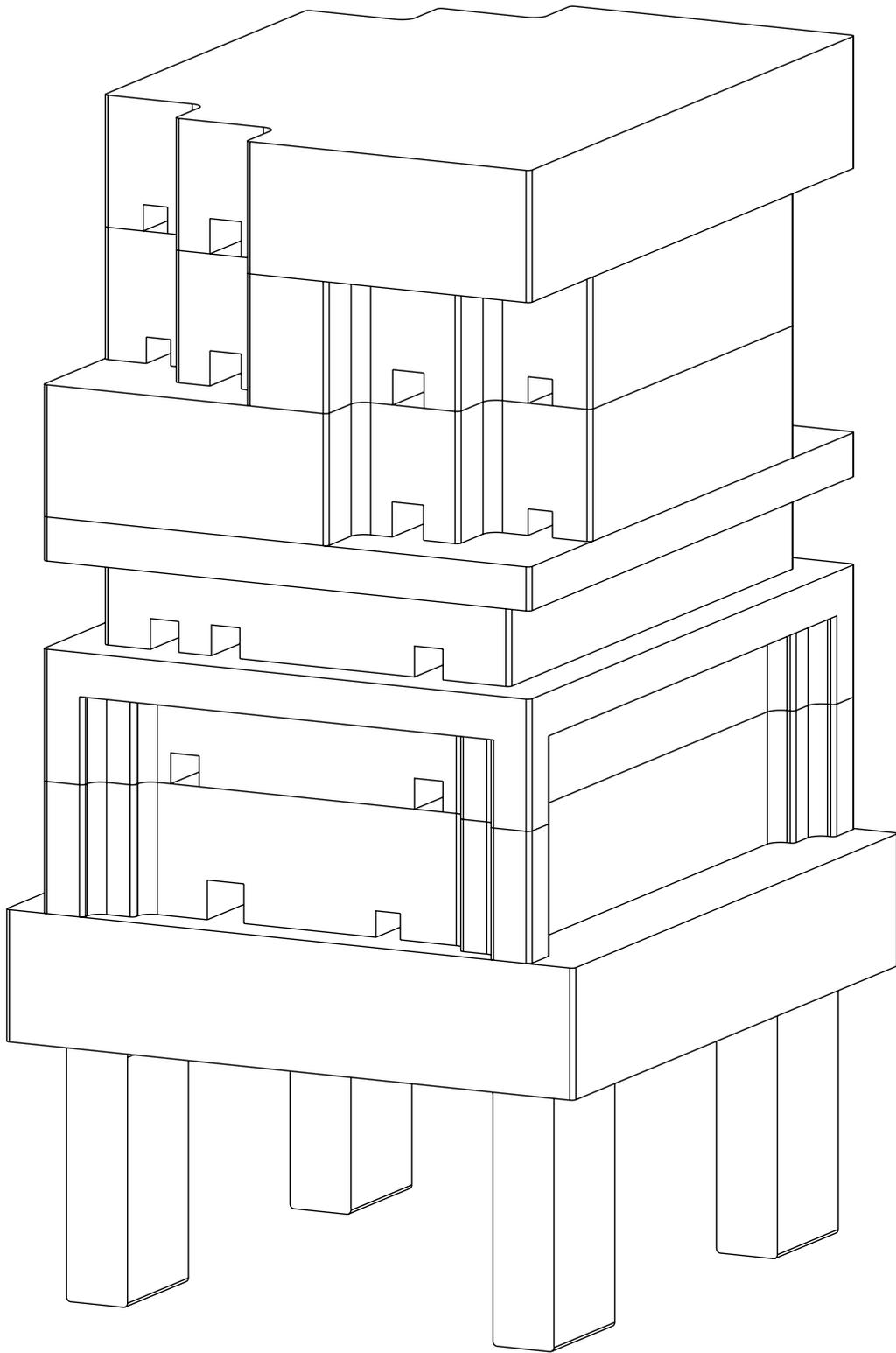


# BEEHOME



Assembly & Maintenance Guide

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# 00: INTRO

## A beautiful home for bees

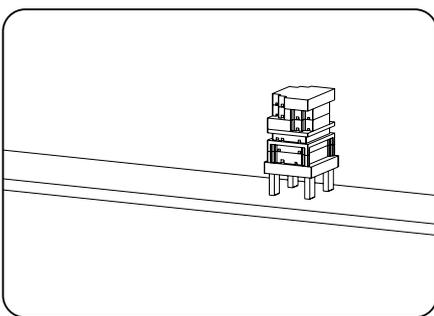
Thank you for designing your very own Bee Home. We at SPACE10 are happy that you want to help restore the relationship between people and nature by building a home for solitary bees. This little guide will take you through the simple steps of turning your Bee Home design into reality. If you encounter any problems that aren't covered here, please reach out to [beehome@space10.com](mailto:beehome@space10.com).

Have fun and please use #BeeHome if you want to share your process or final design with the world.

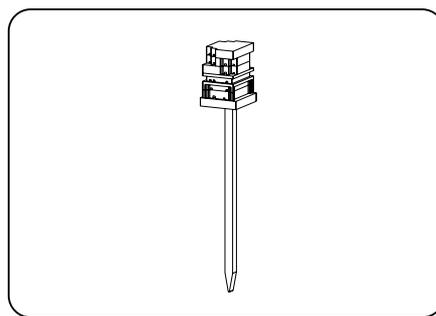
## Creative commons

The Bee Home has a Creative Commons Attribution 4.0 International License. This means that the design is public and free for anyone to use, share and copy without asking for permission. It also means we don't take responsibility for your safety. The only requirement is that you credit SPACE10 (@space10\_journal), Bakken & Bæck (@bakkenbaeck) and Tanita Klein (@tanita\_klein) and add your design to the map on <http://beehome.design>.

