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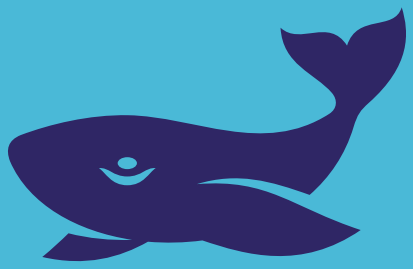
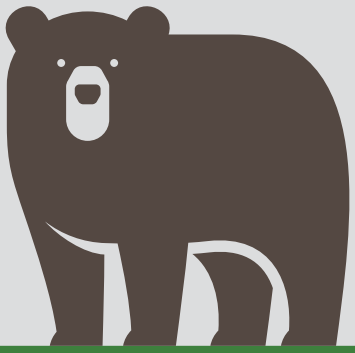


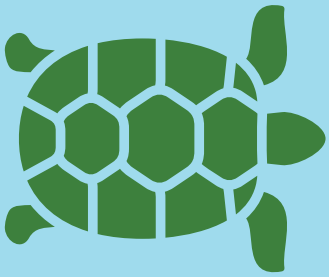


NATURA 2000

TOOLKIT FOR EDUCATORS

STUDENTS AGED:
13-16 YEARS OLD

The European Nature Protection Toolkit



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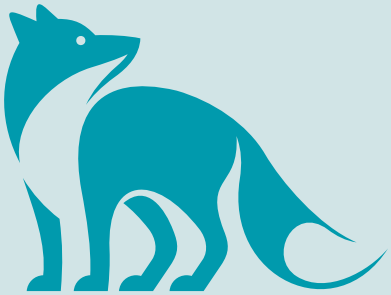

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This European Nature Protection Toolkit has been created for use by educators of students aged 13 to 16 years old across the European Union. The Toolkit can be used in schools as well as in non-formal settings, e.g. in natural history museums or centres for environmental education.

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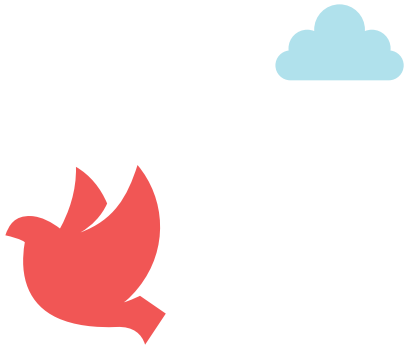
Welcome and introduction for educators

Europe hosts a huge variety of natural landscapes, wild animals and plants – from stunning mountain sceneries to sweeping forests, from innumerable microscopic plants and animals to our largest mammals.



Besides being beautiful, Europe's nature is of great importance on so many levels to all of us and this Toolkit will help your students understand why. It will lead us on a journey that starts with getting down on our hands and knees to look at the plants and animals that inhabit Europe's natural areas. We will talk about biodiversity – "What is biodiversity?" – as well as introduce some of the basic scientific notions that underpin environmental science. We will ask questions such as "What is a species?", "What is a habitat?" and "What is an ecosystem?", as well as "How do they work?" and "Why are they important?". The students will learn to communicate about nature as well as about Europe's shared natural heritage.

The Toolkit provides resources for finding and recognising interesting and important plants, animals and habitats near you. And in addition to identifying species and habitats, your students will also learn more about what nature means to them personally, and why they feel it is important. Inspiring students by what is around them can be a real first step in engaging them with nature in a meaningful way.

Our next port of call will be to look at how nature is doing in Europe. Some human activities are harming and destroying nature. We have all heard the news stories about climate change and loss of biodiversity, and we need all hands on deck to solve this crisis and save our global life-support system.

The European Union and its 27 Member States recognise the importance of nature and have taken great steps to ensure that protecting and restoring nature is both a policy and a practical priority. This Toolkit indicates opportunities for your students to find out about what the EU is doing: What the relevant laws and activities to protect nature are, and how the countries in Europe work together to achieve their goals.

In particular, they will learn about one of the most powerful means to protect EU natural places and species: the Natura 2000 network of protected sites. Natura 2000 safeguards Europe's most valuable and threatened animal and plant species and maintains and restores their natural habitats. There are more than 27 000 Natura 2000 protected areas across the EU! They range from the tiny to the enormous and they protect thousands of terrestrial and marine rare and endangered species and habitats.

The Toolkit invites you to take your students beyond the classroom and in a nearby Natura 2000 sites to find the habitats and species they protect. The Toolkit will help your students understand how conservation decisions are made and how diverging interests can be reconciled towards a shared objective. Students will find out how they can join forces with others, whether it be through contributing to citizen science projects, launching their own campaign, volunteering or simply appreciating the beauty of nature in their nearest park or protected area. We can all get involved in conservation in one way or another.

How much do Europeans know and care about nature?

European citizens care about nature and most of them also expect the EU to act. 80 % of the respondents to an EU-wide survey think that the deterioration of natural habitats and ecosystems and the increased risk of extinction of animal and plant species in Europe are a problem. 96 % of them believe that we have a responsibility to protect nature, most often because they consider that 'taking care of nature is essential for tackling climate change'.

* Eurobarometer (2018) Attitudes of Europeans towards Biodiversity.

The Toolkit's aims

The European Nature Protection Toolkit aims to improve your students' understanding of:

- What we mean by nature and biodiversity, including concepts such as species, habitat and ecosystem;
- Where protected species and habitats can be found in the EU Member States;
- Why Europe's nature is important, and why it is under threat;
- What the EU is doing to protect its nature and how students themselves can get involved.

The Toolkit's activities are framed in such a way as to:

A. **Encourage** students to spend time in and connect with nature, as well as to discover, understand and reflect on their relationship with nature and the place of nature in their own value system;

B. **Inspire and empower** students to become proactive contributors to a more sustainable world in which both nature and people can thrive;

C. **Embrace** students in developing the knowledge and skills related to collaboration, communication, problem solving and systemic thinking that are necessary for understanding the challenges of nature conservation.

The Toolkit is organised around **four modules**, including lesson plans with ready-to-use tools, activities, materials and resources (see table on the next page). At the end of the Toolkit, you will also find a Background and key concepts section with additional information on the issues covered in the modules, as well as a list of References and additional resources to support you in setting up and running the activities, with information about citizen science projects, apps for species recognition and other relevant resources.

Overview of the modules

Module	Educational objectives	Lessons / activities with thematic focus
A. How do we relate to nature?	• Sharpen students' awareness and understanding of their natural surroundings • Reflect on the importance of, and the different values and attitudes towards nature • Understand how human activities impact nature and how these impacts have changed over time	**A.1 Me & nature** • Brainstorming discussion: Define biodiversity and nature • Explore and reflect on attitudes towards nature **A.2 Shake hands with a tree** • Outdoor walk: Recognise the different aspects of a certain tree species and its cultural importance **A.3 Ask older generations** • Interview with the older generation • Understand changes in perceptions of nature and species between generations **A.4 Valuing nature** • Brainstorming discussion: Reflect on the values of nature • Understand the different values people hold towards nature

Module	Educational objectives	Lessons / activities with thematic focus
B. Explore Europe's nature	• Understand concepts such as species, habitat and biodiversity, and their importance • Understand the relationships and interdependencies within and between ecosystems • Learn how to recognise and record species and habitats that occur in the area, region and/or country • Understand what the main habitat types in Europe are, and how they interact	**B.1 What do you know about nature?** • Brainstorming discussion: Improve knowledge about species and habitats • Explore the taxonomic classification system of organisms **B.2 Simulate an ecosystem** • Interactive game: Understand the diversity of relationships within an ecosystem and their effects on its stability and resilience **B.3 Web of Life** • Project: Understand the concept of a food web • Examine and map the relationships among species, and their habitat **B.4 The Wood Wide Web** • Video and discussion: Understand ecosystems as self-organizing systems • Discover scientific findings about tree-fungi interactions **B.5 Explore nature** • Desk research and outdoor activity: Train species recognition, data collection and data recording • Learn a simple method to judge the status of a site **B.6 Flying with cranes** • Project: Map the flyway and needs of common cranes • Understand Europe's diversity of species and ecosystems and how they are connected

Module	Educational objectives	Lessons / activities with thematic focus
C. **How do we protect nature in Europe?**	• Learn what Natura 2000 and the Nature Directives are • Understand why collecting data about nature is important • Explore ways to monitor the state of an ecosystem, habitat or species • Understand different viewpoints in a controversial conservation issue and learn how to move forward	**C.1 What is Natura 2000?** • Brainstorming: Learn about the state of Europe's nature and the main threats it is facing • Group work: Learn about Natura 2000 and the Nature Directives **C.2 Managing a Natura 2000 site** • Project and excursion: Make use of the Natura 2000 viewer • Study a specific species and related threats • Understand how Natura 2000 sites are managed **C.3 Become a wildlife expert** • Project and outdoor walk: Learn to recognise nature on your doorstep • Raise awareness about common plants or animals **C.4 "Name, Place, Animal, Thing!"** • Online quiz and game: Become familiar with the EUNIS database • Learn how to find information about a species or habitat **C.5 "Homes for people or nature?"** • Role play: Understand the different interests and positions that play a role in conservation • Reflect on conflicting interests and priorities and on how to address a controversial situation

Module	Educational objectives	Lessons / activities with thematic focus
D. Engaging in nature protection	• Find out how to get engaged in and contribute to nature conservation • Learn how to engage in raising awareness and promoting actions for conservation • Gain better insights into how EU institutions and policies work and how to develop and present personal positions and policy proposals	**D.1 Campaigning for nature** • Media campaign: Experience how to become active and part of a wider effort and motivate others • Learn how to design a campaign or contribution for an international nature conservation campaign **D.2 Communicating about nature** • Writing an article: Learn how to communicate about nature and decide on key messages • Understand different language styles and learn how to evaluate news articles **D.3 Volunteering for nature** • Interview and Citizen Science Project: Get inspired about different forms of organising and becoming active for nature • Understand the different opportunities for participating and contributing to conservation **D.4 Understanding EU policies** • Discussion and group work: Understand how EU institutions and policies work • Learn to develop personal positions and demands and to present and communicate them to others

How to use the Toolkit

The Toolkit can either be integrated into relevant school subjects such as biology, geography, environmental sciences, social sciences, political sciences, art, language or citizenship or it can be used as a stand-alone, cross-curricular environmental education or education for sustainable development project.

While the activities build on each other to some extent, each module or even each activity can be used as a self-standing element, depending on the age and level of knowledge of the students and the educational context.

In order to help quickly identifying which activities can be used in which context, the description of each activity is preceded by an overview including: 1) the type of activity (for example outdoor, game, etc.), 2) its educational objectives, 3) the required preparation, 4) the academic subject(s) it most closely relates to, 5) its estimated duration and 6) the materials and resources needed to carry it out.

Steps for using the Toolkit

Step 1: Read through the overview of the lesson plans above and decide whether you will implement the whole Toolkit or pick-and-mix a set of activities.

Step 2: Back up your review by reading through the Background and key concepts section at the end of the Toolkit to confirm the issues you want to cover with your students.

Step 3: Check how the activities you have selected can fit into your teaching schedule and school programme. Confirm you have the necessary resources, including any required equipment or transportation.

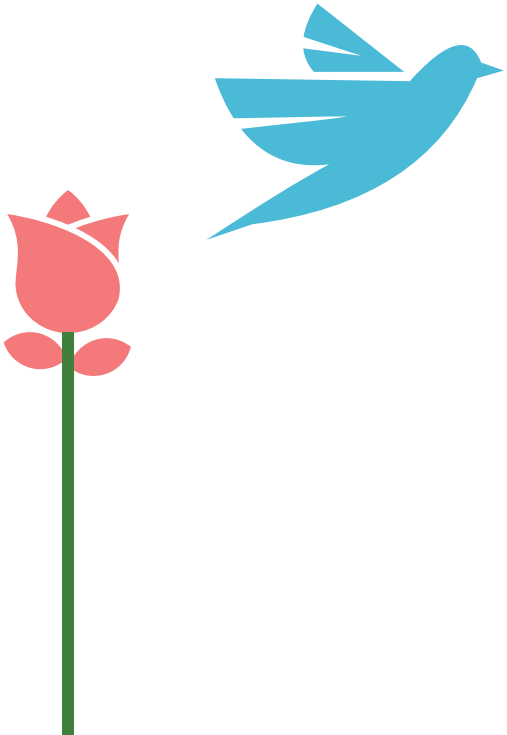
Step 4: Consider whether the lesson plans need adapting for your students. For example, would you like students to freely develop certain ideas and help them structure their own projects on the subjects that interest them?

