that cannot be dealt with indoors and, therefore, should I try to incorporate different educational activities and methods?
6. Can the activity be done at different levels and is it flexible enough to be adjusted to the reality of each group of participants?
7. Are the participants in the activity the true protagonists, with an active role from the very beginning?
8. Do I understand clearly what needs to be highlighted in the activity? Is it the concepts? The method? The discovery? The experimentation? The group work? Or the ratio?
9. Have I identified the particular characteristics of this specific activity, which make it different from other educational proposals dealing with the same subject or the same territory?
10. Have I predicted the educational importance of doing the activity and how the group can assess it?

Which environmental education activities should I use?

I am a Primary/Secondary school teacher, an environmental educator, or an activities instructor, and I want to choose some activities to do with the group (students, in the case of formal education, or others).

10 questions to raise before deciding on the implementation of a specific environmental education activity with the group I am in charge of.

I should ask myself:

1. Does the activity clearly meet the specific needs of the group?
2. Do I know which quality criteria the proposed activity incorporates?
3. Is the economic cost a key element in choosing this activity?
4. Do I consider the activity to directly link with what we are doing in the classroom (before or after the excursion) and as a part of longer-term learning processes (e.g., programmes, syllabuses)?
5. Does the activity allow us to carry out important educational activities that cannot be undertaken in the classroom?
6. Do I know the professional level of the team/environmental educator carrying out the activity? Can I use that as a selection criteria?
7. Am I an active part of the implementation of the activity?
8. Which should be the most important aspect of the activity? Is it the concepts? The method? The discovery? The experimentation? The group work? Or the ratio?
9. Do I carry out the same activities every year? If I change them, which criteria do I use to do so?
10. Do I help the group to assess the educational importance of carrying out the activity?

The quality criteria of an activity

If you are Primary/Secondary school teachers
who use or design educational activities;
if you are environmental educators who carry out activities in different groups,
if you are technicians and responsible for environmental education activities in private or public institutions,
if you are interested in the practice of environmental education,
we encourage you to analyse the quality criteria of your activities.

Name of the activity: _____

How to do it?

1. Tick those criteria that you consider to be already included in the activity analysed.
2. Tick those criteria that you consider should be included in the activity.
3. You don't have to mark all of the criteria.
4. The criteria are grouped into the same six areas presented in the guide, so you can see the strengths and weaknesses in each area.
5. Write improvement proposals for those criteria you deem necessary.

		Included	Should be included
OBJECTIVES, CONTENT AND PURPOSE Ensure that...	1	Objectives are well defined.	
	2	Objectives meet the needs of the target audience.	
	3	Content is well defined.	
	4	Content to be worked on is up-to-date and socially relevant.	
	5	Activity is based on the concept of learning as a socialising process.	
	6	Activity looks at different future scenarios.	
	7	Activity takes into account the complexity of the issue.	
	8	Activity relates to the everyday life of the participants.	
METHOD Ensure that the activity...	9	Uses participative strategies.	
	10	Promotes cooperative learning.	
	11	Facilitates critical thinking.	
	12	Uses different techniques and methods to allow it to be adapted to different realities and groups.	
	13	Incorporates a sequenced learning process.	
	14	Is action-oriented.	
	15	Evokes emotions and empathy.	
	16	Uses practice to prompt theory building.	
EVALUATION Ensure that the...	17	Evaluation is a necessary part of the learning process.	
	18	Activity incorporates the means to allow regulation and evaluation.	
	19	Activity provides space to enable personal learning and self-evaluation.	
	20	Objectives are evaluated.	
RESOURCES Ensure that the...	21	Resources utilised facilitate the development of the activity.	
	22	Creation and use of resources is coherent with the sustainability criteria.	
	23	Activity makes careful use of data and information.	
	24	Resources allow for different learning paces.	
TERRITORY Ensure that the activity...	25	Is contextualised in time and space.	
	26	Stimulates an emotional link with the surrounding area.	
	27	Is undertaken in an appropriate place, taking into account sustainability criteria.	
ORGANISATION AND PLANNING Ensure that the...	28	Group leader and activity leader work together.	
	29	Student/educator ratio is appropriate to the type of activity and the characteristics of the group.	
	30	Activity is well described.	