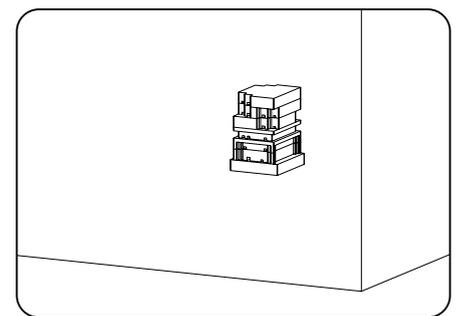
## Three ways to place your Bee Home



Standing Bee Home

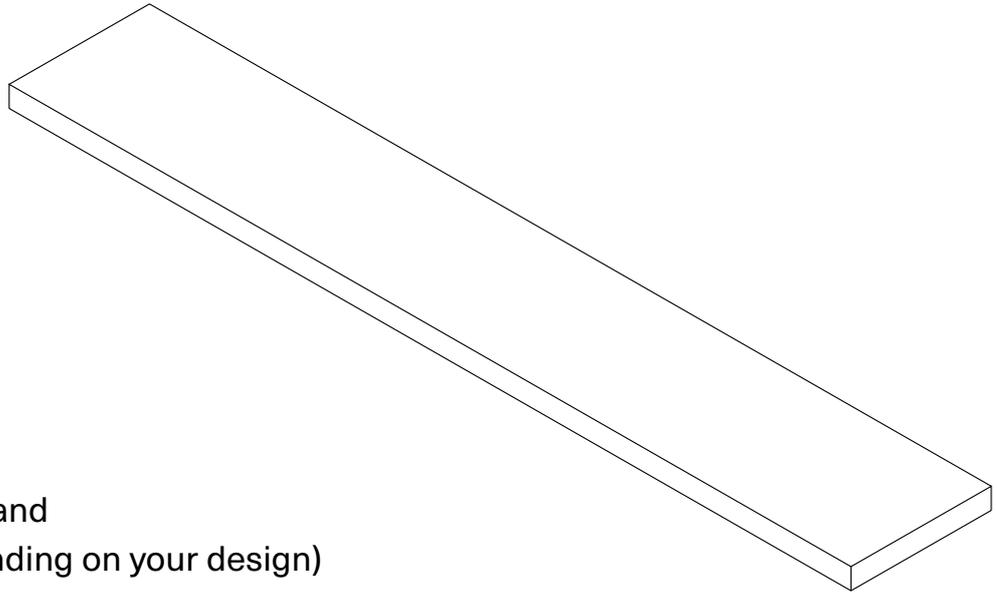


Grounded Bee Home



Fixed Bee Home

# 01: MATERIALS



1 plank of hardwood —  
3 cm thick, 20 cm wide and  
100-300 cm long (depending on your design)

## What to use

Most types of dried hardwood can be used — like oak, larch, cedar or mahogany. As a rule of thumb, the denser and stronger your hardwood is, the longer your Bee Home will last. With our climate in mind, use local and sustainably sourced wood.

## What to avoid

Don't use spruce, as it harms the bees' wings. Also avoid chemically treated or engineered wood, like plywood, MDF or OSB: the glue can be toxic and they age poorly outdoors.

## Where to get it

Ask your local carpenter for offcuts or find planks at a recycling centre, flea market or garage sale. Otherwise reach out to online hardwood dealers, local hardware stores or makerspaces.



