

Learning Journey: Bees and their Communities

Age: 4-5 years old

Learning Activities: Designing and planning investigations; Gathering evidence; Making connections

Creative dispositions: Motivation; Thinking skills; Sense of initiative

Synergies: Dialogue and collaboration; Problem solving and agency

Contextual factors: Grouping; Materials and resources

Background Information

School setting: Suburban Preschool - part of Private School

School policy for science: To promote creativity through science education.

Curriculum links:

- To expand children's knowledge about animal organisms
- To investigate, to experiment and to 'discover' knowledge with open type computer programs (visualization, simulation)
- To organise and extend children's knowledge of numbers
- To encourage children's participation in group activities

Setting the Scene

Focus

The aim of this topic was children's acquaintance with bees and the fostering of **positive attitudes** towards living creatures and the environment in general. Especially for this particular group of insects, that their survival and their work are built upon co-operation, I wanted children to understand the importance of co-operation for the prosperity of every community.

At the center of this project was children's effort to **interact** in a purposeful and effective way. I followed the **cross curricular approach**. The opportunity for work in groups was given by the robot game Bee-Bot.

Rationale

The barriers and difficulties that the children confront in their attempt to **co-operate**, may be overcome, if what they are asked, can be defined by all in the same way. Towards this end and in order to promote their **motivation** and to show them how a scientist works, I introduced activities of **observation**, **data recording**, and constructing and using plans of different routes for Bee-Bot.

Implications for my planning and teaching

I encouraged children to **experiment**, to organize and to execute their own routes with a view to build up their **critical ability** and decision making as well as to enhance their **procedural knowledge**.

Outline of learning activities and resources (over 4 weeks)

Starting points

The children were familiar with the bee-bot robot - disguised as dinosaur - in the context of our previous learning journey to the world of dinosaurs. This time the bee-bot game, took teamwork characteristics and was unfolded in four stages. Up to that point children had studied bees approximately for two weeks and they had learned a lot about their colonies, what they produce, what they give to humans, how they multiply, their biological cycle, their anatomy. They had understood that the members of the same kind constitute different teams with certain duties. Furthermore they had seen beehives and they had observed bees in our school yard.

Developing the Learning Journey

- **1st phase:** Children watched a video about bees. Afterwards we had a discussion about the way bees communicate and orientate themselves to the right flowers.
- **2nd phase:** Children became themselves 'Bee-Bots' by dressing up and trying to cover a particular route in a specially improvised track on the school yard, following their peers' verbal instructions.
- **3rd phase:** Bee-Bot has six buttons: forward , backwards , left , right , cancel move X, and start button GO. There is also a "Pause" button. In groups children tried to navigate a Bee-bot. Each member of the team was responsible for pressing one (or two) buttons. The aim of this activity was the correct navigation of Bee-bot from its honeycomb to the flowers and back to the honeycomb. Children were expected to be energetic, wait their turn and press only the button they were responsible for.
- **4th phase:** Children undertook the role of "designers" of Bee-Bot routes, the role of "navigators" on given routes, and the role of "inspectors" of the process. The symbols for mapping were agreed upon by each team, and were the symbols depicted on top of the robot. It was also decided to show how many squares the Bee-Bot would move by drawing 'boxes'. The aim was to foster co-operation between the members of the teams and the children's gradual initiation to the symbolic representation of a route as well as to the creation of conventional codes that have meaning to the team.

Developing the learning sequence

Phase 1

Activity: What children think about the way bees communicate?

The conversation took place in the plenary of the classroom after watching a video and explaining the way bees communicate.

Rationale

The aim of the discussion was an introduction to the learning activity that will follow – with the bee-bot - and to parallel the way bees co-operate with the way we can work as a team in inquiry-based activities.

Children's responses



Photo 1: Observing bees

"We talk the language of co-operation. Bees talk a secret language- they don't talk at the same time. One shows and the others seek the flower that she has shown."

"Bees have their own language. They don't speak, they make movements. Each bee has its own job to do."

