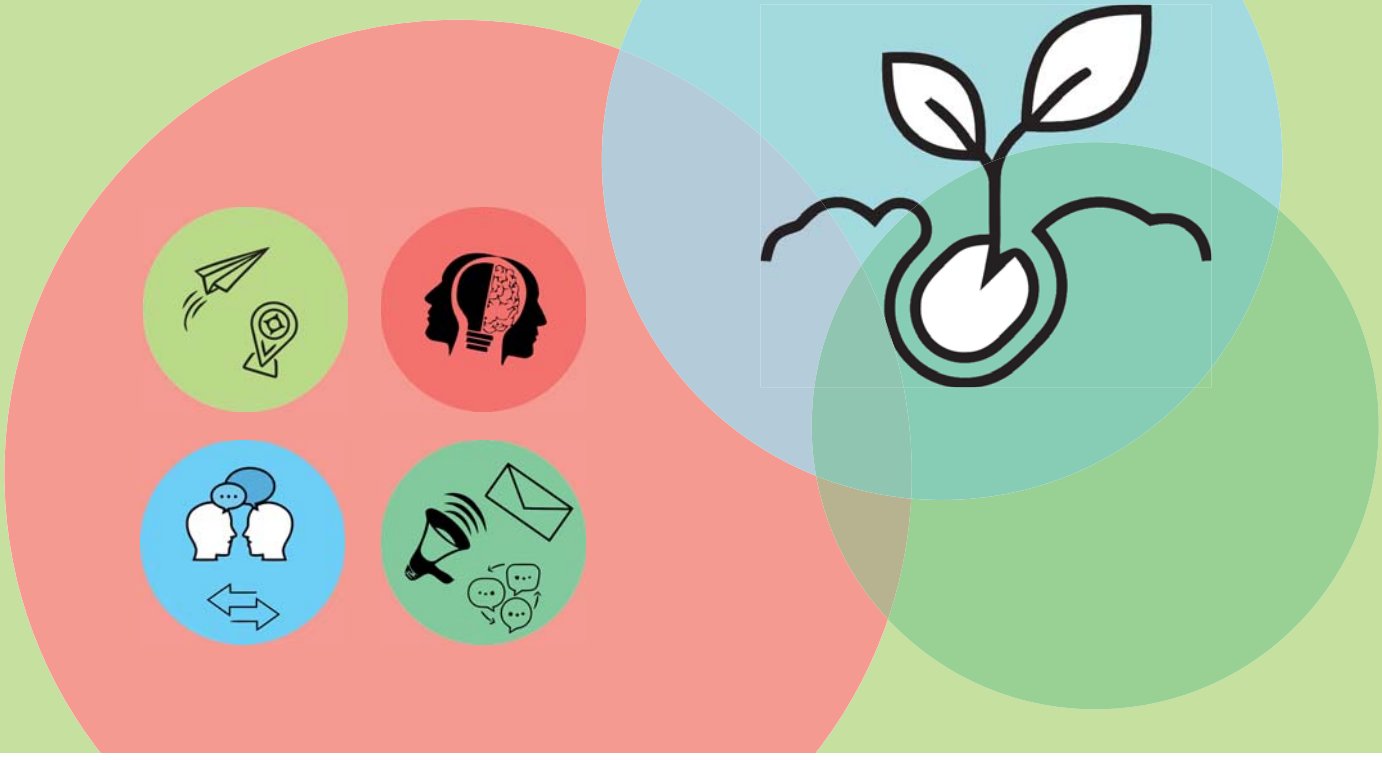
ESD 2030

EDUCATION FOR SUSTAINABLE DEVELOPMENT

DEVELOPING SKILLS IN DEALING WITH UNCERTAINTY

Teaching and learning materials on the topic of

Declining Insect Populations & Agriculture



DGU Deutsche Gesellschaft für Umwelterziehung
FIELDS INSTITUTE
Freie Universität Berlin
INSTITUT FUTUR
gefördert durch DBU Deutsche Bundesstiftung Umwelt

Imprint

Publisher:
Gerhard de Haan
Institut Futur
Freie Universität Berlin
Fabeckstr. 37
14195 Berlin

These teaching and learning materials were created as part of the project:

"ESD for 2030: Emotion and Problem-Focused Coping with Dilemmas, Trade-offs and Risks in Schools"

gefördert durch
DBU
Deutsche Bundesstiftung Umwelt
www.dbu.de

Sponsor:
Deutsche Bundesstiftung Umwelt (DBU)
Funding reference: 35601/68

Contact:
waldowmeier@institutfutur.de
g.dehaan@fu-berlin.de
i.boettger@fields-institute.de

Authors: Hella Polze, Marie Nieberg, Susanne Waldow-Meier, Gerhard de Haan, Ilona Böttger, Saskia Grüßel

Proofreader: Susanne Hofsäss-Kusche

Cover design: Illa Schütte

Design of the collection of materials: Marie Nieberg, Hella Polze

ISBN: 978-3-98633-016-3 | **DOI: http://dx.doi.org/10.17169/refubium-43336**
1st edition May 2024

Additional materials are available at: https://bne-umgang-mit-unsicherheit-lernen.de/

This educational material takes account of the quality criteria for digital ESD materials in accordance with National ESD Platform resolution dated 9 December 2022. Source: ESD portal (see page A24).

Contents

References in the text and bibliography are cited in line with the American Psychological Association (APA), in accordance with the 7th edition of the publication manual:

Bachmann, H. & Theel, M. (eds.) (2021). German APA guidelines: Based on the 7th edition (2019) of the official APA Publication Manual. Scribbr. https://www.scribbr.de/zitieren/handbuch-apa-richt-linien

Introduction

Dear reader,

This manual was produced as part of project „ESD for 2030: Emotion and Problem-Focused Coping with Dilemmas, Trade-offs and Risks in Schools." This research project is funded by the German Federal Environmental Foundation (DBU) and is being implemented with the involvement of Institut Futur at the Free University of Berlin (FU Berlin), the FIELDS Institute and the German Society for Environmental Education (DGU). The project involved developing a model through which competencies in dealing with dimensions of uncertainty in sustainable development can be promoted in a school and extracurricular context. Pupils at stage 1 secondary school (years 5-12, age 10-16) are the main target group. The content focuses on the topic of biodiversity, as it is marked by contradictions, dilemmas and uncertainties.

When engaging with sustainability issues, pupils are often confronted with complex problems and interrelationships. Current research on the connection between knowledge and attitudes in the context of sustainability shows that: The more insights young people have into the problems of global development, the more likely they are to become hopeless and lose their motivation to act (Grund & Brock, 2019). Many young people find themselves surrounded by complex issues that can be overwhelming to deal with, preventing them from taking motivated, targeted action. This effect is already evident in everyday individual consumer decisions: organic or conventional farming? Nutella or a palm oil-free alternative? Once the complex interdependencies are considered, the problems quickly reach global dimensions. Many young people are aware of these interrelationships. A lack of knowledge of the problem does not appear to be the cause of becoming unmotivated and unable to act; rather, a collectively perceived sense of powerlessness sets in when it comes to shaping a sustainable world (Sanson et al., 2019). In addition, there is often the impression that the problems go beyond the potential of personal power and that an individual's own actions will make no difference in the complex structures. Based on these observations, it can be assumed that there is an increased need for educational opportunities that allow people to develop skills in dealing with over-complexity, contradiction and uncertainty. But what exactly does this skill entail? What enables young people to meet the challenges of our time in a purposeful way?

In order to find viable answers to these questions, the objectives of ESD were updated as part of the UNESCO World Conference. The Berlin Declaration calls on education stakeholders to pay more attention to learners' individual transformation processes, including cognitive and socio-emotional learning, community and political education (see UNESCO World Conference, 2021 Berlin Declaration).

The model presented here is therefore intended to support pupils in acquiring these competencies and to empower them in dealing with complex global challenges. The study units follow an experience-based approach in which pupils are introduced to specific problems through concrete situational examples. As part of this, knowledge-based research phases are combined with discussions and refl ections on pupils' own attitudes and emotions. (For specifi c suggestions, see p. A17).