How did we do it?

If you have got this far, you have already read the guide, but we would like to dedicate this chapter to explaining how we wrote it. In EE we talk a lot about the value of the process, and in this case, the making of the guide was, for us, a very important part of its value. In this chapter we present the stepping stones along the path we followed, the context in which the project came about, who participated and how we worked on it.

In 2001 the Council of Environmental Education Centres (Consell de Centres d'Educació Ambiental - CCEA), as part of the Catalan Society for Environmental Education (SCEA), began an internal debate on the quality of educational practices in its centres and produced a manual containing a set of recommended criteria for EE centres.

Some years later, there emerged concern and a need to continue working on the specification and definition of criteria, but this time to go deeper into the criteria relating to the quality of the EE activities. We wanted to analyse the practical side of what we do and how we do it.

The Council of EE Centres proposed this project to its members, Caixa Catalunya provided the necessary funding and we started to work on it. The funding provided us with the necessary resources to: organise meetings at the SCEA (10 meetings, with an average attendance of 10 environmental educators representing various facilities, organisations, businesses and public administration), guarantee a minimum workload to be done by every participant after the meetings, pay for transportation costs, support a small project coordination group in charge of follow up

and keeping up the process of participation. The budget also included the publishing of this guide.

The group was participated in by those professionals from EE centres associated to the CCEA who wished to be involved, and whose career, practical experience or uniqueness was an interesting asset to the project. Each centre was represented by one or two educators, who attended the meetings and passed the information on to the rest of their educational team, and those centres which wanted and were able to, created an internal working group to discuss the quality criteria.

The working group was participated in by the following centres: l'Escola Natura el Corredor, Mas d'en Pedro, Santa Marta CIEP, Cel Rogent Educació Ambiental, Tosca, Consorci del Parc de Collserola, la Fundació Catalana de l'Esplai, la Vola, el CX MónNatura Pirineus (Les Planes de Son) and the Entitat Metropolitana de Medi Ambient de l'Àrea Metropolitana de Barcelona. Also, at specific points in the process certain individuals provided external collaboration.¹

Firstly, we had to agree on the definition of what we mean by an EE activity. When we decided to talk about the quality criteria of activities, several concepts came up, such as educational projects, programmes or services which, for some, have a broader scope than what we mean when we talk about an activity, but for others, the boundaries are harder to define. Finally, we came to agree on a shared framework, which we have reflected in some of the terms and concepts included in the glossary at the end of this guide.

1. Alba Castelltort (agenda21escolar de Barcelona) and Montserrat Roca (CDEC).

Once the starting points had been agreed upon, each educator had to define what they consider from their own experience, makes a good EE activity. There were references to well-known documents that could provide valuable relevant information, but in the first session priority was given to the analysis of our everyday experience, before resorting to external information.

In the second session, the participants contributed documents dealing with quality criteria in environmental and sustainability education. After reviewing the bibliography, we chose the following key documents as a frame of reference: the criteria used by Neus Sanmartí and Alba Castelltort in the ADAPDEA tool, the criteria in the Manual by the Council of Centres, the quality criteria for sustainable schools by Michela Mayer, the Guidelines for Excellence by the NAAEE (North American Association for Environmental Education) on materials and non-formal education, and the criteria used for interpretative activities by the AIP (Asociación para la Interpretación del Patrimonio), which were read in preparation for the third session.²

We agreed on an initial list of criteria, then made a careful selection and defined them one by one in relation to the following parameters:

- **Pertinent or valid:** it should meet the EE objectives.
- **Feasible:** the criteria can be used in the evaluation of most EE activities currently being carried out in Catalonia. If this step from theory to practice is not possible, then the quality criteria must be rejected.
- **Understandable:** it should be understood by everyone (environmental educators, teachers, etc.) and not give rise to ambiguous interpretations.
- **Innovative:** it should improve the quality of an activity in a relevant way.

