Beekeeping

educational program

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Beekeeping project - annual work plan at school and introduction of Montessori principles when running a school apiary together with students.

Montessori Farm School is an educational institution that combines the Montessori methodology with the science of agriculture and life on a farm. The mission of school is to ensure the comprehensive development of students by integrating science, agricultural practice and conscious life on the farm. We focus on education that teaches respect for nature, develops practical skills and shapes attitudes of responsibility and a sustainable approach to life.

Program assumptions:

1. Montessori method: We use the principles of the Montessori method, giving students the freedom to choose activities, an individual pace of learning and creating an environment conducive to independence and exploration.

2. Agricultural education: We teach students practical skills related to agriculture, animal breeding and running a farm. Thanks to this, students gain knowledge about the life cycle of plants and animals, plant cultivation techniques, animal breeding and the principles of sustainable agriculture.

3. Farm Life: Students learn about farm life through daily work on the farm. Classes include: caring for animals, caring for plants, working in the vegetable and fruit garden, and performing various work related to the maintenance of the farm.

4. Ecological education: We care about developing students' ecological awareness, teaching them about the importance of environmental protection, sustainable use of natural resources and protection of biodiversity.

5. Personal development: We also focus on students' personal development, supporting them in building social skills, creativity, self-discipline and coping with various life situations.

Resources and activities:

-Classrooms: We have educational spaces equipped according to Montessori principles, enabling independent learning and exploration.

-Farm: The school has its own farm where students learn practical agricultural skills.

-Educational gardens: The school has vegetable gardens, a fruit orchard and other green areas that serve as a space for learning and practical experiences.

-Farm animals: The school keeps various species of animals, such as chickens and sheep, which are not only a source of knowledge, but also teach respect and responsibility towards animals.

Apiary as the foundation of the Montessori Farm School.

An apiary can be of fundamental importance in a Montessori school for several key reasons:

1.Experiential learning: The Montessori method emphasizes learning through direct experiences. The apiary provides students with the opportunity to have direct contact with nature, observe the life of bees and learn about phenomena related to ecology and biology.

2. Development of practical skills: The apiary is an excellent place to develop practical skills. Students learn how to work in the field, care for animals and plants, as well as various techniques related to beekeeping, which is consistent with the principles of practical education in the Montessori method.

3. Integrated learning: The Montessori school promotes an integrated approach to education, where different areas of knowledge are combined to gain a more complete understanding of the world. The apiary is an excellent tool for integrating science, mathematics, social sciences and art.

4. Development of empathy and respect for nature: By observing the life of bees and working in the apiary, students learn respect for the natural world and develop empathy for animals and plants. This, in turn, helps build ecological awareness and social responsibility.

5. Environmental awareness: Modern education places increasing emphasis on issues related to environmental protection and sustainable development. An apiary can be an excellent tool for developing ecological awareness and encouraging students to take actions to protect nature.

6. A rich source of learning and exploration: The apiary is an extremely rich source of learning and exploration. Students can explore the secrets of bee life, learn about various plant species and their importance for bees, and research the ecosystems that are related to the functioning of the apiary.

In this way, the apiary becomes an irreplaceable element of education at a Montessori school, supporting the holistic development of students and promoting values consistent with the Montessori philosophy, such as independence, responsibility and respect for the natural world.

Methods used in our school:

As part of the apiary at Montessori Farm School, tasks for students are designed in accordance with the principles of the Montessori method, taking into account the individual pace of learning, independence and responsibility for one's own actions. Here are some examples of tasks that can be assigned to students in the apiary:

1. Observing bees: Students can be responsible for regularly observing bees in the apiary. The task will be to monitor the activity of bees, observe the collection of nectar and pollen, and track changes in the hive and bee behavior.

2. Collecting pollen and nectar: Students can help collect pollen and honey. This can be both a hands-on experience and a lesson in the importance of bee pollination of plants.

3. Hive care: Students may be responsible for basic work related to keeping the hive clean and providing appropriate conditions for the bees, such as controlling humidity and ventilation.

4. Gardening: Students can work in the garden, planting flowers and melliferous plants that attract bees and provide them with food. They may also maintain vegetable gardens, which provide a variety of food sources for bees.

5. Production of bee products: Students can participate in the production process of various bee products, such as honey, wax, bee bread and propolis. They can help extract honey, package products and take care of their storage.

6. Educating other students: Students who have already gained some knowledge and experience in beekeeping can act as mentors for other students, sharing their knowledge and skills and supporting them in learning and working in the apiary.

When designing tasks for students in the apiary, it is important to take into account their interests, skills and individual development needs, as well as to provide them with support and appropriate tools for independent action. With this approach, students can experience true hands-on learning and grow both academically and personally.

Outlines of lessons conducted by beekeeping teacher at Montessori Farm School:

The general work plan with students planned for the school year:

September:

1. Introducing students to the topic of bees: discussing their role in nature and their importance for people.
2. Familiarizing students with basic beekeeping equipment.
3. Showing films or multimedia presentations about the life of bees and the work of a beekeeper.
4. Commencement of construction of the school apiary.

October:

1. Continued construction of the apiary.
2. Preparing a lesson on harvesting honey and bee products.
3. Organization of a study visit to a local apiary or bee farm.
4. Training students in the protection of bees and wild pollinating insects.

November:

1. Further work on the school apiary: assembling the hive and placing bee frames.
2. Teaching about different species of bees and wild pollinating insects.
3. Organizing a competition for bee protection projects at school and the local community.
4. Conducting lessons on the ecology of bees and their role in maintaining the balance of ecosystems.

December:

1. Continued work on the school apiary: preparing the hive for wintering.
2. Training students in techniques for observing bees and wild insects in the field.
3. Preparing a presentation on the traditions of beekeeping.
4. Organizing a charity campaign to protect bees or their habitats.

January:

1. Monitoring the wintering status of bees in the school apiary.
2. Discussing plans for the next beekeeping season with students.
3. Preparation of practical classes on the first spring activities in the apiary.

4. Organization of workshops for teachers and the school community on the role of bees in nature.

February:

1. Continuation of monitoring the condition of bees during the winter period.

2. Training students in identifying bees and wild pollinators.

3. Organizing an art competition about bees and their habitats.

4. Conducting lessons on the importance of biodiversity and the role of bees in maintaining it.

March:

1. Beginning preparations for the spring beekeeping season: assessing the condition of the bees and the hive.

2. Teaching about the role of flowers and other plants in bee nutrition.

3. Organization of a study visit to a local botanical garden or arboretum.

4. Preparation of multimedia presentations on the diversity of bees in the world.

April:

1. Continued preparations for the spring beekeeping season: cleaning the hive and removing dead bees.

2. Training students on the importance of honey and other bee products for health.

3. Organizing a study visit to a local health food store where you can find beekeeping products.

4. Conducting lessons on cooperation between humans and bee insects in agriculture.

May:

1. Beginning of the honey harvesting season in the school apiary.

2. Teaching students about the process of producing honey and other bee products.

3. Organization of culinary workshops during which students will be able to prepare dishes with honey on their own.

4. Conducting lessons on the importance of bees for the pollination of crops.

June:

1. Continuation of honey harvest and assessment of yields in the school apiary.

2. Train students to protect bees from pesticides and other environmental hazards.

3. Organization of a school beekeeping festival, where students will be able to present their achievements and knowledge about bees.

4. Preparing an exhibition of students' photos or art works about bees and their habitats.

I. Lesson outline: Biology of bees

Grade: 4-8 (depending on content customization)

Duration: 90 minutes

Lesson goal: To familiarize students with the biology of bees, their role in the ecosystem and their importance for humans.

Specific objectives:

1. Students will be able to describe the body structure of a bee.
2. Students learn about the life cycle of a bee.
3. Students will understand the role of bees in the ecosystem and the importance of their work for humans.
4. Students will learn what threats await bees and how they can be helped.

Learning methods:

- Lecture
- Multimedia presentation
- Discussion
- Work in groups
- Practical exercises

Teaching materials and resources:

- Computer and projector
- Multimedia presentation about bee biology
- Models or illustrations showing the body structure of a bee
- Sheets of paper, crayons, markers
- Examples of bee products (honey, wax)
- Cards with questions for discussion
- (Optional) Samples of pollen, propolis, etc.

Lesson course:

1. Introduction

- Greeting students and presenting the topic of the lesson.
- Short opening questions, e.g. "What do you know about bees?" or "Why are bees important?"

2. Multimedia presentation: "Biology of bees"

- Bee body structure: Discussion of the main parts of the bee body (head, thorax, abdomen) and the functions of individual parts (eyes, wings, legs, sting).

- Bee life cycle: Presentation of the stages of a bee's life (egg, larva, pupa, adult bee).

- Role in the hive: Describe the different roles of bees in the colony (queen, workers, drones) and their responsibilities.

- The importance of bees in the ecosystem: Discussion of the role of bees in pollinating plants and producing honey and other bee products.

- Threats to bees: A brief overview of the problems bees face (pesticides, diseases, climate change) and how we can help them.

3. Group discussion

- Divide the class into small groups.

- Each group receives a card with a question for discussion, e.g. "What products do we owe to bees?", "Why are bees at risk?"

- Groups discuss the questions for a few minutes and then present their answers to the class.

4. Practical exercise: Drawing a bee

- Students receive sheets of paper, crayons and markers.

- The task is to draw a bee, marking and describing its main body parts.

- Interested students can present their drawings and describe what they have drawn.

5. Presentation of bee products

- Presentation of various bee products (honey, wax, pollen, propolis).

- Discussion of their applications and importance for humans.

6. Summary and conclusion of the lesson

- A short summary of the main points of the lesson.

