

## Learning pack #5

Teaching materials for schools and educational institutions  
For students aged 12 to 16 years old



# Pollinators under threat

## Why do we need bees, flies and moths?



# Imprint

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# Editorial

Something was missing. At first, we couldn't put our finger on what it was, but then my daughter suddenly cried: "There are no bees!" It was a beautiful spring day and we were sitting on our balcony, the sun tickling our noses and the air around us filled with the intense scent of the lavender flowers we love for their violet color. Lavender blossoms are usually a magnet for bees, but this spring, they were noticeably absent. And even when we planted more flowers that bees love, they didn't come.

In the summer, the kids ran through meadows and long grass, shouting out every time they found an insect. These creatures that had always been a part of their daily lives, had suddenly become a sensation. Anyone who found a bee or a butterfly, was cheered on, because they understand how important insects are for all of us. They're essential for plant pollination, as food for other animals and for maintaining an ecological balance.

Scientists are now certain that the die-out of insects has greatly increased – not just in industrialized countries, but across the world. Fewer insects also means a decline in fish, frogs, birds and mammals. And it means less food for us, because insects make up the biggest group of pollinators so important for growing most of our fruit and vegetables.

We're dedicating this learning pack to pollinators in the hope of explaining their importance and how we can protect them.

We hope you enjoy finding out more about this important issue.

Yours faithfully,



**Manuela Kasper-Claridge**

*Project leadership Global Ideas  
Deputy editor-in-chief, Deutsche Welle*



# Introduction

This booklet is part of the learning pack “Pollinators under threat,” published by Deutsche Welle and produced by the editorial team from the environmental series Global Ideas. It is aimed at children between the ages of 12 and 16 and their teachers and can also be used outside school settings by environmental groups and institutions.

The pack contains four modules with **worksheets** and explanatory **handouts**. The modules build on each other but can also be used independently of one another.

**Articles, films** and a **quiz** are used as learning tools. Where necessary and possible, students should watch the films a number of times in order to complete the film tasks. It would be helpful, but is not essential, for students to have their own devices on which to play the films. You will find instructions on how to play the films on the last page of the booklet.

Some worksheets come with solutions. But we have not provided them for more open-ended tasks.

Please consider the duration given for each lesson a general guideline. You will be the best judge of the pace at which your group learns.

The print version of the learning pack includes a **DVD** containing all the educational material in digital form. Alternatively, the content is also available for free download on the Deutsche Welle website, where you will also find our other learning packs on interesting environmental topics: [dw.com/learning-environment](http://dw.com/learning-environment)



**Icon for worksheets**



**Icon for handouts**

# Structure

This learning pack will introduce you and your class to the world of pollinators. Why are pollinators under threat? Why do we need them? How can people protect them? These questions will be addressed in various ways across four modules. Each module has its own focus.

## **Module I**

In the first module, project participants are introduced to the topic through a game. The students should split up into small groups and compete against one another in a quiz that will test their prior knowledge of the issue. They will then dive deeper into the topic via a film and an article, and will use a chart and a “fill-in-the-blanks” text to arrange their newly acquired knowledge.

## **Module II**

The second module looks at insects, the largest group of pollinators. An expert explains the extent and consequences of the decline in insects. One of the learning pack films addresses the topic by looking at hand pollination. Project participants will then develop their knowledge by considering how they might personally be affected by the dying out of insects. For instance, what products would they miss? Participants are asked to illustrate their answers on a poster.

## **Module III**

The third module focuses on solutions. Participants will learn about the ways in which the disappearance of pollinators could be prevented. They should consider what they could do personally and what is most important to them. In the context of a fictional talk show, they will discuss the advantages and disadvantages of a project in Morocco.

## **Module IV**

The fourth module shows how some people in Zimbabwe are training to become beekeepers in an effort to halt the decline in pollinators. Project participants should work out the advantages of the project using a job advertisement. Afterwards, they should take action themselves to help pollinators by building an insect hotel.

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The following table offers an overview of the modules, including how long each one takes, a short description of the contents and learning objectives, as well as a note about any materials required.

# Module overview

## Module I – Problem and background

Why are pollinators so important? And why are they endangered?

Duration	Content	Learning objectives	Material
35 min	Pollinator biodiversity: An introductory quiz	To prepare participants for the learning pack using a game	<b>Handout 1</b> <b>Quiz cards</b>
35 min	The world of pollinators: Explaining concepts and the problem	To create a shared foundation of knowledge, defining the terms “pollinator” versus “insect” as well as “domesticated bees” versus “wild bees”	<b>Film 1</b> “A plant’s best friend – the importance of pollinators” <a href="http://dw.com/p/3QMNj">dw.com/p/3QMNj</a> <b>Handout 2</b> <b>Worksheet 2</b> (Fill-in-the-blanks text)
45 min	Engaging with the causes and consequences of the decline in insects	To create an understanding of the causes for the decline in insects and to encourage reflection on how it could be stopped	<b>Article 1:</b> “How to stop an insect apocalypse” <a href="http://dw.com/p/3EF7H">dw.com/p/3EF7H</a> <b>Handout 3</b> <b>Worksheet 3</b> (Table accompanying text)

## Module II – Individual dimensions

How would a world without pollinators look?

Duration	Content	Learning objectives	Material
25 min	Interview with a biologist about the consequences of insect disappearance	An initial insight into what the world would look like without insects, the largest group of pollinating animals	<p><b>Article 2</b>            “We cannot survive without insects”  <a href="http://dw.com/p/2zrkn">dw.com/p/2zrkn</a></p> <p><b>Handout 4</b></p> <p><b>Worksheet 4</b>            (List of foreign and technical words)</p> <p><i>Optional</i>            Reading on the topic, internet access</p>
25 min	The consequences of insect decline: an example from <b>China</b>	Finding out about the need for hand pollination as one consequence of insect decline	<p><b>Film 2:</b>            “China’s plants blossom without bees”  <a href="http://dw.com/p/2wNIB">dw.com/p/2wNIB</a></p> <p><b>Handout 5</b></p> <p><b>Worksheet 5</b>            (Word puzzle)</p>
90 min	Researching the topic “our lives without pollinators”	Recognizing the impact of insect decline on our lives	<p><b>Handout 6</b></p> <p><b>Worksheet 6</b>            (Creating a poster)</p> <p>Material for the poster</p>



## Module III – Structural dimension

How can we protect pollinators?

Duration	Content	Learning objectives	Material
90 min	Introducing a pollinator protection project in <b>Mexico</b>	Finding out how to protect pollinators using the example of vanilla plants	<p><b>Film 3:</b> "Mexico: Protecting vanilla's only natural pollinators" <a href="http://dw.com/p/3Hykz">dw.com/p/3Hykz</a></p> <p><b>Handout 7</b></p> <p><b>Worksheet 7</b> (Making flyers)</p> <p>Material for flyers</p>
40 min	Interview with an entomologist about political and economic measures for pollinator protection	Analyzing and evaluating these various methods	<p><b>Article 3:</b> "The world needs pollinator-friendly policies, scientist warns" <a href="http://dw.com/p/3Qexc">dw.com/p/3Qexc</a></p> <p><b>Handout 8</b></p> <p><b>Worksheet 8</b> (A "priorities" game)</p>
60 min	Alternative farming methods in <b>Morocco</b>	Presenting different perspectives, forming one's own opinion	<p><b>Film 4:</b> "Why are farmers in Morocco becoming insect guardians?" <a href="http://dw.com/p/3NPHe">dw.com/p/3NPHe</a></p> <p><b>Handout 9</b></p> <p><b>Worksheet 9</b> (Talk show)</p>

## Module IV – Taking action

How are pollinators protected in other countries?

How can project participants take action themselves?