- **Agreed-upon:** most environmental educators should agree on it. All the quality criteria have been selected by consensus.

In a master document the quality criteria of the activities were ranked according to the total points assigned to each one by the participants. This tool helped us rewrite some criteria that were not clear enough or were not applicable to the activities, in order to continue to discuss them both in the working group and in the teams at the various facilities. This work enabled us to arrange the criteria somewhat. We obtained a first list of 60 criteria.

But still we had to keep working. We regrouped the criteria so as to reduce their number: those dealing with the same topic at different scales were merged, and the set of criteria was simplified. Finally, the list consisted of 36 criteria.

There was much discussion about the order for the criteria, e.g., should it be according to method, meaning or priority. The working group wondered whether they should choose a classical concept for arrangement of the criteria, one that would be understood by most educators and teachers (objectives, content, method and evaluation), or one that would explicitly state key concepts within a teaching-learning process (e.g., the culture of complexity, critical thinking). A debate ensued which resulted in the criteria finally being grouped according to the area we believe they belong. There are 6 final areas: objectives, content, purpose, method, evaluation, resources, territory, and organisation and planning.

We organised the criteria according to their corresponding areas. Next, in small working groups we defined them: we included a brief description of what each criteria refers to, each one was accompanied by an example to facilitate, in practice, its implementation, and indicators were included to aid in evaluating the criteria.

2. See reading list.

The process of creating the set of criteria was as important as the result; we found a space to debate and discuss our educational practice, something that our daily duties did not allow us. We had a place for mutual training and collective creation, sometimes slower than had been initially planned, but always more rewarding.

The guide was still not finished, but the most important part had been done.

The creation of the guide continued with the writing of the conceptual framework by the coordinating group and a thorough revision by the working group. In every meeting, new ideas and proposals came up, and it was necessary to establish limits. We decided that it was convenient to accompany the criteria with a selection of activities that provided examples, real activities currently carried out in various places in Catalonia, so we selected activities from several facilities. It is hard to summarise them while at the same time conveying their full scope in the space available, but these activities serve to illustrate how to implement some of the quality criteria. Each activity indicates which criteria it meets and selects the three considered to be the most relevant.

The activities were chosen in an attempt to fit in with the kind of outdoor activities we in the EE field are most used to: *e.g.*, itineraries, experiments, problem solving and research. It is not an extensive selection, but a specific one, a selection that brings together a wide range of proposals that facilitate the interpretation of the criteria for the users of the guide.

At this point we had criteria and examples of activities. Throughout the process and the work sessions there were specific examples of educational activities which did not meet the objectives we had set, and which many times were full of mistakes from the very conception of the activity, the method chosen or the resources used. These are the EE «botch-ups» –some of them are ours and some we had seen or heard about– that we collected and in one of the final meetings de-

cided to include as a new chapter of the guide: «One image and a thousand words». We chose images used in many of the training courses we do and everyone provided examples from their own experience. It turned out to be a positive space which uses humour and irony to present real situations to be avoided.

It is necessary to understand that each member of the working group and each user of the guide will make their own interpretation and learn something different. This led us to include the «If you have more time...» and «Glossary» sections in the guide. For us, and we hope for many readers as well, these are tools to help redefine the theory itself, *i.e.*, the framework surrounding the practice.

Broadly speaking, this was the production process. Maybe a publication like this does not necessitate an explanatory section, but the ten meetings of between 3 and 5 hours of debate in which we actively participated, and the work each of us did between the meetings, is something that helped us to improve our professional tasks.

Now that the process has finished, we consider that the initial expectations were exceeded, the fears and doubts we had at the beginning regarding the feasibility and interest of the process at the same time, in such a heterogeneous group, vanished thanks to the cooperative work and the fact that the outcome is the product of the entire group. A small gratification necessary in every process involving collaborative work.

It must be noted that without a technical secretariat and a coordinating group supporting the process, it would have been very difficult to undertake. In this case we had it all: a budget that allowed for a technical secretariat, the work of a group of very committed professionals and a space to debate. What more could we have asked for?