# 02: GET IT MADE

With the help from a local makerspace with a CNC milling machine, fabricating your Bee Home is very simple. However, if you have the tools and knowledge to do it yourself, see our guide in Annexe 1.

## 1. Locate a makerspace with a CNC milling machine

Go to <http://beehome.design> and find a makerspace in your area that has the needed tools and knowhow.

## 2. Hand over your design files and hardwood

The design files contain all necessary information for the fabricator to cut out your Bee Home.

## 3. Weatherproof

Treat your Bee Home with natural oil. Remember not to treat in or around the bee holes — bees prefer natural wood and don't like strong smells from chemicals.

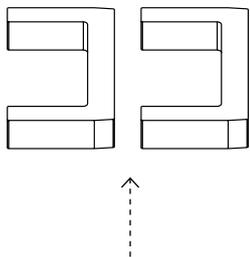
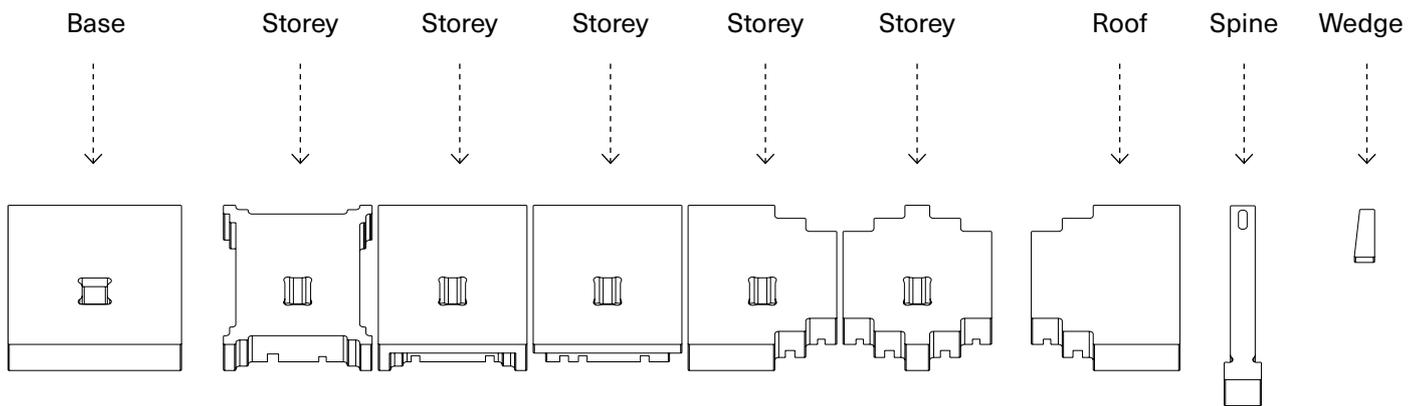