Duration	Content	Learning objectives	Material
45 min	Beekeeping as a way to protect pollinators and an alternative way to earn a living in <b>Zimbabwe</b>	Working out why these alternatives are important	<b>Article 4</b> "Buzz of success in Zimbabwe's forests" <a href="http://dw.com/p/2fRzp">dw.com/p/2fRzp</a>  <b>Handout 10</b> <b>Worksheet 10</b> (Write a job advertisement)
90 min	Experiment: Building an insect hotel	Recognizing that everyone can contribute to protecting pollinators	<b>Handout 11</b> <b>Worksheet 11</b> (Instructions)  Material for the insect hotel



## Pollinator biodiversity: An introductory quiz

 **Duration: 35 min**

The **quiz** aims to prepare project participants and students for this learning pack in a fun way.

Divide the participants into equally sized groups, preferably of three to four people. Each group needs paper and a pen and should choose a member to write down the answers. The groups then compete against each other in the quiz.

Slowly and clearly read out the questions from the **quiz cards** and repeat them if required. Each group must write down the answer they've chosen – without letting the other groups see.

» *Quiz cards*

At the end, go through the questions with all the groups. Explain the answers using the information and pictures on the cards. The winning group is the one with the most correct answers.

## The world of pollinators: Explaining terms and the problem

🕒 **Duration: 35 min**

Distribute **worksheet 2** to the participants. Allow them time to read through the fill-in-the-blanks text. The participants may read the text themselves or take turns reading sections of it out loud. Where required, explain any unfamiliar concepts.

» **Worksheet 2**

Show **film 1** "A plant's best friend – the importance of pollinators" from the website [dw.com/p/3QMNj](http://dw.com/p/3QMNj) or from the DVD. Watch the film together, playing it at least twice. This will allow the group enough time to fill in the blanks in the text that they missed during the first showing. The text provides the information in the same sequence as the film, although not word for word. If the participants are watching the film by themselves or in small groups, they may watch it as often as they need until they've filled in all the blanks. In this case, please plan more time.

» **Film 1**

Once they have finished, discuss the text with the group.

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### Solution

Many insects are attracted by the scent and color of blossoms, and land on them to collect nectar and pollen. This is how they feed themselves and their offspring. But as they collect **pollen**, they transport it from blossom to blossom, thereby helping the plants to reproduce. This process is called **pollination**. The animals are called pollinators.

A pollinator's work is extremely important. Some **75** percent of food crops worldwide are pollinated by insects. In the case of blooming plants, the number stands at **90** percent. The rest are pollinated by **wind**, for instance. Many different kinds of insects transport the pollen, including **bees, flies and beetles**. Moths, ants and butterflies are also diligent pollinators, as are birds and **bats** in some parts of the world.

The honey bee is perhaps the most famous insect pollinator. But there are not enough of these farmed bees to pollinate the whole world's food crops. The wild mason bee, for instance, can pollinate many more **apple blossoms** than a honey bee. Farmers have the best and largest harvests when many different insects pollinate their crops. This is why **biodiversity** is important.

But this very diversity is under threat. Pollinators are losing habitat in which they can find enough food, and so are dying out. This is partly because farmers often focus on **monocultures**, meaning they only plant one crop. Farms also regularly use **pesticides and fertilizers** that are bad for the animals. As pollinators disappear, so too will certain kinds of fruits and vegetables.

It's important to maintain **habitats**. One way to achieve this is to use less pesticide and fertilizer or to stop using it altogether.



## Fill in the blanks for the film “A plant’s best friend – the importance of pollinators”

Watch the **film** [dw.com/p/3QMNj](http://dw.com/p/3QMNj) and fill in the blanks in the text. The terms can be found at the end of the text but are not in the correct order. Cross out the words you have already used.

Many insects are attracted by the scent and color of blossoms, and land on them to collect nectar and pollen. This is how they feed themselves and their offspring. But as they collect ....., they transport it from blossom to blossom, thereby helping the plants to reproduce. This process is called ....., The animals are called pollinators.

A pollinator’s work is extremely important. Some ..... percent of food crops worldwide are pollinated by insects. In the case of blooming plants, the number stands at ..... percent. The rest are pollinated by ....., for instance. Many different kinds of insects transport the pollen, including ..... Moths, ants and butterflies are also diligent pollinators, as are birds and ..... in some parts of the world.

The honey bee is perhaps the most famous insect pollinator. But there are not enough of these farmed bees to pollinate the whole world’s food crops. The wild mason bee, for instance, can pollinate many more ..... than a honey bee. Farmers have the best and largest harvests when many different insects pollinate their crops. This is why ..... is important.

But this very diversity is under threat. Pollinators are losing habitat in which they can find enough food, and so are dying out. This is partly because farmers often focus on ....., meaning they only plant one crop. Farms also regularly use ..... that are bad for the animals. As pollinators disappear, so too will certain kinds of fruits and vegetables.

It’s important to maintain ....., One way to achieve this is to use less pesticide and fertilizer or to stop using it altogether.

- pollen   habitats   pollination   bats   monocultures
- 75   90   pesticides and fertilizers   wind   apple blossoms
- bees, flies and beetles   biodiversity



# Engaging with the causes and consequences of the decline in insects

Duration: 45 min

Distribute **article 1** "How to stop an insect apocalypse" to the participants. You will find a copy included in the learning pack. You can also find the article online: [dw.com/p/3EF7H](https://www.dw.com/p/3EF7H)

» **Article 1**

Give the group time to read the text. They may read it themselves or take turns reading sections of the text out loud.

Divide everyone into groups of about three or four. Each group should work together on the table in **worksheet 3**, the answers to which you will find in the article.

» **Worksheet 3**

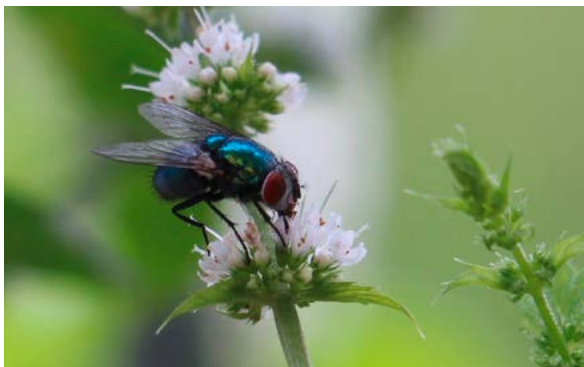
Once you have finished, discuss the answers as a group. This will give participants the chance to add any terms or concepts they missed.

## Solution

Reasons for insects dying out	What does that mean?	What can be done to prevent it?
Intensive farming	<ul style="list-style-type: none"> <li>• Little fallow land left</li> <li>• Monocultures</li> <li>• Fertilizer and pesticide use</li> <li>• Deforestation (trees have to give way for more farmland)</li> <li>• Changes to rivers and wetlands</li> </ul>	<ul style="list-style-type: none"> <li>• IPM = traditional farming practices combined with modern technology</li> <li>• Use natural methods to control weeds and pests</li> <li>• Crop rotation to boost the diversity of useful insects and to avoid nutrient depletion</li> <li>• Only use pesticides as a last resort</li> </ul>
Climate change	<ul style="list-style-type: none"> <li>• Deforestation</li> <li>• Temperature increases already measurable (global warming)</li> </ul>	<ul style="list-style-type: none"> <li>• Abide by the Paris Agreement</li> <li>• Reduce demand for energy and land (less electricity and red meat)</li> </ul>
Urbanization	<ul style="list-style-type: none"> <li>• Large cities and concrete landscapes</li> <li>• By 2050, 2/3 of the population will be living in cities</li> <li>• Natural habitats are disappearing</li> <li>• Light pollution</li> </ul>	<ul style="list-style-type: none"> <li>• Create more green spaces in cities</li> <li>• Wild parks and gardens (wild gardens increase insect biodiversity)</li> </ul>

## How to stop an insect apocalypse

**We might not love creepy-crawlies, but if insects were to vanish within a century, as some scientists predict, there would be dire consequences for us humans. Is it too late to save bees, bugs and butterflies?**



*Insects are threatened worldwide*

We often pay little attention to insects unless one happens to bite, sting or generally bother us. But lately, they've become an unlikely source of nostalgia.

