LESSON PLAN

NATURE ARCHITECTS IN ACTION: DISCOVERING BUGS AND BUILDING THEIR HOMES



Subjects: Science, Mathematics, Design and Technology, Arts & Language
Age Range: Preschool, 6-7 years old

Actuality/ problem to be solved: The children know that something is living in the insect hotel, but they only see small gray or brown spots. To open the “doors” and see all the wonders, we need to call technology to help!
The main message for the child is an invitation to become a real nature detective. By using special tools—such as a digital microscope and an endoscope—children get the chance to peek into hidden spaces that are otherwise invisible. This activity plan integrates observation, exploration, IT-based research, practical construction, and reflection through a holistic STEAM approach

Message for the Child: Our insect hotel has secret doors! Are you ready to become a detective and use a special “magnet lens” to peek where others can’t see?

Planned Activities: Observation – Exploration – Research with IT tools – Planning –Practical Action – Reflection

Knowledge and skills to be acquired:

- Observation and Investigation: Develops the ability to use materials for observation, comparison, and sensory exploration.
- Data Collection and Creating an “Insect Book”: Fostering skills in collecting and documenting findings by creating an “Insect Book”, forming hypotheses about insect habitats, and comparing their recorded research with real-world observations.
- Technological Literacy: Learning to use a digital microscope and endoscope as meaningful research tools.
- Mathematical Application: Ability to count, compare, and group insects based on characteristics like the number of legs or wings.
- Practical Task Performance: Building and placing insect hotels in both sunny and shaded environments to understand how light and moisture affect living organisms and biodiversity.Developing the ability to carry out hands-on practical tasks in a real-world setting.

Required Resources/equipment: Digital microscope and endoscope, materials for visual documentation (drawing supplies, paper), garden tools

Follow up plans

- Relocation of the Insect Hotel: The existing insect hotel will be transferred to the newly developed outdoor area.
- Updating and Using the “Insect Book”: Children will continue to record new observations in their “Insect Book” (adding new species, seasonal changes, or drawings) and use it as a reference tool to compare how the insect population changes in the new location.

Part 1 - Exploration | 3 lessons, duration 40 – 45 minutes

Lesson 1 “Where Do Insects Live?”

Expected Learning Outcome	The child can name 2-3 types of insects and understands the significance of technology (microscope and endoscope) in nature research.
Engagement:	**Teacher’s questions:** • Invites children for a nature walk (yard, near trees, grass) • Asking leading questions (“Where can we find insects?, Where do they hide?”), shows examples or pictures (e.g., insects under stones, tree bark) Creates a problem situation: • “What happens if insects have nowhere to hide?” • 4. Prepares worksheets (Attachment No. 1, Attachment No. 2) where children can mark the insects they find and write down their names. **Child actions:** • Searches for insects in the environment (under leaves, stones, etc.) • Observes and names insects • Find the insects they discovered on a worksheet and circle them • On another worksheet, they identify insects and write down their names using the provided letters. • Shares prior experiences (“I saw an ant...”) • Participates in discussion and expresses ideas
Making assumptions	• Where do insects live in nature? • What do they need to survive? • What happens if they don’t have shelter?
Comparison and evaluation	• Compares different natural shelters (grass, tree, stone) • Evaluates which is safer, warmer or more humid. Using the completed worksheets as a reminder, the child is able to name 2–3 of the insects they found themselves. Reaches a conclusion: insects need a safe place to live.

Lesson conclusion:
The teacher guides children toward the key idea: “We could help insects by building them a home – an insect hotel.”

Lesson 2 “Where Will We Build the Insect Hotels?

Expected Learning Outcome	The child makes assumptions about suitable environments for insect homes and participates in decision-making by selecting two different locations.
Engagement	**Teacher’s action:** • Reminds children of the previous lesson’s conclusion: • “We decided to help insects by building homes.” • The teacher offers the children to watch a video about the construction requirements for an Insect Hotel. (https://youtu.be/NBuE4ZlBbRM?si=NNakJWHu5tMRgxno) • Asks the question: • “Where should we place them so insects would like to live there?” • Invites children to explore the environment (a sunny area and a shaded area near the forest) • Guides children to notice differences (light, wind, moisture)

	Child actions: • Explores the outdoor environment • The children watch the film offered by the teacher and make conclusion • Observes and compares different places • Shares ideas and opinions • Participates in discussion
Making assumptions	• Will insects prefer to live in the sun or in the shade? • Where will there be more insects? • Could different insects prefer different environments?
Comparison and evaluation	Children compares: a sunny location and a shaded location (near the forest) Evaluates: • warmth • light • safety Conclusion: Insects may prefer different environments, so two insect hotels are needed. Children decide to build two insect hotels — one in a sunny location and the other in a shaded area (near the forest).