This manual is divided into an introductory theory section and a topic-specific collection of materials. The introductory section explains the theoretical background, learning objectives as well as the model‘s didactic structure. The collection of materials comprises working materials, didactic tips, information and optional add-ons which you can use to optimise the study unit for your group of learners.

Four additional manuals on other topics in the context of the biodiversity discourse, with which learners come into contact in their everyday lives, are available on the project website. The topics do not build on each other, rather they can be worked on independently.

We hope you manage to apply the model successfully using this manual, thus supporting your pupils in dealing with uncertainties in sustainable development.

Wishing you an enjoyable and constructive collaboration process!

Best wishes from the project team,

Prof. Dr. Gerhard de Haan, Susanne Waldow-Meier, Marie Nieberg, Hella Polze & Ilona Böttger

Current crisis complexity as a challenge for educational processes

Education for Sustainable Development (ESD) is increasingly beset by the challenge of addressing diverse and serious planetary crises, which can have a cognitively destabilising effect on learners and trigger strong emotions, stress and resistance (Singer-Brodowski et al., 2022). In the following topic sections, we explore contemporary challenges of ESD in the context of biodiversity, which are associated with contradictions, dilemmas and risks – in short, uncertainties. The relevance of emotions in educational processes for dealing with uncertainties is addressed (Grund & Singer-Brodowski, 2020).

This is followed by the question as to how educators in ESD can constructively support children and young people in dealing with these uncertainties. To this end, we present selected educational science models, which lead to application-oriented recommendations that may serve the „context-related and creative search for good solutions" (Grunwald, 2023, p. 6, *translated citation*). The collection of materials which follows in Part II contains specific teaching and learning materials that can be used in everyday school and extracurricular activities.

Dimensions of uncertainty in the context of sustainable development

Sustainable development

The United Nations (2015) defines sustainable development as development that meets the needs of the present generation and enables growth without jeopardising the livelihoods of future generations. Nature conservation, sustainable economic growth and social justice are the three essential areas that must be taken into account and regarded as interdependent (ibid.). In terms of sustainable development, social justice, economic performance and ecological compatibility should be striven for (Schreiber, 2012), and coherence, synergy effects and cooperation between the dimensions should be brought about. The coherence principle means that the interrelationships between the dimensions are taken into account during decision-making and that the developments in the various areas are perceived as interdependent. No perspective should be left out. At the same time, however, tension prevails between the perspectives, caused by conflicts of interest and conflicting goals (Schreiber, 2020; Schreiber & Siege, 2016).

Contradictions and dilemmas arise and present not only political decision-makers with challenges – we too find ourselves in decision-making conflicts at an individual level. In addition, when making such decisions, the consequences of the various options can never be predicted with certainty. Uncertainty and risk are therefore a characteristic of sustainability-related decisions (Ernst, 2008; Grunwald, 2010). Dealing with contradictions, dilemmas and risks – in short, uncertainties – in a reflective and constructive manner is at the heart of the teaching strategy. The pupils' main focus is on dealing with conflicts in decision-making, not on the ability to precisely define concepts. Therefore, the theoretical delimitation of the dimensions of uncertainties mentioned here is only of secondary relevance for the project implementation.

At this point, you as the project manager are presented with defining background information on the dimensions of uncertainty.

Dimensions of uncertainty: Dilemmas, trade-offs and risks

Dilemmas

Mader (2023) describes dilemmas as „complex situations in which stakeholders have to choose between several poor alternatives and cannot change the conditions of the situation or rank the given alternatives“ (p. 18, *translated citation*). Consequently, dilemma situations are characterised by two (or more) unattractive possible solutions, one of which must be chosen. This requires that individuals prioritise their own premises for action and values (Lind, 2006). A dilemma cannot be defined objectively, rather it largely depends on the individual‘s subjective perception and the social context (Henkel et al., 2023; Lind, 2006). With regard to decisions around sustainability, dilemmas arise „due to the contradictory nature of relevant objectives, forms of knowledge involved, stakeholders encompassed, applicable time policies and normative orientations“ (Henkel et al., 2023, p. 18, *translated citation*).

Trade-offs

Trade-offs are usually discussed in connection with economic perspectives: Sustainable development – and biodiversity in particular – mainly comes under pressure due to economic goals and interests. A key feature of trade-offs is that stakeholders have to choose between alternatives that, although both desirable, cannot be realised at the same time. One trade-off that affects biodiversity, for example, is the trade-off between habitat conservation and the use of land for the expansion of renewable energy systems (Obrecht et al., 2021).

In the teaching material developed, the main topic in which this conflict is reflected is „Species conservation and wind power.“

When dealing with trade-offs, it is important to counter incompatibility with acceptance and to establish decision-making premises (de Haan & Grüßel, 2023). Contrary to other decision-making contexts, in trade-off decisions, optimising a particular state by choosing the best alternative is not a central component. In the context of trade-offs, there is no such thing as an optimal decision. Therefore, it is more about appraising a given course of action based on the extent to which it is legitimate and justifiable (de Haan et al., 2008). If one option can be deemed more legitimate than the other, the decision will likely be made in favour of this option.

Risks

Sustainable action is future-oriented and, due to its open-ended nature, associated with uncertainties and anticipated risks. It is in learning to deal with these exact risks that the study units provide pupils with support. In concrete terms, this ability means having the capacity to act despite uncertainties and anticipated dangers. However, the learning of such a competent manner of dealing with a risk or event is always influenced by an individual‘s subjective perception of it, and its personal significance to them (de Haan et al., 2008). Therefore, selected fundamentals of risk perception are presented here.

On the one hand, rational, analytical considerations lead to specific interrelationships being assessed as risks, while the risks in turn influence the consideration processes and decision-making in these interrelationships. On the other hand, our perception of risks is subject to the significant influence of emotional, affective factors (Epstein, 1994). Most of our daily decisions are made quickly and automatically based on emotional risk assessments (Douglas & Wildavsky, 1982; Slovic & Peters, 2006). Although this is often an unconscious process, it exerts a crucial influence on the motivation for certain decisions and behaviours (Baumeister et al., 2007; Damasio, 2020). This happens because emotions can be used to confer meaning on events: Emotions shape how events are perceived and how information is processed, and these processes are accompanied by affective stimulation.

The perception of risks is also influenced to a significant extent by social mediation (e.g. media) (Covello, 2001; Kasperson et al., 1988; Peak & Hoeve, 2017). This leads to additional characteristic influences in the assessment of risks (Earle, 2010; Slovic et al., 2000). For example, the increase in flooding as a risk of climate change became a focal point in the media when the July 2021 flood disaster occurred. Such an acute event leads to the risk being assessed as significantly higher than it actually is, due in part to the media presence. This points to a distortion of risk assessment: „When there is a loud crash, we look closely. Isolated, rare risks, especially those that are difficult to control, are generally overestimated, whereas gradual developments that can only be recognised through symptoms are underestimated and not noticed for a long time“ (Ernst, 2008, p. 49, *translated citation*). Risk perception alone is a complex process in which various generalisable and individual patterns come into play. This model does not aim to analyse the mechanisms for all pupils individually in detail. Nevertheless, questions that stimulate reflection should be asked, since dealing with risks and uncertainties in a constructive manner starts with reflecting on our own perceptions. The topic of zoonoses, in particular, provides an opportunity for discussion in this regard.

Relevance of the biodiversity discourse as a topic

The term biodiversity refers to the diversity of all life on earth. This diversity is the result of natural evolutionary processes and is also increasingly subject to human influence. Biodiversity is often regarded as the diversity of species of all animals, plants and micro-organisms. However, this is only one aspect of biodiversity. Other core components of biodiversity include the genetic diversity within species and the resulting individuality of each living organism (Assmann et al., 2014). Another important aspect of biodiversity is the diversity of ecosystems in which living organisms are in constant interaction with each other and with their environment. All these components constitute a complex system of which we humans are a part. At the same time, we are dependent on many environmental services that can only be carried out when sufficient biodiversity is present (Secretariat of the CBD, 2000). In many respects, biodiversity is the prerequisite for processes that provide us with essential foundations of life. For example, a high level of biodiversity is of enormous importance for agriculture (Gerowitt, 2013). Over half of all crops are pollinated by insects, generating an estimated annual worldwide economic output of several billion euros (Lippert et al., 2021). Biodiversity also plays a major role in regulating the climate. An experiment on the productivity of forests showed that over twice as much CO2 is stored by forests with 16 different tree species than by the monocultures studied (Huang et al., 2018). In addition to diversity in forests, diversity in meadows and soils also exerts a positive effect on the climate. This is mainly

due to microorganisms and fungi in the soil that break down plant and animal biomass, thereby binding carbon and nitrogen (Max Planck Society, 2021).