People have started to notice their absence, reminiscing about unwittingly swallowing tiny flies while cycling through the countryside, about car wind-screens splattered with dead bug bodies at the end of a long journey or moths flocking to the light when a window was left open.

And science is backing up such anecdotal observations. A recent study published in the journal *Biological Conservation* says insects are hurtling down the path to extinction.

More than 40 percent of species are in decline and a third is endangered, the analysis found. Worldwide, we lose 2.5 percent of insect biomass each year, and if numbers continue to fall at their current rate, there could be no insects left in 100 years.

The results are "shocking," says Francisco Sanchez-Bayo, environmental scientist at the University of Sydney and co-author of the study. He predicts "catastrophic consequences."

"The word catastrophic is appropriate because the disappearance of insects brings with it the starvation of myriad vertebrates that depend on them, and therefore the collapse of entire ecosystems," he told DW.

Insects don't only play an important role in our food production, by providing a free pollination service, but are themselves food for all kind of animals. Without bugs, amphibians and birds would starve to death and fish would struggle to find enough to eat .

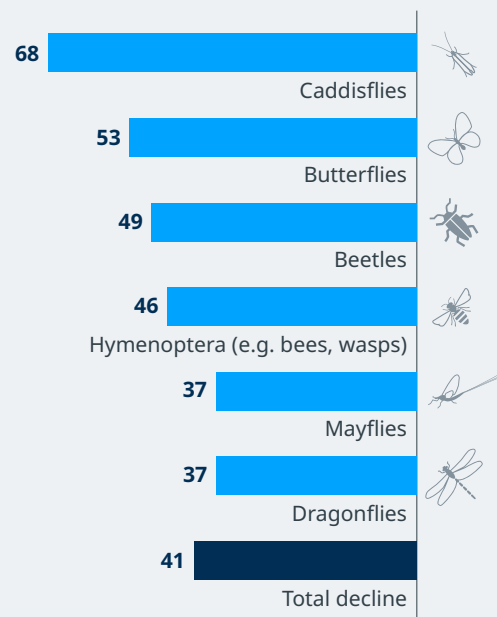
The six-legged helpers also clear away carcasses of animals that die in the wild and decompose plant waste. Without bugs, life as we know it would come to a halt.

### Intensive agriculture is bug-unfriendly

According to the meta analysis, the steepest declines in insect biomass have occurred in the past 30 years. Sanchez-Bayo says this is the direct result of agricultural intensification.

### Insects are disappearing

Decrease of insect populations over the past decade, in percent



Source: Sanchez-Bayo & Wyckhuys, *Biological Conservation* | 2019

©DW

The Green Revolution of the 1950s and 1960s changed the way farmers tended their fields. Fallow practices were abandoned, monocultures were developed and artificial fertilizers were introduced as a means of avoiding nutrient depletion in the soil.

Insecticides and herbicides became common features of pest and weed control, and trees and hedgerows were eliminated to generate more space.

Though this resulted in a huge gain in yield, it also implied a loss of insect habitat and led to chemical residues contaminating nearby waters.

Sanchez-Bayo says the world needs to change the way it grows food. One way forward could be a farming method known as Integrated Pest Management (IPM), which combines traditional agricultural practices with modern technologies.

“IPM advocates the use of natural means of pest and weed control, rotation of crops to maximize biodiversity of beneficial insects and avoid nutrient depletion, and only uses pesticides as the last tool to control a pest or weed outbreak,” Sanchez-Bayo told DW.

By way of example, he cited the International Rice Research Institute in the Philippines, which managed to reduce the use of insecticides in rice crops by 93 percent without losing yields.

### Climate change could cause major insect wipeout

Although intensive agriculture has been identified as the main driver for insect declines in Europe, scientists say the main culprits in other parts of the world are climate change and deforestation.

Even in pristine, virgin tropics, far away from fertilizers, pesticides and insecticides, insect numbers have steadily dropped.

In Puerto Rico’s Luquillo rainforest, for example, there are as many as 60 times fewer insects now than there were in the 1970s. During the same period, forest temperatures have risen 2 degrees Celcius (3.6 degrees Fahrenheit). The number of lizards, frogs and birds that eat insects has declined synchronously.

Calculations by researchers at the Tyndall Centre for Climate Change Research highlight the correlation between global warming and insect survival.

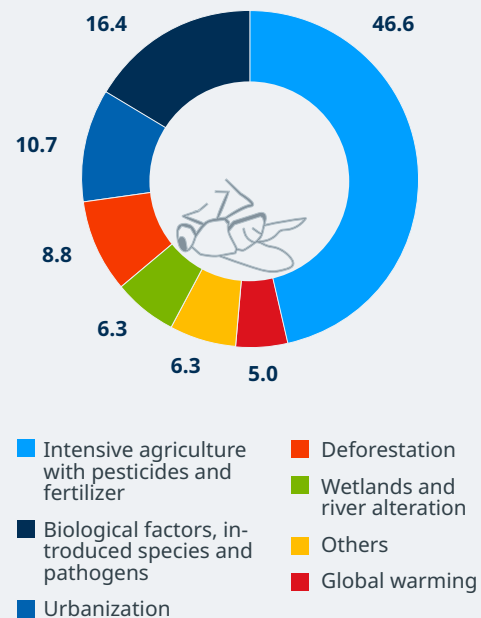
Their projections suggest that if we experienced global warming of 3.2 degrees Celcius above pre-industrial levels, as is likely on the basis of current pledges made under the Paris Climate Agreement, 49 percent of insects would lose half of their geographic range.

If we limited warming to 2 degrees Celcius above preindustrial levels, 18 percent would lose half of their range. In a 1.5 degree scenario, however, the number would drop to six percent.

Rachel Warren, lead author of the study, says it’s very possible that population decreases would actually be even larger than projected because they didn’t factor such things as intensive agriculture into their calculations.

### Main drivers of insect decline

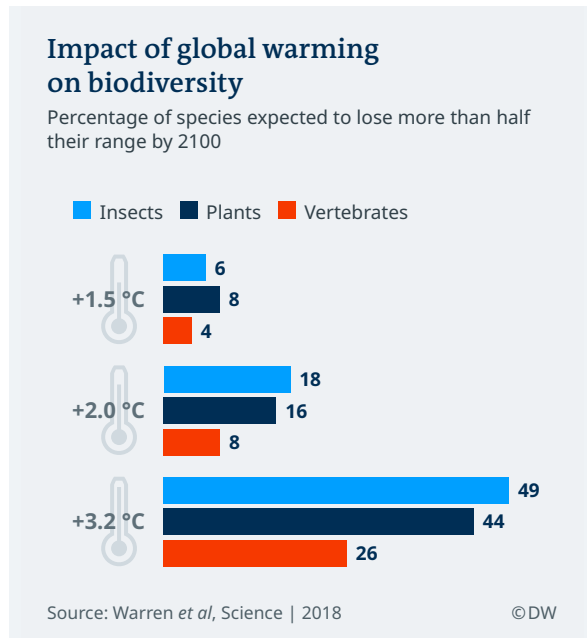
Worldwide, in percent



Source: Sanchez-Bayo & Wyckhuys, Biological Conservation, 2019

©DW





“It’s no question that there are many pressures on insects and if we don’t achieve the goals of the Paris Climate Agreement, there will be another big pressure on them,” Warren told DW.

She says it’s not only important that we manage to achieve the 1.5 C degree goal, but how we achieve it.

“Land availability is a major factor for insect losses. If we use too much land to grow plants for biomass energy, that would be bad for biodiversity,” she explained. “So anything we can do to reduce our energy and land demand, such as using less power and eating less red meat, is great.”