Activity: a specific work proposal designed for an educational purpose. For this reason it involves explicit objectives, defined target users, a context within which it is to be carried out, a method to be applied, timing, resources to be used, and planned follow-up or evaluation.

An activity may consist of more than one experience. These experiences are planned in a sequence: they are the moments designed to achieve specific goals, *e.g.*, to observe, to collect, to compare or to measure. Sometimes we may order the sequence of experiences according to our objectives, the students' level, the time available, etc. Activities are all of those proposals that make up a programme and must meet its specific goals.

Complexity: in EE, the culture of complexity consists of processes such as risk, uncertainty, unpredictability and awareness of limits. This means paying attention to relationships and processes and not only to the final state. (Mayer)

Content: this can be

- **Factual:** knowledge of specific, unique facts, events, situations, phenomena and data: *e.g.*, the age or name of a person, the conquest of a territory, the location of a mountain. Its uniqueness, specificity and descriptive nature are its defining features.
- **Conceptual:** A set of facts, objects or situations that have common features (concepts), and changes produced in a fact, object or situation relative to another (principles). Examples of concepts are «mammals», «density», «city» and «impressionism»; examples of prin-

ciples are the law of thermodynamics and the rules relating population and territory.

- **Procedural:** a set of rules, techniques, skills or abilities, strategies and methods, aimed at achieving a goal. For example: reading, drawing, observing, classifying, jumping, *etc.*
- **Attitudinal:** a set of contents that can be grouped into values, attitudes and norms. Values are principles or ethical ideas that allow people to make judgements about behaviour and sense (*e.g.*, solidarity, responsibility, freedom). Attitudes are more or less stable tendencies of people to act in a certain way (*e.g.*, to cooperate with a group, participate in school tasks). Lastly, norms are rules of conduct to be followed in certain situations (*e.g.*, taking turns when asking questions).

Critical thinking: a set of analyses or considerations based on a careful appreciation of information or evidence. This requires logical thinking skills such as inductive and deductive reasoning. (NAEE)

Detecting and solving problems: a set of steps taken to detect or solve a problem. Firstly, a problem must exist in order to be detected. A problem is such insofar as the person reflecting on it has the capability to understand the situation leading to it, but does not possess a response system that provides an immediate solution (Parra, 1990). The method of solving problems consists of a systematic search to find the source of the problem and thus resolve it. It starts from a state of uncertainty and requires the sequencing of operations to reach a solution.

Discovering the environment: exploration of an environment by coming into contact for the first time with the elements and relationships that make it up. The best way to get to know the environment is to go out and see it: to observe, discover, experience, discuss, and reflect. All these strategies make the interaction between individuals and the environment possible, so people learn through their experiences.

Education in action: educational strategy which considers that participants, as part of the learning process, must prepare and take action along with their companions to solve or offset environmental problems. (Mayer)

Educational programme: a set of educational activities and materials to reach planned goals. The programmes are, at the same time, units that constitute a project, and a collection of projects make up a strategic plan. Therefore, any programme is a significant part of an environmental educational project, an action in its own right that serves a general purpose and involves specific actions to reach specific objectives.

EE works with environmental problems, and goes beyond finding technical solutions. It focuses on identifying the diversity of values, choosing among available solutions and making the wisest decision. (Mayer, 2007). If environmental problems are treated as problems in society, it can be seen that these problems are determined by conflicts of interest in the use of natural resources. This perspective allows an understanding of the fact that there is not only one description of the problem, and enables different stakeholders to deal with the problem from their point of view and, therefore, according to their values. When working on the detection and solution of problems, it is essential to identify which interests lie behind the arguments and contrast the different positions in order to get to the grassroots of the environmental problems.