Reflections

Children showed **interest** in the way bees communicate and co operate.

Children identified advantages in the way bees **co- operate**.

Implications

Children get to work in order to give directions to the Bee-Bot. They say that every member of the team will do its task without hurry. They will listen and watch ... like bees do.

Phase 2

Activity: We become bee robots

Children in groups undertake to guide one child-bee to her hive. They use signs (visual codes) to 'programme' the child 'Bee-Bot' to arrive at her hive on an improvised route created with chalk in the school yard.

Rationale:

The aim of this activity is that children understand the movement of the Bee-Bot and its programming possibilities, in an experiential way.

Children's responses

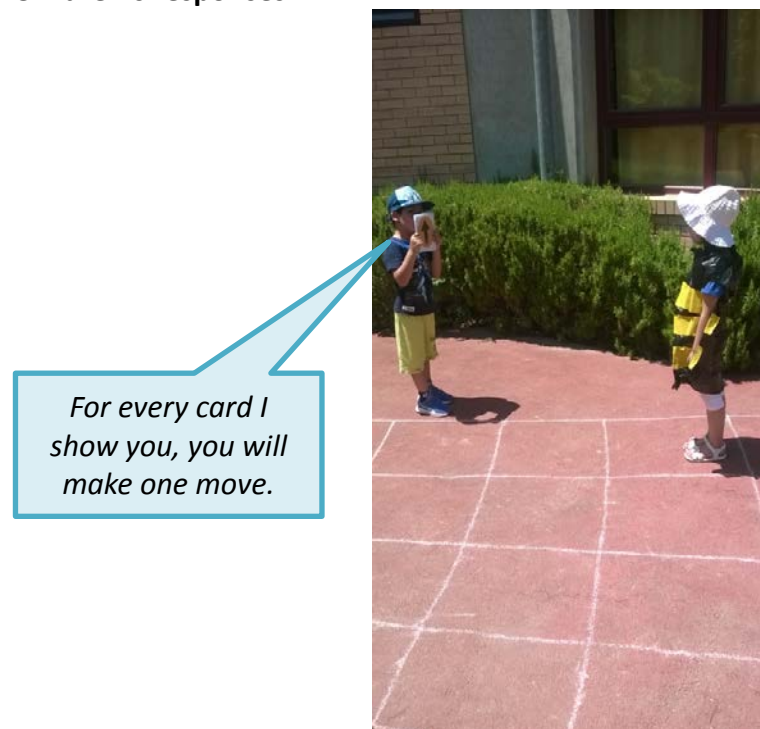


Photo 2: Children playing the Bee-Bots

Reflections

The children were grouped in pairs: the child-bee and the child-robot.

Implications

The activity acted as a trigger for children to understand the game better and to **engage cognitively** and **emotionally** in it.

Phase 3

Activity: Navigating the Bee-Bot as a team

Children, in teams, undertook the navigation of the Bee-Bot. Each member was responsible for pressing a different button. One child was responsible for pressing "forward", one for pressing "backwards", one for "right", one for "left", one for "cancel the previous instruction". The button "GO" would be pressed by the child who gave the last order.

Rationale:

The aim of the activity is the smooth **co operation** between children, who in turns had to navigate the Bee-Bot in a responsible manner from the honeycomb to the flowers and back to the honeycomb.

Children's responses



Photo 3: Children working in groups

"We don't need to click pause in our route, so no one will be responsible for pressing the "pause" button."



Photo 4: Cards used by children with navigation arrows (codes)

Teacher: "Bee-Bot has got another two buttons. Something is missing. Which buttons are missing?"

Reflections

All members took the responsibility of pressing a button at the right time as well as the responsibility for the right navigation!

Implications

Children worked in **teams**, from choosing their role until the end of the Bee-Bot's ride.

Phase 4

Activity: Plan – Run – Evaluate

Children, working in groups, were encouraged to plan Bee-Bot routes on paper, to execute these plans and evaluate them. In each team two children plan the Bee-Bot's route from the starting point to the field and then back to the hive. Two others execute the plan according to the instructions and one child inspects and evaluates the process. At first routes were short but steadily became longer.