#### Urbanization – let your garden grow wild

Big cities and concrete landscapes also play a significant role in insect numbers, and with two-thirds of the global population expected to be living in urban areas by 2050, that impact is set to grow.

Densely built neighborhoods and sealed, concrete roads strip bees and bugs of their natural habitats, while light pollution leads nocturnal insects astray.

Researchers are therefore calling on governments to create more green spaces in cities by rewilding public parks and private gardens, and planting wild flowers along roadsides and on traffic islands.

A study by the University of Basel in Switzerland found that nature-friendly gardens, with deadwood, compost, unmowed grassland and native flowers, can greatly increase the biodiversity of flying and soil-dwelling insects and largely compensate for the negative effects of urbanization.

The wilder and more diverse the gardens, the more insects the researchers counted, including rare millipedes that have not yet been found anywhere else in Switzerland.

Brigitte Braschler, biologist at the University of Basel and co-author of the study, has been researching insects her entire life and says that although the decline in biodiversity “is very strong”, it’s not too late to change the trend.

“The public is waking up to the problem and is willing to act. Certain species are already lost but I’m positive we can stop the decline or at least slow it down,” Braschler told DW.



Wild and diverse gardens will attract more insects

01.03.2019  
Katharina Wecker  
[dw.com/p/3EF7H](http://dw.com/p/3EF7H)



## Table for the article “How to stop an insect apocalypse”

Work in small groups to fill out the worksheet that has been distributed to you.  
Discuss how you will fill in the table – key words will suffice.

Please use the article “How to stop an insect apocalypse” as well as the accompanying graphic:  
[dw.com/p/3EF7H](http://dw.com/p/3EF7H)

Reasons for insects dying out	What does that mean?	What can be done to prevent it?
Intensive farming		
Climate change		
Urbanization		



## Interview with a biologist about the consequences of insect disappearance

 **Duration: 25 min**

Distribute **article 2** “We cannot survive without insects.” You will find it online under [dw.com/p/2zrkn](http://dw.com/p/2zrkn) as well as a copy below. Give the group time to read the text. They may read it themselves or take turns reading sections of the text out loud.

» **Article 2**

Distribute **worksheet 4** and discuss the tasks. The participants create a list of foreign and technical words from the text. Encourage the group to write down all of the words they don't know. For research purposes, the participants will need writing implements, books and/or a computer, tablet or smartphone with internet access.

» **Worksheet 4**

Afterwards, discuss the words and their definitions with the entire group. Allow the participants time to add to their own definitions.

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**Tip** The participants can add to their list of foreign and technical words as they work their way through this learning pack.

## We cannot survive without insects

**Many people see insects as annoying pests. But British biologist Dave Goulson cautions: A world without insects is a dull place without coffee and chocolate – and with dead animals and cow patties piling up.**



*Dave Goulson researches insects, and gives them a voice*

**DW** *How many insects are there in the world?*

**Dave Goulson** Insects are the dominant lifeform on the planet. We've named well over a million species of insects, and there could be 5 or 10 million. As for the number of individuals, it's safe to say that there are many more insects than anything else, excluding microorganisms like bacteria.

**DW** *Why are insects disappearing?*

**Dave Goulson** Most people agree that it's a combination of factors, primarily associated with the way farming has changed in the last hundred years. We've moved to this kind of industrial farming system with very big fields with monocultures of crops that are treated with lots of pesticides. It's very difficult for most insects to survive in.

**DW** *Why should we care about the insect die-off?*

**Dave Goulson** People should be jumping up and down and be concerned over this, because we cannot survive without insects. Pollination is probably the best-known example of what insects do for people. Sometimes it's bees, sometimes it's flies, beetles or whatever. Most of the fruits and vegetables we like to eat, and also things like coffee and chocolate, we wouldn't have without insects.

Insects also help to break down leaves, dead trees and dead bodies of animals. They help to recycle nutrients and make them available again. If it weren't for insects, cow pats and dead bodies would build up in the landscape.

**DW** *Sounds like a dystopia. What would a world without insects look like?*

**Dave Goulson** Pollination is necessary for most wild flowers. So if we lose most of our insects, then we're going to lose our wild flowers, which means that anything else that likes to eat wild plants will disappear. Insects are at the heart of every kind of ecological process you can think of. Without them, we would live in a sterile, dull world where we eke out a boring existence of eating bread and porridge.

**DW** *What about pests like mosquitoes? Do they also have an ecological purpose?*

**Dave Goulson** All insects are doing something. They are either food for something, or they pollinate something or whatever. But not every organism has to have a purpose. It may be the case that one or two insect species go extinct and it wouldn't have any noticeable effect on anything. The concern is that if we lose more and more of them, ecosystems will slowly unravel.

**DW** *Researchers found that insects in a nature reserve in Germany declined more than 75 percent. But that hasn't necessarily affected us and our crops, right?*

**Dave Goulson** The biggest crops grown in Europe don't depend upon insect pollination; wheat, for example, is wind-pollinated. Other parts of the world are starting to see the impacts of the loss of pollinators: In parts of China, they now hand-pollinate their apple and pear trees because they don't have enough bees left to do it.

**DW** *So you are saying, we haven't experienced the full impact of the insect die-off?*

**Dave Goulson** That's right. We've got a growing human population trying to grow more and more food, and we've got a rapidly declining population of pollinators. Those two things are going to crash into each other. It can't be more than 10 years away, and probably less would be my guess.

**DW** *Why are particularly bee colonies in such bad shape?*

**Dave Goulson** Intensification of farming has resulted in a landscape with very few flowers, and when there are flowers, they're very likely contaminated with pesticides. That has made life pretty difficult for bees. Moreover, we've accidentally spread a whole bunch of bee diseases around the planet with moving domestic honeybees around. If you're a bee and you are sick and poisoned and hungry all at the same time, then it is not surprising you might die.

**DW** *Will the ban on the open-air use of neonicotinoids in the European Union save the bees?*

**Dave Goulson** No. Some people wrongly believe that neonicotinoids are the main problem that bees face. Neonics do harm bees, and stopping using them is a wise and sensible thing to do. But we currently use about 500 different pesticides in Europe. Banning three of them, probably the worst three, is a good start – but there's still an awful long way to go. If you withdraw one pesticide, the farmer just wants to know which pesticide he can use instead. We really need to look at this whole system of farming and find a way to massively reduce pesticide use.

**DW** *Which insects will suffer most from climate change?*

**Dave Goulson** Bumblebees are a classic example. They are big furry insects that are well adapted to cold climates, to cool wet temperate conditions, and they are really going to struggle as it gets warmer. There are predictions that many of our European bumblebees will disappear by the end of this century.



*Soon to be extinct? Bumblebees are suffering greatly due to climate change*

**DW** *Will some species of insects also benefit from climate change?*

**Dave Goulson** Certainly some insects. The ones that can breed fast, that have big populations, that are adaptable. Those tend to be the ones that are pests, the ones that we don't want. Whereas butterflies, dragonflies and bumblebees breed much more slowly, they're less adaptable. So we do run the risk exterminating most of the beautiful and important insects that we love. And being left with lots of flies and cockroaches.

02.07.2018

*Sonya Angelica Diehn conducted the interview, which has been shortened and edited for clarity. [dw.com/p/2zrkn](http://dw.com/p/2zrkn)*



*Industrial agriculture uses large amounts of pesticides*



## Listing foreign and technical words from the interview “We cannot survive without insects”

Biology professor Dave Goulson says a world without insects would be sterile and dull.  
Please read the **interview** “We cannot survive without insects”: [dw.com/p/2zrkn](http://dw.com/p/2zrkn)

The text contains some uncommon words. Three of those are in the below table.  
Are there any other words in the text that you don’t understand? Note them in the table.

What do these words mean? Research online or in books.  
Please write their definitions in the right-hand column.

