

INTELLECTUAL OUTPUT 03

SCIENTIFIC CREATIVITY

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

Mystery Boxes



Description and application in everyday life

*Describe the experiment and its **practical application** in everyday life ...*

Scientific knowledge depends on making careful observations.

Science is reliant on evidence. This evidence is obtained by observations and measurements. Scientists can use their own senses or instruments that enhance those senses to obtain evidence. Scientists base their conclusions on available evidence.

In this experiment, students must determine the contents of a number of boxes, without opening them. They are required to form a hypothesis as to what is in each box, based on what they observe using their senses. How does the object interact with the box? What sound does the object make when it hits the box?

This experiment allows students to explore their observations, make conjectures and derive predictions. They ask questions and look for answers. All of which are key components in the scientific method but which are also indicative of a systematic and logical approach to problem solving. It is a framework or technique that can readily be applied to any real world situation outside the science classroom.



Aims

Please list the objectives you want to achieve...

- 1. Distinguish between observations as something students observe using their senses rather than a description of how they feel*
- 2. Recognise that observations are a legitimate form of data for scientific purposes*
- 3. Illustrate that a prediction, for the purposes of science, must be based on legitimate evidence*
- 4. Predict what is in each box based on evidence and reasoning*
- 5. Recognise the need to work together with a common purpose*



Steps we must follow

Detailed description of the different steps to carry out the experiment...

- Place 1 object in each box and seal tightly with tape
- Label the boxes 1-6
- Provide each student with a worksheet – each student must record their own observations during the allotted time
- Divide the class into 6 groups. Assign roles to students.
Timer: Watches the time and makes sure each member of the group gets a chance to observe the box
Collator: Listens to the evidence of the group and decides on their final prediction
Recorder: Writes the group prediction on the post-it and places it on the board
Courier: Transfers the box to the next group
- Give each group one of the mystery boxes
- Give each group a set of post-its; each group should be given a different colour set of post-its so you can track their predictions
- Start the timer: Students are given a specified amount of time to observe the box



- On the worksheet, in the space corresponding to the box that the group have been given, they must each record their observations of what is in the box
- Divide the classroom board into 6 and label each section according to the boxes
- Timer ends
- Groups collate their observations and make a prediction. Provide students with adequate time for discussion and decision making
- Students stick their prediction on the classroom board under the appropriate section header
- The couriers transfer the box to a new group
- Repeat until each group has had an opportunity to observe all 6 boxes
- Use the post-its on the classroom board to discuss the predictions: were there any common predictions? Any outliers? How can students justify their predictions? What vocabulary are they using to explain their observations? Etc.
- Get students to complete the back of the worksheet on skills and approaches. How could they apply these skills in other investigations in science? Outside the science class?



Materials needed

In order the teacher to be prepared for the proper implementation make a list of all needed materials and resources needed.

- *6 identical boxes*
- *6 objects for boxes (e.g. thumb tacks, a die, an eraser, sand, rice, paperclips)*
- *Tape to seal the boxes*
- *Stickers to label the boxes*
- *Post-its: 6 colours*
- *Worksheet*
- *Timer*
- *Classroom whiteboard/ chalkboard etc.*



Tips

If you have any recommendations for the teachers, please share them here. Please include any measures that must be taken to carry out the experiment safely!

Students have a tendency to try to peak in to the boxes so make sure they are sealed tightly.

Sometimes we don't tell the students what objects were in the boxes. It makes them more curious and it adds weight to the idea that it is the process that is important rather than the end result.

If you use an interesting timer, it adds to the drama.

Transferring boxes and placing the post-its on the board are times when the students are moving about and can cause some concerns, depending on the group. Ensure that students have specific instructions as to which way the boxes will rotate between the groups. And if necessary, have 1 group approach the classroom board at a time.



Mystery Box Activity

What do I understand by the term observation? _____



Observation Sheet

Record all of your observations
about the item(s) in each box

BOX 1	BOX 2
BOX 3	BOX 4
BOX 5	BOX 6



What skills & approaches did you use to try and identify what is in the box?

List of skills:

How would these skills be useful in the science classroom?

How would these skills be useful in the world beyond the science classroom?