# 03: ASSEMBLE

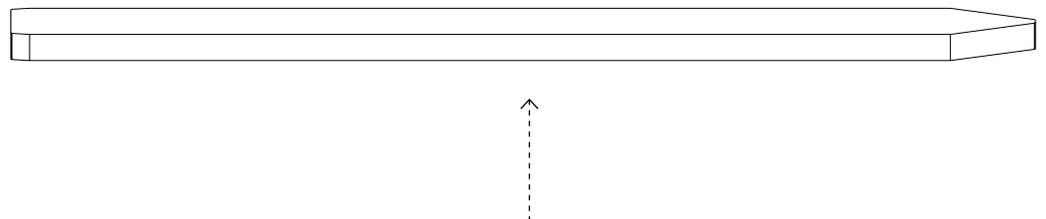
## Tools

Assembling your Bee Home requires no tools, just your hands and a few minutes of your time. For the 'Fixed Bee Home', simply use a drill and two screws to mount it.

**Step 1:** Lay out all the assembly parts and locate the spine, wedge, base, roof and storeys. Remember, every Bee Home is unique, so your storeys may differ from the ones illustrated.



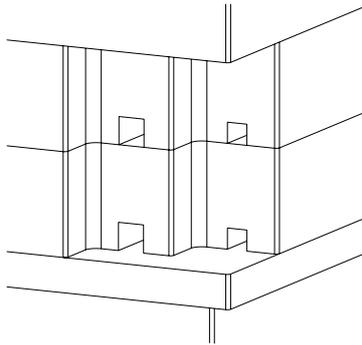
The 'Standing Bee Home' includes a set of legs.



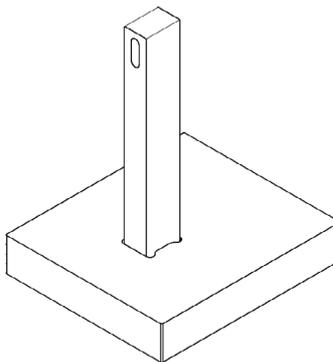
The 'Grounded Bee Home' includes a spike.



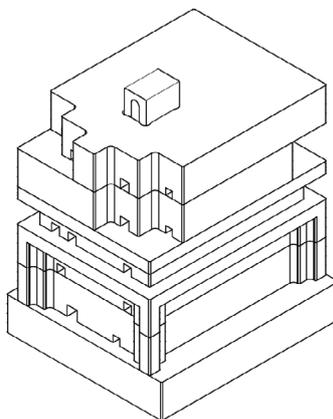
**Step 2:** Make sure the entrance holes are smooth and without splinters.



**Step 3:** Insert the spine into the base.



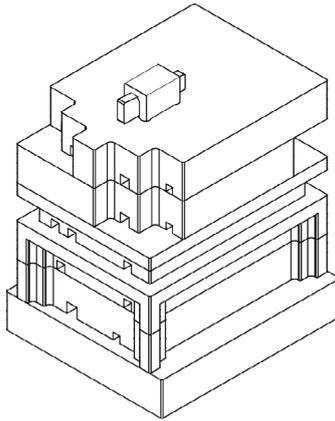
**Step 4:** Stack the storeys according to your design. Feel free to switch them around for a new look, but avoid having bee holes with no bottom.



