



Creativity in Early Years Science Education

Curriculum Materials

Learning Journey

Germination and Growth



Erasmus+

The CEYS project has been funded with support from the European Commission under the Erasmus+ programme (2014-1-EL01-KA201-001644).





**Ana-Maria Marinica
Mirela Catrina
Kindergarten "SPIRIDUSII"
Bucharest, Romania**

GERMINATION AND GROWTH

How can plants grow from seeds?



- “SPIRIDUȘII “** – Kindergarten in Bucharest with children of 3-6 years old
- All children are Romanians; no other language than Romanian is spoken
 - The school policy follows the curriculum objectives for preschool education, but the teacher is free to decide on and organize all the activities, including science.

- **Age:** 5-6 years old
- **Learning activities:** Planning investigations, observing, questioning, explaining evidence, communicating explanations
- **Creative dispositions:** Motivation, curiosity, sense of initiative, making connections, ability to work together
- **Synergies:** Play and exploration, questioning and curiosity, dialogue and collaboration, reflection and reasoning
- **Context:** This is a lesson about plants and the development of plants from seeds linked to the theme “Knowing our environment”. Children were provided with appropriate materials to make observations and carry out their investigations. They had worksheets to record and compare their measurements.



Setting the scene

Focus

- To increase children's knowledge by developing their **curiosity** and involvement.
- To encourage children to ask scientific **questions**, formulate hypotheses, make observations and **communicate explanations**.

Rationale

- I observed that the previous science activities were not so attractive and challenging for all the children because information was transmitted mainly through images, pictures, etc. and not very much by direct involvement, interactivity, investigations. I thought inquiry activities would make children more **motivated** and **feel responsible** for their scientific work.
- Even if the work was to be done individually due to the observations and measurements each child had to do, I wanted to provide opportunities for children to **discuss and communicate their findings** by comparing their results.

Setting the scene

Implications for my planning and teaching

- I encourage children to **ask questions** from the beginning of the activity, communicating with me and with peers.
- The children plan the **activity over time** by observing their own plants and controlling conditions such as amount of water, light, temperature, etc. to support germination and growth.
- They **make connections** between their actions and how well their plants grow and then change their work plans (how frequently they do watering, change the container location to a better/sunny one, etc.).
- The children work individually, but they **observe and compare their work with that of their peers**. Some give advice to the others
- The children receive also worksheets and they carefully record their measurements. At the end of the activity the children are able to **draw conclusions** from their work.
- I did not suggest solutions, but **allowed children to explore and make mistakes**.

Developing the Learning Journey

Starting point

I read "The story of the wheat grain". This introduced children to the subject and made them curious.

Stage 1 – Preparing the containers and sowing the wheat grains

Stage 2 – Observing and measuring (gathering evidence)



Starting Point

Activity: The story of the wheat grain

- The activity started with a story: “The story of the wheat grain” that introduced children into the subject and made them curious. Complementary materials, pictures and short videos were used.
- By asking questions I tried to find out children’s prior knowledge and to provoke discussions between them.
- I offered initial information to children for starting the activity: what the activity is about, how it will be performed and what they would have to do.

Rationale

The purpose of the activity was to foster children’s curiosity, find out about children’s ideas and prompt questioning.

Many questions arose: How can such a small grain produce a big plant? How many grains can live together in this container? Can we make bread from these small grains?

Children expressed many ideas. It will be important to encourage children to make connections to these ideas in making predictions.

Stage 1 - Preparing the containers and sowing the wheat grains

Activity: Each child received a container filled with soil and wheat grains that have to be covered with soil and watered. Deliberately I gave children transparent containers as they can see in time how the roots will develop. I asked questions in order to give children the possibility for making predictions.

Rationale: The aim was to introduce the investigation and to encourage children's predictions.

Teacher questions

What conditions do you think can influence the wheat growth? How this will happen?

Children's questions

Whose wheat will grow faster and be the highest?

The children are very motivated and start to talk about a competition: Some ideas came from the children. Water was the first suggestion, then light and then temperature.

Activity: I gave the children 2 cardboard worksheets so they could record their results.
Rationale: This meant they could compare their results over time and decide what action to take next.

Children attached one worksheet to the container for their wheat grains. It had a scale of different colours so children could measure the height reached by the majority of their plants over time.



The children recorded their results on a blank worksheet and displayed them for comparison across the class.



Photo of worksheets with each child's name



Our cardboard sheets will be very nice if we color them.

Mine will grow faster as I understand how to take care of it.

It is not difficult, I am sure we can do it, even if I never took care of plants...

Stage 1 continued: Sowing the wheat grains.