Practical activities should be prepared well in advance, involving:

- Checking that all necessary requirements and authorisations are in place;
- Informing students and parents of any special equipment that might be required;
- Organising transport and necessary supervision in case of outdoor activities;
- Providing materials and equipment for all students (for example checking how many students have their own smartphone in case the use of an app is required);
- Checking with colleagues at your school or organisation to see if you can work together on all or certain parts of the Toolkit. English teachers may also support activities with resources that are available only in English;
- Looking into citizen science projects in your area that you can collaborate with. A list of relevant projects is included in the References and additional resources section.

Wherever possible, all materials and references used in the Toolkit are available in all EU languages. However, some activities include references to materials that are only available in English, for example short videos or maps. Some activities focus on using online databases such as the Natura 2000 Map Viewer or the EUNIS database, which only operate in English. In such cases, the activities include information about how to overcome potential language barriers.

Modules and Activities



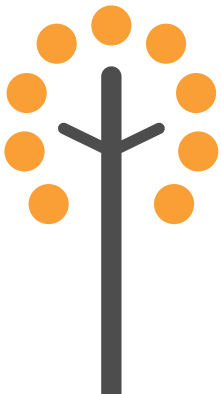
Module A: How do we relate to nature?

Educational objectives

1. Sharpen students' awareness and understanding of their natural surroundings;

2. Reflect on the importance of, and the different values and attitudes towards, nature;

3. Understand how human activities impact nature and how these impacts have changed over time.



BRAINSTORMING DISCUSSION

A.1 Me and nature

45'

Objectives	Preparation required	Subject / Context	Materials needed
Define biodiversity and nature Explore and reflect on attitudes towards nature and biodiversity	Background reading	Biology Political sciences	**For the educator:** Pin-board and pins **For the students:** Pens and cards

Instructions

1. Ask students what they associate with "nature" and "biodiversity". Collect their ideas, until all important aspects are mentioned (check out the definitions provided in the Background and key concepts section).
2. Put the "Me" card in the centre of the pin-board.
3. Ask students to identify their associations with the word "nature" and to write them down on cards.

   Guiding questions could be:

   - What does nature have to do with you?
   - What do you associate with nature?
   - What do you like when you think of nature? What do you not like? Here, they can simply put a "+" or a "-" next to the idea to indicate a positive or negative reaction.
4. Ask them to pin their ideas on the board in a distance to the "me" card that illustrates their connection.
5. Let them reorganise the answers on the pin-board according to their similarities (e.g., uses, feelings, concerns).

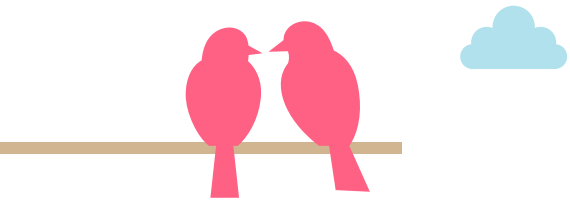
OUTDOOR WALK

A.2 Shake hands with a tree

90'

Walking time to and from school

Objectives	Preparation required	Subject / Context	Materials needed
Recognise the different aspects of a tree species and its cultural importance	Prepare printouts Identify a walk nearby where students can get close to a tree, preferably an oak tree Contact the local forest administration; maybe a forester can join and provide more insights	Biology History Social sciences	**For the educator:** Smartphone with a species identification app or a reference book Tape measure suitable to measure a trunk circumference **For the students:** Smartphones with relevant app



Instructions

In the classroom

1. Read the text "Oaks in Human Culture" with the group and / or ask the students to read it at home in preparation.
2. Discuss the text with the group, using the following questions as guidance:
   - Which characteristics about oaks are described in the text?
   - Have you ever heard of such stories before? Do you know other?
   - What are your own thoughts about oaks? What do you know about them?
   - Why do you think that oaks have obtained such meaning for people?
3. Explain how to determine the age of a tree without damaging it (see method below).
4. Take the students out for a walk.

Outdoors

1. As you approach the tree, let students touch the trunk, bark and leaves and describe how that feels and smells. Ask them to be quiet and listen whether the leaves make any sound. Ask if they know what the tree looks like in other seasons, does it lose its leaves, what its fruit looks like, when it bears its fruit, which animals like to eat them, etc.
2. Ask students to estimate the age of the tree using the calculation method. Let them discuss about the conditions in which the tree grows.
3. Reflect together on what the tree (and the students) experienced during this time period.

Material **Reading text**

OAKS IN HUMAN CULTURE

The majestic oaks, *Quercus spp.*, with their impressive size and longevity have been revered as sacred trees by many human cultures. In Southern Europe, the evergreen oaks (e.g., the European *Quercus ilex* and *Q. suber*) were especially favoured in early human societies that worshipped trees. The ancient Hebrews considered the oak sacred because it was under an oak that Abraham gave hospitality to God and two of his angels, who were disguised as travellers. This story is told in Genesis 18 and is one of 60 references to oaks in the Bible. The early Gauls worshipped oak as a symbol of their supreme God. To the Druids, an order of priests or ministers of religion among the ancient Celts of Gaul, Britain and Ireland, oak was considered a sacred celestial tree. Both oak and the mistletoe, *Viscum album*, a plant that grows on oaks and other trees, were involved in almost all Celtic-Druid ritual ceremonies.

One of the most intriguing aspects of the oak as a sacred tree is its widespread association with thunder gods in various European cultures. This is probably since oak seems to attract lightning more than other trees in the forest. To the northern Europeans, it was the tree of life sacred to the thunder god Thor. The oak was also sacred to the principal Greek god Zeus with his thunderbolts and to his Roman counterpart, Jupiter. The oracle of Zeus at Dodona, Greece, mentioned by Homer, was situated in a sacred grove of oak trees. Predictions were made at this oracle by interpreting the rustling of oak leaves. The Slavic countries of eastern Europe had their own versions of a thunder god associated with oak. In Russia, his name was Perun, derived from the Russian word for thunderbolt. In Lithuania, the god of thunder was called Perkunas, a name thought to be taken from an Indo-European name for oak. In William Shakespeare's King Lear, reference is made to "oak cleaving thunderbolts".

SYMBOLS

To northern European cultures, the oak leaf cluster is a symbol of heroism and victory. This symbol spread to the United States where it has become a military symbol. The Oak Leaf Cluster is a small bronze decoration consisting of a twig bearing four oak leaves and three acorns. It is given to holders of medals for valour, wounding or distinguished service, in recognition of some act justifying a second award of the same medal. In Rome, the oak wreath crown was a prize for saving a citizen's life in battle. A spray of oak once appeared on English sixpence and one shilling coins.

The hard wood of the oak symbolised incorruptibility. The hard wood, combined with the great age that some oaks can achieve, led to oaks being associated with both strength and eternal life in many societies. In China, the oak signifies male strength but also signifies weakness because, unlike the willow or bamboo, it remains rigid in storms, therefore breaking under pressure. To some native American tribes, the oak is a symbol of Mother Earth.

In Christian religions, oak is associated with steadfastness in faith and virtue. The oak is also considered to be a symbol of great achievement accomplished through patience, dedication, perseverance and commitment to the truth. In literature and music, the oak often connotes strength, masculinity, stability and longevity.

HISTORIC TREES AND FORESTS

A grove of some 12 oaks in the state of Mecklenburg-West Pomerania in north-eastern Germany is believed to contain some of the oldest living trees in Europe. Known as the Ivenack oaks, the oldest tree in the grove has an estimated age of about 1 200 years. According to legend, these oaks have a definite prescribed lifespan. It is said that seven nuns from a Cistercian convent broke their vows and were punished by God by being turned into oaks. According to another version of this legend, the nuns were surprised in their sleep by robbers. As they ran half naked through the woods, they called on God for protection and were turned into oaks. After a thousand years, the first oak will die and liberate one nun's soul. Every hundred years thereafter, another oak will die, and its human soul will be freed. In 1962, the German Democratic Republic gave protected status to the Ivenack oaks. This status was maintained after German reunification in 1990.

Source (adapted version):
Temperate Broad-Leaved Trees in Human Cultures (FAO)

Hand-out Calculation method for estimating the age of a tree

Estimating the age of a tree

Maybe you already know that a tree's age corresponds to the number of tree rings inside the trunk. Each ring shows one year's growth: if you can count 50 rings, then the tree is 50 years old. However, you can also get an estimate of the tree age without chopping it down, using this simple method:

1. Measure the tree's **circumference** at 1 m high and at 1.5 m high. Calculate the average circumference of the tree by adding both numbers together and then dividing by 2.

   e.g., Circumference (C) = 160cm (at 1 m) + 180cm (at 1.5 m) = 340cm
   340cm ÷ 2 = **170cm average circumference**

2. Divide the circumference by the mean annual growth rate of the tree species. While trees grow faster when they are young and slower when old, over many years the average increase in circumference of mature trees with a full crown is about 2.5cm per year.

   Estimated age of the tree = 170cm ÷ 2.5 = **68 years**

The growth rate is highly dependent on the conditions in which the tree grows: In good conditions, a tree with a circumference of 300cm is usually about 120 years old, but around 200 years if growing in a forest, and 150 years old if growing for instance in an avenue. Depending on the location of your tree, you could therefore opt to reduce the growth rate (e.g. 1,5 in a forest).

Sources:
https://www.wdvta.org.uk/pdf/Estimating-the-age-of-trees.pdf

https://www.hungerfordvirtualmuseum.co.uk/index.php/15-artefacts/87-how-to-age-a-tree

SURVEY / INTERVIEWS

A.3 Ask older generations

120’

60’ preparation, 30’ interview, 30’ group discussion

Objectives	Preparation required	Subject / Context	Materials needed
Dialogue with older generations Understand changes in the perception of nature between generations Understand how the local environment has changed over time	Prepare a means of presenting the results	Political sciences Social sciences History	**For the educator:** Means of presenting the results **For the students:** Pens and paper / notebooks

Instructions

1. Present this introductory story:
   “For a project in the frame of the UN Decade on Ecosystem Restoration, the mayor of your city wants to assess the potential for restoring nature in and around the city. The first step is to assess how nature has changed over the past 40 to 50 years. You are asked to talk to people who remember those times (someone born before 1960) to gather first-hand reports about how nature in and around the city has changed.”

2. Let students draw a map of their village / town / city quarter and its main natural places or surroundings: for example, forest cover, green spaces or water bodies. They note down any plant and animal species they know.

3. Students should identify at least two potential interviewees born before 1960, e.g., people in their neighbourhood or family, or during a visit in an elderly home.

4. Ask the students to prepare some questions, for example:

   - What can you remember about the environment and nature in your village / town / city quarter from your childhood?
   - Name the three most significant changes in the environment that you have noticed since then.
   - Have you noticed any missing plant or animal species that were there when you were young, but aren’t there anymore?

5. The students carry out their meeting with the interviewees and write a protocol.

6. Once the interviews have taken place, the students can enrich their findings with additional information, e.g., from the archives of the local library, press items, local associations’ archives, aerial photographs, etc.

7. They present their results in a group discussion, where everyone can add their findings on a board (e.g., using the example below).

8. Discuss the results in the group: Is it what they expected, what was the most surprising or interesting?

9. Optional: Add a component on restoration where students can design a plan with suggestions to bring back what was lost.

Material Template: Presentation of results on board

Place	What has changed?	Drivers of (reasons for) change

BRAINSTORMING DISCUSSION

A.4 Valuing nature

45'

Objectives	Preparation required	Subject / Context	Materials needed
Reflect on the values of nature Understand the different values people hold towards nature	Prepare a means of presenting the results	Biology Geography Political / Social sciences Ethics	**For the educator:** Pin board and pins **For the students:** Cards and pens

Instructions

1. Ask students whether and why they think it is important to protect nature.
2. Collect as many different reasons as possible on the board.
3. Let students find similarities in the collected arguments and structure them, e.g., using the worksheet. This can be done with the whole group or in smaller groups.
4. Discuss the findings and reflect on following questions:
   - Why do different people have different values towards nature?
   - Which values do you consider most important to protect nature?
   - If nature is so valuable, why are we losing more and more natural places?