I don't know this word	The word means
Ecosystem	
Pesticides, for example neonicotinoids	
Bee diseases	

Discuss your list with the others. Have you forgotten anything? Add it!



## The consequences of insect decline: an example from China

Duration: 25 min

Show **film 2** “China’s plants blossom without bees” to the entire group. You will find it online under [dw.com/p/2wNIB](http://dw.com/p/2wNIB) or on the DVD. Then distribute **worksheet 5**.

» **Film 2**  
» **Worksheet 5**

Participants are required to match up the sentences that go together. They should do so by drawing a line to match up the parts. If preferred, they may also cut out the puzzle pieces and glue the matching sentences together. In this case, please plan extra time. Please show the film again if required.

Read the correct sentences to the group.

Discuss the advantages and disadvantages of hand pollination with the entire group.

### Solution


Fruit farmers have to do something	that would normally be taken care of by nature.
The bees should really be the ones distributing the pollen,	but there aren't enough of them left in this region.
Therefore, the fruit farmers must	pollinate the blossoms by hand.
Each tree has to be	pollinated three times.
In China, there aren't many bees left,	because too many chemicals are used in agriculture.
A farmer in China uses on average more than twice as much	pesticide per hectare as a European farmer.
Bees are better than people at pollinating blossoms,	because they can crawl into the flowers.



## Word puzzle for the film “China’s plants blossom without bees”

Watch the **film** “China’s plants blossom without bees”: [dw.com/p/2wNIB](http://dw.com/p/2wNIB)  
The film focuses on fruit farmers in China.

Match up the sentences correctly. You can use a pen to connect the puzzle pieces.  
Or you may cut them out and match up the correct parts – similar to a jigsaw puzzle.



Fruit farmers have to do something	but there aren't enough of them left in this region.
The bees should really be the ones distributing the pollen,	because they can crawl into the flowers.
Therefore, the fruit farmers must	that would normally be taken care of by nature.
Each tree has to be	pesticide per hectare as a European farmer.
In China, there aren't many bees left,	because too many chemicals are used in agriculture.
A farmer in China uses on average more than twice as much	pollinate the blossoms by hand.
Bees are better than people at pollinating blossoms,	pollinated three times.





## Researching the topic “our lives without pollinators”

 **Duration: 90 min**

For this unit, participants will make a **poster** addressing the topic “our lives without pollinators.” They may use books or the internet to conduct their research. They may also reread the **interview** “We cannot survive without insects” on page 18/19 as well as online: [dw.com/p/2zrkn](http://dw.com/p/2zrkn)

Some guiding questions will help with the research. Distribute **worksheet 6** to the participants. The group may also complete the research portion of this task as part of their homework. Once they have finished, discuss the results with the group.

» **Worksheet 6**

Divide the participants into small groups and have them make a poster. Discuss ahead of time which materials the groups will need. Discuss who can contribute which materials ahead of the lesson.

**Material** (for instance):

- A large, sturdy piece of paper or cardboard
- Jotting paper
- Water colors and markers of various colors
- Scissors
- Glue
- Old newspapers and magazines
- Computer with internet access
- A printer

Discuss the finished **posters** with the entire group. You may use the following questions to guide the discussion:

1. What is your first impression? What catches your attention immediately?
2. Why did you choose these specific pictures?
3. What stands out to you about the text?
4. How would you describe the relationship between text and pictures?
5. Why did you choose these colors?



## Research and poster: Our lives without pollinators

The world would be very different without pollinators. Many things would no longer exist. Each small group should consider what that would mean for them and what they would have to forgo.

---

Create a list of things that would no longer exist in a world without pollinators.

The following questions are a guideline:

- Which varieties of fruit would you miss?
- Which vegetables would you miss?
- Which drinks would you have to do without?
- And what would it mean for cosmetics and medicines?

You may also try to think of other products that would no longer be around if pollinators disappeared. Please use books or the internet for your research.

**Tip** Reread the **interview** "We cannot survive without insects": [dw.com/p/30TKw](http://dw.com/p/30TKw)

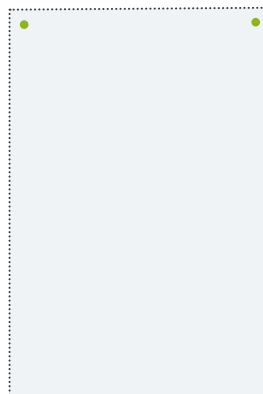
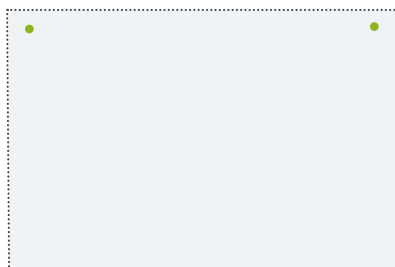
---

Make a **poster** using your research results.

**Tip** Use some jotting paper to make sketches before gluing anything to your poster.

---

Present your poster to the other groups.





## Introducing a pollinator protection project in Mexico

 **Duration: 90 min**

Divide the participants into small groups of four to five people. Distribute **worksheet 7** to everyone.

» **Worksheet 7**

Discuss the task with the entire group:

The aim is to create a **flyer** for the Mexican environmental group BIOMA from **film 3** "Mexico: Protecting vanilla's only natural pollinators." You will find the film online under [dw.com/p/3Hykz](http://dw.com/p/3Hykz) or on the DVD.

» **Film 3**

The flyer is targeted at kids and young people. If you like, you could also consider a different target group together with the project participants.

---

Watch the film with the entire group and have the participants take initial notes. Show the film again with pauses, so the participants can complete their notes. Alternatively, each group is given a device on which to watch the film at their own pace.

---

Each small group should then think about the design of their flyer. Discuss ahead of time which materials the group will need and who can contribute what.

**Material** (for instance) :

- Colored paper
- Jotting paper
- Markers of various colors
- Scissors
- Glue
- Old newspapers and magazines
- A computer with internet access
- A printer

---

Each group should then present their flyer.



# Flyer for the film “Mexico: Protecting vanilla’s only natural pollinators”

Watch the **film** “Mexico: Protecting vanilla’s only natural pollinators”: [dw.com/p/3Hykz](http://dw.com/p/3Hykz)

The film focuses on the Mexican environmental group BIOMA, which is working to protect the vanilla plant.

Working in groups, create a **flyer** for BIOMA. The flyer is aimed at children and young people.

The following questions should help you create the flyer:

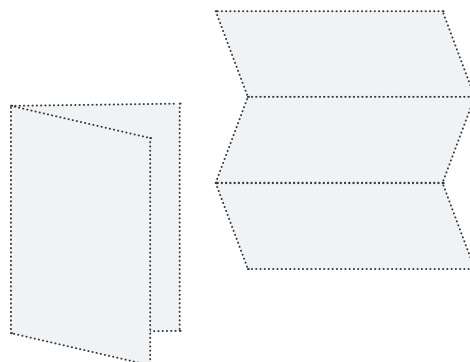
- What kind of project is it?
- What’s the project’s aim?
- Why is the project important?
- Who is supporting the project?
- How can people reading the flyer help the project?

You will find the answers to these questions in the **film** and the accompanying text.

Also think about when and why you use vanilla? Perhaps you could also include this information on the flyer? Write down what should appear on the flyer.

Sketch your flyer on some scrap paper and fold it for test purposes – can you read everything easily?

Design your flyer, taking into account pictures or logos that work with your text. You may paint, draw or craft your flyer, and you could also cut or print out pictures and stick them to the flyer.





## Interview with an entomologist about political and economic measures for pollinator protection

 **Duration: 40 min**

Distribute **article 3** "The world needs pollinator-friendly policies, scientist warns." You will find the text online under [dw.com/p/3Qexc](http://dw.com/p/3Qexc) and a copy of it below.