The environmental services of climate regulation and its role as a food source are two of the many tasks that the planet can only fulfil if sufficient biodiversity is in place. In the Millennium Ecosystem Assessment, a United Nations study on the status and development of ecosystems worldwide, the services provided by ecosystems for humans were divided into four categories (Millennium Ecosystem Assessment 2005, cited in KBU, 2019):

1. Supply services are used for the direct supply of raw materials, food, water, oil, wood and other resources.

2. Regulatory services serve humans indirectly, e.g. through the climate-regulating role of soils and forests, as carbon reservoirs or, by means of floodplains, as natural flood protection.

3. Cultural services relate to natural heritage, tourist and spiritual functions and educational aspects of ecosystems.

4. Basic services (support services) are services that make the ecosystem services of the other three categories possible in the first place. These include, for example, photosynthesis and soil formation processes.

It is not possible to explain the individual services and their dependence on unimpaired biodiversity. Nevertheless, it is clear that biodiversity forms the basis of many of these ecosystem services. If the functioning of important ecosystems is impaired or upset by land sealing, the overuse of natural resources, climate change, environmental pollution and other anthropogenic causes, many of these important services can no longer be guaranteed (Helmholtz-Zentrum für Umweltforschung [Helmholtz Centre for Environmental Research], 2018). This means that humans are also directly affected by the impacts of biodiversity loss.

The sustainable use of biodiversity is included as a goal in the 1992 United Nations Convention on Biological Diversity. In concrete terms, this means that the components of biological diversity should be used in a way that does not lead to the long-term decline of biological diversity and thereby maintains its potential to fulfil the needs and expectations of present and future generations (Secretariat of the CBD, 2000). Numerous risks and dilemmas arise in this context, as already described.

These are to be visualised and processed using various examples in the study units developed as part of this project.

Emotions and the capacity to act in the context of ESD

Human action – in the context of ESD also – can be regarded as the result of a coordinated interplay of perception, cognition and emotional judgement.

„The question as to how this interplay works and how emotions may be plausibly defined yields very diverse answers“ and is expressed in a plethora of around 90 definitions of emotions, Waldow-Meier observes (2022, p. 23, *translated citation*). For the scope of this handout, emotions are

considered to be phenomena that support human decision-making and thus enable us to deal with environmental stimuli and cope with situations (Ali & Tan, 2022). Siegel (2017) summarises it as follows: „[...] what we call ‚emotion' is a dynamic and central function that interconnects behaviour, meaning, thinking, perceiving, relating and remembering." (italics in original, p.267)

In a contemporary study (Hickman et al., 2021), 10,000 young people aged between 16 and 25 from ten countries around the world were asked about their emotions regarding the climate crisis. Most respondents stated that they were worried (59% extremely worried, 84% at least moderately worried). Over 50% cited sadness, fear, anger, powerlessness, helplessness and guilt. In addition, over 45% reported being affected by these negative emotions in everyday life. Conversely, fewer people are hopeful about the future. According to a 2017 study, only 19% of people in Germany declared themselves to be hopeful about climate change (Pidgeon et al., 2017). As emotions have a crucial influence on our actions (Pfister & Böhm, 2008), it is important that this topic be addressed in the context of education for sustainable development.

Emotions are often categorised as positive and negative. However, this polarising classification fails to do justice to their many facets and modes of action. For instance, an emotion may have different dimensions, whose modes of action cannot be clearly interpreted (Pfister & Böhm, 2008). In the context of motivation to act in transformative processes, one example is anger. Despite its conventionally negative connotation, it can motivate people to take action, which therefore has a positive effect. For this reason, we do not categorise emotions as either positive or negative here. Instead, in terms of the capacity to act in transformations leading to greater sustainability, it makes sense to consider which emotions have an inhibiting effect, and which have a motivating and therefore favourable effect.

Emotions that inhibit decision-making and action

A major obstacle to sustainable action is the feeling of being **overwhelmed**. This begins with cognitive overwhelm due to the enormous complexity of interrelationships (Grunwald, 2010). In addition, overwhelm may occur at the evaluation level, due to the lack of uniform evaluation criteria as well as potentially conflicting goals and criteria (Grunwald, 2010). However, overwhelm can also quickly arise at the action level. Above all, the difficulty of moving from individual to collective action must be overcome. This often goes hand-in-hand with a **low or lacking expectation of self-efficacy**, as the influence of individual action cannot be seen in the larger overall structure. Purposeful action may also be prevented by **resignation, frustration, guilt** and **shame** (Leuser & Weiss, 2020). One emotion that can strongly counteract change in general, and therefore in social transformation processes also, is **fear** (Berner, 2015). It can come up as fear of loss, or fear of being unable to cope with change and can cause people to avoid facing challenges (Nussbaum, 2019).

So how can educators and teachers empower young people at an emotional level, thereby providing important building blocks to form the bridge from knowledge to action?

Aspects that promote decision-making and action

To implement stimuli for action in a targeted manner and actually take action, people need to believe that they can actually shape the future in a sustainable manner. In this context, **hope** plays a central role as a motivator for action (Grund & Brock, 2019). The presence of hope makes

it easier to pursue goals and overcome hurdles (Kraft, 2022). However, this does not refer to a romanticised form of hope, rather to a form of hope that is reflected in reality and does not disregard real problems and hurdles, nevertheless develops strategies to achieve set goals (Ojala, 2016; Ojala et al., 2021; Waldow-Meier, 2022). This type of critical and constructive discussion should be encouraged through the model presented here. The aim is to avoid overwhelm and to pose challenges in such a way that they can be dealt with in an effective and independent manner. In addition, aspects that promote hope include the visualisation of inspiring examples, the initiation of a change in perspective on previous achievements and the creation or integration of authentic study locations and participatory study formats (Nussbaum, 2019). When discussing courses of action, care should be taken to ensure that these are in proportion to the challenge at hand. If they are inadequate, for example, only very low-threshold individual measures are discussed, which obviously do not represent a satisfactory solution; this can quickly lead to a cynical attitude.

A factor that is closely related to hope is **trust** in current and future possibilities (Kraft, 2022; Waldow-Meier, 2022). Trust is an important emotional factor, especially at the level of risks and uncertainties, because trust assumes that possibilities which, though as yet unknown, are attributed to the power and creativity of the collective and the self, will emerge at some point in the future (Waldow-Meier, 2022).

The ability to tolerate uncertainties, contradictions and ambiguities is also important in relation to sustainable development (OECD, 2020; Singer-Brodowski et al., 2022). As we are confronted with conflicting information and values on a daily basis, **tolerance of ambiguity** can be regarded as a prerequisite for orientation in our society and for shaping transformation processes successfully within it (OECD, 2020). In line with Lenz (2020), enabling learners to experience diversity (also with regard to different points of view and opinions) as the norm is important. In addition, argumentation, dialogue and debating skills are essential to resolve conflicts of interest in the democratic system and for the capacity to deal with ambiguous, uncertain situations. Lenz (2020) also mentions critical thinking, empathy, adopting a perspective and engaging with dilemmas as key aspects and areas of practice when it comes to developing the ability to tolerate ambiguity.

As mentioned above, it is precisely in the context of global challenges that the feeling that an individual‘s own actions make no difference can arise. The experience of **self-efficacy** can play a major role in breaking down barriers and establishing constructive coping strategies. The conviction of our own efficacy is defined as the individual‘s belief in their own capacity to cope with a certain challenge using their own abilities (Bandura, 1997). A distinction is made between individual and collective self-efficacy, whereby collective self-efficacy plays a decisive role in the context of sustainability (Hamann et al., 2016).