Material Template: Presentation of results on board

Intrinsic values (nature has a right to thrive independent of its value to humans)	Utilitarian values (nature is valued because it is used by people)	Relational values (people are part of nature)

Module B: Explore Europe's nature

Educational objectives

1. Understand concepts such as species, habitat and biodiversity, and their importance;
2. Understand the relationships and interdependencies within and between ecosystems;
3. Learn how to recognise and record species and habitats that occur in the area, region and/or country;
4. Understand what the main habitat types in Europe are, and how they interact.

BRAINSTORMING DISCUSSION

B.1 What do you know about nature?

45'

Objectives	Preparation required	Subject / Context	Materials needed
Improve' knowledge about species and habitats Explore the taxonomic classification system of organisms	Prepare the pin-board corresponding to the worksheet **Optional:** Print out the taxonomic classification	Biology Geography	**For the educator:** Pin-board and pins **For the students:** Cards and pens **Optional:** Worksheets Taxonomic classification

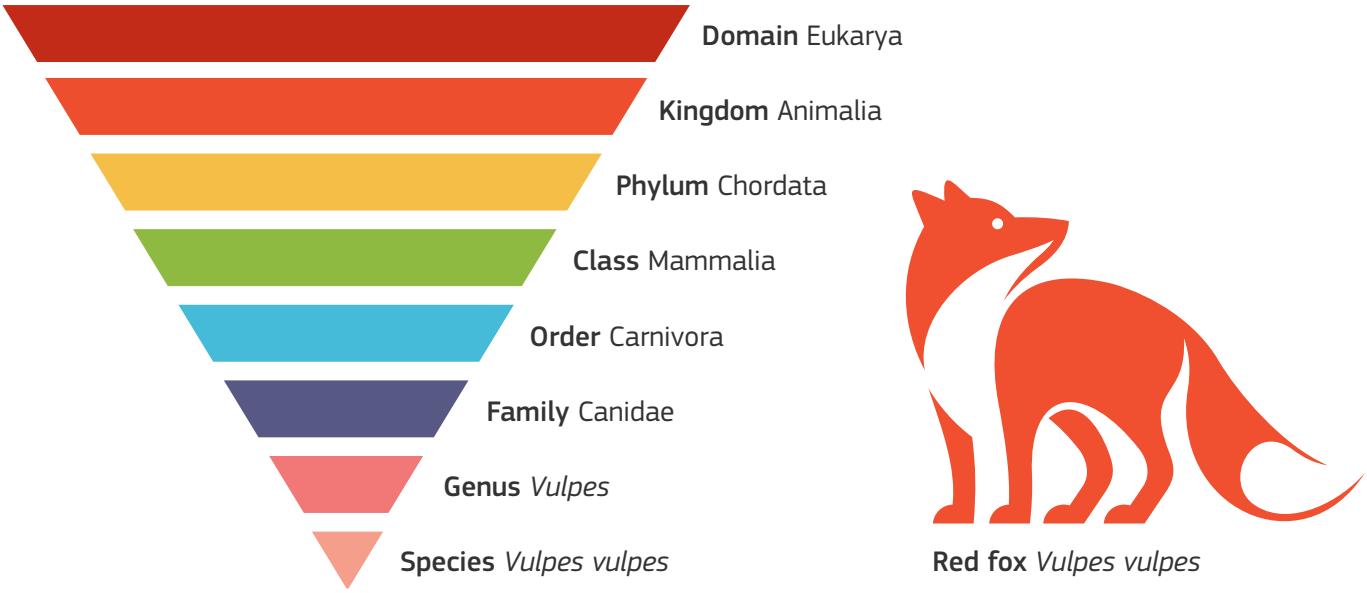
Instructions

1. Ask what students think a "habitat" is, and then ask them to define a "species". Collect ideas to arrive at a common understanding (consult the Background and key concepts as needed).
2. Introduce the taxonomic classification system of organisms (write on board or provide print-outs).
3. Collect at least six different taxonomic classes (e.g. mammals, birds, fish, insects etc, see template) with the group. Ask them to name different species per class, as well as their specific habitat conditions and some distinguishing characteristics (e.g., certain physical features or behaviours). Note them down on the board. Alternatively, print out the worksheets and let students work independently or in groups, before you gather results on the board.
4. Make sure you have at least one species for each taxonomic class.
5. You can extend the activity by asking students to select one species per taxonomic class and determine their entire classification up to domain level.

Material Template: Presentation of results on board

Taxonomic class	Species name	Habitat – where does it live?	Characteristics – special features
Mammal			
Bird			
Fish			
Insects			
Reptiles			
Amphibians			

Material Supporting document: Taxonomic classification



INTERACTIVE GAME

B.2 Simulate an ecosystem

60'

Objectives	Preparation required	Subject / Context	Materials needed
Understand the diversity of relationships within an ecosystem and their effects on its stability and resilience	Preparation or print out of sticky labels Review the ecosystem elements and identify links between them Procure a cord or string of at least 100 metres in length that can easily be unwound	Biology	**For the students:** One sticky label per student each with a different ecosystem element Cord or string Sticky tape

Instructions

1. Write the different ecosystem elements on sticky labels and distribute them. Each student sticks one card to their neighbour's forehead so that they can only see the other students' cards, not their own.

2. They then need to find out which element they are by asking the others "yes or no" questions (e.g., "Am I an animal / plant / element?", "Do I walk / fly / crawl?", "Do I eat other animals or plants?", etc.). They can also give tips to help find out uncommon elements.

3. Once everyone knows their element, gather in a circle. Highlight that all elements of this system exist in close and interdependent relationships with each other.

4. Students now work out their relationships, using the string to span between them as symbol for their connection: One student starts working out their relationship with others by throwing the string to the respective elements. They should also mention the type of connection (e.g., mice eat seeds; bees pollinate dandelions; earthworms help plants to root in the soil; blackbirds and hedgehogs compete for earthworms, etc.).

   Try to ensure all relationships are discovered and all students are part of the web. The string connections should be tight enough to create a firm network.

5. Once all relationships have been discovered, let students experience the interconnectedness of the network by influencing individual components, for example:

   - The use of herbicides or pesticides => the insects disappear, soil gets weaker.
   - Ploughing the grass with heavy machines => grass is taken out.

   The student who represents the respective element pulls on their string - or drops down - so that other students can feel a pull on their rope. Even students that only hold few connections will feel the impact as part of the system.

6. Ask students to sit down, put their strings on the ground and have a wrap-up discussion to reflect on the experience.

Material Template: Element cards

Grass	Great plantain	Hedgehog
Mouse	Human	Common buzzard
Bat	Vine louse	Butterfly
Blackbird	Ladybird	Bluetit
Daisy	Rain	Sun
Soil	Ant	Dandelion
Bee	Earthworm	Snail
Oak tree	Wood owl	Mosquito
Mole	Sun flower	Beetle

PROJECT

B.3 Web of Life

45'

Objectives	Preparation required	Subject / Context	Materials needed
Understand the concept of a food web Examine and map the relationships among species, and their habitat	Print out the food web template Read through the materials and check any unfamiliar terms or names	Biology Art	**For the students:** Computers with internet access Pens and paper / notebooks Printed food webs Large sheets of paper (e.g., poster format) and pens

Instructions

1. Introduce the food web concept using, for example, a desert ecosystem.

2. Optionally (depending on language skills), go through the worksheet provided here (only available in English) and ask students to fill it out.

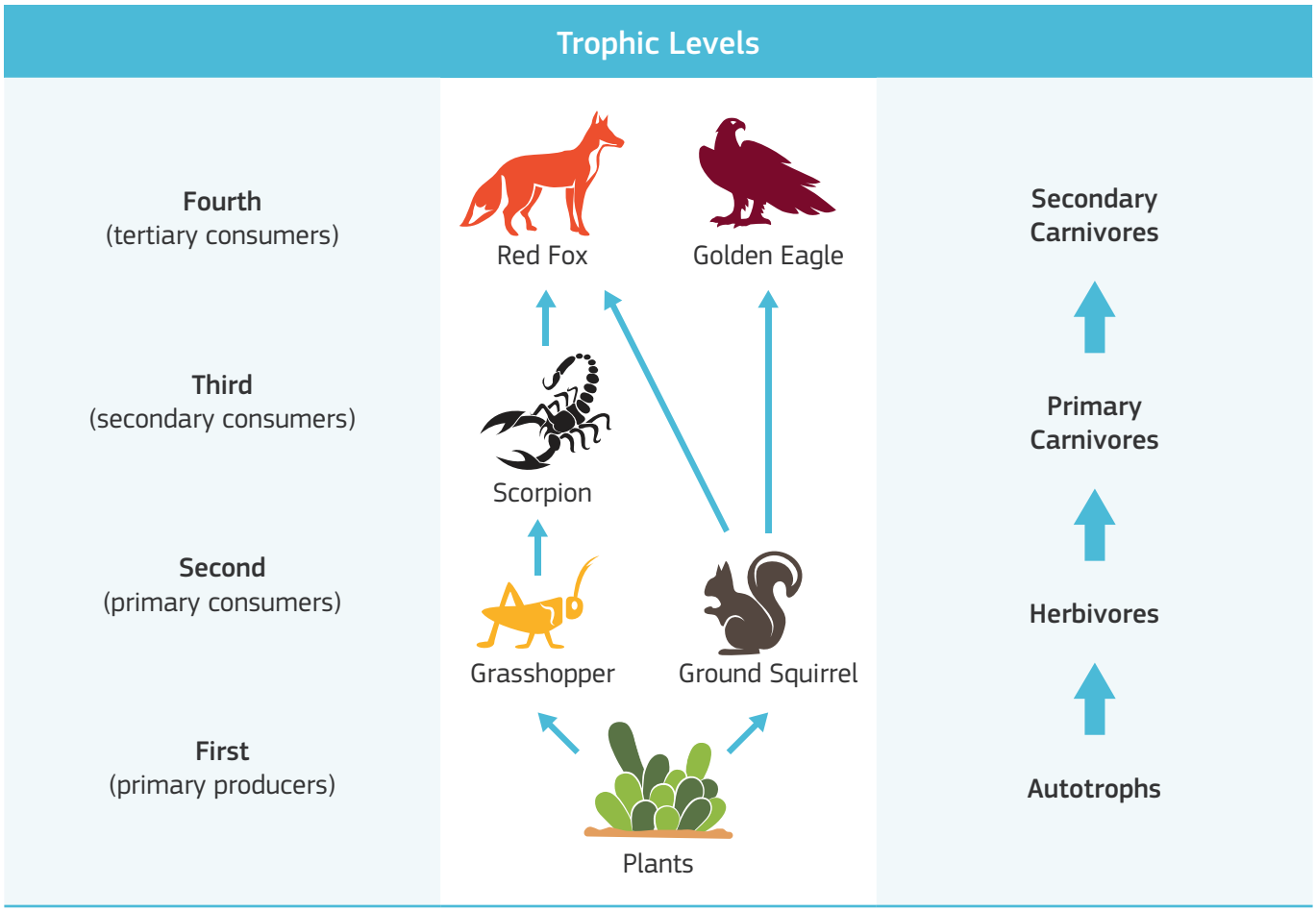
3. Hand out the sample food web and ask students to draw their own food web for an ecosystem of their choice, e.g., forests, mountains, grasslands, rivers, lakes, peatlands, etc. This can be done either individually or in groups:

   - On a large sheet of paper, students write the trophic levels and the corresponding taxonomic order (e.g., herbivores, etc.).
   - In the centre of their sheet, they write down all species that are associated with that ecosystem in their correct place and draw interactions with arrows. They can do an online search to find more information on the type of relationships between the species. Whichever way they present the ecosystem, they need to clearly assign roles and names for each species / element and their connections.

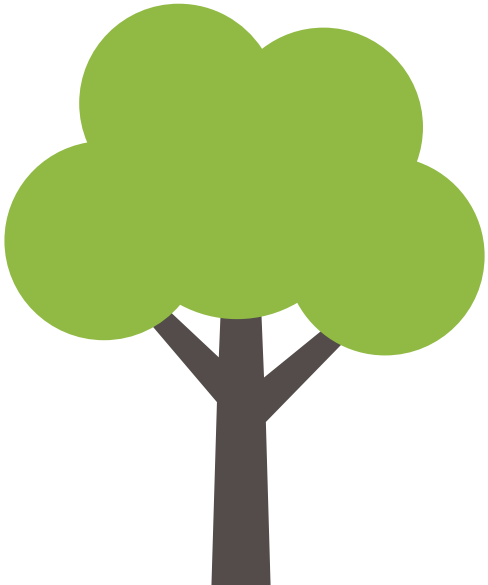
4. They can also position humans in this ecosystem. What kind of connections do they have to the other species? Let them think of human activities – those with direct impact or indirect impact (e.g., fishing would be a direct, our way of consuming goods would be an indirect impact).

