

Learning Journey: The rainbow

Age group: 5-6

Learning activities: observing, questioning, explaining evidence

Creative dispositions: Motivation, Imagination, Ability to work together, Develop thinking skills, Sense of initiative

Synergies: Motivation and affect, Dialogue and Collaboration, Questioning and curiosity

Background Information

School setting: Bucharest, 4th ward

School policy for science: The school policy follows the curriculum objectives for preschool education, but the teacher is free to decide and organize all the activities, including science.

Curriculum links:

Science activities are derived from the annual planning and they are consistent with the national curriculum for the preschool education:

- The pre-schoolers will develop skills associated to scientific investigation such as: observation, formulation of hypothesis, experiments planning and making, interpreting of data obtained from experiments.
- The pre-schoolers will be encouraged to make experiments, to use instruments or equipments, to register and communicate the results of the scientific observations, to use different sources of information, to solve problems, to look for solutions, to synthesize valid conclusions.

Setting the Scene

Focus

- To increase children's knowledge by developing their curiosity and involvement;
- Stimulate collaboration by working in groups;
- Increasing children's creative thinking by asking questions;
- Stimulate curiosity to investigate the environment in relation to the changes that occur in nature;
- Stimulate the children's creativity by working with colours and shapes.

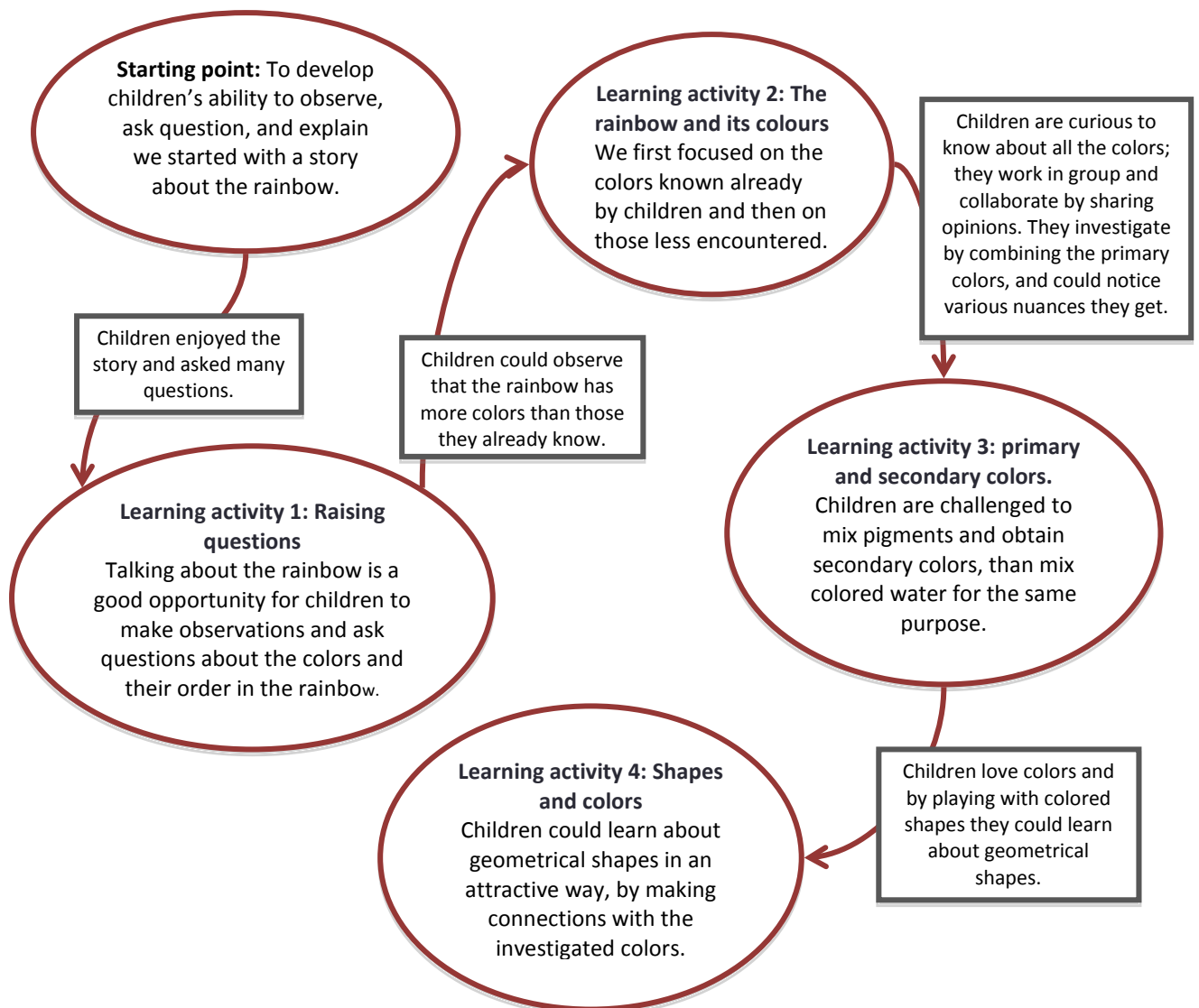
Rationale:

