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## INTELLECTUAL OUTPUT 03

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# SCIENTIFIC CREATIVITY

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4 Creativities Project  
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## INTRODUCTION

The aim of FCREATIVITIES project is to improve the teachers' abilities to generate a creative education, leading to the creation of students who are able to think, analyze and solve daily problems. We **will develop new scientific skills** and competencies through the incorporation of new proposals, spaces, methodologies, and resources that will increase the students' ability, creativity and the skills for innovation. These activities will be used **with 10 to 12 years old students**, promoting their motivation and creativity. The activities will be composed for **six working activities** which will contain the different activities that we will elaborate with our students.

With the **scientific creativity** promotion we will improve the thinking capacity of our students and the ability to go from basic notions to more complex ones; they will learn to resolve problems in a real situation; they will practice the construction of their own learning; they will train their **deductive capacity** and this will take them to create strategies and solutions of their own and they will get better with their physical environment and their appreciation from different spaces, shapes, parts and the group in general. Scientific creativity will take place inside the classroom through scientific experiments workshops.

All the **experiments** will be presented in an experiment manual. The format will be a paper card, it will contain all the material that we will need to accomplish the experiment, how you do it, **how it is related to everyday life** and other relevant details.

The experiments that will conform the manual will be the following ones: **bacteria everywhere. Cells. Let's make a periscope. Light and air. Prehistoric illumination. Can we imitate a heart? Global warming.**

Scientific activity will be **boosted through observation, manipulation and research**. That will lead students to discover their immediate environment. Experimental and research activities will offer students the opportunity for learning in an independent and significant way.



## Title of the experiment

Mini Ecosystem



## Description and application in everyday life

With this activity you will create "mini ecosystems" with different materials. Ecosystems are made up of living things. Ecosystems are constantly changing. In this activity you will see how it changes, from the beginning, where it starts with gravel and bare rocks, to become a complex ecosystem, where a series of communities (small plants, insects...) interact. In addition, you will understand how living things obtain matter and how they pass it from one to another, describing the cycles between organisms and the created environment. To create our ecosystem, we can use elements of the nature.



## Aims

1. *Learn how to design an ecosystem.*
2. *Observe the communities that are established in the ecosystem and the interactions between them.*
3. *Learn about the interactions that occur in an ecosystem.*



## Steps we must follow

To create our ecosystems, we will form groups of 4 students. Each group will create an "ecosystem". Each group will be in charge of watching the changes that happen in the "ecosystem" and keeping it alive.



Steps to follow to create the "mini ecosystems":

1. Place at least a layer of about one and a half centimeters of gravel in the bottom of your clear jar. The gravel will help the ecosystem to drain and thus protect the life of the organisms in it.
2. Add about two centimeters of garden soil and make sure it is not too wet. Use a funnel to add it to avoid it getting on the walls of the jar. Then add rocks and other elements, such as natural wood from a garden/field.
3. Incorporate small plant species and avoid using compost. It is important to leave the jar uncovered for several days before closing it so that it has a well-balanced moisture level. Don't overwater your ecosystem, maintain a cool environment and avoid direct sunlight.
4. Add some worms, ants or flies. Use any live insects you find outside in the soil. Measure the height of the plants and note if the insects feed on them. Try to get the right balance of soil, plants and animals.
5. Measure the temperature with a thermometer. Do this at the same time every day and keep a "climate" diary. Count surviving insects, measure plant growth and humidity levels. Remember that ambient light affects plant growth.
6. When a few weeks have passed and we have seen the progress of our ecosystem, we can return the "bugs", insects, worms... to the wild.



## Materials needed

Materials needed for each group of 4 people:

- Gravel
- Garden soil
- Rocks
- Water
- A funnel
- A large clear jar
- Small non-flowering plants and insects
- Thermometer



## Tips

Before creating the ecosystems and once we have the necessary materials to buy (jar, funnel and thermometer), we can go down to the school playground with the pupils to collect the stones, soil, plants, insects...

When we are going to create the ecosystem, it is essential to put a sufficient amount of gravel at the bottom of the jar and that the soil we use is not too wet. Once created, do not water it abundantly or expose it to direct sunlight all the time. In addition, the plants should be small in size and you should not introduce many insects into the ecosystem because it is a small ecosystem.

This activity can be done for the biology class, or we can rely on the biology teachers to do it and create the necessary humidity and temperature parameters for all living things to survive.

The idea of how to make this ecosystem is inspired by the document "75 experiments in the classroom" of the Ministry of Education, Culture and Sport.  
[https://semanadelaciencia.fundaciondescubre.es/files/2013/06/75\\_experimentos\\_en\\_aula.pdf](https://semanadelaciencia.fundaciondescubre.es/files/2013/06/75_experimentos_en_aula.pdf)