- Questions for students to consolidate knowledge, e.g. "What roles do bees play in the colony?", "Why are bees important to the ecosystem?"

Additional notes: It is a good idea to have samples of various bee products in the lesson so that students can see and touch them. If possible, you can organize a visit to a local apiary or invite a beekeeper to the lesson to talk about his work and show the students beekeeping equipment.

Note to the presenter:

The queen bee, drones and workers are the three main types of bees in the hive, each of which plays a specific role in the social life of the bee swarm.

1. Queen bee:

The queen bee, also called the queen, is the only fertile female in the hive. Its main task is to lay eggs and maintain the integrity of the bee colony. The queen bee can lay up to 1,500 eggs a day and is responsible for the reproduction of the swarm. Its presence ensures the continuity of the swarm's life and increases its efficiency. The queen also emits pheromones that maintain harmony in the bee community.

2. Drones:

Drones are the fertile males in the hive. Their main role is to provide genetic material for breeding new bees. Drones leave the hive only once in their lives to fertilize the queen bee. They do not collect nectar or pollen, nor do they perform other foraging tasks like workers. Drones are often fed by workers, and their number in the hive is controlled by workers, who decide when to produce or remove drones depending on the needs of the hive.

3. Worker bees:

Workers are sterile females that make up the majority of the population in the hive. They perform various functions, depending on the age and needs of the hive. The basic tasks of worker bees include:

- Care: Young workers take care of the larvae and the queen bee, feeding them with royal jelly.

- Foraging: Older workers venture outside the hive to collect nectar, pollen and water necessary to produce honey and feed the colony.

- Wax production: Worker bees produce wax, which is used to build comb in the hive.

- Defense: When threatened, workers defend the hive by attacking intruders.

- Cleaning: Worker bees remove debris from the hive and keep it clean.

The division of labor in the hive is dynamic, and workers are flexible in performing various tasks depending on the needs of the colony and their age and physical abilities. This cooperation and specialization in different functions are crucial to the success and survival of the bee swarm.

II. Lesson outline: Bee products

Grade: 4-8 (depending on content customization)

Duration: 90 minutes

Lesson goal: To familiarize students with the variety of bee products, their properties and uses.

Specific objectives:

1. Students learn about various bee products and their properties.
2. Students will learn about the importance of bee products for humans.
3. Students will be able to indicate various uses of bee products in everyday life.

Learning methods:

- Lecture
- Multimedia presentation
- Discussion
- Work in groups
- Practical exercises

Teaching materials and resources:

- Computer and projector
- Multimedia presentation about bee products
- Samples of bee products (honey, wax, pollen, propolis, royal jelly)
- Sheets of paper, crayons, markers
- Worksheets with tasks
- Notebooks and pens

Lesson course:

1. Introduction

- Greeting students and presenting the topic of the lesson.
- Short opening questions, e.g. "What bee products do you know?" or "Who among you likes honey?"

2. Multimedia presentation: "Bee products"

- Honey: Discussion of different types of honey, their properties and uses.

- Types of honey (e.g. linden, acacia, buckwheat).
- Health properties of honey.
- Use of honey in cooking and medicine.
- Beeswax: Discussion of the wax production process and its uses.
- Production of wax by bees.
- Wax uses (e.g. candles, cosmetics, medicinal products).
- Pollen: Discussion of pollen collection by bees and its nutritional value.
- Collection and storage of pollen by bees.
- Nutritional properties of pollen.
- Uses of pollen in diet and medicine.
- Propolis: Discussion of the properties of propolis and its uses.
- How bees produce propolis.
- Antibacterial and anti-inflammatory properties of propolis.
- The use of propolis in medicine.
- Royal Jelly: An overview of what royal jelly is and its uses.
- Production of royal jelly by bees.
- Health properties of royal jelly.
- Use in cosmetics and medicine.

3. Group discussion

- Divide the class into small groups.
- Each group receives a worksheet with questions for discussion, e.g. "What bee products are the most popular?", "How can bee products be used in everyday life?".
- Groups discuss the questions for a few minutes and then present their answers to the class.

4. Practical exercise: Creating posters

- Students receive sheets of paper, crayons, markers and other art materials.
- The task is to create a poster presenting a selected bee product, its properties and uses.
- Interested students can present their posters and describe what they presented.

5. Presentation of bee products

- Showing various samples of bee products (honey, wax, pollen, propolis, royal jelly).
- Discussion of their properties and applications.

- (Optional) Tasting different types of honey.

6. Summary and conclusion of the lesson

- A short summary of the main points of the lesson.

- Questions for students to consolidate knowledge, e.g. "What bee products do you know?", "Why is propolis important?"

- Homework (optional): Write a short note on one bee product and its uses.

Additional remarks:

- It is worth having samples of various bee products during the lesson so that students can see, touch and try them. If possible, you can organize a visit to a local apiary or invite a beekeeper to the lesson to talk about his work and show the students beekeeping equipment.

Note to the presenter:

1. Honey: This is the most famous and widely used beekeeping product. Honey is a product produced by bees from the nectar of flowers. After collecting the nectar, the bees take it to the hive, where it is processed through enzymes and water evaporation, creating honey. Honey is a rich source of energy, contains many vitamins, minerals and antioxidants, and has many health benefits, including improving immune function and heart health.

2. Pollen: Pollen is a protein that bees collect from flowers and carry to the hive. It is an important component of the bees' diet, but can also be harvested by humans due to its high nutritional value. Flower pollen contains a wealth of vitamins, minerals, amino acids and antioxidants. It is used as a dietary supplement to improve health and strengthen immunity.

3. Propolis: is a sticky substance that bees collect from tree buds and other plants. It is used to seal and disinfect the hive and to defend against bacteria and fungi. Bee honey has antibacterial, antifungal and anti-inflammatory properties, making it a popular ingredient in skin care products and for treating various health conditions.

4. Beeswax: Beeswax is a product produced by bees to build comb in the hive. It is collected and used by people to make candles, cosmetics, creams, lotions and other products. Beeswax has moisturizing and protective properties for the skin and is used in many traditional cosmetic recipes.

5. Royal jelly: Royal jelly, also called royal jelly, is a substance secreted by the mammary glands of young worker bees to feed the larvae and the queen bee. It is rich in proteins, vitamins, minerals and other nutrients, which gives it many health

benefits, such as improving immunity, anti-inflammatory and anti-cancer properties.

Bee products are not only delicious, but also full of nutritional value and have many health benefits. Their diverse use, from cosmetics to dietary supplements, makes them very popular among consumers looking for natural and healthy products.

III. Lesson outline: Pollination of plants by bees

Grade: 4-8 (depending on content customization)

Duration: 45-60 minutes

Lesson goal: To familiarize students with the process of pollination of plants by bees, its importance for the ecosystem and agriculture, and the threats to bees.

Specific objectives:

1. Students learn the mechanism of pollination of plants by bees.

2. Students will understand the importance of pollination for food production and biodiversity.

3. Students will learn about threats to bees and ways to protect them.

Learning methods:

- Lecture
- Multimedia presentation
- Discussion
- Work in groups
- Practical exercises

Teaching materials and resources:

- Computer and projector
- Multimedia presentation about pollination of plants by bees
- Models or illustrations of flowers and bees
- Pollen samples
- Sheets of paper, crayons, markers
- Worksheets with tasks
- Notebooks and pens

Lesson course:

1. Introduction

- Greeting students and presenting the topic of the lesson.

- Short opening questions, e.g. "What do you know about plant pollination?" or "Why are bees important to plants?"

2. Multimedia presentation: "Pollination of plants by bees"

- What is pollination?: Explain the process of pollination and its importance for plants.

- The role of bees in pollination: Discuss how bees transfer pollen from flower to flower.

- Flower structure (stamens, pistil, nectar).

- The process of collecting pollen by bees.

- The importance of pollination for the ecosystem and agriculture:

- How pollination affects biodiversity and food production.

- Examples of plants pollinated by bees (fruits, vegetables, flowers).

- Threats to bees:

- Discussion of threats such as pesticides, diseases, climate change.

- How we can help bees (creating bee-friendly gardens, avoiding pesticides).

3. Group discussion

- Divide the class into small groups.

- Each group receives a worksheet with questions for discussion, e.g. "What plants depend on bee pollination?", "What will happen if bees become extinct?"

- Groups discuss the questions for a few minutes and then present their answers to the class.

4. Practical exercise: Pollination simulation

- Students receive models of flowers and bees (or illustrations).

- The task is to simulate the pollination process: transferring pollen from the stamens of one flower to the pistil of another flower using a bee model.

- Students can work in pairs or small groups to thoroughly understand the mechanism of pollination.

5. Presentation of products created thanks to pollination

- Showing various products that we owe to bees, e.g. fruit, vegetables, honey.

- Discuss how the lack of bees would affect the availability of these products.

6. Summary and conclusion of the lesson

- A short summary of the main points of the lesson.

- Questions for students to consolidate knowledge, e.g. "What is the importance of pollination?", "How can we protect bees?"

- Homework (optional): Write a short note or create a poster about how we can help bees in our area.

Additional remarks:

- It is worth having pollen samples in the lesson so that students can see and touch them. If possible, a visit to a local apiary or botanical garden could be arranged so that students can see bees in action.

Note to the presenter:

- Importance: Pollination of plants by bees is a key process in ecosystems that allows plants to reproduce and produce fruits and seeds. Without pollination, many plant species would not be able to survive, which could have serious consequences for biodiversity and for humanity that relies on fruits, vegetables and other plant products.

- Mechanism of action: While collecting nectar and pollen from flowers, bees transfer pollen from the stamens of one flower to the stigma of another flower. This process, known as cross-pollination, fertilizes the egg cells in the flower ovules and produces seeds. Bees are effective pollinators because they regularly visit many flowers of different species in one flight.