I wanted to motivate children to understand the succession of phenomena and processes in nature by their own observations. scientific inquiry. I noticed that they like to make observations and explore and I used this to encourage them to formulate questions and make connections.

Implications for planning and teaching

- To provide an interesting subject for the investigation and the necessary resources to make them curious and stimulate their thinking.
- To motivate children so that they participate with interest in the activity, collaborate; accept the ideas and the solutions of the others.
- To provide opportunities for children to ask questions, explore and take decisions.

Outline of learning activities and resources



Developing the Learning Journey

Starting Points

Activity: About the rainbow

I started with a short story that aims to introduce children to the subject of the lesson: Tom and Jerry are friends and decided to take a plane ride. The rain was over, and the sky was again without clouds. They could see the city far away. The plane was flying smoothly, friends were enjoying the journey, when suddenly ... a lot of colors appeared on the sky. It was awesome! Like a coloured girdle thrown into the sky. And they were wondering what was that? There was no weird bird and no plane. And yet, what is it, and what is it looking for in heaven?

Rationale

This lesson aimed to help children understand the rainbow, to learn about primary and secondary colors and geometrical shapes through the proposed investigations; it aimed to develop critical thinking and imagination, and enhance children's attention and focus

Developing the learning sequence

Activity 1: Initial questions and observations

I asked some questions about the story, to find out what children understood and what they had experienced.

- What do you think the two friends have met?

They engaged in discussion and concluded that it was a rainbow.

- Have you seen a rainbow? What did it look like?

I used some photos in order to explain what a rainbow is (a phenomenon that is due to the passage of sunlight through the water droplets in the air and which has a multicolored appearance), but also to teach about colors: primary and secondary colors.

Do you like the rainbow? Can you name the colors in the rainbow? What is the order?

Rationale

The purpose of these activities was to motivate the children and to foster curiosity and their ability to make connections between the story and the rainbow in nature.

Activity 2: Understanding about the rainbow and its colours

Rationale

The activity was planned to familiarize children with the rainbow colors by drawing.

Children's responses

When asked, children named in the rainbow the colors they already knew: red, blue, green. By drawing the rainbow children could learn about secondary colors: yellow, orange, purple.

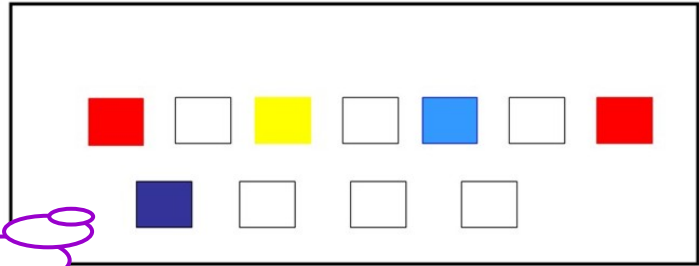


Reflections and Implications

I wanted children to explore all the colours in the rainbow and be prepared for the next activity about primary and secondary colors.

