



Workshop

Wild Bee Herb Garden

TITLE: Designing and Implementing a Herb Garden for Wild Bee Conservation

TARGET GROUP: Students (12-18 years old)

DURATION: Total Time: 6 Hours (Split into 3 sessions of 120 minutes)

- **Session 1: Theory & Site Survey (120 min):** 60 min lecture on pollinator ecology; 60 min outdoor site analysis (measuring and soil testing).
- **Session 2: Technical Design & Mapping (120 min):** 90 min scale mapping on Worksheet #1; 30 min resource audit and material listing.
- **Session 3: Implementation & Monitoring (120 min):** 90 min physical planting and habitat construction; 30 min initial observation using Worksheet #2.

EXPECTED LEARNING RESULTS (AIM AND OBJECTIVES)

- Identify the ecological requirements of the wild bees versus honeybees in your country.
- Analyze the specific requirements of a herb garden to maximize attractiveness to pollinators (nectar, sun, and nesting).
- Apply mathematical scaling and orientation to design a functional garden map.
- Monitor and evaluate the ecological outcome of the garden through field observations.

STUDENT KNOWLEDGE AND PERCEPTIONS

Students often perceive "bees" as a single species (honeybees) living in hives. This lesson shifts focus to the species of wild bees (e.g. 300+ in Sweden, 70% of which are ground-nesters), and challenges the idea that a "tidy" garden is a healthy one.

CLASSROOM ORGANIZATION AND REQUIRED INFRASTRUCTURE

- **Classroom:** Equipped with desks for technical drawing.
- **Outdoor Plot:** A south-facing area with well-draining soil. Access to a water source is required.

MATERIALS & SOFTWARE

- **Herbs:** For example Chives, Oregano, Lavender, Thyme, Sage, and Hyssop.
- **Substrates:** Coarse sand/gravel (for 30% soil mix) and specialized loose sand for the "Nesting Volcano."
- **Hardware:** Shallow water dishes, pebbles/marbles, and optional Bee Hotels.
- **Tools:** Measuring tapes, compasses, graph paper, trowels, and rakes.



- **Software:** Smartphone compass app and website for identification (e.g. *Artfakta* (SLU Artdatabanken or wikipedia)).

DESCRIPTION (BRIEF DESCRIPTION OF THE TEACHING PROCESS)

The project begins with a theoretical dive into the "Pollen vs. Nectar" needs of pollinators. Students then conduct a site survey to find a suitable spot). After the physical installation of plants, a "Nesting Volcano" (sand patch), and a "Bee Bar" (water station), students transition into the role of observers of the patch.



WORKSHEET #1: Planning, Mapping & Resources

Objective: To design the physical layout of the garden and audit the materials required for installation.

Step 1: The Fast Guide to Swedish Pollinators

- **Honeybees vs. Wild Bees:** Honeybees are managed "livestock." (e.g. Sweden has ~300 species of Wild Bees, including 40 types of bumblebees).
- **The Home:** The ground-nesters wild bees need bare, sunny sand or soil—not a wooden box.
- **The Food:** Herbs like Oregano, Thyme, and Sage are "high-octane" nectar sources.

Step 2: Technical Drawing Instructions

1. **Setting the Scale:** Use a scale of 1:20 (1 cm on paper = 20 cm on the ground). Measure your plot dimensions before drawing.
2. **Orientation:** Use a compass to mark North and South. Identify the "Sun Trap" (the area with direct sun between 10:00–14:00).
3. **Vertical Zoning:** Place Tall Herbs (Sage/Hyssop) in the North Zone and Creeping Herbs (Thyme) in the South Zone to prevent shading.
4. **Habitat Features:** Mark the Nesting Volcano (50x50 cm sand square), Bee Hotels (if you already have them). and the Bee Bar (water dish) on your map

Step 3: Resource Audit

- **Plants:** (e.g., 5x Oregano, 3x Lavender) _____
 - **Substrate:** (e.g., 2 bags of sand, 1 bag of gravel) _____
 - **Tools:** (e.g., Trowels, rake, measuring tape) _____
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WORKSHEET #2: Field Guide & Observation Log

Objective: To identify visitors and analyze the ecological success of the garden.

Step 4: Identification Key (The "Big Three" Bumblebees)

- Red-tailed: Velvety black body with a bright rusty-red tail.
- Buff-tailed: Two yellow stripes on a black body with a white tail.
- Carder bee: Mossy orange/brown all over. Often nests in surface moss.

Step 5: The 10-Minute Pollinator Count

Observe the garden closely for 10 minutes.

Visitor Type (What kind of bee or other insects)	Number	Behavior

Step 6: Critical Reflection & Ecological Analysis

A. Pollinator Behavior & Floral Fidelity Observe a single bee as it moves. Does it stay on the same type of flower (e.g., only Lavender), or does it switch between different species (e.g., from Lavender to Sage)?

- Observations: _____
- Scientific Context: This is called *floral fidelity*. Why might it be more efficient for a bee to stick to one plant species during a single foraging trip? (Think about the "handling time" required to learn how to extract nectar from different flower shapes).



B. Infrastructure Performance Check Evaluate the non-plant features you installed.

- The Bee Bar: Did you see any insects landing on the pebbles to drink? If not, is the water clean, or is the dish too far from the flowers?

- The Nesting Volcano: Look for tiny holes (the size of a pencil lead) in the bare sand. These are signs of ground-nesting solitary bees. Do you see any activity?

C. The "Bloom Relay" Assessment Look at the entire garden plot.

- Which plants are currently in full bloom, and which have already finished or haven't started yet? _____
- Predict: If you were a bee arriving here in two weeks, which plant would be your primary food source? _____

D. Design Improvement Based on today's observations, if you had an extra 20 Euros to spend on this garden, what would you buy? (e.g., more of a specific "popular" herb, more sand for nesting, or a different type of Bee Hotel?). Explain your reasoning using the data you collected in Step 5.

- Proposal: _____
- Reasoning: _____