- Importance to agriculture: Bees are of great importance to agriculture because they pollinate many species of crops, including fruits, vegetables, nuts and oilseeds. It is estimated that bees are responsible for pollinating approximately 75% of the world's major crops. Lack of sufficient bee populations can lead to a decline in crop yields and quality, which in turn affects food availability and the economy.

- Threats to bee pollination: Bees are threatened by many factors, including habitat loss, pesticide use, diseases and parasites. These factors can lead to a decline in bee populations, which in turn affects pollination efficiency and the ability of bees to maintain ecosystem balance.

- Protective actions: To protect bees and ensure the continuity of the pollination process, it is necessary to take actions at both local and global levels. These actions include protecting bee habitats, reducing the use of pesticides, promoting bee-friendly agricultural practices, and public education about the importance of bees and their role in ecosystems.

- Summary: Pollination of plants by bees is a fundamental ecological process that is of great importance for the health of ecosystems and humanity. Protecting bees and their habitats is crucial to maintaining the balance of nature and ensuring food availability for future generations.

IV. Lesson outline: Obtaining honey and its properties

Grade: 4-8 (depending on content customization)

Duration: 45-60 minutes

Objective of the lesson: To familiarize students with the process of obtaining honey, its health properties and its importance in diet and culture.

Specific objectives:

1. Students will learn how honey is made and the stages of its extraction.

2. Students learn the health properties of honey.

3. Students will understand the importance of honey in the diet and culture of different nations.

Learning methods:

- Lecture
- Multimedia presentation
- Practical demonstration
- Discussion
- Work in groups

Teaching materials and resources:

- Computer and projector
- Multimedia presentation about honey extraction and its properties
- Models or illustrations of hives and bees
- Empty beeswax slices
- Samples of different types of honey
- Worksheets with tasks
- Notebooks and pens

Lesson course:

1. Introduction

Greeting students and introducing the topic of the lesson. Short opening questions, e.g. "Who likes honey?" or "Does anyone know how honey is made?"

2. Multimedia presentation: "Obtaining honey and its properties"

- The process of making honey: Explain how bees collect nectar from flowers and

turn it into honey.

- Collecting nectar by bees.

- Processing nectar into honey in the hive.

- Explaining the role of bees in honey production.

- Honey extraction stage: Discuss the steps a beekeeper must take to obtain honey.

- Removing a comb of wax from the hive.

- Removing the patch cover.

- Centrifuging honey.

- Pouring honey into jars.

- Health benefits of honey: Presentation of the various health benefits of consuming honey.

- Antibacterial and anti-inflammatory properties.

- The use of honey in natural medicine.

- The effect of honey on the immune system.

3. Practical demonstration: Honey extraction

- Showing a model of a beehive and a comb of beeswax.

- Showing how the beekeeper removes wax combs from the hive and extracts the honey.

- Discussion of the steps that need to be taken to obtain honey.

4. Group discussion

- Divide the class into small groups.

- Each group receives a worksheet with questions for discussion, e.g. "What are the most important health properties of honey?", "Why is honey important in folk culture?"

- Groups discuss the questions for a few minutes and then present their answers to the class.

5. Trying different types of honey

- Students have the opportunity to try different types of honey (e.g. linden honey, acacia honey, buckwheat honey).

- Discuss the differences in taste and consistency between different types of honey.

6. Summary and conclusion of the lesson

- A short summary of the main points of the lesson.

- Questions for students to consolidate knowledge, e.g. "How is honey made?" or "What are the health benefits of honey?".

- Encouragement to consume honey in the diet and appreciate its value.

- Homework (optional): Write a short note about the health properties of honey and its importance in your diet.

Additional remarks:

- It is a good idea to have samples of different types of honey in the lesson so that students can try them.

- If possible, you can invite a beekeeper to a lesson to talk about his work and present beekeeping equipment.

Note to the presenter:

Honey is a natural bee product that is created as a result of honey bees collecting nectar from flowers and its processing and storage in the hive. The process of making honey can be divided into several steps.

1. Collecting nectar: Bees visit flowers in search of nectar, a sweet fluid secreted by flowers. Using special structural organs, such as suction cups, bees collect nectar from flowers.

2. Transporting nectar to the hive: After collecting the nectar, the bees carry it to their hive where it will be processed into honey. Nectar is stored in special chambers of the hive called honey harvesters.

3. Conversion of nectar into honey: Once delivered to the hive, the nectar is processed by the bees. This process involves adding enzymes that convert the sugars contained in the nectar, mainly glucose and fructose, into simple sugars such as glucose and fructose. This fermentation process makes the nectar more stable and more honey-like.

4. Honey processing: Once the nectar has been properly processed, the bees focus on removing moisture to obtain the appropriate honey consistency. They do this by fanning their wings, which helps evaporate excess water from the nectar.

5. Honey storage: Ready honey is stored in combs in the hive chambers. The bees cover the honey cells with wax to protect the honey from contamination.

Finally, the finished honey is ready for human consumption. It is a product of high nutritional value, rich in sugars, vitamins, minerals and other nutrients. Honey is commonly used as a sweetener, an addition to dishes and drinks, as well as for medicinal and cosmetic purposes.

Honey properties:

1. Antibacterial properties: Honey has the ability to kill bacteria due to the presence

of low pH, high sugar content and the presence of antibacterial substances such as hydrogen peroxide. Due to this, honey was traditionally used to treat wounds and infections.

2. Anti-inflammatory effect: Substances contained in honey have anti-inflammatory effects, which means that honey can relieve inflammation in various parts of the body, including the throat and digestive system.

3. Antiviral properties: Honey also has antiviral properties, which can be helpful in the fight against viruses such as flu and cold viruses.

4. Supports wound healing: Due to its antibacterial and anti-inflammatory properties, honey can accelerate the healing process of wounds and skin ulcers. It is used in both conventional and natural medicine to treat wounds.

5. Relieving cough and sore throat: Honey has properties that soothe throat irritations and relieve cough symptoms. It is an ingredient of many cough syrups and gargles.

6. Aids the digestive system: Consuming honey can help regulate the digestive system. It has a soothing effect on heartburn and indigestion, and also has a soothing effect on the digestive system.

7. A rich source of antioxidants: Honey contains many different antioxidants, such as flavonoids and polyphenols, which help fight oxidative stress and prevent free radical damage to cells.

8. Support for the immune system: Consuming honey can support the immune system thanks to its antibacterial and anti-inflammatory substances and nutrients such as vitamins and minerals.

9. Moisturizing and nourishing properties for the skin: Honey can be used externally as an ingredient in skin care cosmetics because it moisturizes, soothes irritations and nourishes the skin.

10. Improved hair condition: Honey can also be used for hair care as it moisturizes, strengthens the hair and gives it shine.

To sum up, honey is not only a delicious sweet addition to dishes, but also has many health benefits both internal and external. Its unique properties make it a valued ingredient in natural medicine and cosmetics.

V. Lesson outline: Obtaining pollen and its properties

Grade: 4-8 (depending on content customization)

Duration: 90 minutes

Lesson goal: To familiarize students with the process of obtaining flower pollen by bees, its nutritional properties and its importance for the ecosystem and health.

Specific objectives:

1. Students will learn how bees collect pollen and what its importance is for bees.

2. Students will learn the nutritional properties of pollen.

3. Students will understand the importance of pollen for the ecosystem and human health.

Learning methods:

- Lecture
- Multimedia presentation
- Practical demonstration
- Discussion
- Work in groups

Teaching materials and resources:

- Computer and projector
- Multimedia presentation about obtaining flower pollen and its properties
- Models or illustrations of bees and flowers
- Pollen samples
- Worksheets with tasks
- Notebooks and pens

Lesson course:

1. Introduction

- Greeting students and presenting the topic of the lesson.

- Short opening questions, e.g. "Do any of you know what pollen is?" or "Why is pollen important for bees?".

2. Multimedia presentation: "Obtaining flower pollen and its properties"

- The process of obtaining pollen: Explain how bees collect pollen from flowers.
- How pollen is transferred to the bee's body.
- Where does pollen come from in the bee hive?
- The role of pollen for bees: Discuss why pollen is important to bees.
- How pollen is used by bees to feed larvae.
- How bees collect pollen in the hive.
- Nutritional properties of pollen: Presentation of the health benefits of consuming pollen.
- Rich in nutrients (proteins, vitamins, minerals).
- The impact of pollen on health and immunity.
- The importance of pollen for the ecosystem: Discussion of the role of pollen in pollinating plants and maintaining biodiversity.
- How pollen helps plants reproduce.
- The importance of pollination for food production and the preservation of biodiversity.

3. Practical demonstration: Flower pollen

- Showing pollen samples.
- Discuss what pollen looks like and where it comes from.
- Showing how bees transfer pollen to their bodies.

4. Group discussion

- Divide the class into small groups.
- Each group receives a worksheet with questions for discussion, e.g. "What are the nutritional properties of pollen?", "Why is pollen important for plants?"
- Groups discuss the questions for a few minutes and then present their answers to the class.

5. Presentation of the health benefits of pollen

- Discuss the various health benefits of consuming flower pollen.
- Presentation of how pollen can be used in diet and supplementation.

6. Summary and conclusion of the lesson

- A short summary of the main points of the lesson.
- Questions for students to consolidate knowledge, e.g. "Why is pollen important for bees and plants?" or "What are the nutritional properties of pollen?".

Note to the presenter:

Pollen is tiny grains found in the stamens of flowers. It is the male gametophyte of the plant, which plays a key role in the process of plant pollination. Pollen contains the plant's reproductive cells and is necessary for fertilizing the female plant cells found in flower ovules.