» **Article 3**

Allow them time to read through the text. The participants may read the text themselves or take turns reading sections of it out loud. Explain any unfamiliar words or concepts.

Distribute **worksheet 8** with the "priorities" game. Participants should read the table. Working alone, each person should then mark the 10 statements they believe to be particularly important. In small groups, they should discuss their decisions. The groups should then decide which five statements they find most important and order them. The most important statement comes in first, with the least important placed in fifth.

» **Worksheet 8**

Reflect with the entire group which statements were considered difficult to weight and which statements the groups agreed on easily

## To stop an insect die-out, the world needs pollinator-friendly policies, scientist warns

**Insects are among the most successful creatures on the planet. But they're in decline and that would have serious consequences for the world. Entomologist Josef Settele talks to DW about stopping the insect die-off.**



*Josef Settele says we need insect-friendly farming to stop pollinator decline*

Creepy-crawlies are among the oldest life forms on this planet. Before dinosaurs ever walked the Earth, insects were certainly already there. Some estimates date their origins to 400 million years ago. They're also extremely successful. Of the 7-8 million species documented on Earth, around three quarters are likely bugs.

But several insect species could disappear for good in the next few decades and that would have serious consequences for humans.

Insects like bees, butterflies and even certain species of beetle and ant incidentally pollinate our crops when they collect protein-rich pollen and sugary nectar, ensuring we have enough to eat.

DW spoke to Josef Settele, a professor and entomologist at the Helmholtz Centre for Environmental Research (UFZ) in the eastern German city of Halle, about whether we need to worry about our food and how politics and business could intervene to halt the insect decline.

Settele was in the global spotlight in May 2019 when the United Nations IPBES Global Assessment Report on Biodiversity and Ecosystem Services was

published. In the report, the entomologist and his colleagues determined that around 1 million plant and animal species are threatened with extinction.

Insects are being hit particularly hard. The scientists estimate that around 10% of all insect species are threatened with dying out over the next few decades – and that's a conservative calculation.

**DW** *In the report, you conclude that in some world regions 40% of wild, pollinating insects, particularly wild bee species, are already facing extinction. Why don't we just put up bee boxes and hives everywhere?*

**Josef Settele** That will only help so much. The wild cousins of the honeybee don't necessarily live under the guardianship of humans. And the honeybee is responsible for pollinating only a certain percentage of our crops. For instance, they pollinate just a small portion of our apples. Wild pollinators whether they be hoverflies, bumblebees, or other insects like butterflies are more important in this regard.

**DW** *So my apple harvest could be less bountiful if the honeybee is the only species available to pollinate it?*

**Josef Settele** Correct but even more importantly, certain plants can't be pollinated by honeybees in the first place. Bumblebees, for instance, typically pollinate broad beans. Honeybees can't do much here really.

Broad-bean blossoms are closed and the bumblebee can easily force its way in with its wide body. Another example is alfalfa, an important forage crop that is dependent on the bumblebee. Honeybees just can't get into the blossom.



*Solitary pollinators like the leafcutter bee like to nest in tunnels, such as in this insect hotel*

**DW** *What would the global community have to fork out if all pollinating insects suddenly disappeared and our food crops had to be pollinated by hand?*

**Josef Settele** Global pollination (by insects and other animals) is worth at least \$235 billion a year, according to our conservative estimates. And you'd really have to expend considerable resources to imitate the animals' pollination performance. Humans just haven't mastered the technique. Look at the use of brushes. The yields are always paltry in comparison to natural pollination.

The other question is: where in the world am I doing it? If I'm in a country where the labor costs are low, then it could provide some kind of alternative. But there would be no point in trying that in Germany, for instance. Your apples would suddenly be ten times more expensive when you take our labor costs into account.

**DW** *Considering those prospects, you would think that politicians and businesses would have a big interest in stopping species loss. What courses of action are there for policy makers? What shape would pollinator-friendly politics take?*

**Josef Settele** Many different factors contribute to the disappearance of insects but a lot of it is very much connected to our land use. A more sustainable use of our land needs to be encouraged. That could be achieved by, for instance, having a higher diversity of habitats and by reducing pesticides, particularly insecticides.

We really need policy that would heavily promote the production of sustainable products. So, groceries that require fewer pesticides and make more sense from an energy perspective. That means eating more plants in our diet and fewer animal-based products.

I'm not a vegetarian but the strong preference in Europe and North America for consuming meat, has to change. Our high meat consumption fuels the demand for soy, which is used as a feed for cattle. By importing soy from South America, we're contributing to species extinction. That's because forests and areas that were full of species-rich ecosystems are often turned into plantations. These are grave changes that are causing habitats to disappear.

**DW** *But are large, blooming monoculture plantations not good for wild pollinators?*

**Josef Settele** Pollinators need more than just food. They need nesting habitats. Solitary wild bees lay their eggs in holes in the ground or hollow stems, the likes of which are mimicked in insect hotels. Those are basically reproductions of the shelters found in nature and where they lay their eggs.

**DW** *What can I do as an individual?*

**Josef Settele** Being aware of the impact of how you consume is a good start, although, that is often difficult to navigate. It's always a good idea to make sure you've got a diversity of flowering plants around your home. Even just getting in touch with nature is good.

**DW** *So, just get outside into nature?*

**Josef Settele** Yes! Out into nature. And bringing nature to your own front door.



*Pollinators love wild summer meadows with native flowers and grasses*

20.10.2019

*Kerstin Palme conducted the interview, which has been condensed and edited for clarity.*

[dw.com/p/3Qexc](https://www.dw.com/p/3Qexc)



### Priorities game: How can we protect pollinators?

Read the **interview** "The world needs pollinator-friendly policies, scientist warns": [dw.com/p/3Qexc](http://dw.com/p/3Qexc)  
The interview mentions measures for protecting pollinators.

Take a look at the accompanying table where you will also find suggestions for ways in which pollinators might be protected. Mark the 10 methods you find most important.

Discuss your choices within a small group to see who had the best arguments. Then agree on five methods the group finds most important, numbering them accordingly. Number one is for the method you find most important for pollinator protection. Number 5 is the method you find least important.

Present your top five answers to the other groups and explain the reasons for your choices.

We can protect pollinators by ...	The 10 most important to me (X)	The 5 most important to us (1 - 5)
... using less plastic, because it pollutes the environment.		
... setting up beehives.		
... avoiding monocultures as they don't provide enough food for pollinators.		
... setting up insect hotels. Wild bees, for instance, can nest there.		
... establishing protected areas for insects.		
... demanding that politicians implement sustainable agricultural policies.		
... planting herbs as they're particularly popular with insects.		
... not cutting the grass in our gardens. Many insects like to hide in long grass.		
... using less pesticide and fertilizer, as they are toxic for pollinators.		
... eating less meat, as cattle ranches often mean loss of habitat for pollinators.		
... preventing deforestation.		
... planting native flowers. Exotic plants often don't provide food for insects.		
... buying honey from local beekeepers. Beekeepers often advocate for wild bees as well as their honey bees.		
... buying regional food products. These don't have to travel far to get to us, thereby helping to protect the climate.		
... putting insect screens on our windows, so the creatures don't end up in our homes, where they won't survive.		





## Learning about alternative farming methods in Morocco

 **Duration: 60 min**

**Preparation** Make copies of **worksheet 9** and cut out the role cards.

» **Worksheet 9**

This lesson involves some participants taking part in a mock talk show. Please discuss all the rules before starting, including how long the talk show should last and how the guests should behave.

---

Divide the participants into six small groups of roughly the same size. Each group receives a role. If you only have a few participants, you can leave out the “PhD student” role card. As the project leader/teacher, you should play the role of talk show presenter.

Watch **film 4** “Why are farmers in Morocco becoming insect guardians?” You will find it online under [dw.com/p/3NPHe](http://dw.com/p/3NPHe) as well as on the DVD. At this stage, the participants should take initial notes.