Activity 3: Primary and secondary colors

- I used Johannes Itten's Color Sphere to help children identify the colors. First we discussed about the colors in the middle of the sphere.
- Children could name the colors: red, yellow, blue. We learned about the primary colors of pigments.
- The other colors on the Itten's sphere are named, with my help. Do you know how these colors are called?
- They are secondary colors: orange, green and violet, obtained from the primary colors.



Using the worksheet with colored and uncolored squares, children were asked to explain how the secondary colors are obtained.

Reflections and Implications

I planned to continue the theme of colours by encouraging children to investigate how to get secondary colors by using pigments and colored water.

Activity 3: primary and secondary colors -exploring with pigments

Children engaged in exploring with primary colors first. They were curious and motivated to see what happens with their colors.

Why do we call them primary colors?

I shall color my worksheet with red first.

Which one to start with?!?

What if we mix these two with blue?

We shall have orange, like on the sphere Miss showed us earlier, if we mix red and yellow.



Children's responses

Children are asking questions and try to explain to each other what colors can be obtained. I could see how they collaborate and share ideas.

Reflections and Implications

Children could observe how they can get secondary color and the result of investigation was surprising: many nuances of secondary colors depending on the quantity of each primary colors used.

Activity 3: Primary and secondary colors - exploring with coloured water

Children are challenged to obtain secondary colors by correctly combining two of the primary colors



Reflections and Implications

Children could observe how they can get secondary color and the result of investigation was surprising: many nuances of secondary colors depending on the quantity of each primary color used.

Activity 3: primary and secondary colours

I suggest children to observe the order of the colors both in the rainbow and in the color sphere. "It is almost the same!" – they say.

Children's responses

Children now can talk about the order of the colors in the rainbow is: red, orange, yellow, green, blue, indigo (purple) and violet (pink). There is a nice song in English we learned about the rainbow colors:



<https://www.youtube.com/watch?v=tRNY2i75tCc>

Reflections and Implications

- This was an activity aiming to consolidate the knowledge children already have about colors.
- My plan was to continue the lesson by introducing the geometrical shapes using the colors we just learned about.
- The next activity is to use the shapes on colored paper and to order them like in the rainbow.