Pollen is obtained mainly by bees, especially honey bees. This process is called pollen collection, and bees that specialize in this task are called pollen collectors. Here are the steps bees take when collecting pollen:

1. Collecting pollen: Bees collect pollen by visiting flowers and interacting with stamens. Special brushes on the bee's legs, called anthers, help collect pollen and attach it to the bee's body.

2. Transferring pollen to baskets on its legs: Once the pollen has been collected, the bee transfers it to special structures on its legs called pollen baskets or pollen tufts. These baskets are located on the bee's hind legs and are used to transport pollen from flowers to the hive.

3. Transferring pollen to the hive: After collecting enough pollen, the bee returns to the hive and transfers the pollen to the hive cells. There, the pollen is stored and stored as food for the bees within the colony.

Pollen can also be obtained by humans using special pollen traps placed near flowers. After the bee is trapped in the trap, the pollen is collected and used for food or medicinal purposes.

Pollen is an extremely valuable source of nutrients such as proteins, vitamins, minerals and antioxidants. It is also widely used as a dietary supplement due to its potential health benefits, such as improving immunity, supporting heart health, improving physical performance, and anti-allergic effects.

VI. Lesson outline: Obtaining bee bread

Grade: 4-8 (depending on content customization)

Duration: 45-60 minutes

Objective of the lesson: To familiarize students with the process of obtaining bee bread by bees, its properties and importance for bees and people.

Specific objectives:

1. Students will learn what bee bread is and how it is made.
2. Students will learn about the nutritional and medicinal properties of bee bread.
3. Students will understand the importance of bee bread for bees and humans.

Learning methods:

- Lecture
- Multimedia presentation
- Practical demonstration
- Discussion
- Work in groups

Teaching materials and resources:

- Computer and projector
- Multimedia presentation about obtaining bee bread and its properties
- Models or illustrations of bees and hive
- Samples of bee bread
- Worksheets with tasks
- Notebooks and pens

Lesson course:

1. Introduction

- Greeting students and presenting the topic of the lesson.
- Short opening questions, e.g. "Have any of you heard of the bee bread?" or "Do you know what bee bread is for?"

2. Multimedia presentation: "Collecting bee bread"

- What is bee bread?: Explanation of what bee bread is and how it is made.

- How bees collect pollen and transform it into bee bread.

- Where the bee bread is stored in the hive.

- Nutritional and medicinal properties: Presentation of the health benefits of consuming bee bread.

- Rich in nutrients (proteins, vitamins, minerals).

- The use of bee bread in natural medicine.

- The process of obtaining bee bread: Discussion of the steps a beekeeper takes to obtain bee bread.

- Removing wax combs from the hive.

- Removing the wax comb cover.

- Obtaining bee bread from the comb.

3. Practical demonstration: Pierzga

- Showing a sample of bee bread.

- Discussion of what bee bread looks like and where it comes from.

- Showing how bees store and accumulate bee bread in their hives.

4. Group discussion

- Divide the class into small groups.

- Each group receives a worksheet with questions for discussion, e.g. "What are the nutritional properties of bee bread?" or "Why is bee bread important for bees?".

- Groups discuss the questions for a few minutes and then present their answers to the class.

5. Presentation of the health benefits of bee bread

- Discuss the various health benefits of consuming bee bread.

- Presentation of how bee bread can be used in diet and supplementation.

6. Summary and conclusion of the lesson

- A short summary of the main points of the lesson.

- Questions for students to consolidate knowledge, e.g. "Why is bee bread important for bees and people?" or "What are the nutritional properties of bee bread?".

- Encouragement to appreciate the role of bee bread in the health of bees and humans.

Note to the presenter:

Pierzga is a special bee product obtained from a mixture of nectar, honey, pollen, secretions of the bees' salivary glands and microorganisms that are transformed by the bees into specific food.

The process of creating bee bread begins when bees collect pollen from flowers using special brushes on their hind legs, which are called anthers. When bees collect pollen, it mixes with nectar to create what is called fermentable nectar. At this point, enzymes and secretions from the bees' salivary glands are added to this mixture. This allows the mixture to ferment, which changes the chemical composition of the pollen and nectar, transforming it into bee bread.

The next step is to transfer this mixture to the comb cells in the hive, where it is stored. There, the bee bread becomes food for bee larvae. The larvae are fed with bee bread by adult bees, which is important for their proper development and growth.

Bee bread is a rich source of protein, vitamins, minerals and other nutrients, which makes it an important element of the bees' diet. Additionally, bee bread is also appreciated by people for its potential health benefits, such as improving immunity, supporting heart health, and even having anti-cancer effects.

VII. Lesson outline: Obtaining propolis

Grade: 4-8 (depending on content customization)

Duration: 45-60 minutes

Lesson goal: To familiarize students with the process of obtaining propolis by bees, its properties and importance for bees and humans.

Specific objectives:

1. Students will learn what propolis is and how it is produced.
2. Students will learn the healing and antibacterial properties of propolis.
3. Students will understand the importance of propolis for bees and humans.

Learning methods:

- Lecture
- Multimedia presentation
- Practical demonstration
- Discussion
- Work in groups

Teaching materials and resources:

- Computer and projector
- Multimedia presentation about obtaining propolis and its properties
- Models or illustrations of bees and hive
- Propolis samples
- Worksheets with tasks
- Notebooks and pens

Lesson course:

1. Introduction

- Greeting students and presenting the topic of the lesson.
- Short opening questions, e.g. "Have any of you heard of propolis?" or "Why is propolis important for bees?".

2. Multimedia presentation: "Obtaining propolis"

- What is propolis?: An explanation of what propolis is and how it is made.

- How bees collect tree resin and transform it into propolis.

- Where propolis is stored in the hive.

- Medicinal and antibacterial properties: Presentation of the health benefits of using propolis.

- Antibacterial and anti-inflammatory properties.

- The use of propolis in natural medicine.

- The process of obtaining propolis: Discuss the steps a beekeeper takes to obtain propolis.

- Removing the wax frame from the hive.

- Removing propolis from the wax frame.

- Purification and preparation of propolis for use.

3. Practical demonstration: Propolis

- Showing a sample of bee propolis.

- Discuss what propolis looks like and where it comes from.

- Showing how bees store and accumulate propolis in the hive.

4. Group discussion

- Divide the class into small groups.

- Each group receives a worksheet with questions for discussion, e.g. "What are the healing properties of propolis?" or "Why is propolis important for bees?".

- Groups discuss the questions for a few minutes and then present their answers to the class.

5. Presentation of the health benefits of propolis

- Discussion of the various health benefits of using propolis.

- Presenting how propolis can be used to treat various ailments.

6. Summary and conclusion of the lesson

- A short summary of the main points of the lesson.

- Questions for students to consolidate knowledge, e.g. "Why is propolis important for bees and people?" or "What are the medicinal properties of propolis?".

Note to the presenter:

Propolis, also called bee glue, is a substance produced by honey bees. It is a mixture of plant resins, beeswax, pollen and various organic substances such as essential oils. Bees use propolis for many purposes in colony life, such as sealing and

disinfecting the hive, defending against intruders, and maintaining hygiene.

The process of propolis formation begins when bees collect resin from tree buds, mainly from poplar, willow, birch, oak, chestnut, and other plants. After collecting the resin, the bees mix it with enzymes contained in their saliva and additional substances such as beeswax and pollen. The resin is then processed by the bees and placed to maintain hygiene in the hive and to maintain and harden the walls of the hive.

As a result of this process, propolis is created with a diverse chemical composition, which is characterized by strong antibacterial, anti-inflammatory and antioxidant properties. Propolis is also used in natural medicine due to its potential health benefits for humans, such as strengthening immunity, promoting wound healing, antiviral and anticancer effects.

WINTER PRACTICAL CLASSES

I. Building a hive with students:

Making a bee hive together with students in the carpentry shop is not only an educational, but also a practical undertaking. Such a project can teach the basics of carpentry, teamwork and environmental responsibility. Below I present a detailed step-by-step plan on how to make a bee hive using one hive as a model.

1. Preparation

Materials:

- Wooden boards (preferably pine or spruce)
- Wood screws or nails
- Wood glue
- Paints or varnishes safe for bees
- Ventilation mesh
- Wire for attaching the net
- Moisture protection foil (optional)

Tools:

- Hand saw or chainsaw
- Drill/screwdriver
- Hammer
- Measure
- Pencil
- Carpentry square
- Sandpaper
- Carpentry clamps
- Paint brushes or rollers

Organization:

- Protect the work surface.
- Prepare a beehive pattern as a model.
- Divide students into groups, assigning them different stages of building a hive.

2. Introduction

1. Education: A short presentation about the structure of the hive, its parts and functions, as well as the role of bees in the ecosystem.

2. Safety: Reminder of safety rules when working with carpentry tools.

3. Wood Preparation

1. Cutting the boards:

- Measure and mark the lengths of the boards according to the dimensions of the beehive pattern.

- Cut the boards for the side walls, front and rear walls, base, roof and frames.

- Dimensions of an example hive (Langstroth):

- Side walls: 50 cm x 24 cm

- Front and rear walls: 42 cm x 24 cm

- Base: 55 cm x 45 cm

- Canopy: 55 cm x 50 cm

2. Grinding:

- Smooth the edges and surfaces of the boards with sandpaper to remove splinters and irregularities.

4. Assembling the Beehive

1. Assembling the body:

- Fold the side walls with the front and back walls to form a rectangle. Use carpentry clamps to hold the pieces in place.

- Apply wood glue to the edges and attach the walls with screws or nails.

2. Fixing the base:

- Attach the base to the bottom edge of the body. Use wood screws or nails.