Rationale

The aim of the activity was to enhance children's **co-operation** by navigating the Bee-Bot, undertaking responsibilities and executing a common expedition. Additionally the aim was to experiment in designing simple routes, cartography, **making predictions** and **planning** a certain route.

Children's responses



Photo 5: Children planning routes for the Bee-Bot

“The planned route shows that the Bee-Bot moves straight at the start.”

“We will draw the route first with cards and then on paper.”

Reflections

The cards with the arrows proved useful in this process.

Reviewing learning across the project

- As an initiation to the Bee-Bot game, children became Bee-Bots themselves! Using cards which symbolize visually the moves of the Bee-Bot, they tried to navigate one another in our school yard. So a game which is played mainly indoors and by one person was transferred outdoors and took collective character!
- Overall, children enjoyed the ‘plan – run – evaluate’ processes and asked to act different roles many times. Experiencing these inquiry processes as part of a game increased their motivation and creativity.
- Having a specific role in the game helped them be responsible. E.g., a child said: *“By being someone responsible for pressing ‘Cancel’ we don’t forget it anymore!”*
- Most problems arose because of the different point of view children looked from, so we decided to look where the Bee-Bot was looking.
- Teams drew routes that could be titled “from beehive to fields” or “from fields to beehive”. These and many more could make a Bee-Bot’s navigator guide.

Overall Reflections

Children’s progress

Child 1 (Ch.):

“Now it has to go there (left). It is written on the paper.”



Photo 6: Child 1

Child 2 (G.):

“The bee (on the left) found a flower with plenty of nectar. She makes movements towards the other bees showing them where it is!”



Photo 7: Child 2's drawing

All Children (G., K., Ch.):

Worksheet: Let's help the bee-bot collect pollen from flower and reach the beehive... this time on paper

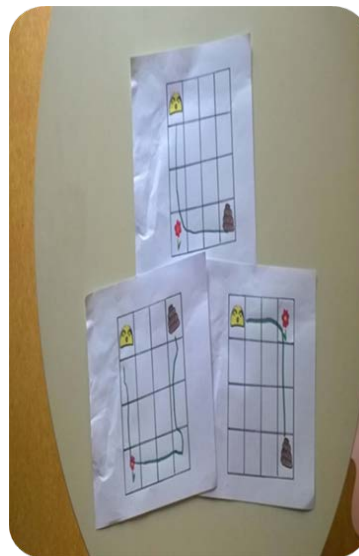


Photo 8: The routes planned by the 3 focus children

Review of children's progress

- The children realised that they were all members of a group, focused on one goal and tried all together to achieve it. Consequently, the effort was shared and was achieved more easily.
- The children followed the procedure of coding and decoding symbols and thus steadily designed longer routes.
- The children expanded their interest on issues of navigation and during their free play designed various kinds of maps.

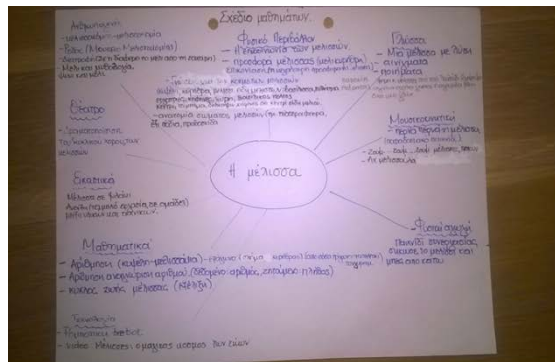
Teacher role

The teacher's main concern was to involve children in play and exploration. Their motivation to participate was high, since the Bee-Bot game is particularly popular to children of this age. The role of the teacher was to facilitate the processes that presented obstacles and help children to find solutions to problems.

Classroom environment

The materials and resources we have in our disposal helped to carry out the activities. The 6 Bee-Bots and the various kinds of tracks for them promoted the rotation of activities, as well as the engagement of more children with them.

More photos





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