Lesson 3 "What Will Our Insect Homes Look Like?"

Expected Learning Outcome	The child represents their idea of an insect home in a drawing (sketch) and selects appropriate elements based on insects' needs.
Engagement	**Teacher's action:** • Reminds children about the decision to build two insect homes • Asks the question: • "How can we build a home where insects would like to live?" • Shows natural materials or images (wood, cones, reeds) • Invites children to create a sketch of an insect home **Child actions:** • Observes materials and examples • Shares ideas • Draws a sketch of an insect home • Explains their drawing . • Children explore the insects they have become familiar with that live in the surrounding environment and create an "Insect Book" – which environment would be most suitable for an insect?"
Making assumptions	• What materials will insects like? • Should the sunny and shaded insect homes be the same or different? • Where can insects hide?
Comparison and evaluation	Compares different materials Evaluates which are better for: shelter, warmth. Compares their ideas with others **Conclusion:** Insect homes can be different and adapted to the environment. Children create sketches that will be used as a basis for building the insect hotels in future lessons.

Part 2 - Implementation of the Plan | 5 lessons, duration 40 – 45 minutes

Lesson 1- 3 “Building an Insect Hotels”

Expected Learning Outcome	The child participates in building an insect hotel, chooses suitable materials, implements their idea, and selects an appropriate location while explaining their choice.
Engagement	**Teacher’s questions:** • Reminds children of their sketches and ideas • Presents building materials • Asks questions: • “How can we finish the insect home?” • “Where would insects like to live best?” • What kind of environment and materials would be most suitable for insects to live in? • Encourages children to work independently and make decisions **Child actions:** • Looks at their sketch and ongoing work • Chooses materials • Participates in discussion • Takes part in the building process

Developing / constructing the plan	• Children complete the insect hotel:
	  • place reeds as shelters
	  • add cones for filling
	  • use sticks for structure
	  • add leaves and bark
	• Create and secure sections
	• Check the stability of the structure
	
	The teacher supports with safety and technical guidance

Evaluating the work	• Is the insect hotel stable? • Does it have different shelters for insects? • Are the materials suitable and safe? Children express evaluation: • “I managed to...” • “I would improve...”

Materials:

- Wooden frame or box
- Natural materials:
  - cones
  - sticks and twigs
  - reeds / bamboo sticks
  - bark
  - dry leaves
- Cardboard (for sections)
- String / rubber bands
- Scissors (with adult supervision)
- Work gloves (if needed)
- A previously started insect hotel (if continuing work)

Lesson 4, Lesson 5 “Placing the Insect Hotels”

Expected Learning Outcome	• The child participates in placing insect hotels in a suitable environment (sunny and shaded locations). • Children understand how the environment (light, plants, moisture) affects the lives of insects. • Children participate in improving the environment
Engagement	**Teacher’s questions:** • Invites children to become creators of the environment • Reminds children of previous work (building insect homes) • Asks the question: • “Where will insects live better – in the sun or in the shade?” • Divides children into groups and organizes activities in two locations: • a sunny area • a shaded area (near the forest) **Child actions:** • Goes to the chosen locations • Participates in discussion and shares ideas • Explores the environment (plants, soil, light) • Prepares for practical activities
Choosing the design of the plan	**Together they plan:** • where exactly to place the insect hotels • how to improve the environment for insects **Children choose:** • the most suitable location for each hotel • what improvements to make in the environment **A joint decision is made:** • one insect hotel – in a sunny location • the other insect hotel – in a shaded location (near the forest)
Developing / constructing the plan	**Children, in collaboration with their parents:** • place the insect hotels in the chosen locations • participate in improving the environment: • leave natural materials for insects **The teacher explains why:** • plants help insects (food, shelter) • they promote biodiversity • they create shade and a natural environment for insect habitats • they create a sustainable “future garden,” where the insect hotel becomes part of the ecosystem
Evaluating the work	Children compare the sunny and shaded environments, as well as the observations made in different locations, while the teacher asks questions: “Which place is more suitable and why?” and “What helps insects live here?”, and based on their observations, children conclude how the environment affects insect life and why specific locations were chosen, while at the same time strengthening their understanding of the importance of the environment.