The role of **resilience** in the context of coping with global crises is in focus in a relatively new branch of research. In relation to the climate crisis, resilience has been defined as having the „psychological ability and resources to process stresses caused by the climate crisis in a healthy, cognitive, emotional, interpersonal and action-orientated way, and thus to harness them as an opportunity for development“ (Dohm & Klar, 2020, p. 106, *translated citation*). This definition can also be applied to other problems in the context of (un)sustainable development (Peter & Niessen, 2022). Just like climate change, biodiversity loss, which is at the centre of the project, is an element that has the potential to cause stress and trigger crises and therefore requires the development of

resilience. Resilience factors, i.e. protective factors that are useful to people in coping with crisis situations, have been identified in empirical studies. The resilience factors that are not determined by our genetic make-up but can be acquired are of particular interest for the study units. In relation to coping with stressful situations successfully, the following six competencies are particularly relevant (Rönnau-Böse, 2013):

- Self-perception and perception of self by others (realistic self-assessment)
- Expectation of self-efficacy
- Self-control (emotional regulation)
- Social skills (ability to cooperate and to deal with conflict)
- Problem-solving skills
- Adaptive coping skills (ability to apply skills in relevant situations).

As part of the project, pupils are to train their self-perception and perception of self by others in exchange and reflection phases with a view to promoting these resilience factors. In addition, self-efficacy expectations are to be elevated by means of various courses of action. In the context of sustainability, collective self-efficacy, i.e. being able to achieve something together, is particularly important. By engaging with value judgements and emotions, deepening aspects of knowledge and developing action strategies together, conflict management and cooperation skills can be developed and problem-solving skills acquired.

Shaping competence (”Gestaltungskompetenz”) and learning objectives within the scope of the project

The **aim** of the project is to give pupils the opportunity to grapple with dimensions of uncertainty in the context of biodiversity so that they can learn to engage with them constructively, at both individual and collective levels. A didactic concept that specifically addresses selected aspects of the shaping competence (”Gestaltungskompetenz”) model (de Haan, 2008) was developed for this purpose. This is the best-known competence model in ESD to date and has already been taken up in numerous framework curricula and international papers (Cebrián et al., 2020).

Shaping competence initially means the ability to „apply knowledge about sustainable development and recognise problems of unsustainable development“ (de Haan, 2008, p. 31, *translated citation*). It includes various sub-skills, which collectively constitute the ability to make decisions in terms of sustainable development processes and to implement them at individual and societal levels (ibid.). The following aspects are particularly relevant in the context of social transformation in dealing with biodiversity loss:

- Skill in dealing with incomplete and overly complex information: being able to recognise and weigh up risks, dangers and uncertainties
- Skill in overcoming individual decision-making dilemmas: being able to take conflicting goals into account when reflecting on action strategies
- Motivation skills: being able to motivate yourself and others to take action

The aspects which are relevant in the respective sub-skills and thus represent the specific

objectives of the study units are described below. The learning objectives are formulated based on the objectives described in the shaping competence model (de Haan, 2008) and to which new aspects are added.

Skill in dealing with incomplete and overly complex information: being able to recognise and weigh up risks, dangers and uncertainties

Cognitive analysis and judgement strategies have been cited in the shaping competence model under this sub-skill to date. However, since risks are analytically objectifiable as well as being social constructs (Douglas & Wildavsky, 1982) and their perception is heavily influenced by individual psychosocial factors (de Haan et al., 2008), skills that relate to the emotional, subjective level of dealing with risks and uncertainties also need to be acquired. Emotions influence not only our perception and evaluation of situations, but also our actions. If pupils want to learn how to deal with uncertainties and risks, they must become aware of their own emotions and learn to reflect on and harness them (ibid.). Risks are often embedded in complex causal networks that can trigger overwhelm and hopelessness. In this respect, pupils should be empowered in their ability to work towards a more sustainable world despite overwhelming complexity, contradictions and unpleasant emotions. In order to avoid resignation or paralysis due to fear and overwhelm, it is necessary to start by recognising risks and complexity, being aware of our own attitudes and associated feelings, as well as being able to tolerate contradictions and complexity. Therefore, in addition to dealing with risks at an analytical level, the ability to tolerate ambiguity should be promoted as the foundation of the capacity to act.

Accordingly, the following objectives for the study units can be derived from this sub-skill: The pupils ...

- are able to analyse and assess the risks and dangers of unsustainable actions,
- recognise the complexity of interrelationships,
- become aware of and reflect on their own emotions when dealing with risks, dangers and uncertainties,
- engage with the question of trustworthy sources and reflect on how they influence their thoughts and actions.

Skill in overcoming individual decision-making dilemmas: being able to take conflicting goals into account when reflecting on action strategies

This sub-skill relates to competing goals which, although they are often of equal value, trigger the dilemma of being able to achieve only one of them. Nevertheless, a decision has to be made. By addressing this target skill, detailed training should be provided on the ability to make decisions in dilemmatic situations with regard to sustainable development (de Haan, 2008). This initially includes pupils‘ ability to recognise and describe dilemmas and to position themselves in relation to them. Since the act of positioning oneself in the context of dilemmatic decision-making situations is always linked to the formation of value judgements, and value judgements have an inherent emotional component, judgement processes are always subject to emotional processes (Petri, 2018). Therefore, reflecting on our own attitudes and emotions also plays an important role in dealing with dilemmas in order to make decisions and develop approaches to action. In a

social-democratic context, we must be able to justify our own decisions and negotiate collective approaches to action democratically (ibid.; Eikel, 2006).

The following sub-goals can be formulated: The pupils ...

- are able to identify and describe social decision-making dilemmas in real-life contexts,
- describe ways of dealing with decision-making problems where different perceptions of the problem and/or competing sustainable development goals exist,
- develop strategies for sustainable action based on jointly implemented, transparent consideration processes,
- are capable of positioning themselves personally on a dilemma and reflecting on the arguments, attitudes and emotions that influence their decision,
- practice their discussion skills and come to a decision in co-operative exchange processes.

Motivation skills: being able to motivate yourself and others to take action

This skill is central, as the definition of shaping competence includes the dimension of the capacity to act, which in turn depends to a large extent on self-motivation and motivation from others. This is then largely determined by emotions: Motivation is positively influenced by hope for success and the prospect of positive feelings, as well as tolerance of ambiguity and trust (de Haan, 2008). These positive and empowering feelings are often absent in uncertain situations. This makes enabling pupils to reflect on their own emotions all the more important. The experience of self-efficacy is also linked to emotions and the capacity to act. Therefore, with regard to this sub-skill, the focus in this project is on the following goals:

The pupils ...

- experience self-efficacy in the development of action strategies,
- are able to describe and evaluate their personal way of dealing with dilemmas, uncertainties and open situations,
- describe their motivations for participating in democratic decision-making processes and sustainable action,
- describe their own and shared successful learning paths in the context of sustainability and show how these can be used for further learning.

In order to offer a viable study context for the learning objectives listed here, the following basic concepts were chosen as the foundation of the didactic model.

Basic concepts: Konstanz Method of Dilemma Discussion (KMDD) and Values and Knowledge Education (VaKE)

Konstanz Method of Dilemma Discussion (KMDD)

KMDD is a method from the field of moral and democratic psychology and is used to discuss ethical dilemmas. The aim is to enable learners to reflect on, discuss and deal with conflicts on the basis of universal moral principles (Lind, 2019a; Lind, 2019b). The aim is to develop the ability

to act by actively engaging with courses of action and their underlying moral values based on concrete situations.[1]

The teacher's role is to create stimulating opportunities for learning and to be on hand to offer advice during the process (Lind, 2019; Schirrmacher, 2012). „Therefore, rather than providing them with model solutions for every conceivable case, which, in this day and age, would be a hopeless endeavour, the aim is to develop a mindset regarding action that enables the learner, either independently or in collaboration with others, to find the fairest and most sustainable solution possible in a specific problem situation" (Lind, 2006, p. 12, *translated citation*). KMDD is thus based on a constructivist morally didactic approach. Through confrontation with a task that is appropriate to the learner's developmental level and provides the right level of challenge, it stimulates the activation of mental processes that are necessary for dealing with moral conflicts (ibid.). In the Konstanz method, this task is an educational moral dilemma. A dilemma that it is semi-real, i.e. concerns a fictitious person, but can still arouse the readers' emotions, should be chosen. The processing of the dilemma follows a formula whose core elements are a spontaneous first vote, a subsequent discussion and, after the discussion, a second vote. This formula constitutes the basic structure of the following teaching and study materials (Part 2 of the manual).