5. They present their webs to the group and then discuss the impact humans are having on the ecosystem.

Material Supporting document: Example of a food web for a semi-desert



Adapted from Hui, D. (2012)
Food Web: Concept and Applications. Nature Education Knowledge 3(12):6



VIDEO AND DISCUSSION

B.4 The Wood Wide Web

45'

Objectives	Preparation required	Subject / Context	Materials needed
• Understand ecosystems as self-organizing systems • Discover scientific findings	Watch the video, undertake additional background research if needed	English (for the video) Biology	**For the educator:** Computer with video-playing software, projector and screen **For the students:** Pens and paper / notebooks

Instructions

1. Play this video (1:48 minutes, only available in English with English subtitles). Clarify any difficult terminology.

2. Discuss the video using for instance the following questions:

   - How do trees communicate with each other?
   - How do they cooperate and compete with each other?
   - What is a "mother tree"?
   - The world's first trees emerged between 393 million and 372 million years ago[1]. Since then, they have evolved into many different shapes and forms, and have created incredible species-rich and diverse forest ecosystems around the world. Why do you think have they been so successful?
   - What do you find most interesting or surprising about the "Wood Wide Web"?

B.5

DESK RESEARCH AND OUTDOOR ACTIVITY

Explore nature

150'

45' preparation, 60' outdoors, 45' group discussion

Objectives	Preparation required	Subject / Context	Materials needed
Train in species recognition, data collection and recording Learn a simple method to judge the status of a site	This activity is best carried out in spring or summer Identify a suitable grassland or forest habitat nearby (in collaboration with the students) Print out the worksheets	Biology Geography	**For the students:** Computers with internet access Smartphones with species identification app Pens and paper / notebooks Worksheets

Instructions

In the classroom

1. Ask students to choose a suitable grassland or forest habitat they can visit, either a) in a park, field, along waterways or dikes, or b) a woodland or forest. They can also use the Natura 2000 Map Viewer to see whether there is a suitable Natura 2000 site nearby.

2. The activity is best done in small groups of 2 or 3 students.

3. Before visiting the site, students should conduct literature or online research using the Natura 2000 Viewer and/or EUNIS database as well as other internet sources to identify at least five plant and five animal species that typically occur in grasslands or forests in their country. They should also try to identify at least one species that was once common but is now rare and endangered.

Outdoors

1. On site, students observe and take notes of what they see, using the worksheet. They can also use an app to identify species.

Back in the classroom

1. They present their findings to the group and discuss the results:

   - Which group has got the highest number of points (= most diverse and natural grassland)?
   - What plant and animal species did they discover?
   - Were they the ones they were expecting?
   - Has anyone discovered a rare or endangered species?

Note down the species that were counted and identified – how many did all groups find in total?

2. Highlight the existence of citizen science websites (e.g., Observation.org and its national sub-portals, iNaturalist, Ornitho, European Butterfly Monitoring Scheme, European Bird Census Council, BioBlitz, or the EuroBirdPortal) to explain that citizens across the continent collect this kind of information and send it to monitoring schemes which help to inform management and protection actions.

Material Worksheet 1: Grassland

Date:	Place:	Name:

How many different colours of blooming flowers do you see?		Points Species names
There are no blooming flowers.	0 points	
1-2 colours: Most flowers are yellow or white. *Identify them and note down their names.*	1 point	
3 colours: Most flowers are yellow, white or pink. *Identify them and note down their names.*	2 points	
There are many different flowers, including dark blue or purple. *Identify and note down the names of all blooming flowers.*	3 points	
How many different plant species do you see (other than flowers)? *Identify them and note down their names.*	1 point per species	
How many different butterflies do you see?		**Points Species names**
There are no butterflies.	0 points	
There is only one butterfly species. *Identify it and note down its name.*	1 point	
There are two different butterfly species. *Identify them and note down their names.*	2 points	
There are more than two species of butterfly. *Identify and note down the names of all butterfly species you see.*	1 point per species	
Do you hear insects, birds or other animals sounds in the grassland?		**Points**
No	0 point	
Yes	2 points	
Do you see animals or signs of presence of animals in the grassland, e.g., insects, spiders, spiderwebs, snail shells, caterpillars, etc.?		**Points Species names**
No	0 point	
Yes	2 points	
How many different animal species do you see? *Identify them and note the names of all animal species you see.*	1 point per species	
Total		

Material Worksheet 2: Forest

Date:	Place:	Name:

How many different trees do you see?		Points Species names
There is only one tree species. *Identify it and note down its name.*	1 point	
There are two tree species. *Identify them and note down their names.*	2 points	
There are more than two different tree species. *Identify and note down the names of all different tree species you see.*	1 point per species	
How does the ground look like?		**Points Species names**
There are no branches or dead wood lying around.	1 point	
How many different plant species do you see? *Identify and note down the names of all different plant species you see.*	1 point per species	
There is a lot of dead wood, broken or fallen trees and / or branches on the ground.	2 points	
There are mushrooms growing on the ground and / or on tree trunks. *Identify them and note down their names.*	1 point per species	
Do you hear insects, birds or other animal sounds in the forest?		**Points**
No	0 point	
Yes	2 points	
Do you see animals or signs of presence of animals in the forest, e.g., insects, spiders, spiderwebs, snail shells, caterpillars, etc.)?		**Points Species names**
No	0 point	
Yes	2 points	
How many different animal species do you see? *Identify them and note the names of all animal species you see.*	1 point per species	
Total		

PROJECT

B.6 Flying with cranes

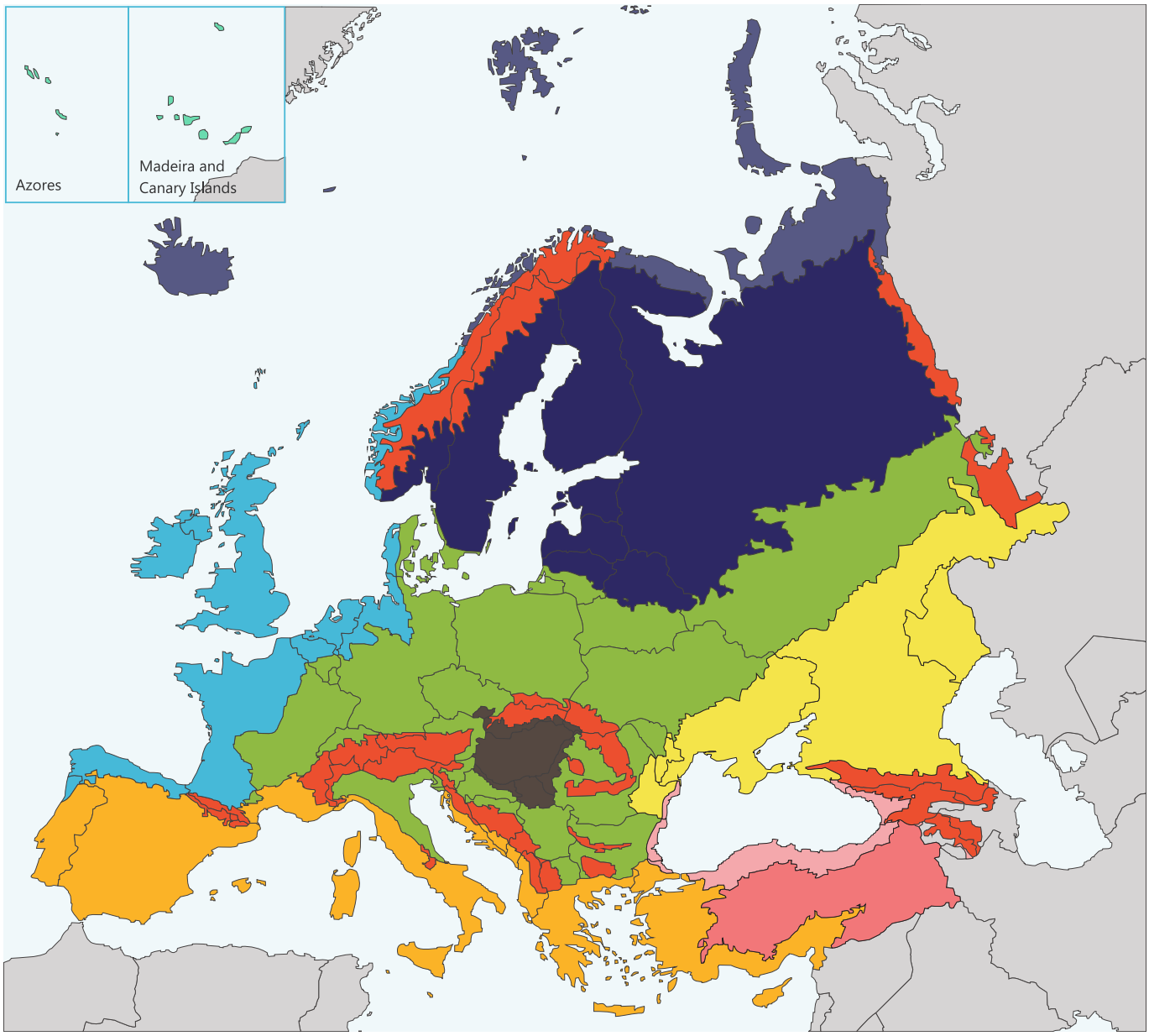
90'

Objectives	Preparation required	Subject / Context	Materials needed
Map the flyway and needs of common cranes Understand Europe's diversity of habitats and ecosystems and how they are connected Understand why countries need to work together to protect a migratory species	Print out the maps in colour	Geography Biology	**For the educator optional:** PC with internet connection and software for playing videos, projector and screen **For the students:** Printed maps and coloured marker pens Pens and paper / notebooks

Instructions

1. Ask students to estimate the number of different species and habitats in Europe to highlight the rich diversity in numbers (see supporting document).
2. Introduce the Common crane (*Grus grus*) using the species overview provided here (in English, French, and Russian). Print the flyway map for illustration.
3. Play a short video of common cranes for students to get a better idea, e.g., here (8:55 minutes) or here (4:35 minutes). Neither video has any narration or text and so are suitable for all languages. You can also check out the EU children's booklet "Flight of the Cranes" with additional material, videos, etc. in different languages.
4. Introduce the map of Europe showing its biogeographical regions to highlight the ecological differences across Europe. Divide students in groups of four. Each group gets a colour copy of the map.
5. Ask students to draw the migration route of the crane on the map: indicate where they fly, breed, winter and rest and at what time of year (e.g., by using different coloured pens), which type of habitat they need and where they find it. Do the cranes pass through your country and, if yes, where and when? They can highlight this on the map.
6. Students should find out as much as possible about the species, including population status and trends and why the cranes have become a conservation success story.
7. Initiate a discussion about how to protect cranes, i.e., that countries need to work together across borders. Highlight that, despite the great diversity and differences across Europe, there are common features (e.g., types of habitats, common concerns for nature), connected through a migratory bird.
8. Invite students to check the EuroBirdPortal, where scientists gather information about the species and present their results. This short video explains how it works.
9. You can expand this exercise by letting students write a short story, essay or article about the crane's journey across Europe.