3. Installation of the canopy:

- Assemble the roof from the boards, creating a slightly protruding roof over the edges of the body to protect the hive from rain.

- You can add foil or sheet metal to the top of the canopy for additional protection against moisture.

4. Ventilation:

- Cut ventilation holes in the side walls, near the top edge.

- Attach the ventilation mesh on the inside to protect the holes.

5. End of classes:

1. Quality control:

- Check each element of the hive for stability and finish.
- Correct any shortcomings.

2. Cleaning the station:

- Make sure all tools are clean and stowed away. Remove any remaining materials and secure the workplace.

3. Reflection and summary:

- Talk to students about their experiences and what they have learned.
- Encourage questions and further interest in beekeeping.

6. Documentation and Exhibition

1. Photos:

- Take photos of students at work and finished hives.
- Share them on your school's social media or website.

2. Presentation:

- Organize a small exhibition of finished hives so that students can see and talk about their work.

II. Painting beehives with students:

Painting hives with students is a great learning and fun opportunity, and a great way to support bees and educate about their role in the ecosystem. Below is a detailed step-by-step plan on how to conduct such workshops:

1. Preparation

Materials:

- Wooden hives (e.g. bodies, bottoms, extensions, roofs)
- Bee-safe paints (e.g. water-based acrylics)
- Brushes of different sizes
- Painting tapes
- Sandpaper
- Protective masks (optional)
- Disposable gloves (optional)
- Painter's aprons or old shirts
- Newspapers or painting foil to protect the surface
- Water cups for rinsing brushes
- Palettes for mixing paints
- Sheets of paper and pencils (for sketches and designs)

Organization:

- Establish a place of work (preferably outdoors or in a well-ventilated room).
- Protect the work surface with painting foil or newspapers.
- Prepare stations with materials for students.
- Discuss the action plan with students and explain why it is important to paint the hives.

2. Introduction

1. Education: A short presentation about bees, their role in the ecosystem and why we paint hives (wood protection against weather conditions, recognition for bees and beekeepers).

2. Safety: Reminder of safety rules when working with paints and painting tools (e.g. avoiding contact with eyes, washing hands after work).

3. Preparation of the Hives

1. Sanding: If the hives are new, students can lightly sand the surface with sandpaper to help the paint adhere better.

2. Cleaning: Remove dust and dirt from the hives with a damp cloth.

4. Design

1. Sketches: Encourage students to draw their designs on pieces of paper. These can be patterns, nature motifs, abstractions or other creative ideas.

2. Division of work: Discuss with students who will be responsible for each part of the hive (e.g. one group paints the body, another the roof).

5. Painting

1. First layer: Apply the first layer of color base. Use lighter colors that can provide a background for more detailed patterns.

2. Drying: Allow the paint to dry according to the manufacturer's instructions. During this time, you can take a break for educational activities about bees.

3. Second painting: After the first layer dries, students can start painting details and patterns. Use painter's tape to separate different areas and create clean lines.

6. Ending

1. Final coat: If necessary, apply a second coat of protective paint or varnish.

2. Cleaning: Make sure all brushes and tools are thoroughly cleaned. Remove the painting foil and tidy up your work area.

3. Presentation: Organize a small exhibition of painted beehives. Students can talk about their projects and inspirations.

7. Summary

1. Reflect: Talk to students about what they learned and how they had fun.

2. Planning for the future: Consider what other projects you could do to support bees and other pollinators.

8. Setting up the Hives

1. Placement: When the time comes, place the painted hives in the right place in the apiary

2. Documentation: Take photos of your finished hives to share your work with the wider community.

III. Nailing and wiring beekeeping frames with students:

Nailing and wiring beekeeping frames are important beekeeping skills that can be taught effectively with students. This activity not only develops manual skills, but also introduces students to the world of beekeeping. Here is a detailed step-by-step plan on how to organize such workshops:

2. **Preparation**

Materials:

- Sets for nailing frames (side, top and bottom strips, dividers)
- Beekeeping wire (steel or copper)
- Small nails (for fastening the wire)
- Hammers
- Combination pliers or pliers
- Screws or nails to nail the frames
- Small nails or staples to attach the hoses
- Beeswax (wax sheets)
- Work boards (optional, to protect the tables)
- Carpentry clamps (optional)
- Goggles
- Protective gloves (optional)
- Aprons or old shirts

Organization:

- Prepare your workplace (preferably in a well-lit and spacious room or outdoors).
- Protect the work surface with boards or mats.
- Prepare stations with materials for students.
- Discuss the action plan and safety rules with students.

2. Introduction

1. Education: A short presentation on the role of frames in the hive, how they are constructed and why wiring is important (keeping the wires in place, structural strength).

2. Safety: Reminder of safety rules when working with tools, especially hammers

and wire.

3. Frame Breaking

1. Assembling the parts:

- Top molding: Take the top molding and the two side frame pieces.
- Side strips: Connect the side strips to the top strip, making sure they are even.

2. Dodgeball:

- Use a hammer and nails to connect the top strip to the side strips. You can also use screws if available.
- Repeat the process with the bottom strip, creating a rectangle.

3. Inspection:

- Make sure the frame is straight and stable. If necessary, use carpentry clamps to hold the parts in place while nailing.

4. Wiring Frames

1. Preparation:

- There are usually small holes for the wire on the side strips of the frame. If they are not there, they need to be drilled.
- Prepare the wire and pliers.

2. Threading the wire:

- Thread the wire through the holes in the side strips, starting at one end of the frame and going to the other end.
- Make sure the wire is tight enough to hold the hose in place. You can use pliers to tighten the wire.

3. Wire fixing:

- Secure the ends of the wire to the side strips using small nails or staples.
- For greater stability, you can make small bends at the ends of the wire so that they hold the frame better.

6. Ending

1. Quality control:

- Check each frame to make sure the wire is tight and the hose is securely attached.

- Correct any shortcomings.

2. Cleaning the station:

- Make sure all tools are clean and stowed away. Remove any remaining materials and secure the workplace.

3. Reflection and summary:

- Talk to students about their experiences and what they have learned.

- Encourage questions and further interest in beekeeping.

7. Documentation and Exhibition

1. Photos:

- Take photos of students at work and finished frames.

2. Presentation:

- Organize a small exhibition of finished frames so that students can see and talk about their work.

IV. Feathering the beeswax with students:

Attaching beeswax to frames with a straightener is a delicate task in beekeeping, but it can be a fascinating learning experience for students. Here is a detailed description of the process that you can carry out with your students:

1. Preparation of materials:

- Make sure you have all the necessary materials and tools, including beekeeping frames, beeswax, beeswax, straightener (a special device for feathering the hoses), scissors

2. Choosing the right place:

- Choose a suitable place to conduct classes, where students will be able to work freely and observe the process of attaching beeswaxes to frames.

3. Explanation of the process:

- Before starting work, discuss with students the importance of the hose for the bee colony and the need to properly attach it to the frames. Explain how the straightener helps to evenly stretch and secure the hoses in the frame.

4. Preparing the frame and hoses:

- Warm up the rectifier according to the manufacturer's instructions. Take out the beekeeping frame and place a piece of knitting into the frame.

5. Feathering Knots:

- Once the rectifier has warmed up, gently place the beeswax on the hot surface. The straightener will help you evenly stretch the hose and attach it to the frame. Be careful not to overheat the wax, which can cause it to melt and ruin the hose.

6. Observation and control:

- Monitor the fusing process of the hose to ensure it is evenly stretched and securely attached to the frame.

8. Discussion and summary:

- After completing the task, organize a short discussion about the experience. Discuss what difficulties you encountered and how they could have been resolved. Also summarize the importance of the snake to the bee colony and its role in bee reproduction.

V. Wax melting:

Melting beeswax from old combs is a hands-on activity you can do with your students. Below is a detailed step-by-step plan on how to complete this process in a safe and educational way.

1. Preparation

Materials:

- Old honeycombs
- Large pot (preferably made of stainless steel)
- A second pot or vessel for the water bath
- Gauze pads or a fine strainer
- Large spoon or stirrer
- Bucket
- Gum gloves
- Protective aprons
- Containers for ready-made wax
- Aluminum foil or parchment paper
- Clean cotton cloths

Tools:

- Gas or electric stove
- Scissors for cutting slices
- Kitchen thermometer (optional)
- Wax press (optional, but useful)

Organization:

- Prepare your work area in a well-ventilated room.
- Establish safety rules and remind students to be careful when working with hot water and wax.

2. Introduction

1. Education: A short presentation about beeswax, its properties, uses and importance in beekeeping.

2. Safety: Reminder of safety rules when working with hot water and hot wax. Emphasize the need to wear protective gloves and aprons.

3. Preparation of Patches

1. Cutting the slices:

- Students should cut old honeycombs into smaller pieces to make melting the wax easier.

2. Cleansing the patches:

- Remove as much dirt as possible, such as bee remains or mechanical impurities. You can use tweezers or scissors.

4. Melting Wax

1. Preparation of the water bath:

- Fill a large pot about half full with water and place it on the stove. Heat the water until it begins to boil.

2. Melting the wax:

- Place the cut wax slices in a second pot or dish that can be placed over a pot of water (creating a water bath).

- Place the container with the slices in hot water. The wax will begin to melt with heat. Use a spoon or mixer to speed up the process.

3. Temperature Monitoring:

- If you have a kitchen thermometer, monitor the temperature to keep it below the boiling point of the wax (approx. 62-65°C). The wax should not be overheated so that it does not lose its properties.

5. Wax Filtration

1. Preparation for filtering:

- Place a gauze pad or a fine strainer on the bucket or container into which you will pour the melted wax.