Part 3 — Practical / Outdoor Lesson | 1 lesson

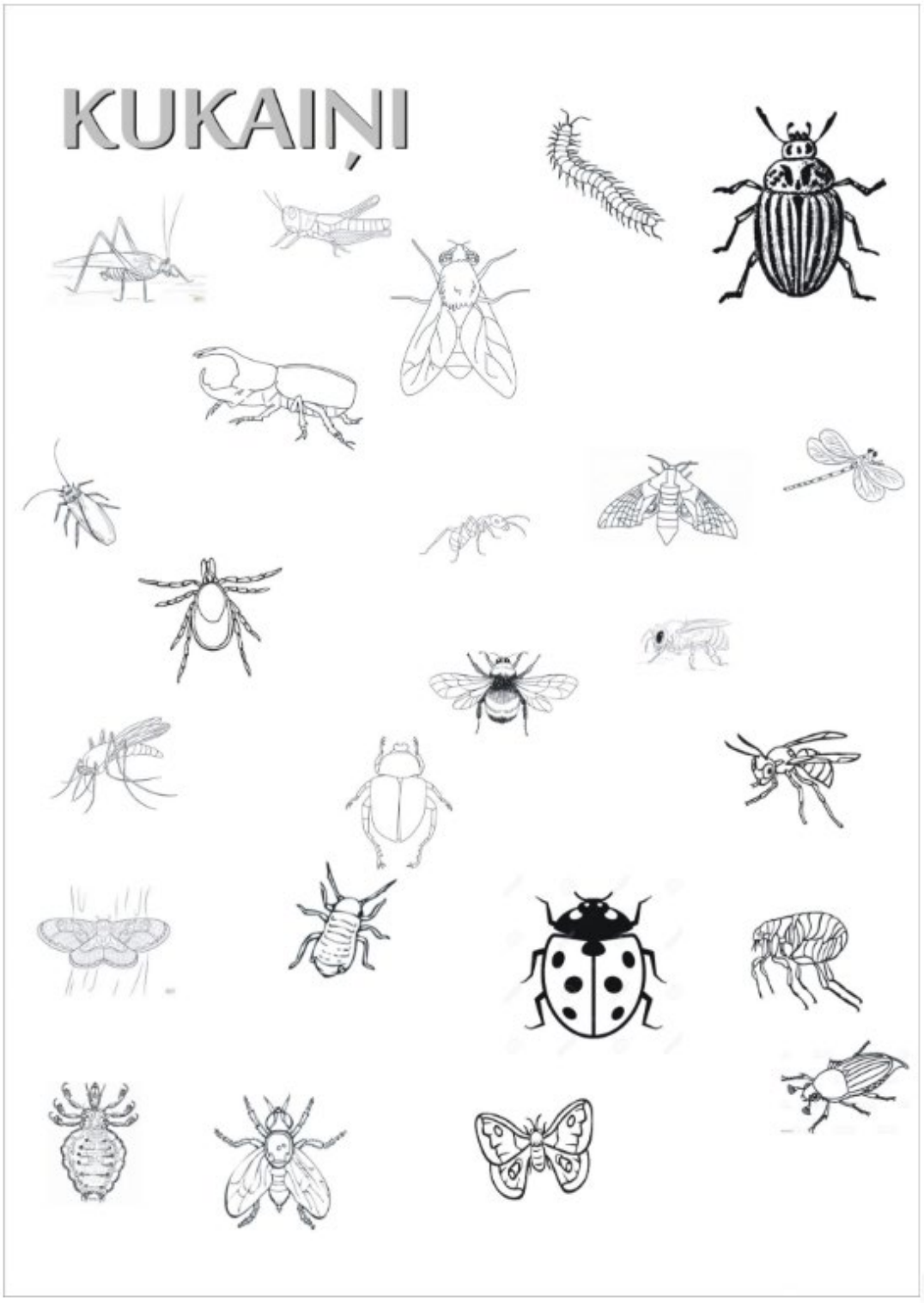
Lesson “Insect Researchers: Who Lives in Our Insect Hotels?”