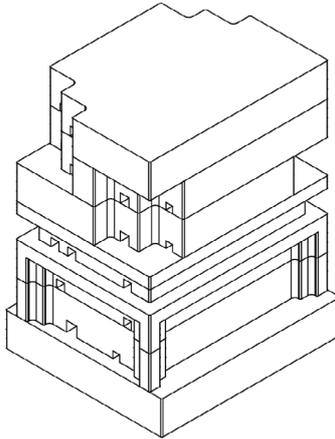
For the 'Fixed Bee Home', the storey with a wall mount — i.e. small holes for screws or nails — has to be just under the roof.



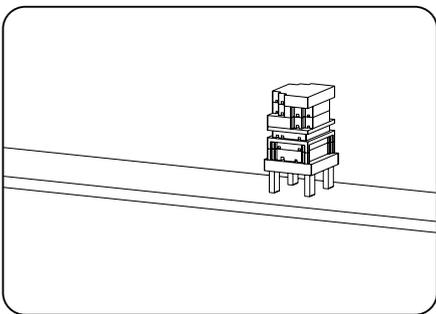
**Step 5:** Lock your construction with the wedge.



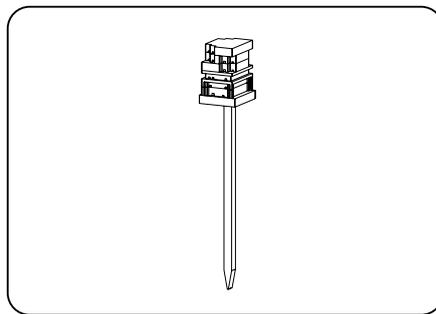
**Step 6:** Place the roof on top.



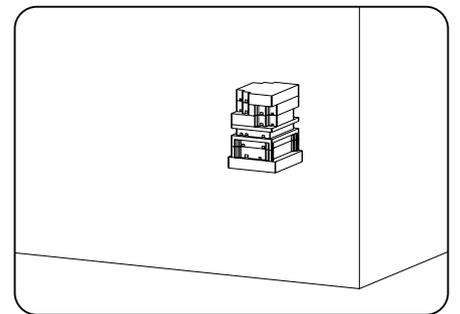
**Step 7:**



**Standing Bee Home:**  
Fit the legs snugly and place your Bee Home on an even surface.



**Grounded Bee Home:**  
Hammer the spike about 20 cm into the ground and place your Bee Home on it.



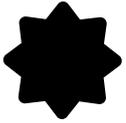
**Fixed Bee Home:**  
Mount your Bee Home on a vertical surface using two nails or screws.



# 04: PLACE

## Find a good spot for your Bee Home

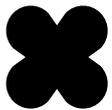
Put out your Bee Home in spring. It is designed to be placed almost anywhere, but there are a few things to keep in mind when looking for a spot.



Face towards the morning sun. Bees prefer it dry and warm.



Protect from heavy rain and strong winds so it remains stable at all times, lasts longer and can better protect the bees inside. Place your Bee Home under a roof, next to a wall, under a tree etc.



Within 300 m of flowers. Solitary bees usually won't travel further than that.



Place the Bee Home at least 1 metre above the ground so dogs or small children won't disturb the bees.



Once placed, don't move the Bee Home — otherwise female nesting bees will struggle to find their way back. Also, avoid opening the Bee Home as it could kill the offspring. It's easy to see if the Bee Home is occupied as the bees seal their bee holes after laying eggs.

# 05: MAINTAIN

## Make bees feel at home

The Bee Home requires very little maintenance. However, you shouldn't forget about it entirely. Below are a few tips to make sure that the bees have a pleasant stay in a home free of mould, fungus, diseases and parasites.

## How do I clean my Bee Home?

Clean it once every year. Do it at the beginning of autumn when most flowers are gone and most bees have hatched. To clean it, disassemble and clean all the parts with warm water and vinegar (1 part vinegar for 4 parts water). Then rinse with clean water and let it dry completely. Reassemble the Bee Home and put it back out in spring.

## What if I find cocoons that haven't hatched yet?

See our guide in Annexe 2.