2. Filtering:

- Slowly pour the melted wax through a gauze or strainer to separate any impurities. Make sure students do this carefully to avoid spilling the hot wax.

3. Second filtration (optional):

- If the wax is very dirty, you can filter it again using a clean gauze or other filter.

6. Cooling and Forming of Wax

1. Cooling:

- Allow the filtered wax to cool in the container. You can use aluminum foil or parchment paper to line the wax molds, making it easier to remove once it hardens.

2. Forming:

- If you want to obtain specific shapes, pour the wax into appropriate molds. You can use silicone cake pans or other containers.

3. Removing the wax:

- Once it has cooled completely and hardened, remove the wax from the mold. It can be stored in clean, airtight containers.

7. Ending

1. Cleaning the station:

- Make sure all tools are clean and stowed away. Remove any remaining materials and secure the workplace.

2. Reflection and summary:

- Talk to students about their experiences and what they have learned.

- Encourage questions and further interest in beekeeping.

8. Documentation and Exhibition

1. Photos:

- Take photos of students at work and finished products.

2. Presentation:

- Organize a small exhibition of finished wax products so that students can see and talk about their work.

VI. Preparation of the apiary workshop before the intensive beekeeping season

Preparing the beekeeping workshop before the season together with students is an excellent opportunity to learn and integrate the team. Below is a detailed step-by-step plan on how to clean and prepare your beekeeping studio for the new season.

1. Preparation

Materials and tools:

- Cleaning agents (e.g. mild detergents, disinfectants)
- Buckets and bowls
- Sponges, brushes and cloths
- Mops and buckets with wringers
- Protective gloves
- Protective aprons or old shirts
- Garbage bags
- Vacuum cleaner
- Hazardous waste bags (if necessary)
- Steam cleaner (optional, but helpful for disinfection)
- Organizers, containers and storage labels

Organization:

- Prepare workstations and set tasks for individual students.
- Discuss the action plan and safety rules, especially when working with detergents and tools.

2. Introduction

1. Education: A short presentation on the importance of hygiene in beekeeping and why it is important to maintain a clean studio.
2. Safety: Reminder of safety rules when working with cleaning products and tools.

3. Removal of All Items

1. Emptying the studio:

- Remove all items from the workshop (e.g. tools, equipment, materials). Place them outside or in a designated place.

2. Sorting items:

- Divide items into three groups: to clean, to repair and to throw away.

- Make sure students know what items can be kept and what should be removed.

4. Cleaning and Cleaning

1. Surface cleaning:

- Wipe dust and dirt from all surfaces (tables, shelves, windowsills). Use a cloth or sponge and appropriate cleaning agents.

- Wash the floors with a mop and detergent. If the floor is very dirty, use a steam cleaner.

2. Cleaning the equipment:

- Wash and disinfect all beekeeping tools and equipment. Make sure they are thoroughly dried before storing again.

- If equipment requires repair, note what needs to be done and assign responsibility.

3. Vacuuming:

- Vacuum all hard-to-reach places, such as corners, cabinets, and spaces under furniture.

- Make sure all air vents are clean.

5. Space Organization

1. Review and organization of tools:

- Organize tools and equipment logically and easily accessible.

- Use organizers and containers to store small items. Label your containers so you can easily find what you need.

2. Workshop equipment:

- Make sure that all necessary materials for work during the season are available in the studio (e.g. gloves, protective hats, spare frames, beeswax).

3. Safety and hygiene:

- Check whether a first aid kit and disinfectants are available in the studio.

- Make sure all students know where emergency exits and firefighting equipment are located.

6. Inspection and Review

1. Final inspection:

- Walk through the workshop and check that all tasks have been completed correctly.
- Make sure all surfaces are clean and equipment is well organized.

2. Summary:

- Talk to students about the progress of work, what has been achieved and what can be improved for the future.
- Thank students for their commitment and effort.

7. Documentation

1. Photos:

- Take photos of students working and after cleaning.
- Share them on your school's social media or website to show off your work.

Conducting workshops on preparing a beekeeping workshop is a valuable experience that can not only improve students' practical skills, but also increase their ecological awareness and responsibility for the environment.

Practical classes in spring and summer:

I. Lesson Outline: Overview of the Bee Family

Lesson goals:

Educational :

Understanding the structure and functions of the bee family.
Learning the basic activities related to hive inspection.

Practical :

Learning how to handle bees safely.
Conducting a practical inspection of the hive.

Social :

Strengthening the skills of cooperation and communication in a group.

Duration: 90 minutes

Materials:

- Protective beekeeping outfits for students (hats, gloves, overalls).
- Beekeeping vacuum cleaner.
- Beekeeping tools (chisel, beekeeping brush).
- Hives with bee families.
- Notebooks and pens for students.
- Blackboard, markers.

Lesson course:

1. Introduction (15 minutes)

- Greeting students.
- Discussing the lesson objectives.
- A short introduction to the topic: what is a bee family, what are its elements (queen, workers, drones) and their functions.
- Safety rules when working with bees.

2. Theoretical basis of hive inspection (15 minutes)

- Discuss what a hive inspection is and why it is important.
- Presentation of tools used to inspect the hive.
- Showing a diagram of the hive and explaining what should be checked during the inspection (condition of the colony, amount of food, presence of diseases, condition of the mother).

3. Preparing for inspection (10 minutes)

- Division of students into groups.
- Distribution of protective equipment and tools.
- Instructions on how to properly put on a beekeeping outfit.
- Demonstration of using a vacuum cleaner.

4. Practical inspection of the hive (35 minutes)

- Going to the apiary.
- Each group, under the supervision of a teacher, inspects the hive:
    - Opening the hive and using a vacuum cleaner.
    - Removing frames and assessing their condition.
    - Searching for the queen and assessing her condition.
    - Checking the quantity and quality of honey and pollen.
    - Paying attention to the presence of diseases or parasites.
- Recording observations in notebooks.

5. Discussion and summary (15 minutes)

- Back to class.
- Discussion of observations and conclusions from the review.
- Summary of acquired knowledge.
- Answers to students' questions.

Comments:

- Before the lesson, make sure that all students are not allergic to bee stings.
- Have a first aid kit on hand, including antihistamines.

Note to the presenter:

1. Preparation for inspection

1. **Protective suit** :
    - Put on a beekeeping suit, gloves and a hat with a protective net.
    - Make sure all parts of the outfit fit well and there are no holes through which bees can get inside the garment.
2. **Tools** :
    - Prepare a vacuum cleaner, a beekeeping chisel, a beekeeping brush, a notebook and a pen.
    - Light the vacuum cleaner using appropriate fuel (e.g. dry grass, leaves, wood) and make sure the smoke is mild and cool.

2. Hive inspection

1. **Approach to the hive** :
    - Approach the hive calmly and slowly, avoiding sudden movements.
    - Use a vacuum cleaner to introduce a few clouds of smoke into the entrance of the hive. Smoke calms the bees, reducing their aggressiveness.
2. **Opening the hive** :
    - Gently remove the roof of the hive, using a beekeeping chisel to separate the lid from the body.
    - Introduce further clouds of smoke over the top of the frames to calm the bees working above.
3. **Frame overview** :

- Start with the outer frames and slowly move towards the center of the hive.
- Gently remove the frame with a bee chisel, holding it vertically.
- Look at both sides of the frame, paying attention to:
    - The presence of eggs, larvae and brood, which indicates the activity of the queen bee.
    - Quantity and quality of honey and pollen.
    - Cell health – look for signs of disease such as American foulbrood and varroa.
    - The presence and condition of the queen bee (may be marked with a colored point).

4. **Queen bee condition** :
    - Identify the queen bee. It is larger than workers and has an elongated abdomen.
    - Check to see if the mother is moving efficiently and laying eggs in a regular pattern.
5. **Stock status** :
    - Assess the amount of honey and pollen collected. The honey frames should be well covered and the pollen cells should be colorful.
6. **Bee health check** :
    - Pay attention to the bees' behavior - whether they are calm and hard-working.
    - Look for signs of disease: misaligned wings, patchy spots on bees, deformed wings.

3. Closing the hive

1. **Placing frames** :
    - Once you have gone through each frame, place it back in the hive in the same order.
    - Use the vacuum cleaner to calm the bees before each move.
2. **Closing the hive** :
    - Gently close the hive lid, making sure all parts fit properly.
    - Apply a few clouds of smoke at the entrance of the hive before leaving.
3. **Cleanliness of tools** :
    - After inspection, clean tools and protective clothing.
    - Turn off the vacuum cleaner.

4. Inspection documentation

1. **Notes in the notebook** :
    - Record the date of inspection, the condition of the hive, observations regarding the health of the bee colony, the amount of supplies, the presence of the queen bee and any disturbing symptoms.
    - Note any actions that need to be taken in the future, e.g. treating diseases, adding new frames.

Additional notes:

- **Safety** : Ensure that all review participants are aware of safety rules and are properly equipped.
- **Calm** : During the inspection, stay calm and move slowly so as not to stress the bees.
- **Training** : Before the inspection, it is worth conducting a short theoretical and practical training so that all participants know what to expect and how to react in various situations.

Such detailed instructions will help to conduct a bee colony inspection in a safe and effective manner, both for the bees and for the people participating in the inspection.

II. Lesson Outline: Honey Harvesting

Lesson goals:

1. **Educational** :
    - Understanding the honey harvesting process and the role of bees in honey production.
    - Learning the tools and techniques used for honey harvesting.
2. **Practical** :
    - Learning how to conduct honey harvesting safely and effectively.
    - Practical experience in collecting honey from the hive.
3. **Social** :
    - Strengthening the skills of cooperation and communication in a group.

