Project diary - Cook chlorophyll and the colours of the fall

09/2019 Tuning in to the subject

Learning goals: the kids practise forming questions, supporting motivation, pondering together, bringing the phenomenon to the kids everyday life.

We discussed the subject chosen together with the kids. What would they like to know about leaves, what to study together and what arouse interest in the subject. We had visited a science event at Arktikum beforehand. There we took part in a science workshop regarding to chlorophyll. We told the kids about cook chlorophyll who prepares food for the trees in a leaf kitchen. After this we wrote down thoughts the kids had regarding to the upcoming project on a carton leaf. The kids were excited to ask questions, and based on those questions we started planning the upcoming science project. Lastly the kids wondered what does cook chlorophyll look like and drew pictures of it.
In the puppet show played by the adults, earthworm Masi and Metsämörri admire the colours of the fall and Masi wonders where does the green disappear.

09/2019 Trip to the forest - categorizing the leaves by colour and size

Learning goals: practise making observations and voicing them out loud to others, practise categorizing based on the observations, working in a group.

During the project we did several trips to the forest. Before the trip we discussed the meaning of the leaves both for humans and for trees. During them we kept track of the progress of the fall by observing the trees. We made observations about what kind of changes does the fall cause in trees. We included mathematics, observing and categorizing to the trips. The kid’s self-motivated playing and exploring the nature were also an important part of the whole project.
The groups chose their favourite trees that we photographed the whole fall. At the same time we captured the clear changes in the leaves.

The kids had to find different kind of leaves and then organize them from smallest to biggest, by colour and based on other traits such as shape.
10/2019 What happens to the leaves at fall and who is the cook chlorophyll hustling in the leaf kitchen?

Learning goals: Get the kids to notice the meaning of trees for humans, through fictional story give the kids an idea about scientific concepts and get them to discuss those. Arousing enthusiasm.

The adults presented a play whose purpose was to tell the kids about photosynthesis through fictional story. The story is about cook chlorophyll who prepares food for the tree in leaf kitchen from water and oxygen with the help of sun rays. After the story we discussed what happens to chlorophyll at fall. We looked for an answer to the kid’s question “How can the green colour go inside the tree trunk?” Afterwards the kids got to play cook chlorophyll themselves. The kids also made leaf paintings.

10/2019 The leaf paintings

Learning goals: developing fine motoric skills, promoting the hold of a pen, identifying leaves from different trees, information retrieval.

The kids made small paintings using real leaves. The idea was to glue a leaf cut in half to a paper, and draw and color the other half.
10/2019 Examining with loupes and microscope

Learning goals: practising studying skills, getting to know microscope.

We named different parts of the leaf and took a closer look at them with loupes and microscope. After naming the parts, we practised hyphenation connecting it to moving, e.g. jumping. After this we included music, and the kids pretended to be leaves swirling in the wind while listening to Sibelius *Myrsky* symphony.

Every kid had their own loupe or magnifying glass. With them they inspected different kind of leaves. By the lead of a teacher we took a closer look at the leaves with a microscope. The kids were really excited and had many questions. Later on we decided to invite biologist to visit us and then studied the microscopic pictures again with her, and she answered the questions the kids had.
Learning goals: revising different parts of the leaf, noticing similarities and differences, communicating, frottage-technique, wash-painting technique.

We iterated different parts of the leaf through art.
10/2019 Colours in laboratory

Learning goals: practise making observations, revising primary and secondary colours, communicating.

The kids practised observation by pipetting primary colours. The goal for the kids was to find same colours from pipetted colours and the fall leaves. With a marker test the kids could study what the colors consist of.
10/2019 Making watercolors from natural dyes and painting with them

We wanted to try making our own watercolors from natural ingredients which can be found from e.g. bio waste bin. We got to see the results by painting with our handmade watercolors.

For coloring we used e.g. beetroot and red onion peels, red cabbage, carnation and turmeric.

11/2019 Ask the biologist -day

Learning goals: finding answers to the questions the kids had.

We had invited biologist Jaana Sillman to visit us and answer the kid’s questions. We had sent her questions, that had aroused during studying the microscopic pictures of the leaves, in advance. We examined the microscopic pictures seen before and asked the questions picture by picture. We found out that the reduction of the amount of light causes chlorophyll to retreat to the tree trunk. We also learned that trees dropping their leaves is an adaptation to the winter. The kids were interested in hearing what the biologist had to say, and they had new questions all the time.
11/2019 Trip to the forest to examine how nature prepares for winter
Is there any green? Do trees rest over winter? How does birch drink?

Learning goals: observing the surroundings closely, making conclusions from observations, sparking interest in plants growth.

Together we thought about what plants need for growing. The kids could name well the factors affecting the growth of plants: light, water, air, soil and temperature. We discussed if these factors could be found from wintry forest. First we played the growth tag. One area was the sun the other far away was good seedbed for growth. The kids were split into three groups: water, frost and seedlings. The kids belonging to seedling group were located in the good seedbed area, and water and frost groups were located in the area between seedbed and sun. The idea was for seedlings to try to run to the sun area and grab at least one water with them. If frost catches them on the way, they have to return to the original places to wait for the new growing season. After playing we discussed how trees drink and how the water can move upwards in the trees trunk. The teachers introduced the capillary phenomenon. After that we played “bring water to the birch” relay race. Finally we discussed what was still green in the forest. The instructor told why coniferous trees needles don’t fall off. Then the kids had to find something green and mark it with green wool, then they had free playing time in the forest.
11/2019 Do the color get to the flower petals? Getting to know the capillary phenomenon

Learning goals: demonstrating the capillary phenomenon.

We returned in our minds to the previous trip to the forest where we told how the birch drinks. We wondered how can the water rise straight up and does the same thing happen with plants and flowers. First we wondered how the water can defy gravity and rise up. The water molecules cling to each other and the inner surface of the pipe and rises up in a thin tube. First we did some experimenting by dipping paper towel in water and noticing how the water rises up in the paper towel. Then we moved onto the actual experiment, where the kids worked in pairs doing a little different experiments. In all variations the kids put carnations, celery or Chinese cabbage in differently colored water. Then the groups got to think what will happen and draw their hypotheses. Lastly the groups got to show their experiments to the others. Together we looked what the groups had thought to happen, and they told everybody observations of what had really happened: how the plants had colored. Together we came to the conclusion the water rises up in thin pipes, capillaries, in the plants stem. Water spreads to every part of the plant.
01/2019 Length and area

The area of a leaf is important because trees take carbon dioxide from air and evaporates water through leaves. The bigger the area is, the more effectively the tree can perform these functions.

Learning goals: Perceiving area and differentiate it from length, concentrating to one feature at a time, organizing, understanding and experience of measuring.
The kids got to organize, individually, colored rods by length from the smallest to the biggest.

The teacher reminded the kids about organizing items by length and led them to the concept of area. In pairs the kids had to organize rectangle shaped paper pieces by size. Finally the pairs got to organize pictures of the leaves collected at the fall approximately by area. The organizing happened visually by testing putting the pieces on top of each other.
Last time the kids had organized the leaves by area visually. This time we check the answers by measuring. Everybody got their own picture of a leaf. Inside the outlines of the leaf the kids stamped different coloured one square centimetre sized patches side by side with a rod. When the paint had dried, the squares were counted. The area of the leaf was declared in square centimetres and the order of the previously made predictions were checked.