Material Supporting document: Map of Europe's biogeographical regions

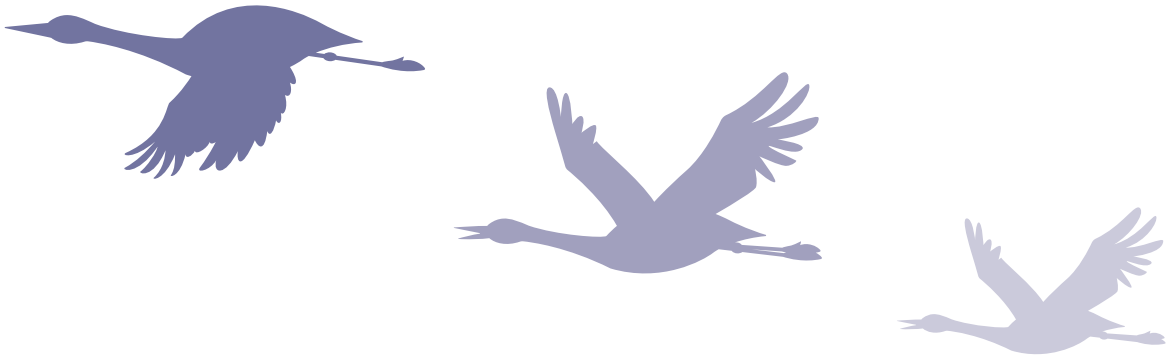


Biogeographical regions in Europe, 2016

- Alpine
- Anatolian
- Arctic
- Atlantic
- Black Sea
- Boreal
- Continental
- Macaronesia
- Mediterranean
- Pannonian
- Steppic
- Outside data coverage

Material Supporting document: Guiding questions for discussion

Question	Answer
How many **animal** species have scientists discovered so far in Europe?	260 000, including 145 000 sub-species[2]: 936 bird species[3] including accidental visitors. The EBCC Atlas of European Breeding Birds[4] indicates there are 625 bird species that are actually reproducing in Europe. 219 terrestrial mammal species; 41 marine mammal species[5]; more than 100 000 invertebrate species (including insects)[6]; 85 amphibian species[7]; 382 freshwater[8] and 1 220 marine fish species[9].
How many **plant** species have scientists discovered so far in Europe?	20-25 000[10]
How many **fungi** species have scientists discovered so far in Europe?	8 000[11]
How many **threatened species** have scientists identified (in the European Red Lists of Threatened Species)?	15 060[12]
How many **habitat types** have scientists identified (according to the European Red List of Habitats)?	233 terrestrial and freshwater habitats[13] 257 marine habitats[14]



Module C: How do we protect nature in Europe?

Educational objectives

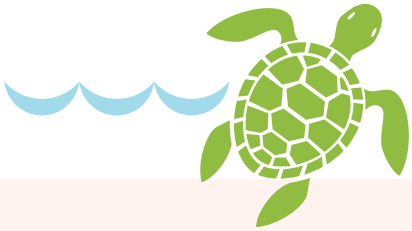
1. Learn what Natura 2000 and the Nature Directives are;
2. Understand why collecting data about nature is important;
3. Explore ways to monitor the state of an ecosystem, habitat or species;
4. Understand different viewpoints in a controversial conservation issue and learn how to move forward.

BRAINSTORMING AND GROUP WORK

C.1 What is Natura 2000?

90'

Objectives	Preparation required	Subject / Context	Materials needed
Learn about the state of Europe's nature and the main threats it is facing Learn about Natura 2000 and the EU Nature Directives	Read Background and key concepts section on Nature Directives and Natura 2000	Political sciences Social sciences	**For the educator:** Flip chart or whiteboard, and pen **For the students:** Pens and paper / notebooks Computers or tablets with internet access



Instructions

Part 1. Brainstorm and preparation

1. Remind students of the importance of maintaining healthy ecosystems (see also Background and key concepts section).

2. Highlight that Europe's biodiversity has declined over the past decades: fewer than half of all EU bird species are in a good condition, while almost 40 percent are in a poor or bad condition. Three-quarters of the EU's habitats are in a poor or bad condition[15].

3. Ask students about the reasons and collect ideas on the board (e.g., land conversion, infrastructure, intensive agriculture, pesticides and herbicides, pollution, unsustainable forest management and logging of old growth-forests, illegal killing of wildlife, hydropower, invasive alien species, climate change, etc.).

4. Brainstorm solutions: what can be done to better protect nature? Collect the answers on the board.

5. Explain that EU Member States have agreed to work together to address those threats by adopting the Nature Directives:
   - Present the Nature Directives (see also here), how they focus on the protection of individual species and their habitats, and that this legislation led to the creation of the world's biggest network of protected areas: the Natura 2000 network.
   - Present the Natura 2000 network (see also here).

Part 2. Group work: steps to designate a Natura 2000 site

1. Briefly explain the three levels of governance in Europe:
   - European Union (EU) - provides the legal framework for all 27 EU Member States.
   - National governments of the 27 EU Member States - contribute to EU-level decision making, translate EU policies into national law.
   - Local authorities in the 27 EU Member States (e.g., local administrations, municipalities, etc.) - implement, comply with and enforce legislation, and report on local conditions to higher levels.

2. Divide students into groups to think of the steps and information required to create (designate) a Natura 2000 site, starting with identifying a habitat or species listed under the Habitats Directive that they want to protect.

3. Groups should come up with at least five actions they think are needed in order to designate a Natura 2000 site. These can be at a local, national or EU level and they should discuss which level / institution is responsible for implementing each action.

4. Groups present their findings, which are collected on the board. Point to actions or steps that are missing, using the worksheet as guidance.

5. Ask students to reflect on the process of designating a protected area.

Material Worksheet: Steps and actors involved in designating a Natura 2000 site

Action / information required	Organisation(s) involved
Name of the site	
Exact location and size	
Name(s) and description of species to be protected	
Name(s) and description of habitat to be protected	
Is the species protected by national and/or EU legislation (e.g., on an Annex of the Habitats or Birds Directive)?	
Threats and pressures	
Proposed conservation actions to be carried out on the site once it is designated	
Consultation with relevant ministries	
Public consultation	
Submission of the proposal to the European Commission	
Evaluation of designation proposal	
Inclusion of the site in the Natura 2000 network	

PROJECT, EXCURSION

C.2 Managing a Natura 2000 site

135'

45' preparation, 60' outdoors, 30' group discussion

Objectives	Preparation required	Subject / Context	Materials needed
Make use of the Natura 2000 Viewer Study a specific species and related threats Understand how Natura 2000 sites are managed	Get acquainted with the Natura 2000 Viewer Print out worksheets Identify a suitable site for a visit, preferably with a field guide **Optional:** Start a short project whereby students research information about the chosen site	Biology Social sciences	**For the educator optional:** Computer with internet access, projector and screen **For the students:** Pens and paper / notebooks Worksheets Computers with internet access Smartphones with species identification app

Instructions

In the classroom

1. Explain the functioning of the Natura 2000 Network Viewer.
2. Ask students to use the viewer to find Natura 2000 sites nearby and select together a suitable site for the exercise / excursion.
3. Based on the information in the Natura 2000 Standard Data Form, ask students to identify the managing authority of the site.
4. Students then form groups of 2 or 3 and find out as much as possible about that site, using its the Natura 2000 Standard Data Form and any other sources (e.g., the EUNIS database), and fill in worksheet 1.
5. Students develop a short questionnaire with about five questions for the Natura 2000 manager / field guide during the visit.

Outdoors

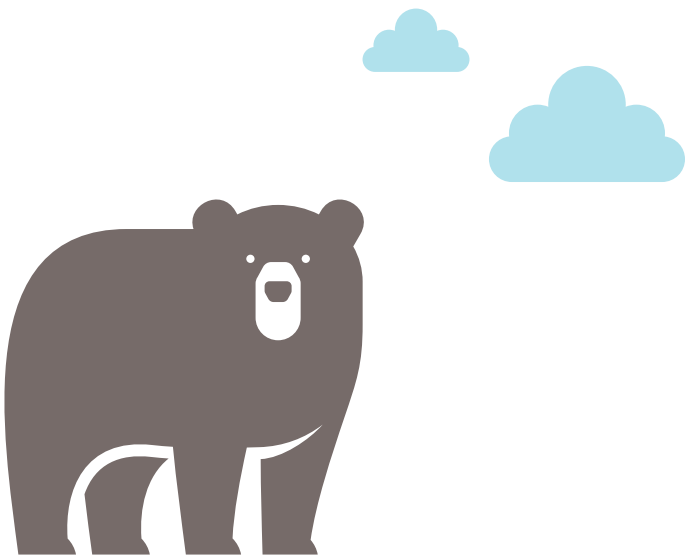
1. During the excursion, ask students to identify as many species and habitats as possible and note them in worksheet 2, using field and taxonomic guidebooks or apps. They should note down signs of human presence in the site. If possible, organise a question-and-answer session during the visit with the site manager.

Back in the classroom

1. Students compare their findings (worksheet 2) with their earlier results (worksheet 1). Each group presents their findings followed by a plenary discussion to compare results and identify species or habitat types that where not discovered in the field.
2. Students can also discuss possible management activities that could help to increase the presence of species and improve the condition of the site.

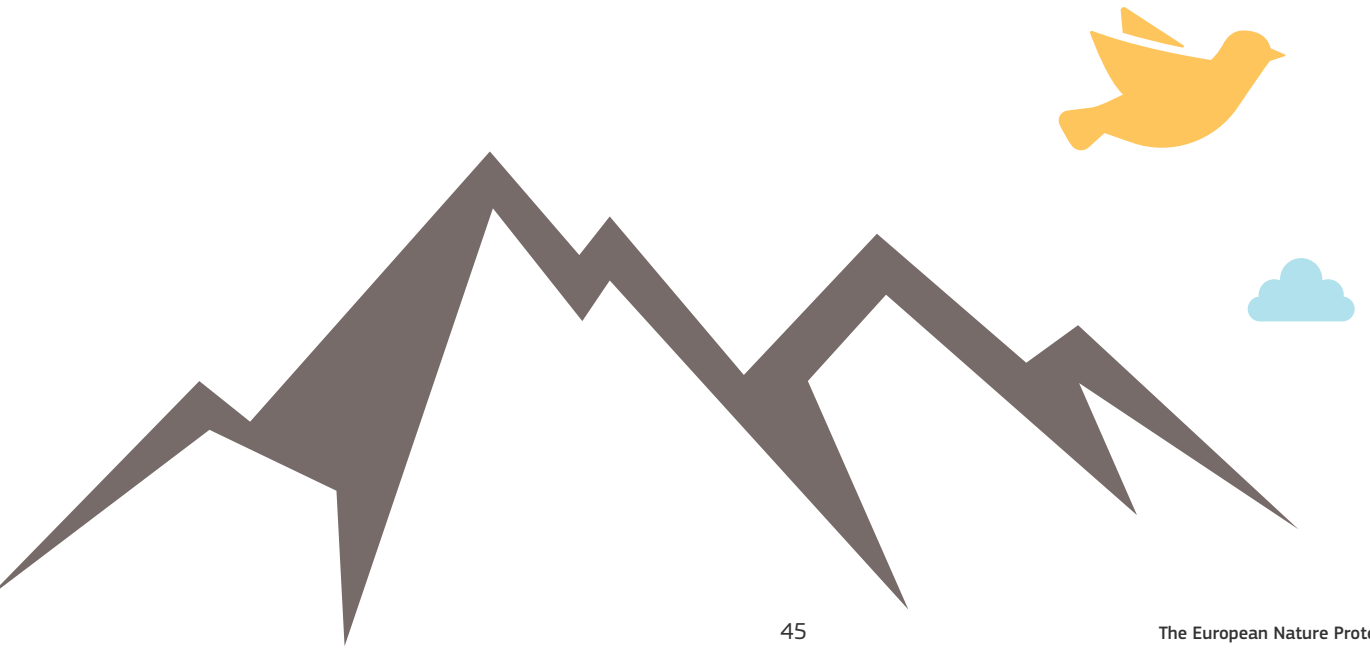
Material Worksheet 1: Desk research

Name of the site:			
Protected species	Protected habitats	Threats and pressures	Activities allowed in the site



Material Worksheet 2: On site

Name of the site:		
Species present	Habitats present	Indications of human activities



PROJECT AND OUTDOOR WALK

C.3 Become a wildlife expert

90'

Objectives	Preparation required	Subject / Context	Materials needed
Learn to recognise nature on your doorstep Raise awareness about common plants and animals	Prepare the board according to the template Print out worksheets Identify a short walk near the school where students can see plant or animal species Provide large paper and pens for the poster	Biology Social sciences	**For the educator:** Computer with internet access **For the students:** Smartphone with relevant app Pen and paper / notebook Pens and paper for poster

Instructions

In the classroom

1. Ask students which plants, insects and birds species they know something about. Collect the species' names on the board (see template).

Outdoors

1. Take them out for a 30-minute walk and ask them to identify at least five additional species of plants, insects and birds respectively, using an app or reference book to identify the species, and take photos if possible.