Values and Knowledge Education (VaKE)

The second underlying concept is the values and knowledge education approach by Weyringer and Patry (2005). In this approach, knowledge content is addressed in combination with the reflection of value systems. They justify the relevance of their approach by arguing that knowledge alone cannot prepare learners to actively take on responsibility in society, rather this knowledge must be considered in a reflective, critical manner. The acquisition of knowledge must therefore be closely linked to a culture of debate, the ability to form opinions and participation (ibid.).

The method is based on constructivist principles in both the area of value education and the perspective of knowledge acquisition. Thus, study is seen as an active constructive process, not as a passive absorption of information. The quality and effectiveness of the learning process is closely linked to the degree to which the content is of personal significance to the learner; the question „What am I learning for?" is therefore crucial (Keast & Marangio, 2015). The VaKE approach also takes up the idea that learning must be designed as an interactive process in order to enable reflection on the applicability and real meaning of what has been learned in dialogue. The teacher's role is to create situations that stimulate cognitive engagement with problems and to support learners in their learning process (Weyringer & Patry, 2005). As an important element in the process, Weyringer and Patry cite the joint creation of rules for dialogue and discussion, which are based on the principle of „companionship – not rivalry."

[1] KMDD was conceptualised by Georg Lind based on Lawrence Kohlberg's insights into moral development. The method can be understood with the help of Kohlberg's definition of moral judgement as „the ability to make decisions and judgements that are moral, i.e. based on inner principles, and to act in accordance with these judgements" (Kohlberg, 1964, p. 103, *translated citation*). Moral competence is therefore „a key competence for living together in a democratic society" (Lind, 2019b, p. 108, *translated citation*).

This element is outlined at the beginning of the first block of each topic titled „Dialogue rules." Based on this, pupils can compile relevant information, weigh up arguments, reflect critically and, if necessary, revise their own opinion.

Didactic model and sequence of the study units

How can the model be used, how is it organised and how are the materials structured? As the material can be used flexibly, there are many ways in which it can be implemented. For example, it can be realised in a single project week, over the course of four double lessons in a related subject, in an extracurricular project or in another setting. Each study unit is divided into four 90-minute blocks. Within a defined framework, the pupils are given the opportunity to engage with the respective topic independently, following their personal interests and setting their own priorities. The content-related and self-reflective examination of the problems addressed constitute the core elements of the model. A dilemma situation is described within the context of an everyday scenario from the respective subject area. The pupils then deal with the dilemma situation. The aim is to develop an independent attitude with regard to possible courses of action in complex situations. This is done by looking at the dilemma more closely. In four blocks, individual positions are taken, in-depth research is carried out and arguments are discussed. By alternating between emotion and cognition, engagement with the situation is deepened and condensed (Fig. 1). The aim is always to develop the capacity to act in complex situations.

The materials consist of introductions, information sheets and worksheets (Fig. 2). For you as a teacher or instructor, the **introductions** are the core element of the material. They serve as a point of entry to familiarise yourself with the study units and offer suggestions on how the individual blocks can be structured.

The **information sheets** mainly serve as a source of information on various aspects of the material or topic. They provide an insight into background information and include visualisations to illustrate complex interrelationships or different positions. The individual blocks also comprise games and discussion rounds. These are described in greater detail in the information sheets with suggestions for game and method instructions. The information sheets also provide support for the discussion rounds in the form of scripts.

As a side note for you: The information sheets can be shared with pupils in some cases.

Notes are provided in the introduction in such cases.

The worksheets, in turn, are aimed at the pupils. They help pupils explore and consolidate their positions. They also help them to reflect on their own emotions and record the knowledge they have acquired. Worksheets that encourage action, such as instructions on how to make palm oil-free cosmetics, are also provided.

Depending on the time available and the desired depth of content and methodology, optional materials and methods can be incorporated or existing materials omitted when preparing the teaching units, which will increase or reduce the length of time required. Using the units in a flexible manner and/or with extensions is recommended, as the model enables learning in a variety of group compositions and dynamics.

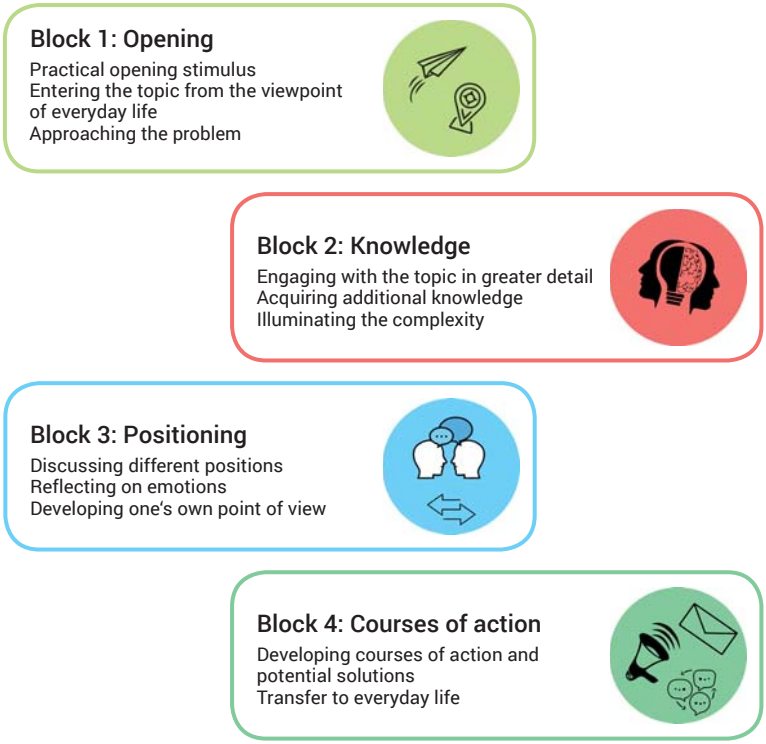


Fig. 1 *The teaching model at a glance: This shows the sequence of the individual teaching units with the focal points of introducing the topic, research phase, positioning phase, development of courses of action. The topics are organised based on this model and are similar in structure, although the block sequence is structured differently in some cases.*