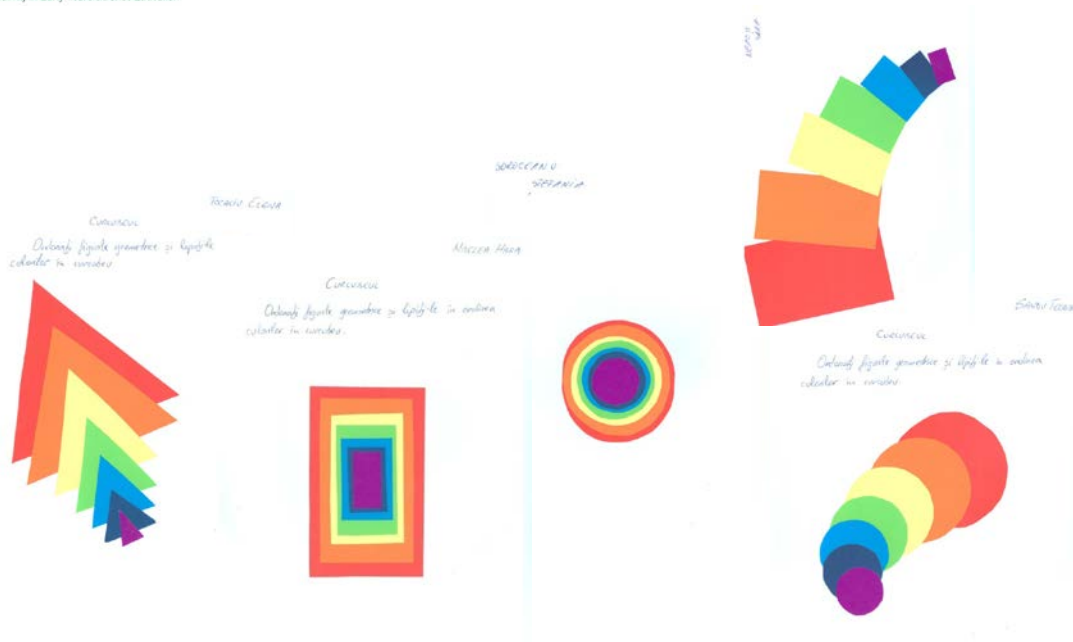
Activity 4: Shapes and colours

It is a moment of reflection:

- Children receive papers in the colors of the rainbow, cut into different geometric shapes and different sizes. They have to make an original rainbow.
- Children are asked to analyze the shapes and to say what seems easier to achieve, which requires too much time, what they find interesting, etc.

Children's responses

- Children can choose any of these shapes and arrange the colors in any form they want (but no other order than in the rainbow).
- Children talked about how the shapes could be ordered and manipulated, to get original arrangements.
- Children are free to choose the way the rainbow can be done (overlapping, joining) and they really are creative.



Reflections

Children's progress

At the end of the activity children were able to:

- * recognize the color groups (primary-secondary) on the color sphere;
- * explain for each secondary color the primary colors from which it is obtained;
- * obtain secondary colors by mixing the corresponding primary colors;
- * investigating with different amounts of pigments to obtain secondary colors.
- * order primary and secondary colors in a rainbow;
- * make compositions with geometrical shapes according to the order of rainbow colors;
- * make judgments/evaluation about their own work or that of colleagues;

Children worked in groups, collaborated, gained confidence in their actions, took initiative.

They were very curious about combining colors and the inquiry activity made them observing with great attention what was happening. David, for example, could not wait until I could distribute all the materials to the children and broke the colored chalk into many small pieces. I was a bit nervous and I asked him: "What did you do with the chalk?" The answer was: "I'm searching, Miss, I'm studying! I could not make any remark because I realized he was right: only by observing, touching, analyzing, we can learn and discover new things.

Unanticipated outcomes

- Because children did not mix the same amount of liquid, the obtained colours were slightly different, so they could express different opinions about the combination of colours.

- They have noticed that by mixing multiple colors or failing to combine to the correct quantities of colored liquid, they fail to obtain the right result.
- Children’s curiosity and their involvement in investigation was shown also by many questions they asked: “How the rainbow appears?”, “Why colors do not change?”, “Why we can not touch it?”. I promised another lesson to solve these problems.
- Children came with lots of ideas and give various appearances to the geometrical shapes arranged in the same order as the rainbow colours. They proved to be very creative.

Teacher role

- Children were allowed to experience many color combinations without being corrected, without providing solutions, or imposing limits. This motivated them, led them to participate freely and with pleasure in the activity (role of play and exploration).
- The fact that I did not intervene when they combined the wrong colors, used more colors in the same container, or created a new shape for the rainbow, helped them to experiment by themselves, to participate with great interest (teacher scaffolding and involvement).
- I noticed that children did not really exchange ideas as they drew the rainbow, instead they collaborated on color combinations, they even competed in practical activities, where they tried to make original works (dialog and collaboration).
- As a result of this activity, I organized several outdoor activities by giving children colorful chalk to draw a rainbow on the asphalt.

Reflection questions for the reader

- What opportunities do you provide for children to explore?
- In what ways do you foster children’s pleasure in solving various problems?
- Do the children use specific questions for investigation? How do you support children in coming up with questions for investigation?
- In what ways do you give attention to the ideas suggested by children in achieving results in scientific inquiry?



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