## How long will my Bee Home last?

Your Bee Home can last anywhere between five to 30 years.

The durability depends on a few factors.



Different types of hardwood have various life expectancies. To give an example, ash is not very durable and will most likely last less than five years, while oak could last up to 30 years.



Strong winds and heavy rain can harm your Bee Home. To reduce the risk of rotting over time, place it under a roof or a tree.



After cleaning your Bee Home, treat it with natural oil to extend the life expectancy. Remember not to treat in or around the bee holes.

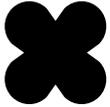


To protect your Bee Home and the bees inside, you may store it in a cold, dry place over winter. This could be an unheated shed, porch or carport. Remember not to open the Bee Home as it could kill the offspring.

# 06: IMPROVE SURROUNDINGS

## Create a bee-friendly environment

Since bees are free-living beings, we cannot guarantee their arrival. Nonetheless, creating a bee-friendly environment around your Bee Home will definitely increase your chances.



Make sure there are flowers within 300 m of your Bee Home. If not, plant some — preferably native flowers.



Just like humans, bees need to drink, too. If there is no source of water in your area, place a bowl of water nearby.



Certain types of bees, like mason bees, use mud from puddles or creeks to build their nests from. If there is no source of water nearby, or if it has been a dry year, mix a bit of water and dirt and place it near your Bee Home.



If you have a garden, leave a few areas untouched. Don't cut the grass or remove windfalls, leaves, rocks or branches — bees like to hide in the wilderness.

# 07: SHARE

## Help us create buzz

Please share your Bee Home with the world using #BeeHome and add it to our map on <http://beehome.design>. Together we can spark awareness about the decline of bees and inspire people across the planet to take action.

We would also appreciate if you tagged us on Instagram (@space10\_journal) and credit our collaborators Bakken & Bæck (@bakkenbaeck) and Tanita Klein (@tanita\_klein).



# ANNEXE 1: FABRICATING THE BEE HOME

Welcome to our guide on how to fabricate the Bee Home yourself. If you have limited to no knowledge about CNC fabrication, we recommend that you reach out to a local makerspace who can help you build your Bee Home.

## Tools

- CNC milling machine
- Computer with a CAM software (Computer-Aided Manufacturing)
- 6 mm (or ¼ inch) end mill, long enough to cut through 30 mm
- 5 mm (or 0.2 inch) end mill, for the smaller bee holes
- 45 or 60 degrees V mill, for carving the Bee Home ID — Optional

## Design files

The file downloaded is a .dxf file. It includes the following:

- Outlines of the plank of wood
- 3D geometries nested on the plank of wood
- 2D machining lines nested on the plank of wood and layered into machining operations

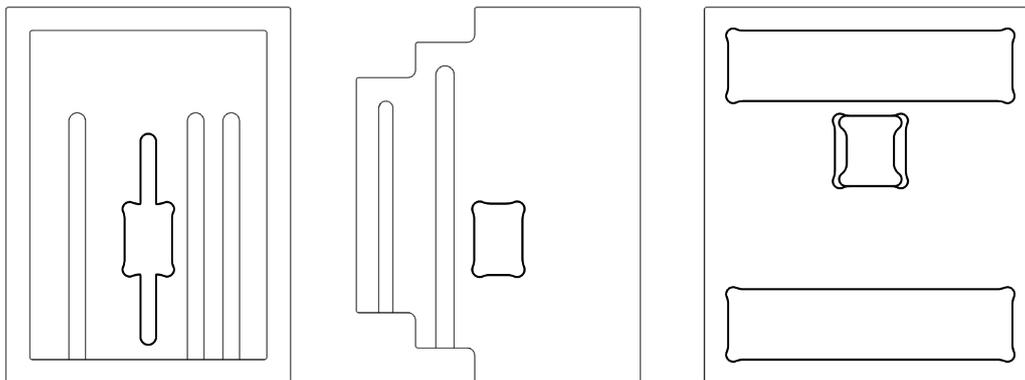


## Computer-aided manufacturing (CAM)

The 2D cutting lines are all grouped in layers that describe the required operations and tools. To give an example, “POCKET-INSIDE\_T6MM\_20.00MM” means that you should pocket inside the lines with a 6 mm end mill and cut 20 mm deep. Use this information to create your G-code in the CAM software.