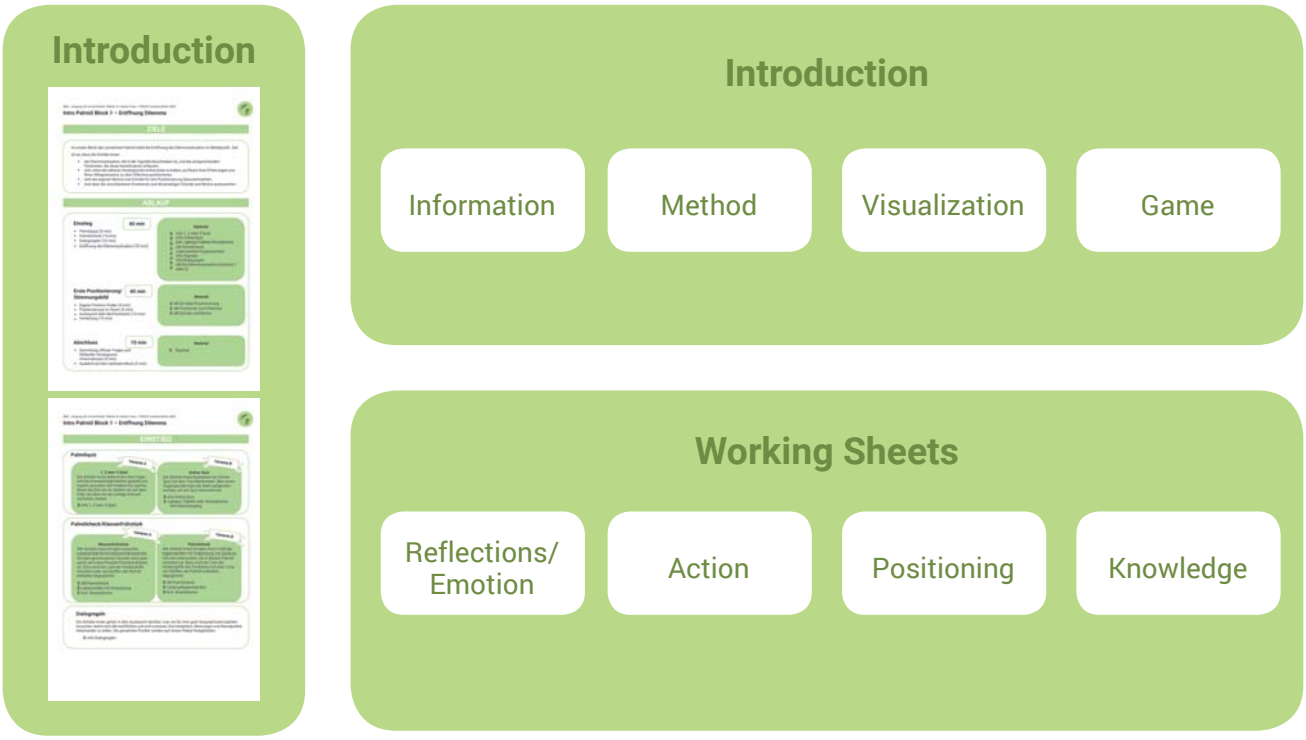


Fig. 2. *The materials at a glance: As can be seen, the material is divided into introductions, information sheets, worksheets and their content components.*

The teacher‘s role

This model is primarily concerned with providing children and young people with a space to explore their own options in the context of uncertainties and contradictions in sustainable development. De Haan (2008) describes ESD as being essentially an educational component that is orientated towards the ideas of inter- and intra-generational education. The intention of ESD is not to evaluate individual positions or to normatively redirect behaviours towards a type of behaviour which is supposedly „better“ or more sustainable. We would like to emphasise that this model is not intended to impose certain normative, sustainable value judgements on pupils. Rather, it is intended to open up a space to enable all those involved in the process to engage with their own options, value judgements and emotions as well as other perspectives in relation to sustainable development.

This opens up the option of transformative learning (Mezirow, 2012). The transformational character arises from the fact that our own views, value judgements and emotions are opened up to critical reflection. Such learning processes are not commonplace, as we usually strive to maintain our own frames of reference, which make the world comprehensible and manageable for us and provide a sense of continuity (Mälkki & Green, 2018; Singer-Brodowski et al., 2022).

However, perspectives are being increasingly challenged due to the complexity of crises, dilemmas and uncertainties in sustainable development, and it is becoming clear that many established habits are unsuitable for making a constructive contribution to current problems. When our views and interpretations of the world become exasperated, this can have a destabilising effect and this state is inevitably associated with emotions – usually with unpleasant emotions

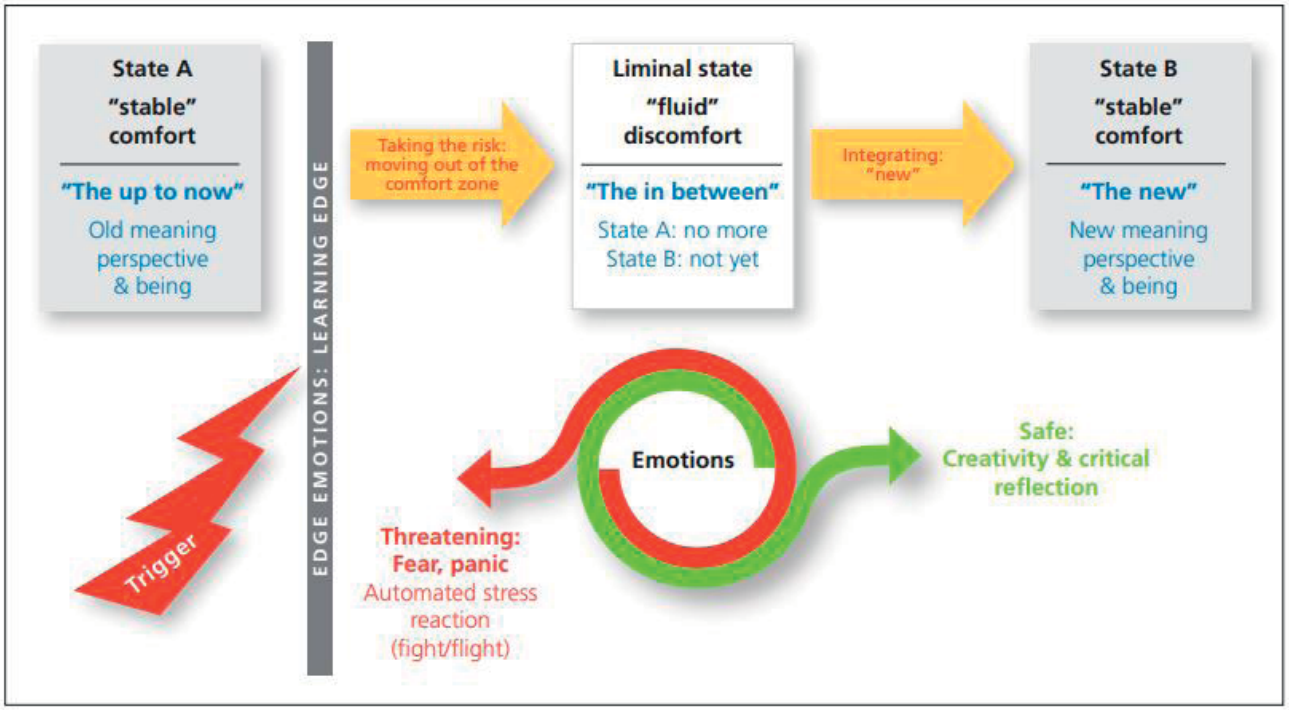


Fig. 3: *Loss of comfort zones and state of „fluid discomfort“ (taken from: Förster, R. et al., 2019. Transformative teaching in Higher Education for Sustainable Development: facing the challenges. GAIA- Ecological Perspectives for Science and Society, 28(3), 324-326. http://dx.doi.org/10.14512/gaia.28.3.18)*

first, which Mälkki (2019) refers to as edge emotions: Edge emotions act as „threshold indicators" that show us a state of uncertainty. They indicate that we are moving outside of our comfort zone.

In order to maintain safety and stability in our interpretations of the world, unpleasant emotions that challenge us to go outside of our own comfort zones tend to stimulate us to revert to our former frames of reference as a point of orientation. For instance, we use familiar explanations to categorise events, or we discredit others so as to keep our interpretation of the world stable. If the unpleasant emotions and associated behaviours are not reflected upon, they can have a very conservative effect in order to protect our world views (Mälkki, 2019; Waldow-Meier, 2022).

In engaging with dilemmas, we can also find ourselves in a state of fluid discomfort, as we become aware that old ways of looking at things seem unsuitable for solving problems, but that new ideas and behaviours may not yet be within our grasp, or that we have some at hand, whose disadvantages we cannot overlook. The topics and problems that are dealt with in this project are characterised, in particular, by the fact that no clear-cut solutions, no clear-cut right or wrong exist. Therefore, pupils and teachers alike are confronted with uncertainty. If this uncertainty can be tolerated for a while in order to turn to and reflect on the emotions and recognise the imperfections of one's own perspectives as a valuable learning moment, the opportunity to develop new perspectives arises. Transformative Learning processes require the courage to question previous ways of thinking and approaches and to seek new perspectives through dialogue. As a teacher, you are called upon to create a culture of dialogue that allows pupils to recognise imperfections in their own perspectives (Mälkki & Green, 2016). This requires critical reflection that examines previous assumptions. The appropriate mode of carrying out this examination is through an appreciative dialogue (Mezirow, 2012), which enables critical thinking and the questioning of routines and perspectives as well as the adopting of perspectives, empathy and respect for others.

As a basis for this, we recommend starting by collectively agreeing on dialogue rules, which support appreciative listening and pave the way for further constructive collaboration (see the Dialogue rules worksheet).