Back in the classroom

1. Add the additional species to the board.
2. Fill in the remaining two columns together with the group and discuss any interesting or unclear issues.
3. Students then select a species they find interesting and form groups of two or three to prepare a poster presentation about that species. They can include interesting facts, where the species lives, how it is doing, if it is protected, and/or whether and how it comes into conflict with human activities and what can be done about it.
4. They could notably use the Natura 2000 Network Viewer, EUNIS database and Standard Data Forms to find relevant information.

Material Template: Presentation of results on board

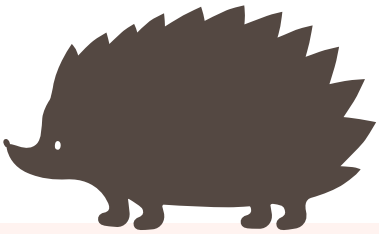
Name of the species (common and Latin)	Brief description (characteristics and needs)	Our relationship with that species (e.g., can / do we eat it or its fruits / products, does it provide shade or fresh air, etc.)

ONLINE QUIZ AND GAME

C.4 Name, Place, Animal, Thing!

45'

Objectives	Preparation required	Subject / Context	Materials needed
Become familiar with the EUNIS database Learn how to find information about a species or habitat	Familiarise yourself with the EUNIS database and its search functions	Biology Geography	**For the students:** Computer with internet access Pen and paper



Instructions

1. This activity is an adaptation of the popular game "Name, Place, Animal, Thing".

2. Ask students to agree on one letter for the whole group. They then need to find a habitat type and a species whose Latin names start with that letter in the EUNIS database (so, for instance, find a species and habitat type that start with the letter E). Since the EUNIS database only uses English and Latin names, they need to note down the Latin name first and then look up its common name using a search engine. The goal is not to choose the first possible option but the unusual and to be the only person who choses that specific habitat type or species.

3. The first student to identify both a habitat type and a species whose Latin names start with the chosen letter, and has identified the common name of that species, stops the game. They present their results and compare what they found.

4. **Points are given as follows:**

   - 10 points for the students who have a (correct) answer no one else has.
   - 5 points if several students have chosen the same (correct) answer.
   - The exercise can be repeated several times with different letters. The student who has most points in the end is the winner.

5. This game can also be played offline: Students select categories, e.g. plant, mammal, insect, bird, carnivore, herbivore, habitat, etc. and have to come up with species or habitat names for that category starting with the chosen letter.

Expansion: Becoming a EUNIS expert

The activity can be expanded by looking up more information about the types of habitats and species they have identified during the game, for instance:

For habitats:

- What does the habitat look like, how is it described in EUNIS?
- What is the conservation status of this habitat in the EU?
- Are there any Natura 2000 sites that protect the habitat? If yes, in which countries?

For species:

- What is the conservation status of this species in the EU? How is this species protected?
- What habitat does this species prefer?
- Is there a Natura 2000 site designated for this species in your country?

Afterwards, have a discussion in the group on what they have learned and what they found most interesting and useful about the database.

ROLE PLAY / SIMULATION GAME

C.5 "Homes for people or nature?"

120'

Objectives	Preparation required	Subject / Context	Materials needed
Understand the different interests and positions that play a role in conservation Reflect on conflicting interests and priorities and on how to address a controversial situation	Print out the hand-outs	Political sciences Social sciences Citizenship for older children	**For the students:** Hand-outs, role cards Pen and paper

Instructions

1. Through role play, this activity introduces students to the different needs and interests involved in conservation, and encourages them to think about how to arrive at practical solutions.

2. Explain the starting situation for the role play, based on the description provided below. Distribute the text and let students read it again carefully.

3. Choose a facilitator for the Citizens' Assembly; this could either be the educator or one or two students. Their task is to lead the discussion during the Assembly. While the groups discuss their position, the facilitator(s) should think about their facilitation strategy including the structure and rules of the debate. These rules should be made clear at the beginning of the Assembly meeting (e.g., people should not interrupt each other, each group has 3 minutes to present their case, etc.).

4. The remaining students should form five groups:

   1) Municipality
   2) Nature protection non-governmental organisation (NGO)
   3) Cattle farmers and landowners
   4) Community members (citizens)
   5) The "Better living" construction company

5. Each group must develop the position of their stakeholder and agree on how to best present their case (the key points they agree on, what they might be willing to negotiate on, what are the lines they are not willing to cross). Each group should agree on who will speak on their behalf in the Assembly.

6. The groups then come back to attend the Citizen Assembly. The facilitator(s) explain the structure of the Assembly as well as the rules.

7. The speaker from each group then presents their case to the Citizens' Assembly. The facilitator(s) lead the discussion and note the proposed solutions on the board. The objective is to find a solution that everyone / the majority can live with.

8. After the role play, lead the students in a discussion to reflect on the solution-finding process and how the decision was made in the end.

9. The role cards below are meant as an inspiration and each group is free to develop and expand its role.

Material Supporting document: Context for the game

Starting situation

The municipality of a small town has announced its plan to build a new settlement for 1 000 new residents on its outskirts, including a new road and a bicycle track connecting it to the centre of an adjacent bigger city. The location it has envisaged for the new buildings includes a large grassland area with several old oak trees on it, which is currently used by some farmers to graze their cattle. To build the houses, large areas would need concreting and the trees felled. Similarly, to construct the roads and the 4-metre wide bike track, more trees would need felling. On top of that, the bike track would cut through a nature conservation area. The mayor calls a Citizens' Assembly to present the proposal and consult and discuss it with the citizens.

Material Template: Role cards

Role card "Municipality"

The plan to build settlements and expand public transport is very attractive because, in recent years, the town has seen many young people moving away as they felt they were cut off from opportunities they would have in the bigger city. At the same time, families from the city who want to have more space in a calmer area could not find suitable housing. The mayor thinks that the new settlement could make the town younger and more vibrant and therefore, in the future, also attract new businesses and generate jobs and economic development.

Role card "Nature protection NGO"

The NGO opposes the building of a new settlement and transport infrastructure. Not only would it result in a decline of biodiversity in the area, but it would also destroy old trees that help keep the town's air clean and provide shelter for many animals. While the NGO is in principle in favour of expanding climate-friendly public infrastructure, such as cycle lanes, the new infrastructure would disturb and destroy local biodiversity. It would seal the soil, which means water cannot seep into the ground anymore, and therefore increase the region's vulnerability to flooding.

Role card "Cattle farmers and landowners"

The town's small-scale cattle farmers usually let their cattle graze during spring and summer on the area where the new houses would be built. However, with this space taken up by the new project, they fear their livelihoods will decline and that they might eventually have to give up farming altogether. On the other hand, the municipality has offered them a good price for the land which would also make them more independent from grazing livestock. Similarly, the new road is planned through the land of several landowners and they are concerned that they could lose their property.

Role card "Community members (citizens)"

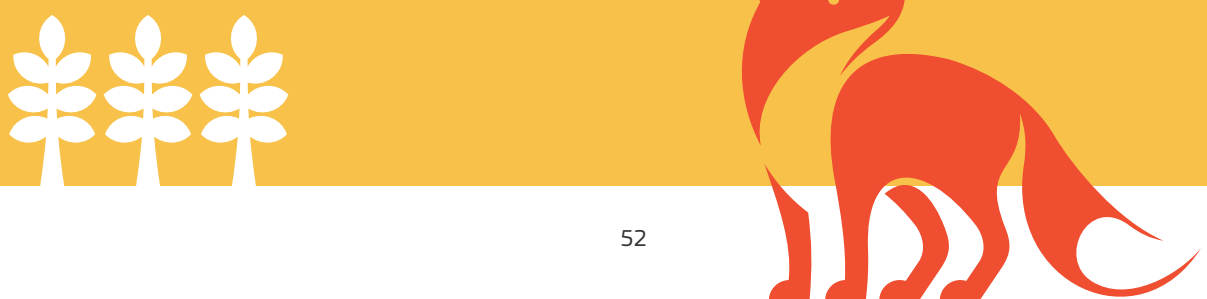
The citizens are a heterogeneous group with a variety of opinions. Some welcome the project as they believe it will revive the city and finally give young people a new perspective by providing a better connection to the bigger city. Another group is happy about the housing plan since they hope a younger population will attract more shops and businesses to the small town.

On the other hand, some citizens are also concerned about the new buildings and would prefer their hometown to not change and potentially loose the small-town spirit that they like. Others are concerned about the loss of biodiversity which would occur with the destruction of the grassland, tree felling and soil sealing in the area where the houses and the roads would be built.

Role card "The "Better living" construction company"

"Better living" is a construction company, specialised in building housing developments across Europe. This new construction project is an important business opportunity for the company and would expand its market share in the region. The company is convinced that the new houses will make the city livelier and more attractive.

Module D: Engaging in nature protection

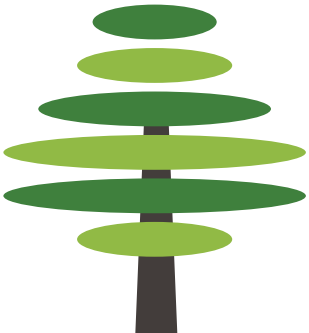


Educational objectives

1. Find out how to get engaged in and contribute to nature conservation;

2. Learn how to engage in raising awareness and promoting actions for conservation;

3. Gain better insights into how EU institutions and policies work and how to develop and present personal positions and policy proposals.



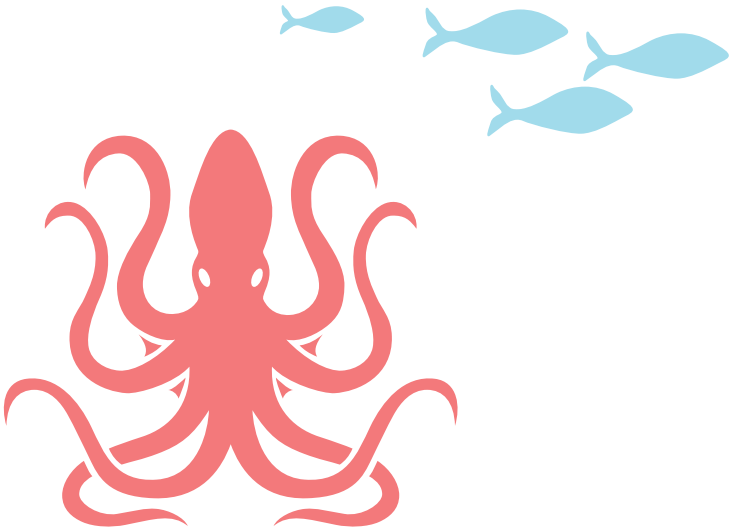
D.1

PROJECT: MEDIA CAMPAIGN

Campaigning for nature

180'

Objectives	Preparation required	Subject / Context	Materials needed
Experience how to become active and part of a wider effort and motivate others Learn how to design a campaign or contribution for an international nature conservation campaign	Background reading on suitable campaigns, such as Natura 2000 Day or the World Migratory Bird Day	Natural sciences Social sciences Arts Languages	To be identified and organised by the students



This activity can be done as a longer project, e.g., in the frame of a project week, or in two consequent sessions:

1. Preparation and planning of the campaign, and
2. Design and implementation.

The timing should be planned according to the timing of the campaign chosen. For example, for a contribution to the European Natura 2000 Day, the activity should ideally begin in April / early May to match the launch on 21st May. The World Migratory Bird Day takes place during the migration season of the birds, in May and in October, so planning should take place in April or September.

Introduction

1. Let students conduct online research about the different types of campaigns and international days and their topics, e.g., World Migratory Bird Day, #UnitedforBiodiversity, etc. For inspiration, watch video clips from different campaigns (e.g., videos of the World Migratory Bird Day (in English language) can be found here and here).

2. Students get together in groups and agree on their campaign topic. For Natura 2000 Day, this could be a particular Natura 2000 site (they can use the Natura 2000 Network Viewer to select one) or the protection of a particular species or place, the raising of awareness about a certain threat to biodiversity, etc.

3. Students should also decide on their communication strategy:

    - Purpose and objective (what do they want to achieve?)
    - Key message (what do they want to say?)
    - Target audience (whom do they want their message reach?)
    - Communication means and channels (how do they want to promote their message?)
    - Communication product that fits their communication purpose, e.g., a poster, a photo story, a local action, etc.)

4. The groups design their campaign, e.g., organise an event at their school, a discussion panel with teachers or peers, a social media campaign, a presentation at a local fair, a poster, a song, a video clip, etc.

5. Each team presents their results and implements the campaign. For the World Migratory Bird Day, they can register their event on this website and become part of the global community celebrating and raising awareness about migratory birds.