Environment: everything that surrounds us; the collection of various situations, phenomena, elements and processes that take place in an area. This concept takes different forms:

- **Natural environment:** an environment that is not altered by human beings and is independent of human action. Examples are a river, forest or beach area.
- **Rural environment:** an environment that is not urban, and combines residential, industrial, transport and agricultural activities. It is defined as the opposite of an urban environment.
- **Urban environment:** an environment corresponding to the city, more densely populated than rural areas and providing goods and services, but in need of agricultural and livestock products, raw materials and energy, which are provided by the rural areas.

Environmental education: educational processes that lead to better knowledge and understanding of the environment, and thus to developing consistent, responsible attitudes towards the protection and improvement of the environment in its entire human dimension. (SCEA)

Environmental educator: person transmitting knowledge and values necessary to train individuals who can analyse environmental problems and provide answers. (SCEA)

Environmental problem: a specific example of potential or existing degradation, destruction or contamination. (NAEE)

Evaluation: analysis of the skills and knowledge acquired by the participants through a learning experience. This is a process designed to determine whether or not the objectives or the purpose set have been achieved. (NAEE)

Hidden curriculum: a set of learning experiences that occur unintentionally in an activity, without

being planned by the educator, teacher or educational centre.

Interdisciplinary: this refers to the view of knowledge and focus on the syllabus that applies methodology and language from more than one discipline to examine a central theme, question or experience. It includes terms such as «multi-disciplinary» (juxtaposition of various disciplines focused on a problem, with no intention of integrating) and transdisciplinary (beyond the scope of the disciplines, for instance starting with a problem and producing knowledge from relevant sources). (NAEE)

KPSI Questionnaire (Knowledge and Prior Study Inventory): a self-assessment questionnaire that aims to show the degree of knowledge regarding the proposed activity («I know it and I can explain it», «I know it», «it rings a bell...», «I do not know anything about it»). Putting the results together and assessing as a group the advisability of improving them helps to make the goals of the activity clear, in such a way that the questionnaire itself can be used to close the activity as a summative evaluation tool.

Method: the means used to reach a goal, from the Greek term «methodos» («path» or «way»). In this guide we use it when referring to an educational strategy.

Objective: the statement of a specific desired, measurable or observable outcome of an activity. (NAEE)

Participants: learners –school-age children or adults– who take part and are the target of the activities. According to the concept of education in action, the terms «participants» and «learners» are synonyms.

Participation: the decision-making process in which the people involved take part and share

responsibility for decision-making. Participation, in the context of EE, places learners at the centre of the learning process, empowers them as authors, and promotes motivation to discuss, find solutions and act in a social context: this encourages them to have confidence in their own abilities. (Mayer)

Quality criteria for EE activities: statements that guide the readers towards good practice when designing, implementing, using and evaluating EE activities. (SCEA)

Resources: materials (e.g., books, texts, videos or games) used to support the learning process, with the goal of facilitating or stimulating it.

Sustainability: the ability to meet the needs of the present generation without compromising the ability to meet the needs of future generations. (I. Brundtland)

Teaching-learning process: personal and shared process in which those learning develop skills enabling them to select, organise and interpret information establishing meaningful relationships with their pre-existing knowledge. The objective is to produce knowledge that promotes personal development and allows the understanding and transformation of reality.

Territory: a defined area which is in lawful possession of an individual, organisation, institution, state or country.

If you have more time...

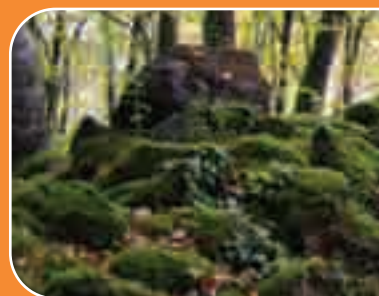
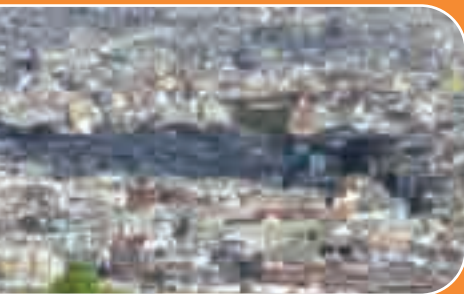
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