With this in mind, you and the pupils are invited to familiarise yourselves with your own emotions in relation to the complex problems and dilemmas of sustainable development as part of the project. Elements that support the observation of one's own emotions are integrated into each topic block. The observations can and should be made explicit to varying degrees: It can be useful for pupils to make a note of their own observations to protect their privacy. Dialogue and exchange in teams of two can be a suitable mode, as well as group discussions in which observations can be shared if sufficient mutual trust exists. Pupils are free to choose the extent to which they share self-observations in the group. Opportunities for emotional reflection can be created by visualising emotions, e.g. using emotion monster cards. For additional free suggestions of ways to customise the way in which study processes are shaped, see: https://www.umweltbundesamt.de/sites/default/files/medien/1410/ publikationen/anlage12_methode_fuer_die_reflexionsphase_2_reflexion_eigener_gefuehle_und_ gedanken.pdf

Sustainable development is inconceivable without the inclusion of emotions – on the one hand they are obstacles, making decisions and changes more difficult, on the other hand, they are motivators, propel us forward, promote ideas in individuals and processes in society as a whole.

Therefore, giving space to paralysing or inhibiting emotions is an important part of the model. This is not in order to fuel them, but to find a way of dealing with them that promotes action. Throughout the study units, critical hope and trust should be encouraged and the ability to tolerate ambiguity developed. In addition, the aforementioned resilience factors should be strengthened, and self-efficacy experiences should be enabled in order to lay an important foundation for pupils to competently deal with dilemma situations and uncertainties of sustainable development.

Bibliography

Ali, F., & Tan, S. C. (2022). Emotions and lifelong learning: synergies between neuroscience research and transformative learning theory. *International Journal of Lifelong Education*, 41 (1), 1–15. http://dx.doi.org/10.1080/02601370.2021.2015635

Assmann, T., Drees, C., Härdtle, W., Klein, A., Schuldt, A., & von Oheimb, G. (2014). Ökosystem und Biodiversität. *Nachhaltigkeitswissenschaften*, 147-174.

Baumeister, R. F., Vohs, K. D., Nathan DeWall, C., & Zhang, L. (2007). How emotion shapes behavior: Feedback, anticipation, and reflection, rather than direct causation. *Personality and social psychology review*, 11(2), 167–203. http://dx.doi.org/10.1177/1088868307301033

Berner, W. (2015). *Change! 20 Fallstudien zu Sanierung, Turnaround, Prozessoptimierung, Reorganisation und Kulturveränderung* (2. Aufl.). Schäffer-Poeschel Verlag.

Cebrián, G., Junyent, M., & Mulà, I. (2020). Competencies in Education for Sustainable Development: Emerging Teaching and Research Developments. *Sustainability* 12 (2), 579. https://doi.org/10.3390/su12020579

Covello, V., & Sandman, P. M. (2001). Risk communication: evolution and revolution. In A. B. Wolbarst (Hrsg.), *Solutions for an Environment in Peril* (1. Aufl., S. 164–178). The Johns Hopkins University Press.

Damasio, A. R. (2020). *Wie wir denken, wie wir fühlen. Die Ursprünge unseres Bewusstseins*. Hanser Verlag.

Damasio, A., & Carvalho, G. B. (2013). The nature of feelings: evolutionary and neurobiological origins. *Nature reviews neuroscience*, 14(2), 143–152. https://doi.org/10.1038/nrn3403

de Haan, G. (2008). Gestaltungskompetenz als Kompetenzkonzept für Bildung für nachhaltige Entwicklung. In I. Bohrmann & G. De Haan (Hrsg.), *Kompetenzen der Bildung für nachhaltige Entwicklung - Operationalisierung, Messung, Rahmenbedingungen, Befunde* (1. Aufl., S. 40–41). VS Verlag für Sozialwissenschaften | GWV Fachverlag GmbH.

de Haan, G., & Grüßel, S. (2023). Dilemmata, Risiken und Trade-Offs [sic!] im Kontext der Bildung für nachhaltige Entwicklung–Eine Konzeptskizze. In A. Henkel, S. Berg, M. Bergmann, H. Gruber, N. C. Karafyllis, D. Mader, A.-K. Müller, B. Siebenhüner, K. Speck & D.-P. Zorn (Hrsg.), *Dilemmata der Nachhaltigkeit* (1. Aufl., S. 243–258). Nomos Verlagsgesellschaft mbH & Co. KG.

Dohm, L., & Klar, M. (2020). Klimakrise und Klimaresilienz. *psychosozial*, 43(3), 99–114. https://doi.org/10.30820/0171-3434-2020-3-99

Douglas, M., & Wildavsky, A. (1982). How Can We Know the Risks We Face? Why Risk Selection Is a Social Process1. *Risk analysis: an official publication of the Society for Risk Analysis, 2* (2), 49–58. https://doi.org/10.1111/j.1539-6924.1982.tb01365.x

Earle, T. C. (2010). Trust in Risk Management: A Model-Based Review of Empirical Research. *Risk Analysis*, 30(4), 541–574. https://doi.org/10.1111/j.1539-6924.2010.01398.x

Eikel, A., & de Haan, G. (2006). *Demokratische Partizipation in der Schule*. Schwalbach/Ts.: Wochenschau Verlag.

Epstein, S. (1994). Integration of the cognitive and the psychodynamic unconscious. *American Psychologist, 49* (8), 709–724. https://doi.org/10.1037/0003-066X.49.8.709

Ernst, A. (2008). Zwischen Risikowahrnehmung und Komplexität: Über die Schwierigkeiten und Möglichkeiten kompetenten Handelns im Umweltbereich. In I. Bormann & G. de Haan (Hrsg.), *Kompetenzen der Bildung für nachhaltige Entwicklung: Operationalisierung, Messung, Rahmenbedingungen, Befunde* (1. Aufl., S. 45–59). VS Verlag für Sozialwissenschaften.

Förster, R., Zimmermann, A. B., & Mader, C. (2019). Transformative teaching in Higher Education for Sustainable Development: facing the challenges. *GAIA-Ecological Perspectives for Science and Society, 28*(3), 324–326. http://dx.doi.org/10.14512/gaia.28.3.18

Gerowitt, B. (12. und 13. November 2013). *Biodiversität im Grünland - unverzichtbar für Landwirtschaft und Gesellschaft* [Vortrag]. Agrobiodiversität im Grünland nutzen und schützen - Tagungsband eines Symposiums, Berlin. https://www.genres.de/fileadmin/SITE_MASTER/content/Schriftenreihe/Band34_Gesamt.pdf

Grund, J., & Brock, A. (2019). Why we should empty Pandora's box to create a sustainable future: Hope, sustainability and its implications for education. *Sustainability*, 11(3), 893. http://dx.doi.org/10.3390/su11030893

Grund, J., & Singer-Brodowski, M. (2020). Transformatives Lernen und Emotionen. Ihre Bedeutung für die außerschulische Bildung für nachhaltige Entwicklung. In *Außerschulische Bildung*, 3/2020, 28–36.

Grunwald, A. (2010). Die Ökologie der Individuen. Erwartungen an individuelles Umwelthandeln. In C. Büscher & K. P. Japp (Hrsg.), *Ökologische Aufklärung: 25 Jahre „Ökologische Kommunikation"* (1. Aufl., 231–257). VS Verlag für Sozialwissenschaften.

Grunwald, A. (2010). Wider die Privatisierung der Nachhaltigkeit – Warum ökologisch korrekter Konsum die Umwelt nicht retten kann. *GAIA-Ecological Perspectives for Science and Society, 19*(3), 178–182. https://doi.org/10.14512/gaia.19.3.6

Grunwald, A. (2023). Grußwort. In A. Henkel, S. Berg, M. Bergmann, H. Gruber, N. C. Karafyllis, D. Mader, A.-K. Müller, B. Siebenhüner, K. Speck & D.-P. Zorn (Hrsg.), *Dilemmata der Nachhaltigkeit: Zur Relevanz und kritischen Reflexion in der Nachhaltigkeitsforschung. Ein Leitfaden*. Nomos Verlagsgesellschaft mbH & Co. KG.

Hamann, K., Baumann, A., & Löschinger, D. (2016). *Psychologie im Umweltschutz*. Handbuch zur Förderung nachhaltigen Handelns. oekom Verlag.