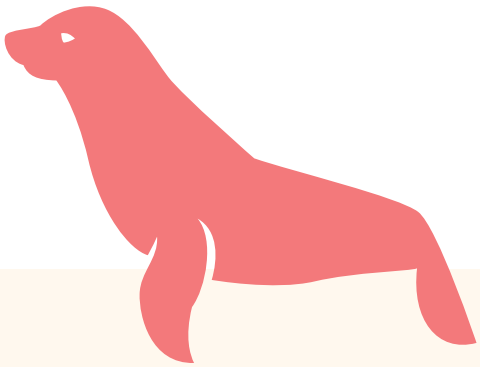
D.2

WRITING A JOURNALISTIC ARTICLE

Communicating about nature

45'

Objectives	Preparation required	Subject / Context	Materials needed
Learn how to communicate about nature and decide on key messages Understand different language styles and learn how to evaluate news articles	Online research about suitable news articles (see below) Print out of texts	Social sciences Citizenship Language	**For the students:** Pens and paper / notebooks Hand-outs (see below)



Instructions

1. Carry out online research to find two different types of news article on the same environmental issue (e.g., decline of insects or birds, a national or local conservation or restoration project or initiative, etc.). The articles should be about the same topic but different in their style, e.g., a balanced view of both sides of the issue and a clearly biased towards one side; or a neutral, factual description of the situation as opposed to an opinion piece with a clear value judgement reflecting the opinion of the author.

2. Read the texts with the group, ask them to identify the differences and discuss how to identify a balanced and descriptive text from an opinion piece.

3. Students should select a topic of their interest and write their own article, mindful of the different styles identified in the discussion. They can also include pictures or diagrams to illustrate their point.

4. The contributions could be compiled into a class "nature bulletin" which the students could, for instance, sell or hand out to other students in their school.

PROJECT

D.3 Volunteering for nature

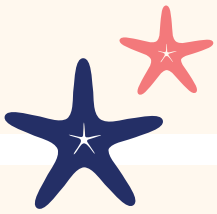
90'

45' for the visit

Objectives	Preparation required	Subject / Context	Materials needed
Get inspired about different forms of organising and becoming active for nature Understand the different opportunities for participating and contributing to conservation	Research on local initiative related to nature conservation Research on relevant citizen science projects	Citizen studies	**For the students:** Computer with internet access Pen and paper

This activity is structured in two parts:

1. An interview with a representative of a nature organisation; and
2. Participation in a citizen science project. The two parts can be implemented independently of each other. In preparing for the citizen science project, carefully check the timing because some projects are carried out at very specific times of the year. Others can be ongoing over longer periods.



Instructions

A – Interview: Nature protection in your backyard

1. Ask students to identify a local organisation, initiative or project that works on nature conservation, e.g., through an online search.
2. Decide with the group which organisation they find most interesting and invite someone of that organisation to either visit the school or, alternatively, organise an excursion to their office.
3. Before the visit, students should brainstorm and prepare some questions they would like to ask that person.

B – Be part of the science

1. Navigate through the EU Citizen Science website (or check-out other sites from the Reference and additional Resources section) to find projects you could take part in with your group and present a few to the group.
2. Students form groups, each finding out more about one project, its purpose and how the scientific data collection and data quality control processes work.
3. The groups then actively participate / become involved and contribute to the project, e.g., over the course of the next week. They record the process (e.g., write a short report or explanatory bullet points) on what activities they undertook.
4. At the end of the week, they can share their experiences as citizen scientists and report about their activities.

DISCUSSION AND GROUP WORK

D.4 Understanding EU policies

90'

Objectives	Preparation required	Subject / Context	Materials needed
Understand how EU institutions and policies work Learn to develop personal positions and demands to present and communicate them to others	Background reading Print out the worksheet	Political sciences Citizen studies	**For the educator:** Whiteboard and pen **For the students:** Worksheets

Instructions

1. Recall information about the EU, e.g., here and in the Background and key concepts section, and look out for current news with regards to EU environmental policies, or other relevant public discussions about the EU, e.g., elections, etc.

2. Kick-off a discussion with your students by collecting ideas about what they associate with the EU, whether, when and in which context they have heard about the EU, e.g., the European flag, the Euro, the 27 Member States, etc.

3. Clarify any questions, e.g., "What is the European Union?" and "What are its tasks?". Note the answers and important points on the board.

4. Discuss the EU's role in protecting nature, and remind them of the EU Nature Directives and the Natura 2000 network. Collect answers on the board.

5. Read out the statements in the worksheet and let students decide which ones are true and which ones are false. Alternatively, print out and distribute it so they can mark the answers themselves.

6. Reflect with the whole group on the statements:

   - Why have those rules been set up?
   - Why are they carried out at the EU level, rather than at the national level?

7. Students now form groups or pairs. Their task is to develop their own proposals related to nature policies, e.g., by answering on following questions:

   - What is important for you?
   - What do you think should change?
   - Which nature-related issues do you notice in your everyday life or in the media?
   - What do you think should be done about it and what role could the EU play?

Each group develops at least three proposals and presents them to the others, who then provide feedback. Which proposals are supported most?

8. Discuss the results and let students highlight the proposal they think is most important and why.

Material Worksheet: List of statements (for students)

Statement	True (T) or False (F)
EU Member States must translate the EU Nature Directives into national legislation.	
Bananas that are not curved enough cannot be sold.	
EU Member States must designate Natura 2000 sites and report this to the European Commission.	
It is not a problem to build a coal plant in a Natura 2000 site.	
The protected areas (including Natura 2000) should cover at least 30 % of EU land and 30 % of EU seas by 2030.	
Humans are not allowed to do any kind of activities in a Natura 2000 site.	
In urban parks, a certain number of trees need to be reserved for nesting birds.	
When a whale swims by, ships must stop.	
EU Member States must protect species listed in the EU Nature Directives.	
It is not allowed to pollute Europe's air or water beyond a certain threshold.	

Material Worksheet: List of statements with solutions (for educator)

Statement	True (T) or False (F)
EU Member States must translate the EU Nature Directives into national legislation.	T
Bananas that are not curved enough cannot be sold.	F
EU Member States must designate Natura 2000 sites and report this to the European Commission.	T
It is not a problem to build a coal plant in a Natura 2000 site.	F
The protected areas (including Natura 2000) should cover at least 30 % of EU land and 30% of EU seas by 2030.	T
Humans are not allowed to do any kind of activities in a Natura 2000 site.	F
In urban parks, a certain number of trees need to be reserved for nesting birds.	F
When a whale swims by, ships must stop.	F
EU Member States must protect species listed in the EU Nature Directives.	T
It is not allowed to pollute Europe's air or water beyond a certain threshold.	T

Background and key concepts

Biodiversity

Biodiversity (from "biological" and "diversity") focuses on the diversity of living organisms and the ecosystems they live in. Biodiversity is commonly explained as existing on three levels:

A. **Genetic diversity:** Diversity within a species which explains, for example, why all sparrows are not identical. Genetic diversity (differences in the DNA of individual plants or animals) allows populations to adapt to changing conditions.

B. **Species diversity:** All the different plant and animal species that exist. This is the most common use of the word biodiversity.

C. **Ecosystem diversity:** The diversity of different kinds of ecological systems in which species live, such as forests, grasslands, etc.

Besides natural organisms and areas, the term also applies to semi-natural places and cultivated organisms such as farmed crops.

Nature

The term "nature" has a broader meaning than the term "biodiversity" and typically refers to the physical world in a wider sense, covering all living organisms (plants, animals, mushrooms…) and the physical world they interact with (landscapes, air, water, rocks, soil…).

Species

Every animal or plant belongs to a particular group of organisms that all share a similar set of features. They can look similar, have similar DNA, and / or show the same kind of behaviour. These groups of organisms that are alike in certain ways are called "species". Reproduction can typically only take place between individuals of the same species. Species can be divided into sub-groups (sub-species) which are made up of organisms that are even more alike in their features than others of the same species. There are more than 8 million species of plants and animals on Earth, but scientists have examined only around 1 million of them to date.

Habitats

The environment in which certain plants, animals or other organisms naturally live and grow is called a habitat. A habitat provides the most suitable living conditions for all creatures residing inside it including, for example, nutrition and shelter. Habitats can be very different from each other, depending on the prevailing climate conditions, the surface of the land (e.g., rocky, silty), water availability and other factors. For example, pine forests are habitats, as are different kinds of meadows and swamps. Plants and animals are usually adapted to the specific conditions of the habitat they live in and are therefore usually dependent on it. A habitat or a group of related habitats can be considered an ecosystem.

Ecosystem

The term "ecosystem" merges "ecological" and "system". Ecosystems contain all kinds of living beings (plants, animals, bacteria, fungi) which are dependent on and constantly interacting with each other, while also being dependent on their non-living natural surroundings (temperature, humidity, rocks, etc.) to survive. This means, for example, that if a condition in an ecosystem changes, the ecosystem itself must adapt: for example, in case of changes in temperature or in water availability, certain plants might not be able to survive there anymore. In turn, this affects the animals that would usually feed on these plants.

Ecosystems can be terrestrial or aquatic and they come in all shapes and sizes. A habitat - or a group of related habitats - can also be an ecosystem (or part of an ecosystem). Often multiple habitats form a large ecosystem together; however, a single pond can be an ecosystem too if it exists in relative isolation in its immediate environment.

Ecosystem functions

Ecosystem functions refer to the processes generated through the interaction of living organisms between each other and with their surroundings, such as energy and nutrient exchange, and decomposition. Those processes are the foundation for all life on earth. For instance, the ecosystem functions provided by healthy freshwater ecosystems include clean water provision; peat bogs provide carbon storage; and forests improve air and soil quality.

Food web

A food web is a diagrammatic way of representing the feeding relationships between species in a community – basically showing who eats what, or who eats who. Food webs are a useful way of showing the different and complex ecological interactions within ecosystems through a focus on energy flows. A food web is made up of interconnecting food chains, demonstrating through a linear relationship how a particular species feeds and – in the case of all plants and most animals – how, in its turn, it is eaten.

Humans and nature

We depend upon nature to keep us alive: we need air to breath, water to drink, plants and animals to eat, soil to grow crops in, energy to warm ourselves, and raw materials to make things from. Our interactions with nature are multiple:

- **Economic connections:** We interact with nature in an economic way when we use land for construction or raw materials, for example to grow or catch food (e.g., crops or fish) or to create other products (e.g., wood, metal);
- **Cultural connections:** From our celebration of seasonal festivals (e.g., mid-summer), our use of symbols drawn from nature (e.g., the eagle in Austria, Germany and Poland, the shamrock in Ireland), to local cuisine, traditions, myths, fairy tales and folklore art;
- **Social connections:** Nature provides us with many opportunities to enjoy social activities, often recreational such as walking, cycling, sailing, fishing, etc., as well as photography, painting, outdoor music festivals, etc.;
- **Spiritual connections:** The spiritual values of nature can include sacred natural sites, and experiencing our own connectedness with nature, appreciating that nature recharges our energy and is crucial for our mental well-being;
- **Health connections:** A growing body of research shows how spending time in nature has beneficial effects on our mental and physical health, lowering blood pressure, reducing stress and promoting healing.

EU Nature Directives

The two key pieces of EU nature conservation legislation are the Birds Directive and the Habitats Directive, commonly referred to together as the Nature Directives.

The Birds Directive became European law in April 1979. It is the oldest piece of EU legislation on the environment. The Directive aims to protect all 535 species of wild birds naturally occurring in the European Union. It also lists 195 bird species and sub-species that require particular protection of their habitats. EU Member States must designate Special Protection Areas (SPAs) for these species to ensure their protection.

The Habitats Directive was adopted in 1992 and ensures the conservation of 1780 animal and plant species and 233 habitat types. For many of the species and all the habitats listed in the Directive, EU Member States must identify and designate Special Areas of Conservation (SACs) to ensure that each habitat type and species is effectively protected across the EU. Together with the Special Protection Areas established under the Birds Directive, the SACs of the Habitats Directive are the constituents of the so-called "Natura 2000 network" (see below).