» **Film 4**

Three roles appear in the film: a scientist, a PhD student, a farmer who supports the project. You should make up three other roles: a farmer who opposes the project, a visitor to the market and a mayor. This will make the talk show panel more interesting.

In small groups, participants should consider which arguments they could put forward in their roles on the talk show. They may also include arguments that don’t appear in the film.

Play the film again for the entire group, stopping it at various points to give the participants time to add to their notes. Alternatively, the groups could use their own internet-enabled devices to watch the film at their own speed.

Each group should then decide who will appear on the talk show. The participants that make up the audience should take note of whether all the arguments discussed as part of the roles are actually put forward. The presenter should ensure that all the agreed rules for discussion are observed.

Finally, discuss which arguments were particularly convincing. The chat show audience members should also give their impressions.



## Talk show for the film “Why are farmers in Morocco becoming insect guardians?”

Split up into small groups. Each group receives a role card. One of the group members will later play this role in a fictional talk show. Devise arguments that this group member will present during the show.

---

Watch the film “Why are farmers in Morocco becoming insect guardians?”:  
[dw.com/p/3NPHe](http://dw.com/p/3NPHe)

The film focuses on a project that aims to help farmers improve their harvests while protecting insects. The model is known as “Farming with Alternative Pollinators” or FAP for short.

You may make notes while watching the film. Write the arguments you formulate as part of the group on the role cards. You may also include points not directly addressed in the film. Please write clearly, as the person playing the role will use the card during the talk show.

---

Then decide which member of your group should take part in the talk show. The other members will sit in the “audience.”

Pay attention as to whether your representative in the **talk show** makes all of the arguments you listed.



**Project leader**

You are a scientist and are leading the project. You know how important it is to protect pollinators and are using FAP, the model you developed, to protect them. At the same time, the farmers are earning a living, which is also important to you.

**Arguments**

.....  
.....  
.....

**PhD student**

You are of the same opinion as the project leader and will support them on the talk show. You have a lot of contact to the farmers and are aware of their concerns and needs. You also know what successes you've already achieved with the project.

**Arguments**

.....  
.....  
.....

**Farmer in favor of the project**

You have positive experience with the FAP model and are earning more money. You are now cultivating a more diverse range of products and as a result, can sell a wider variety of vegetables. You are hoping to expand your land.

**Arguments**

.....  
.....  
.....  
.....

**Farmer opposed to the project**

You are not in favor of the project. Why would you be bothered about insects? For you, they are just harmful pests. You can't stand it when other people tell you how you should do things. You earn good money with your monoculture, so why should you change?

**Arguments**

.....  
.....  
.....  
.....

**Visitor to the market**

You don't think the project is good, as you're concerned that prices might rise. Why aren't the usual products enough? You're annoyed by the changes.

**Arguments**

.....  
.....  
.....  
.....  
.....  
.....

**Mayor**

You don't like it when outsiders interfere with your community. You believe each farmer should decide for themselves how to tend to their land. Politicians shouldn't get involved in agriculture. Furthermore, the new training for the farmers costs time and money and the government doesn't pay for other companies to take part in such things.

**Arguments**

.....  
.....  
.....  
.....



## Beekeeping as a way to protect pollinators and an alternative way to earn a living in Zimbabwe

 **Duration: 45 min**

Distribute **article 4** “Buzz of success in Zimbabwe’s forests” to the participants. You will find the text online under [dw.com/p/2fRzp](http://dw.com/p/2fRzp) and a copy below. Allow them time to read through the text. The participants may read the text themselves or take turns reading sections of it out loud.

» **Article 4**

Distribute **worksheet 10** and discuss the task – to write a job vacancy – with the entire group. The questions in the worksheet will help as a guideline.

» **Worksheet 10**

Afterwards, discuss the finished job advertisements with the entire group, asking questions such as what worked well and, for instance, whether any information was missing?

---

### Optional

Participants may also write a job application in answer to the advertisement, if they wish. Discuss what is relevant when writing an application with the participants. Please plan extra time for this task.

## Buzz of success in Zimbabwe's forests

**As organic beekeeping spreads like wildfire across eastern Zimbabwe, the industrious little insects are helping to preserve forests and prevent woodland fires.**



*A beekeeper and his bees*

To start his day, Benjamin Chatambura inspects his 250 beehives scattered over a small plot – to make sure that no unwanted visitors – that is, thieves – have come overnight.

“It gets me motivated,” the 39-year-old soft-spoken beekeeper told DW as his children watch from a distance. After that, he checks to see if any hives are ready for harvesting. His kids are afraid of bees, but they like what they produce. “It is sweet and it pays their school fees,” he said.

Until recently, beekeeping was of little interest to most Zimbabweans living in the country's eastern district of Mutasa, a lush green mountainous region about 350 kilometers (217 miles) from the capital Harare. It was a niche business like many others.

That has changed dramatically since the nonprofit organization Environment Africa started encouraging locals to get into the beekeeping business as a means of providing alternative livelihoods and protecting the forests.

The project, which is active in other parts of Zimbabwe and several other African countries as well, is financed by the European Union and managed by the UN Food and Agricultural Organization (FAO).

“This project has changed not only the lives of people in this community, it has managed to preserve trees,” said Lawrence Nyagwande, the field officer for Environment Africa in Manicaland province. “Deforestation had become the order of the day here and had reached alarming levels.”

### **Busy bees prevent fire**

In the past, logging had been the primary source of income in this region – but rampant deforestation threatened the entire industry. Now, beekeeping has almost caught up with timber in terms of economic importance, and has even helped give the logging business new life.

“It was going to be difficult to stop deforestation without coming up with an idea that would solve what causes it,” Nyagwande told DW. “Most people burn grass to make hunting easier, or they cut trees for firewood,” he explained.

Violet Makoto, the spokeswoman for the government's Forestry Commission, told DW in an interview that the beekeeping project had drastically reduced wildfires and deforestation in Zimbabwe.

“In Zimbabwe, we now want the beekeeping concept to maintain a stronghold as one of the projects that communities must take up, until we get to a level where we totally eliminate the problem of veld fires and cutting down of trees,” said Makoto.



*Beekeeping could provide an alternative to logging and collecting wood in Zimbabwe*

### Alternative livelihoods best logging deterrent

According to official figures, the country had been losing 1.5 million hectares of forest a year until 2015. Even hefty fines for setting fires and cutting down trees for firewood could not deter Zimbabweans from cutting down trees to earn a living.

One of them was Chatambura. "I used to cut trees without planting any," he said. But now that he's joined the beekeeping project, he doesn't want to see anyone cutting down or burning the forests.

"It is not that I like trees very much. But trees provide flowers, which are the food that lets the bees produce honey – and honey is now my livelihood."

Before he entered the beekeeping business, Chatambura was never formally employed, which is not unusual in Zimbabwe. While reliable statistics are difficult to obtain, some estimates put the national jobless rate at more than 85 percent.

Chatambura has been doing very well since he started producing honey about four years ago. His family now always has enough to eat, and he has even bought a motorcycle.

### Beekeepers are top earners

Within three years, the beekeeper's association in Mutasa district has grown to more than 1,100 members, says the head of the organization, Paddington Nemaunga.

On average, each farmer has 250 beehives. The beekeepers are trained by Environment Africa, which also provides them with equipment.

Beekeepers harvest three or four times a year, Nemaunga said, with some farmers earning an average of as much as €894 (\$1,000) a month. That's a lot, considering that a typical government worker in Zimbabwe only earns around €450 a month.

### Scaling the project up

But for Environment Africa, the job isn't done yet – the group wants to expand the project to other parts of the country.

As things stand, beekeepers don't process their own honey – instead, they sell it to buyers from Harare for around €2.05 per kilogram (\$2.30). The honey is processed in the capital, and the end product is sold in stores across the country for almost five times the purchase price.