Duration:

- 90 minutes

Materials:

- Protective beekeeping outfits for students (hats, gloves, overalls).
- Vacuum cleaner.
- Beekeeping tools (chisel, uncapping fork, beekeeping brush).
- Honey extractor (centrifuge).
- Honey containers (jars, buckets).
- Table for uncapping slices.
- Notebooks and pens for students.
- Blackboard, markers.

Lesson course:

1. Introduction (15 minutes)

- Greeting students.
- Discussing the lesson objectives.
- A short introduction to the topic of honey harvesting: what it is, why it is carried out, when is the best time to harvest honey.
- Safety rules when working with bees and honey.

2. Theoretical basis of honey harvesting (15 minutes)

- Discussion of the process of honey production by bees.
- Presentation of tools used for honey harvesting.
- Discussion of the stages of honey harvesting: uncapping combs, centrifuge, honey filtering.

3. Preparation for honey harvesting (10 minutes)

- Division of students into groups.
- Distribution of protective equipment and tools.
- Instructions on how to properly put on a beekeeping outfit.
- Demonstration of using a vacuum cleaner.

4. Practical honey harvesting (35 minutes)

- Going to the apiary.
- Each group, under the supervision of a teacher, carries out honey harvesting:
    - Opening the hive and using a vacuum cleaner.
    - Removing honey frames.
    - Uncapping slices with an uncapping fork.
    - Placing frames in the honey extractor and starting the centrifuge.
    - Collecting honey into containers.
    - Filtration of honey and pouring it into jars.

5. Discussion and summary (15 minutes)

- Back to class.
- Discussion about the honey harvest and conclusions from the observations.
- Summary of acquired knowledge.
- Answers to students' questions.

Notes for the presenter:

1. Preparation for honey harvesting

1. **Protective suit** :
    - Put on a beekeeping suit, gloves and a hat with a protective net.
    - Make sure all parts of the outfit fit well and there are no holes through which bees can get inside the garment.
2. **Tools** :
    - Prepare a vacuum cleaner, a beekeeping chisel, an uncapping fork, a beekeeping brush, a honey extractor and honey containers.
    - Light the vacuum cleaner using appropriate fuel (e.g. dry grass, leaves, wood) and make sure the smoke is mild and cool.

2. Carrying out honey harvesting

1. **Approach to the hive** :
    - Approach the hive calmly and slowly, avoiding sudden movements.
    - Use a vacuum cleaner to introduce a few clouds of smoke into the entrance of the hive. Smoke calms the bees, reducing their aggressiveness.
2. **Opening the hive** :
    - Gently remove the roof of the hive, using a beekeeping chisel to separate the cover from the body.
    - Introduce further clouds of smoke over the top of the frames to calm the bees working above.
3. **Removing frames** :
    - Start with the outer frames and slowly move towards the center of the hive.
    - Gently remove the honey frame with a beekeeping chisel, holding it

vertically.
- Use a bee brush to gently sweep the bees away from the frame.

4. **Uncapping the patches** :
    - Place the frame on the uncapping table.
    - Use an uncapping fork to gently remove the wax lids from the honey cells.
5. **Centrifuge (honey extractor)** :
    - Place the uncapped frames in the centrifuge.
    - Turn on the centrifuge to centrifuge the honey from the combs into a container located under the centrifuge.
6. **Filtering and storing honey** :
    - Pour the honey through a sieve or cheesecloth to remove wax residue and other impurities.
    - Pour the purified honey into prepared jars or buckets.

3. Closing the hive

1. **Placing frames** :
    - After removing the honey and cleaning the frames, place them back in the hive in the same order.
    - Use a vacuum cleaner to calm the bees before each move.
2. **Closing the hive** :
    - Gently close the hive lid, making sure all parts fit properly.
    - Apply a few clouds of smoke at the entrance of the hive before leaving.
3. **Cleanliness of tools** :
    - After harvesting honey, clean your tools and protective clothing.
    - Turn off the vacuum cleaner.

4. Honey harvest documentation

1. **Notes in the notebook** :
    - Record the date of honey harvest, the condition of the hive, the amount of honey collected, and any observations about the bees and the honey harvest process.
    - Note any actions that need to be taken in the future, e.g. adding new frames, treating bees.

III. Lesson Outline: Exchange of Queen Bees in Bee Families

Lesson goals:

1. **Educational** :
    - Understanding the role of the queen bee in the bee family.
    - Learning the reasons and benefits of replacing queen bees.
    - Acquiring knowledge about mother exchange methods.
2. **Practical** :
    - Learning to conduct queen exchange safely and effectively.
    - Practical experience in working with queen bees.
3. **Social** :
    - Strengthening the skills of cooperation and communication in a group.

Duration:

- 90 minutes

Materials:

- Protective beekeeping outfits for students (hats, gloves, overalls).
- Vacuum cleaner.
- Beekeeping tools (chisel, cages for transporting queens).
- Queen bees (new, to be replaced).
- Sugar syrup.
- Notebooks and pens for students.
- Blackboard, markers.

Lesson course:

1. Introduction (15 minutes)

- Greeting students.
- Discussing the lesson objectives.
- A short introduction to the role of the queen bee in the bee family: what she does and how she influences the functioning of the family.
- Overview of situations where queen replacement is necessary (e.g., aging mother, low productivity, illness).

2. Theoretical basis of mother exchange (15 minutes)

- Discussion of various methods of exchanging queens: direct method, cage method, method of feeding queens onto patches.
- Presentation of tools used to replace queens.
- Discussion of the stages of the mother replacement process.

3. Preparing for queen exchange (10 minutes)

- Division of students into groups.
- Distribution of protective equipment and tools.
- Instructions on how to properly put on a beekeeping outfit.
- Demonstration of using a vacuum cleaner.

4. Practical mother exchange (35 minutes)

- Going to the apiary.
- Each group, under the supervision of a teacher, carries out an exchange of mothers:
    - Opening the hive and using vacuum cleaner.
    - Removing frames with queen bee.
    - Finding and removing the old mother.
    - Introducing a new queen using a cage or directly on the combs.
    - Closing the hive and observing the bees' reactions.

5. Discussion and summary (15 minutes)

- Back to class.
- Discussion about the exchange of mothers and conclusions from the observations.
- Summary of acquired knowledge.
- Answers to students' questions.
- Short homework assignment: Writing a short report on the exchange of mothers and your own observations.

Note to the presenter:

1. Preparation for queen exchange

1. **Protective suit** :
    - Put on a beekeeping suit, gloves and a hat with a protective net.
    - Make sure all parts of the outfit fit well and there are no holes through which bees can get inside the garment.
2. **Tools** :
    - Prepare a vacuum cleaner, a beekeeping chisel, cages for transporting queens and sugar syrup.
    - Light the vacuum cleaner using appropriate fuel (e.g. dry grass, leaves, wood) and make sure the smoke is mild and cool.

2. Conducting queen exchange

1. **Approach to the hive** :
    - Approach the hive calmly and slowly, avoiding sudden movements.
    - Use a vacuum cleaner to introduce a few clouds of smoke into the entrance of the hive. Smoke calms the bees, reducing their aggressiveness.
2. **Opening the hive** :
    - Gently remove the roof of the hive, using a beekeeping chisel to separate the cover from the body.
    - Introduce further clouds of smoke over the top of the frames to calm the bees working above.
3. **Finding and removing the old mother** :
    - Start with the outer frames and slowly move towards the center of the hive.

- Gently remove the frame containing the queen bee, holding it vertically.
- Find the queen bee. It is larger than workers and has an elongated abdomen.
- Carefully remove the old mother from the frame.

4. Introduction of a new mother :

- **Cage method** :
  - Place the new mother in the transport cage.
  - Place the cage with the queen between the frames in the hive so that the bees can come into contact with it.
  - The cage should have an opening through which the bees can crawl out to the queen, allowing the bees to gradually accept the new queen.
- **Direct method** :
  - If using the direct method, gently place the new queen directly onto the brood frames.
  - Watch the bees' reaction. If the bees are aggressive, place the queen in a cage.

5. **Closing the hive** :

- Once the new queen has been introduced, gently close the hive lid, making sure all parts fit properly.
- Apply a few clouds of smoke at the entrance of the hive before leaving.

6. **Acceptance monitoring** :

- After a few days, check whether the new queen has been accepted by the bee family. If the mother is alive and laying eggs, the exchange was successful.

3. Documentation of queen exchange

1. **Notes in the notebook** :
   - Record the date the queen was replaced, the condition of the hive, observations of the bees' response, and any other important observations.
   - Note any actions that need to be taken in the future, such as additional monitoring of the new mother's acceptance.

IV. Lesson Outline: Treating Bees from Varroa

Lesson goals:

1. **Educational** :
    - Understanding what varroa is and how it affects bees.
    - Learning the methods of diagnosing and treating varroa.
    - Learning about preventive measures to prevent the development of varroa.
2. **Practical** :
    - Learning how to diagnose varroa.
    - Practical experience in the use of varroa treatment methods.
3. **Social** :
    - Strengthening the skills of cooperation and communication in a group.

Duration:

- 90 minutes

Materials:

- Protective beekeeping outfits for students (hats, gloves, overalls).
- Vacuum cleaner.
- Beekeeping tools (chisel, beekeeping brush).
- Varroa diagnostic kits (e.g. oil trays, rinsing liquid, mesh jars).
- Drugs against varroa (formic acid, oxalic acid, amitraz, flumethrin).
- Sample storage containers.
- Notebooks and pens for students.
- Blackboard, markers.

Lesson course:

1. Introduction (15 minutes)

- Greeting students.
- Discussing the lesson objectives.
- A short introduction to the topic of varroa: what it is, how it affects bees and beekeeping.
- Overview of the symptoms and effects of varroa.

