Co-funded by the Erasmus+ Programme of the European Union

# BotSTEM – Erasms+ KA2 Project

**2017-1-ES01-KA201-038204**

## Good practice template

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| 1. **Title of the activity/ Practice** | **Processes of inquiry in pre-primary's students: crystallography** |
| 2. **Origin of the activity** | Espiciencia was born in 2010 by PhD. Bárbara de Aymerich, fruit of her inquest to continue with her teaching and research work in the rural world. |
| 3. **Age of the students** | 4-11 y.o. |
| 4. **Target group (type of the learners, size of the group)** | At all, 24 kids. Divided in two groups of 12.<br>In this activity, the parents work with their kids, and older students help the younger ones. |
| 5. **School subjects + topics concerned** | Chemistry; physics; geology, creativity & maths. |
| 6. **Educational goals of the practice** | 1.- Introduce the student in the scientific method from the inquiry: study of the problem, hypothesis setting, experimentation and obtaining results, verification of the hypotheses proposed and discussion and elaboration of conclusions.<br><br>2.- Encourage the curiosity of the child for the world of science, stimulating their critical sense and logical-rational spirit.<br><br>3.- Stimulate the participation of the family in the knowledge and practice of science as a driving vehicle for new vocations.<br><br>4.- Introduce children to the elements of scientific experimentation such as materials, safety standards and protocols.<br><br>5.- Know the geology of the area, specifying if there are mineral deposits and their crystallography. |
| 7. **Duration** | 1,5 hour per session/ 4 sessions |
| 8. **Place** | Espinosa de los Monteros (Burgos) |

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| 9. **Short description of the activity** | 1. Visualizing a collection of minerals, we observed that the crystals were different, presented different shapes and colors and everyone wanted to know why.<br><br>2. An experience of crystallization of sodium chloride was then raised, in which they learnt the concept of solute and solvent, of saturated and supersaturated concentration and observe the cubic form of the crystals.<br><br>3. Afterwards, the process was studied more thoroughly, making several experiences in which different variables were changed, introducing the students in the process of inquiry (asking researchable questions, formulating our hypotheses, experimenting, observing the results and compiling them, we analyze the data and we draw conclusions).<br>The dependent variables:<br>• 1. Compound to crystallize, solute (common salt, sugar, salts of Epson, borax, alum)<br>• 2. Solvent temperature (water at 15º C and water at 60º C)<br>• 3. solvent (water, alcohol, oil).<br>• 4. Crystallization time (1, 2, 3 and 4 weeks).<br><br>4. Another very interesting part of the experience is its creative side, in which each one wanted to give shape and color to their crystals, giving rise to a nice example of chemistry and art.<br><br>5. To end the experience, an excursion to the field was made to observe a karst complex and its calcium carbonate concretions.<br><br>METHODOLOGY for CRYSTALS FORMATION:<br>1. Preparation of supersaturated solution of the solute (crystallizable compound) and solvent (water, alcohol, oil) selected at the temperature of the fixed solvent (10ºC, 60ºC).<br>2. Filtration of the solution on filter paper (funnel).<br>3. Let the solution stand in a petri dish or in a glass with a thread or pipe cleaner or sponge, in a flat place for the set time (1, 2, 3 or 4 weeks). |

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| 10. **Evaluation** | The completed activity is evaluated from three different points of view:<br>• Kids<br>• Families<br>•Teachers<br>For this we conducted a fifth feedback session in which we passed a survey to parents, teachers and students on the development of the experience, in which we value from 1 to 5 (1 unsatisfactory, 5 very satisfactory) the following items:<br>1. Did you like the practice?<br>2. Have you learned new concepts?<br>3. Would you know how to reproduce it at home? |
| 11. **Materials/ Resources/Technical requirements** | Materials:<br>• Classroom with water, electricity and internet connection.<br>• Fungible:<br>– Mineral collection<br>– Magnifying glasses<br>– Glass tumblers<br>– Spoons<br>– Heat source (stove...)<br>– Container to heat<br>– Funnels<br>– Filter paper<br>– Petri dishes<br>– Sponges<br>– Pipe cleaner<br>– Clips<br>• Reagents<br>– Food dyes<br>– Fluorescent marker<br>– Water<br>– Alcohol<br>– Oil<br>– Crystallizable chemical compounds (sodium chloride, white sugar, Epson salts, alum salts, borax) |

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| 12. **Tips for educators / theoretical background (if applicable) or curriculum context** *(optional)* | The rural environment is an ideal place for the development of STEAM activities, given that it has unique and easily accessible natural, patrimonial and social resources.<br><br>The start-up of a school, of an educational project similar to ESPICIENCIA, is expensive in its beginnings given the idiosyncrasies of rural society, but it is immensely enriching and necessary to bring families from small populations to the mornings of science and technology.<br>http://www.espiciencia.com |

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