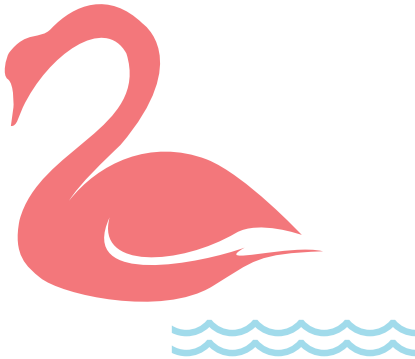
Natura 2000 network

Natura 2000 is the biggest network of protected areas in the world (see also the Natura 2000 Barometer which provides an overview of the Natura 2000 network of sites). Its objective is to safeguard Europe's most valuable and threatened species and natural habitats. The selection of the Natura 2000 sites and their boundaries is made by EU Member States.

The network comprises around 27 000 sites across all EU Member States, covering almost 18 % of the EU's land and nearly 10 % of its marine area. If you want to look for a particular Natura 2000 site, you can find them on the Natura 2000 Network Viewer, an interactive online tool. The viewer also provides information on the species and habitats present in each site, as well as data on habitat area, population size and conservation status.

The European Natura 2000 Award has been rewarding the best Natura 2000 sites and projects across Europe since 2014.

How do countries translate nature policies into action?



EU Member States are legally bound to respect the requirements of the EU Birds and Habitats Directives. For this reason, all 27 Member States were required to identify and designate Natura 2000 sites that are representative of their national biodiversity and sufficient to ensure that a favorable conservation status can be achieved for all protected habitats and species. Now, three decades after the entry into force of the Habitats Directive, the Natura 2000 network is almost complete on land, but Europe's marine territory still requires additional site designations.

Once the Natura 2000 sites are designated, they require active management and legal protection to ensure that there is no deterioration in the sites. For those species and habitats that are not yet in a favourable conservation status, additional work is needed to restore habitats or remove threats and pressures.

How Europe's nature is doing

The health of Europe's nature varies widely and according to specific ecosystems, species or habitats. But it is generally not in good condition. According to the latest European Environmental Agency (EEA) report on the 'State of nature in the EU':

- The conservation status of only 15 % of habitats assessments and 27 % of non-bird species is 'good'. Open habitats, such as grasslands, heathlands and dunes have worse conservation status and trends than other habitats.
- The population status of almost half of the bird species in the Birds Directive is 'good'; however, many bird species of farmlands that were formerly abundant are now severely declining.

Despite efforts at national and international levels, more conservation work is still needed to reverse current trends and to ensure a resilient and healthy nature.

Monitoring Europe's nature

Every six years, all EU Member States report on the sizes of and trends in bird populations (according to the Birds Directive), and on the conservation status of and trends in targeted habitats and species (according to the Habitats Directive). This information is then summarised and presented in the 'State of nature in the EU' report, which also includes information on main pressures and threats, on conservation measures and on impacts of the Natura 2000 network.

The reporting data from Member States can be checked out on so-called dashboards that summarise the key findings on the state of Europe's nature.

EUNIS and BISE

The European Nature Information System (EUNIS) compiles data from several European databases and organisations on species, habitat types and Natura 2000 sites. It is an expert knowledge base useful for anyone interested in learning more about species or habitats and has a handy search function.

The Biodiversity Information System for Europe (BISE) is a one-stop shop providing key information about European nature in a user-friendly way for the general public. BISE was created by the European Commission and the EEA. It includes information on the following:

- Natura 2000 sites, species and habitats by country;
- Latest figures on the state of EU nature;
- Ecosystems, why they are important and why they are threatened;
- Protected Areas: what they are, where they are located, and why they are important;
- EU biodiversity policy.

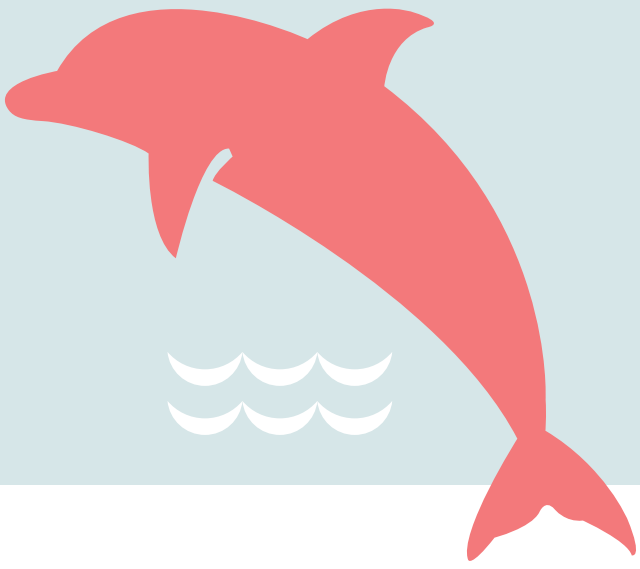
Threats to nature

The main threats to European nature include:

- **Land use change:** We are using more and more space, for instance for the production of goods and food and for housing and transport infrastructure, leaving less space for natural ecosystems.
- **Over-exploitation:** The unsustainable use of natural resources occurs when harvesting exceeds the reproduction capacity of wild plants, animals or ecosystems. Europe's use of its biological resources is well above their capacity to reproduce.
- **Fragmentation:** Habitat fragmentation refers to the transformation of large areas of habitat into smaller patches, isolated from each other, by land use choices including urban expansion or transport networks. Impacts of fragmentation can include a decline in the habitat health, reduction in plant or animal population viability, loss of biodiversity, increase in invasive species, and reduction in water quality.
- **Pollution:** Pollution impacts on biodiversity in various ways, including nutrient loading whereby excess quantities of, for example, nitrogen and phosphorus, enter an ecosystem and its waterways. Excess atmospheric nitrogen deposition can result in chemical changes in soils leading to stresses on ecosystems.
- **Invasive alien species:** These are non-native species that are not held in check by the usual predators or other impacts that keep species populations in balance. They can cause great damage to native species by competing with them for food, eating them, spreading diseases, etc.
- **Climate change:** The climate, species, habitats and ecosystems are linked through complex relations, and any change to the prevailing climate can impact seriously on how species, habitats and ecosystems functions interact – in the most extreme cases even leading to species extinctions.

More information on all these points can be found on BISE.

References and additional resources



This section provides a selection of different materials that can be helpful for implementing the activities and provide further food for thought and ideas for environmental education.

Become a citizen scientist!

Citizen science initiatives are becoming increasingly popular – and important – in protecting nature. The so-called "citizen science" approach is based on volunteers (so-called "citizen scientists") collecting data on a particular issue (e.g., butterflies) in a standardised way and sending it to the relevant monitoring scheme's central database. Many citizen projects also offer background information on the targeted species and can present a great opportunity to get in contact with experts/scientists in the field.

Some relevant citizen science initiatives

- EU-citizen.science: platform listing current and past citizen science projects carried out within the EU
- Observation.org
- Ornitho
- iNaturalist
- BioBlitz

There is also a growing list of national platforms, such as:

- Citizen Science Network Austria
- Centre for Citizen Science, Austria
- Citizen Science Center Zurich
- Swiss Citizen Science Network
- Flemish Knowledge Centre for Citizen Science (Scivil)
- German Citizen Science Network
- Italian SNPA Citizen Science Group
- Danish Citizen Science Network
- Swedish Citizen Science Network
- European Network of Heads of Environmental Protection Agencies–interest group on citizen science

Apps for species recognition

Numerous apps exist for species recognition, including many free ones. The following ones are the most comprehensive ones, available in all languages and free of charge.

- iNaturalist
- ObsIdentify

Interesting initiatives from across Europe

There are many interesting and inspiring educational initiatives and programmes from all over Europe. Here are a few examples:

- Eco-Schools Network: International network which includes many European schools with lots of useful materials, activities, festivals, etc. around biodiversity;

- MEdIES: The Mediterranean Education Initiative for Environment and Sustainability, a network of 6000 educators and hundreds of schools across the region;

- Educational areas: Training students to be actors in the conservation of biodiversity (French Biodiversity Agency (OFB), France).

Selected resources for environmental education

- Public learning resources: A range of resources in different languages on nature-related topics from different countries;

- Living planet report 2020: The youth edition of this WWF report, in English;

- Education for Sustainable Development in Biospheres Reserves and other Designated Areas: A resource document in English for educators, focusing on the functioning of ecosystems, biosphere reserves and sustainable development within them.

References

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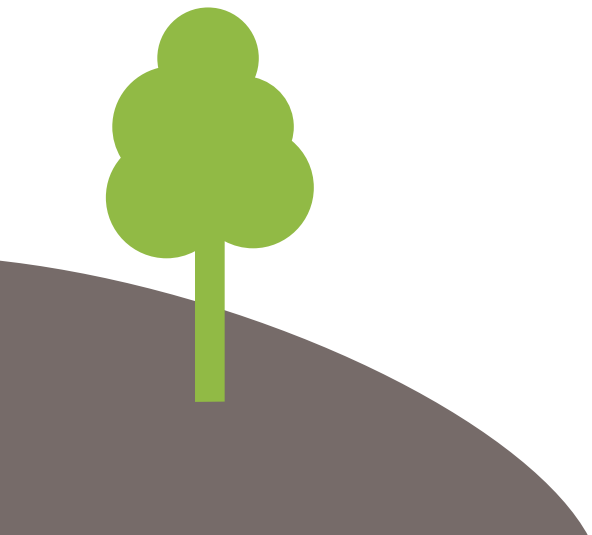
3. Avibase - Bird Checklists of the World, Europe
4. The EBCC Atlas of European Breeding Birds (Wikipedia)
5. The Status and Distribution of European Mammals (IUCN)
6. Fauna of Europe (Wikipedia)
7. European Red List of Amphibians (European Commission)
8. European Red List (Freshwater fishes) (European Commission)
9. European Red List (Marine fishes) (European Commission)
10. European Red List (Vascular Plants) (European Commission)
11. 33 Threatened Fungi in Europe (Mycological Research)
12. European Red List of Threatened Species (IUCN)
13. European Red List of Habitats (terrestrial) (European Commission)
14. European Red List of Habitats (marine) (European Commission)
15. State of nature in the EU (European Environment Agency)



Imprint

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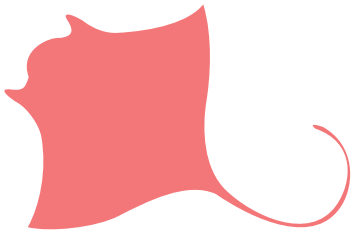

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Activity B.2 Simulate an ecosystem: This activity is an adaptation of Module 16, page 145 of the publication “Grünland entdecken. Umsetzung des Themas Grünland im Unterricht der Jahrgangsstufe 5 des Gymnasiums”. Herausgeber: Bayerisches Staatsministerium für Unterricht und Kultus und Bayerisches Staatsministerium für Umwelt und Verbraucherschutz; Redaktion: Bayerische Akademie für Naturschutz und Landschaftspflege (ANL), Staatsinstitut für Schulqualität und Bildungsforschung (ISB) und Akademie für Lehrerfortbildung und Personalführung Dillingen (ALP); Gesamtproduktion: Bayerische Akademie für Naturschutz und Landschaftspflege (ANL) © 2019. Diese Publikation wurde gefördert mit Mitteln des Bayerischen Staatsministeriums für Umwelt und Verbraucherschutz im Rahmen der Umsetzung der bayerischen Biodiversitätsstrategie.

B.5 Explore your habitat: This activity is an adaptation of Module 9, page 86 of the publication “Grünland entdecken. Umsetzung des Themas Grünland im Unterricht der Jahrgangsstufe 5 des Gymnasiums”. Herausgeber: Bayerisches Staatsministerium für Unterricht und Kultus und Bayerisches Staatsministerium für Umwelt und Verbraucherschutz; Redaktion: Bayerische Akademie für Naturschutz und Landschaftspflege (ANL), Staatsinstitut für Schulqualität und Bildungsforschung (ISB) und Akademie für Lehrerfortbildung und Personalführung Dillingen (ALP); Gesamtproduktion: Bayerische Akademie für Naturschutz und Landschaftspflege (ANL) © 2019. Diese Publikation wurde gefördert mit Mitteln des Bayerischen Staatsministerium für Umwelt und Verbraucherschutz im Rahmen der Umsetzung der bayerischen Biodiversitätsstrategie.

D.4 Understanding EU policies: This activity is an adaptation of “Wer macht die Gesetze in Europa?” published by „Umwelt im Unterricht“ and licensed under a Creative Commons Namensnennung - Weitergabe unter gleichen Bedingungen 4.0 International Lizenz.

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