## CNC milling machine

Milling out your Bee Home parts requires three types of operations: pocketing, engraving and profiling. To avoid splinters, mill the shallowest pockets first and then work your way to the deepest. Inaccurate milling will most likely not affect your outcome. However, when cutting out the holes for the spine or the pockets for the legs or spike, you should mill fairly precisely.



If you don't get it completely right, don't panic. The design files include a 0.4 mm tolerance around all critical parts. This also ensures that you can disassemble your Bee Home even though the wood has swollen due to humidity.

## Finish

Sand your assembly parts. To weatherproof your Bee Home, treat it with natural oil. Remember not to treat in or around the bee holes — bees prefer natural wood and don't like strong smells from chemicals.



# ANNEXE 2: HARVESTING AND HATCHING COCOONS

## Harvesting

If you find cocoons when cleaning your Bee Home at the start of autumn, follow these simple steps to make sure they hatch in the coming spring.

- Step 1:** Remove the cocoons from your Bee Home — be gentle and try not to squeeze them.
- Step 2:** Pour clean sand over the cocoons to get rid of mites and other pathogens.
- Step 3:** Place the cocoons in a food container or a jar and add a wet cotton ball or pad to ensure a humid environment. Then close the lid.
- Step 4:** Store in a cool place, such as a shed, garage or even your fridge. The temperature should be constant.
- Step 5:** In spring, place your open food container or jar near your Bee Home and watch the bees emerge.

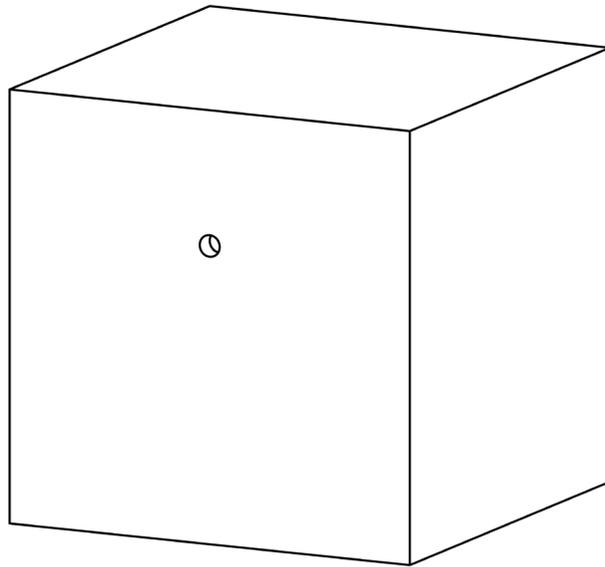
## Identifying dead bees

To identify bee holes containing dead larvae, mark all sealed bee holes with a coloured marker in spring. By autumn, if some bee holes are still marked with the colour, you'll know that the larvae inside are dead. Clean the hole so it's ready for new residents.



## Hatch box

If you have two or more Bee Homes, you can use a hatch box to make the bees move from one home to another. This is usually done when you want to clean or move one of your Bee Homes.



- Step 1:** Find a box that is large enough to contain your Bee Home, such as a cardboard box, wooden box or plastic container.
- Step 2:** Drill a 10 mm hole in the box and place your Bee Home inside it.
- Step 3:** As bees emerge from your Bee Home, they will naturally search for light and therefore exit through the hole in the hatch box. Since it is completely dark inside the box, bees from outside will not enter through the hole.
- Step 4:** By autumn, most bees will have hatched. Take your Bee Home out of the hatch box, and clean or move it to another place.