Environment Africa is considering whether the beekeepers should process their own honey, which could increase profits significantly.

And then there is still the matter of the trees – Environment Africa doesn't want to leave that to chance. The head of the organization in Zimbabwe, Barnabas Mawire, said: "We are also into tree planting – we actually increase the hectareage where the bees can forage."



*Bees provide an income and protect the climate*

27.06.2017

Columbus S. Mavhunga  
[dw.com/p/2fRzp](http://dw.com/p/2fRzp)



## Job advertisement for the article “Buzz of success in Zimbabwe’s forests”

Please read the **article** “Buzz of success in Zimbabwe’s forests”: [dw.com/p/2fRzp](http://dw.com/p/2fRzp)

The organization Environment Africa wants to boost the number of beekeepers in Zimbabwe.

Now imagine that you work for Environment Africa. You’re looking for new beekeepers to start immediately and your task is to write an advertisement for a job vacancy.

You may use the following questions as a guideline:

- Who is being sought for a job?
- Where is the job?
- When does the job start?
- Who is advertising the position? Describe the organization briefly.
- What duties and tasks will the new beekeeper have?
- What are the earnings?

---

You will find the information needed to write the advert in the article and on this worksheet. The following key words could also help you:

250 beehives   save forest   wildfires  
honey production   feed families   trees are important for flowers  
bees need flowers   plan: produce your own honey  
1100 members of the beekeepers’ association   \$1000 per month  
three to four harvests a year   \$2.30 for a kilo of honey

## Experiment: Build an insect hotel

 **Duration: 90 minutes**

At the start of this unit, discuss the importance of insect hotels with the entire group. Participants have acquired the specialist knowledge required for this from previous modules.

Distribute **worksheet 11** and explain it step-by-step, addressing any questions that arise. Divide participants into groups of three or four. Each group will build a hotel.

» **Worksheet 11**

Discuss in advance where to put the finished hotels. It's possible that the area around participants' homes could meet the necessary criteria. The insect hotels should be put in places that are protected from rain and that are dry, warm and sunny. The passageways in the insect hotels should be positioned horizontally.

Discuss what materials are required and who will bring what in each group:

- Empty, clean cans
- Can opener
- Sandpaper or pliers
- Hollow wood or sticks, for instance, bamboo cane
- A small saw
- A wood drill (either hand drill or electric drill)
- Cotton wool
- String or cord

Before the participants get going, you should discuss the possible dangers of building an insect hotel and lay ground rules with the groups.

The participants should follow the instructions step-by-step. Please provide assistance to the groups as required.





## Constructing an insect hotel

**You can build an insect hotel yourself. But you have to keep a few important things in mind, otherwise insects won't be able to use it.**

Firstly, you'll have to find **the right spot** for your insect hotel. This place must be protected from the rain, be dry, warm and sunny. Within the group, discuss where the hotel could be placed. It's important to note that the passageways in the hotel must be positioned horizontally to allow the creatures to crawl inside.

Insects also need **plants** they can visit and feed from near their hotel. Use some books or the internet to find out what suitable plants your region has to offer. Perhaps there's an expert in your area who could answer any questions you have about insect hotels.

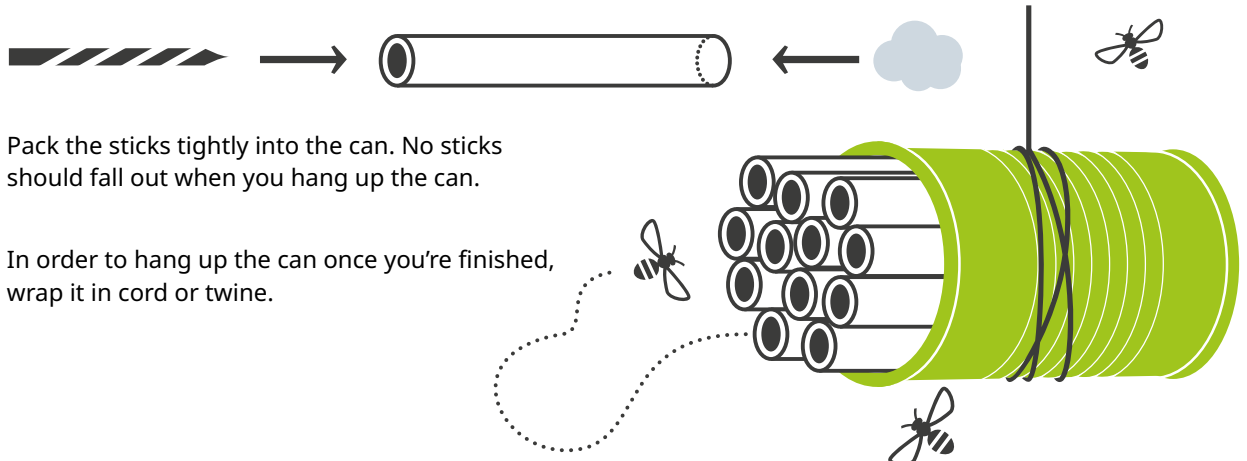
### To build the insect hotel, you will need

- Empty, clean cans
- Can opener
- Sandpaper or pliers
- Hollow wood or sticks, for instance, bamboo cane\*
- A small saw
- A wood drill (either hand drill or electric drill)
- Cotton wool\*
- String or cord

*\* The amount of hollow wood or sticks and cotton wool required, depends on the size of the cans and sticks.*

### Instructions If you require help with any of the steps, ask an adult.

1. Remove the bottom of the can. You can use a can opener for this. If the edges are sharp, sand them down or bend them in.
2. Saw the hollow wood or sticks into small pieces. They should be slightly longer than the can.
3. Are the sticks completely hollow? If not, use a drill to hollow out the rest, but be careful.
4. Seal the sticks at one end with cotton wool.





# Instructions for playing films

You have several options for playing the films accompanying this learning pack:

### 1. Playing films from DVD

If you have a hard copy of the learning pack, you will find all of the films on an accompanying DVD. You will need a DVD player connected to a TV screen, or a laptop/PC with a DVD drive, as well as software for playing video (media player).

### 2. Playing films from the internet

If you don't have the learning pack DVD, you can stream all the films directly online. You will find the film links in the handouts, as well as the right column of the module overview (materials and implementation).

Please test your internet connection to ensure the film plays smoothly. If the picture is choppy, then your internet connection likely isn't stable. In this case, we recommend that you download the films beforehand and save them as mp4 files.

### 3. Downloading and playing films as mp4 files

To download the films, follow the links in the handouts and module overview.

You can start the download by clicking "Download: Save MP4 file" in the sidebar to the right of the screen. You can save the film as an mp4 file on your computer or external storage device (e.g. USB key, SD card or external hard drive).

Please plan enough time to download the films. Downloading the material can take between a few seconds and a few hours depending on the speed of your internet.

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**Note:** **Playing the films on a projector**

If you connect your DVD player, PC or laptop to a projector to show the films, we recommend using speakers for the sound.

Please also ensure that the room is dark enough and you have a large and smooth enough white wall for the projection.



# Global Ideas

## The multimedia environment magazine

**Around the world, imaginative people and innovative projects are working to protect our climate and biodiversity. Global Ideas tells their stories on TV and online.**

**Global Ideas** is Deutsche Welle's multiple award-winning, multimedia environment magazine supported by the German Environment Ministry's International Climate Initiative. Established in 2009, it showcases TV reports, background articles, web features and more, as a means of informing people all over the world about solution-based initiatives to protect the planet.

**Global Ideas** is more than just television. Think interactive specials such as a visit with Africa's wild animals or explainers that answer complex questions like "does global warming really exist?" The magazine also has an educational element in the form of carefully crafted "learning packs" on key environmental topics. Available free of charge in German, English and Spanish, these learning materials include videos, articles, worksheets and teacher handouts, as well as other educational materials such as posters, picture cards and practical experiments.

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