Expected Learning Outcome	• The child independently uses a digital microscope and an endoscope to study insects and their habitats. • The child performs practical tasks by collecting and documenting data on insect diversity. • Children check whether the findings from their research, recorded in the “Insect Book”, match the real environment – whether insects actually live in the types of habitats they identified and documented. • The child classifies insects according to their characteristics (number of legs and wings). • The child understands the importance of insects in biodiversity.
Engagement	**Teacher’s questions:** • Invites children to become nature detectives: • “Today we will use a secret lens to discover what lives in the insect hotels!” • Reminds children about previous lessons and the insect hotels in two locations (sunny and shaded) • Asks the question: • “Do the same insects live in both places?” • Prepares children to work with digital tools **Child actions:** • Takes on the role of a researcher/detective • Makes assumptions • Prepares for investigation • Goes to the insect hotels Attachment nr. 3 “ General safety roles and Teamwork guidelines” -3. Use of digital tools and safety
Practical part (hands-on activity)	**Research in two locations:** Children investigate insect hotels in two locations – in the sunny garden and in the shaded area near the forest, using an endoscope to look into deeper spaces and a digital microscope to examine materials and insects up close **Data recording:** children take photographs of the insects found and use a tablet for saving images and making drawings **Classification:** children count insect legs and wings, dividing them into groups (e.g., with 6 or 8 legs) and comparing the insects found in both locations.
“Circle” - reflection and discussion	Children sit in a circle and share their experiences, talking about what they have found, what they observed, and what surprised them. Children discuss the differences between the two houses: which insects chose the shade in the forest and which chose the sun while the teacher asks questions about which insects live in the sunny area and which in the shaded area, as well as why insects choose different habitats, and the children, comparing their observations and analyzing the collected data, draw conclusions about how the environment affects insect life, why insects choose different l

Part 4 – Conclusions

Feedback	Children graphically depict their findings in drawings or collages, showing what they discovered behind the “doors” of the insect hotels using the endoscope, and they reflect on and evaluate how successfully they classified insects by the number of their legs and wings, while the teacher summarizes the children’s conclusions and highlights the importance of collaboration with parents, noting how joint activities such as environmental improvements contributed to creating a richer and more suitable habitat for insects, emphasizing that these actions supported both the learning process and the development of a sustainable outdoor ecosystem.
Observation and improvement	Children compare their observations from both locations—the sunny area and the shaded forest area—and conclude that different environmental conditions attract different insects, which helps them understand how to plan and improve the outdoor environment, while also recognizing the role of parents in supporting this process through shared practical activities, and, together with the teacher, children reflect on how the insect hotels and environmental improvements create a more diverse and sustainable ecosystem, supporting insect life and enhancing biodiversity.

Attachment No. 1
Worksheet "Insect detective sheet."



Attachment No. 2
Worksheet "Naming insects with letter prompts"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	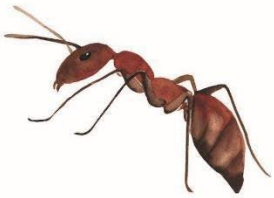
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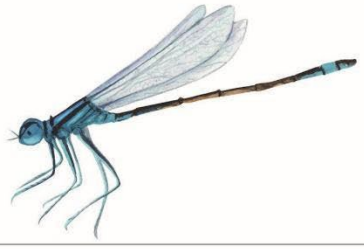	
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	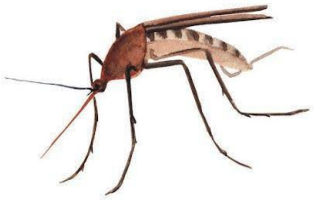
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General safety rules and Teamwork guidelines

Outdoor and Construction Safety

- **Hand Protection:** Use work gloves when handling rough natural materials like bark, twigs, or wooden frames.
- **Tool Safety:** Scissors and garden tools must be used under strict adult supervision.
- **Environment:** When exploring shaded areas near the forest, teachers should ensure the area is clear of hazardous plants or nesting wasps/hornets.

Teamwork and Collaboration Roles

To achieve the "Practical Task Performance" and "Data Collection" skills, children can be assigned specific roles during the lessons.

- **Detectives :** search for insects under stones, leaves and bark during exploration.
- **Researchers:** based on their observations, create an “Insect Book”, witch they will compare with the real enviroment.
- **Architects :** create sketches and decide on material placement (reeds, cones, sticks).
- **Tech experts :** operate the endoscope and digital microscope to see insects.
- **Data recorder :** take photographs on tablet and count insect legs or wings for classification.

Use of digital tools and safety

- **Supervision:** Devices like the digital microscope and endoscope must be used only with an adult present.
- **Handling**: Children must be taught to hold devices carefully to avoid dropping or shaking them.
- **Ocular Safety:** Children must never look directly at the sun through any optical or digital device.
- **Hygiene**: Ensure devices are not put near the mouth or eyes.
- **Environmental Care:** Do not use electronic tools near water or high moisture unless they are specifically rated for it.

Focus: *Digital tools are a research aid, not a toy*

Attachment No.4.

References

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