Activity: Children discuss and make decisions about how to plant their grains.

Rationale: This activity enabled children to come up with their own ideas. They were responsible for their own investigations.

I want my wheat to grow the highest....

I shall not put the grains too deep in the soil as the plants can grow easily....



I keep the grains at equal distances one from the other...

The children are enthusiastic and express their ideas and worries..

Working in groups supports children in talking about their strategies and ideas

Stage 2 – Observing and measuring plant growth (gathering evidence)

Activity: Each day over two weeks children observed and measured their own plants . They used their observations to make hypotheses about the future development of the wheat and discussed what they might need to change to make their plant grow better.

Rationale: The purpose of this activity was to encourage children to observe plant growth closely and begin to suggest connections between how well the plant grew and the decisions they had made, for example related to water, light and temperature.



I know how much water my wheat needs. Teacher said until the soil is shiny ...

The children discussed and shared their ideas about what their plants needed to grow well.

Stage 2 – Observing and measuring (gathering evidence)

I would like to add one more colour, can I?



I am really happy about my wheat. It grows nicely. I can draw now the 8th coloured line.

The children were excited to record and discuss the growth of their plants.

It will be important to encourage children to discuss what they notice and suggest ways to improve the growth of their plants.

Reflections: Children's progress

- Every morning children went to the “Science corner” to see what the wheat looked like. They were very **motivated** by seeing the results of their work and showed involvement in this inquiry activity.
- Children tried to **solve problems** that appeared in time as they observed some plants turning yellow and bent. They expressed **some hypotheses** about why this happened. I also helped with some ideas, and finally I let them **choose their own solutions**.
- Children's **curiosity and their involvement in their observations** was shown also by **many questions they asked**: *What are the little white fibres in the soil (wheat roots)? How high the wheat will grow? What about the wheat kept in the dark, will it still have the yellow colour or it will turn to green if we put it in the sun?* They **tried to find the right answer by themselves**.
- Through **reflection and critical thinking** children took decisions for **solving their problems**. For example they moved the containers as close as possible to the window for the wheat to have much light (when they observed that the wheat in the container kept in dark was shorter than that kept in light).

Reflections: Children's progress continued

Unanticipated outcomes

- Many children were doing **parallel observations at home** too, where they prepared a similar container and involved also their parents in the investigative work.
- At the end of the activity when the wheat was higher than our measuring cardboard sheets, the children proposed to transfer it into the school garden.

Children's reflections on their learning

- The children **came up with the conclusion** that is not so difficult to grow plants, but you have to know how to do it (reference to needed conditions: light, water, etc)
- Some **expressed the wish to repeat the investigations** with other plants. One child said: When I shall go to my grandmother's village I shall teach her how to sow the wheat...

Reflections: Teacher role

- **My questioning** was important to important in fostering sharing and **discussion of ideas and strategies**.
- Encouraging children to check the growth of the plants every day promoted interest and ongoing **reflection and reasoning** about the best conditions for growth

Reflection on other aspects of the spider that contributed to children's inquiry and creativity

- The **assessment** of the activity was a discussion with the whole group. The children could learn also from their peers' opinions and comments and by comparing the results of their work.
- I plan to use **other locations** too, not only the classroom, and extend this activity with visits at museums and farms.

Next steps for learning and teaching based on evidence of learning.

- Considering my experience and the children's motivation I am confident that I can use inquiry for some other science lessons that will lead undoubtedly to the increased creativity of children.
- My future plans are to help children to **ask questions** as I observed that they offer many opportunities to foster children's creativity and investigative skills; they make children to think.

The image shows a science project display. In the background, a white sign with a red dotted border has the word "STIINTA" written in large, colorful letters (S in red, T in blue, I in orange, I in green, N in blue, T in orange, A in yellow). Below the sign is a drawing of a microscope. In the foreground, two clear plastic trays filled with soil and green sprouts are shown. Several colorful paper markers, made of folded paper with various colors (red, orange, yellow, green, blue, purple, pink), are placed in the trays. The markers have small drawings and text on them, including a drawing of a plant and the word "STIINTA".

STIINTA

Reflection questions for the reader

- How do you encourage children to share their ideas and questions?
- What opportunities do you provide for children to discuss the results of their investigations?
- In what ways do you make links with children's experiences outside school?

ACKNOWLEDGEMENTS

CREATIVITY IN EARLY YEARS SCIENCE EDUCATION (2014-2017)

WWW.CEYS-PROJECT.EU



The Open University



© 2017 *CREATIVITY IN EARLY YEARS SCIENCE EDUCATION Consortium*

This work is licensed under the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License. To view a copy of this license, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/>.