2. Theoretical basis of varroa treatment (15 minutes)

- Discussion of the life cycle of the varroa destructor mite.
- Presentation of varroa diagnosis methods: sugar method, alcohol method, oil trays.
- Discussion of various methods of treating varroa: chemical (drugs) and non-chemical (mechanical, biological).
- Overview of preventive measures to prevent the development of varroa.

3. Preparation for diagnosis and treatment (10 minutes)

- Division of students into groups.
- Distribution of protective equipment and tools.

- Instructions on how to properly put on a beekeeping outfit.
- Demonstration of using a vacuum cleaner.

4. Practical diagnosis and treatment of varroa (35 minutes)

- Going to the apiary.
- Each group, under the supervision of a teacher, carries out diagnostics and treatment:
    - **Varroa diagnosis** :
        - Opening the hive and using a vacuum cleaner.
        - Collecting bee samples for diagnostics (sugar or alcohol method).
        - Conducting diagnostic tests (counting mites on trays with oil, in jars with a mesh).
    - **Varroa treatment** :
        - Selection of the appropriate drug depending on the diagnostic results.
        - Use the drug according to the instructions (e.g. evaporation of formic acid, pouring oxalic acid solution).
        - Monitoring the bees' reaction to the medicine used.

5. Discussion and summary (15 minutes)

- Back to class.
- Discussion on the diagnosis and treatment of varroa and conclusions from observations.
- Summary of acquired knowledge.
- Answers to students' questions.

Note to the presenter:

1. Preparation for diagnosis and treatment

1. **Protective suit** :
    - Put on a beekeeping suit, gloves and a hat with a protective net.
    - Make sure all parts of the outfit fit well and there are no holes through which bees can get inside the garment.
2. **Tools** :
    - Prepare a vacuum cleaner, a beekeeping chisel, a beekeeping brush, varroa diagnostic kits (trays with oil, rinsing liquid, jars with a mesh) and anti-varroa medications.

2. Performing diagnostics

1. **Approach to the hive** :
    - Approach the hive calmly and slowly, avoiding sudden movements.
    - Use a vacuum cleaner to introduce a few clouds of smoke into the entrance of the hive. Smoke calms the bees, reducing their aggressiveness.
2. **Opening the hive** :

- Gently remove the roof of the hive, using a beekeeping chisel to separate the cover from the body.
- Introduce further clouds of smoke over the top of the frames to calm the bees working above.

3. **Collecting bee samples** :
    - Remove the bee frame by holding it vertically.
    - Transfer a sample of bees (approximately 300 bees) to a mesh jar or other diagnostic container.
4. **Performing diagnostic tests** :
    - **Sugar method** :
        - Add powdered sugar to the jar with the bees.
        - Shake the jar gently for a few minutes.
        - Pour the contents of the jar through a sieve, counting the mites that have fallen off.
    - **Alcohol method** :
        - Add alcohol to the jar with the bees.
        - Shake the jar for a few minutes.
        - Pour the contents of the jar through a sieve, counting the mites that have fallen off.

3. Carrying out treatment

1. **Choosing the right medicine** :
    - Based on the diagnostic results, choose the appropriate drug for the treatment of varroa (formic acid, oxalic acid, amitraz, flumethrin).
2. **Use of the drug** :
    - **Formic acid** :
        - Use a special evaporator to introduce formic acid into the hive.
        - Follow the instructions regarding dosage and application time.
    - **Oxalic acid** :
        - Dissolve oxalic acid in water with sugar.
        - Pour the solution over the bees on the frames, trying to cover all the bees evenly.
    - **Amitraz and flumethrin** :
        - Use strips soaked in the active substance and place them between frames in the hive.
        - Follow the instructions regarding application time.
3. **Monitoring the bees' response** :
    - Observe the bees for several days after applying the medication.
    - Pay attention to possible negative reactions of bees to the medicine.

4. Closing the hive

1. **Placing frames** :
    - Once diagnosis and treatment are complete, place the frames back in the hive in the same order.

V. Lesson Outline: Feeding bee colonies

Lesson goals:

1. **Educational** :
    - Understanding the role and importance of feeding bees.
    - Learning about different types of food used to feed bees.
    - Learning the methods and techniques of feeding bees.
2. **Practical** :
    - Learning to prepare different types of food for bees.
    - Practical experience in feeding bee colonies.
3. **Social** :
    - Strengthening the skills of cooperation and communication in a group.

Duration:

- 90 minutes

Materials:

- Protective beekeeping outfits for students (hats, gloves, overalls).
- Vacuum cleaner.
- Beekeeping tools (chisel, beekeeping brush).
- Sugar syrup, sugar dough, honey.
- Feeders (for syrup and dough).
- Utensils for preparing sugar syrup (buckets, mixers).
- Notebooks and pens for students.
- Blackboard, markers.

Lesson course:

1. Introduction (15 minutes)

- Greeting students.
- Discussing the lesson objectives.
- A short introduction to the topic of feeding bees: what is feeding, why is it important and when is it used.
- An overview of different types of food used to feed bees (sugar syrup, sugar dough, honey).

2. Theoretical basics of feeding bees (15 minutes)

- Discussion of the seasonal nutritional needs of bees.
- Presentation of feeding methods: internal feeders, external feeders, sugar dough.
- Discussion of the benefits and potential problems associated with feeding bees.
- Overview of precautions when feeding bees.

3. Preparation for feeding (10 minutes)

- Division of students into groups.
- Distribution of protective equipment and tools.

- Instructions on how to properly put on a beekeeping outfit.
- Demonstration of the use of a vacuum cleaner.

4. Practical feeding of bees (35 minutes)

- Going to the apiary.
- Each group, under the supervision of a teacher, feeds the bees:
    - **Preparation of sugar syrup** :
        - Discussion of the proportion of sugar and water (1:1 in spring and summer, 3:2 in autumn).
        - Demonstration of preparing sugar syrup.
    - **Feeding with sugar syrup** :
        - Using feeders to administer sugar syrup.
        - Discussion of feeding techniques and timing.
    - **Feeding sugar dough** :
        - Demonstration of sugar dough preparation.
        - Placing the sugar dough in the hive.
    - **Feeding with honey** :
        - Discussion of the principles of feeding honey to bees.

5. Discussion and summary (15 minutes)

- Back to class.
- Discussion about the feeding carried out and conclusions from the observations.
- Summary of acquired knowledge.
- Answers to students' questions.

Note to the presenter:

1. Preparation for feeding

1. **Protective suit** :
    - Put on a beekeeping suit, gloves and a hat with a protective net.
    - Make sure all parts of the outfit fit well and there are no holes through which bees can get inside the garment.
2. **Tools** :
    - Prepare a vacuum cleaner, a beekeeping chisel, a beekeeping brush, feeders and vessels for preparing sugar syrup.

2. Preparation of food

1. **Sugar syrup** :
    - **Proportions** :
        - In spring and summer: 1 part of sugar to 1 part of water.
        - For autumn: 3 parts of sugar to 2 parts of water.
    - **Preparation** :

- Heat the water, but do not boil.
- Add sugar to warm water and stir until it dissolves completely.
- Allow the syrup to cool before serving to the bees.

2. Sugar cake :

- **Ingredients** :
  - Icing sugar.
  - A small amount of water.
- **Preparation** :
  - Add water to powdered sugar and mix until you obtain a thick, uniform mass.
  - Shape the dough into flat pieces that can be easily placed in the hive.

3. Carrying out feeding

1. **Approach to the hive** :
   - Approach the hive calmly and slowly, avoiding sudden movements.
   - Use a vacuum cleaner to introduce a few clouds of smoke into the entrance of the hive. Smoke calms the bees, reducing their aggressiveness.
2. **Opening the hive** :
   - Gently remove the roof of the hive, using a beekeeping chisel to separate the cover from the body.
   - Introduce further clouds of smoke over the top of the frames to calm the bees working above.

3. Feeding :

- **Sugar syrup** :
  - Fill the feeder with sugar syrup.
  - Place the feeder in the hive so that the bees have easy access to it.
- **Sugar cake** :
  - Place pieces of sugar dough on top of the hive frames.
  - Make sure the cake is firmly secured and won't fall off.
- **Honey** :
  - Only give honey if you are sure it does not come from another apiary to prevent the transmission of diseases.
  - Fill the feeder with honey and place it in the hive.

4. Closing the hive

1. **Placing frames** :
   - Once you have finished feeding, place the frames back in the hive in the same order.
   - Use a vacuum cleaner to calm the bees before each move.
2. **Closing the hive** :
   - Gently close the hive lid, making sure all parts fit properly.
   - Apply a few clouds of smoke at the entrance of the hive before leaving.

End:

Thanks to the joint efforts of students and teacher, our beekeeping project at Montessori Farm School was completed with great success! Over the past few months, we have been exploring the secrets of beekeeping, learning about the extraordinary life of bees and their importance for our environment.

Our students gained not only theoretical knowledge, but also practical skills by carrying out, among others: inspecting bee families, learning techniques for feeding bees or even conducting honey harvesting. This experience was not only educational, but also strengthened our bond with nature and understanding the need to protect its diversity.

I would like to thank everyone involved - our students for their curiosity and commitment, teachers for professional conduct of classes and parents for their support and trust. Thanks to our joint work, we managed to create an unforgettable educational experience that will remain in our memory for a long time.

Let us remember that our responsibility towards the environment does not end here. Further activities, such as caring for local flora and organizing educational field trips, will continue our efforts to protect bees and their natural habitats.

Thank you all for participating in this exciting beekeeping project. Let our positive experiences inspire us for further activities for nature conservation and ecological education in communities.