Helmholtz-Zentrum für Umweltforschung (2018). *Naturkapital Deutschland – TEEB DE. Wert der Natur aufzeigen und in Entscheidungen integrieren. Eine Synthese*. https://www.ufz.de/export/data/462/211806_TEEBDE_Synthese_Deutsch_BF.pdf

Henkel, A., Berg, S., Bergmann, M., Gruber, H., N. C. Karafyllis, Mader, D., Müller, A.-K., Siebenhüner, B., Speck, K., & Zorn, D.-P. (2023). *Dilemmata der Nachhaltigkeit: Zur Relevanz und kritischen Reflexion in der Nachhaltigkeitsforschung* (1. Aufl.). Nomos Verlagsgesellschaft mbH & Co. KG.

Hickman, C., Marks, E., Pihkala, P., Clayton, S., Lewandowski, E. R., Mayall, E. E., Wray, B., Mellor, C., & van Susteren, L. (2021). Young People's Voices on Climate Anxiety, Government Betrayal and Moral Injury: A Global Phenomenon. *SSRN Journal*. http://dx.doi.org/10.2139/ssrn.3918955

Huang, Y., Chen, Y., Castro-Izaquirre, N., Baruffol, M., Brezzi, M., Lang, A., Li, Y., Härdtle, W., von Oheimb, G., Yang, X., Liu, X., Pei, K., Both, S., Yang, B., Eichenberg, D., Assmann, T., Bauhaus, J., Behrens, T., Buscot, ... F., Schmid, B. (2018). Impacts of species richness on productivity in a large-scale

subtropical forest experiment. *Science*, 362 (6410), 80–83. https://doi.org/10.1126/science.aat6405

Kasperson, R. E., Renn, O., Slovic, P., Brown, H. S., Emel, J., Goble, R., Kasperson, J. X., & Ratick, S. (1988). The Social Amplification of Risk: A Conceptual Framework, *Risk Analysis*, 8 (2), 177–187. https://doi.org/10.1111/j.1539-6924.1988.tb01168.x

Keast, S. & Marangio, K. (2015). Values and Knowledge Education (VaKE) in Teacher Education: Benefits for Science Preservice Teachers when Using Dilemma Stories. *Procedia - Social and Behavioral Sciences*, 167 (2015), 198–203. https://doi.org/10.1016/j.sbspro.2014.12.662

Kohlberg, L. (1964). *Development of moral character and moral ideology. Review of child development research*, 1, 383–431.

Kommission Bodenschutz beim Umweltbundesamt (2019). *Das Konzept der Ökosystemleistungen - Ein Gewinn für den Bodenschutz*. [Broschüre]

Krafft, A. (2022). *Unsere Hoffnungen, unsere Zukunft. Erkenntnisse aus dem Hoffnungsbarometer* (1. Aufl.). Springer Verlag.

Krafft, A. M., & Walker, A. M. (2018). *Positive Psychologie der Hoffnung: Grundlagen aus Psychologie, Philosophie, Theologie und Ergebnisse aktueller Forschung* (2. Aufl.). Springer-Verlag.

Lenz, C. (2020). Ambiguitätstoleranz – ein zentrales Konzept für Demokratiebildung in diversen Gesellschaften. In Schwarzkopf Stiftung Junges Europa: Educational Briefing (Hrsg.), *Gleichheit, Unterschiedlichkeit, Mehrdeutigkeit – Kompetenz und Haltung für den Umgang mit Diversität in Bildungsprozessen* (1. Aufl., S. 12–20). https://schwarzkopf-stiftung.de/content/uploads/2021/10/educational_briefing_2020_de-1-1.pdf?x41391

Leuser, L., & Weiss, D. (2020). *Veränderungen berühren alle – Die Rolle von Emotionen in Nachhaltigkeitstransformationen. Teilbericht im Rahmen des ReFoPlan-Vorhabens „Den ökologischen Wandel gestalten“*. Hrsg.: Umweltbundesamt. TEXTE 87/2020. https://www.umweltbundesamt.de/sites/default/files/medien/479/publikationen/texte_87-2020_veraenderungen_beruehren_alle_die_rolle_von_emotionen_in_nachhaltigkeitstransformationen.pdf

Lind, G. (2006). Das Dilemma liegt im Auge des Betrachters. Zur Behandlung bio-ethischer Fragen im Biologie-Unterricht mit der Konstanzer Methode der Dilemmadiskussion. *Praxis der Naturwissenschaften/Biologie in der Schule* 1(55), 10–16. https://www.researchgate.net/publication/237619277_Das_Dilemma_liegt_im_Auge_des_Betrachters_Zur_Behandlung_bio-ethischer_Fragen_im_Biologie-_Unterricht_mit_der_Konstanzer_Methode_der_Dilemmadiskussion1

Lind, G. (2019a). Moralerziehung. In J. Drerup, G. Schweiger (Hrsg.), *Handbuch Philosophie der Kindheit* (1. Aufl., S. 252–258). Springer Verlag. https://doi.org/10.1007/978-3-476-04745-8

Lind, G. (2019b). *Moral ist lehrbar! Wie man moralisch-demokratische Fähigkeiten fördern und damit Gewalt, Betrug und Macht mindern kann* (4. Aufl.). Logos Verlag.

Lippert, C., Feuerbach, A., & Narjes, N. (2021). Revisiting the economic valuation of agricultural losses due to large-scale changes in pollinator populations. *Ecological Economics*, 180 (106860), 1–14. https://doi.org/10.1016/j.ecolecon.2020.106860

Mader, D. (2023). In A. Henkel, S. Berg, M. Bergmann, H. Gruber, N. C. Karafyllis, D. Mader, A.-K. Müller, B. Siebenhüner, K. Speck & D.-P. Zorn (Hrsg.), *Dilemmata der Nachhaltigkeit: Zur Relevanz und kritischen Reflexion in der Nachhaltigkeitsforschung. Ein Leitfaden*. Nomos Verlagsgesellschaft mbH & Co. KG.

Max-Planck-Gesellschaft (2021). *Biodiversität - Vielfalt des Lebens*. https://www.mpg.de/biodiversitaet

Mälkki, K. (2019). Coming to grips with edge-emotions: The gateway to critical reflection and transformative learning. In T. Fleming, A. Kokkos & F. Finnegan (Hrsg.), *European perspectives on transformation theory* (1. Aufl., S. 59–73). Palgrave Macmillan. http://dx.doi.org/10.1007/978-3-030-19159-7_5

Mälkki, K., & Green, L. (2016). Ground, warmth, and light: Facilitating conditions for reflection and transformative dialogue. *Journal of Educational Issues*, 2(2), 169–183. http://dx.doi.org/10.5296/jei.v2i2.9947

Mälkki, K., & Green, L. (2018). Working with Edge Emotions as a means for Uncovering Problematic Assumptions: Developing a practically sound theory. *Phronesis*, 7(3), 26–34. https://doi.org/10.7202/1054406ar

Mezirow, J. (2012). Learning to think like an adult. Core Concepts of Transformation Theory. In E. W.Taylor & P. Cranton (Hrsg.), *The Handbook of Transformative Learning. Theory, Research and Practice* (S. 73–95). Jossey Bass.

Nussbaum, M. (2019). *Königreich der Angst. Gedanken zur aktuellen politischen Krise*. Wissenschaftliche Buchgesellschaft.

Obrecht, A., Pham-Truffert, M., Spehn, E., Payne, D., de Bremond, A., Altermatt, F., Discher, M., Passarello C., Moersberger, H., Schelske, O., Guntern, J., Prescott, G., & Geschke, J. (2021). Mit Biodiversität die SDGs erreichen. *Swiss Academies factsheets*, 16 (1), 1–11. https://doi.org/10.5281/zenodo.4457329

OECD (Hrsg.). Deutsche Arbeitsgruppe im internationalen OECD-Projekt Future of Education and Skills 2030 (2020). *OECD Lernkompass 2030, Rahmenkonzept des Lernens*. https://www.oecd.org/education/2030-project/contact/OECD_Lernkompass_2030.pdf

Ojala, M. (2016). Facing anxiety in climate change education: From therapeutic practice to hopeful transgressive learning. *Canadian Journal of Environmental Education*, 21 (2016), 41–56. https://cjee.lakeheadu.ca/issue/view/79

Ojala, M., Cunsolo, A., Ogunbode, C. A., & Middleton, J. (2021). Anxiety, worry, and grief in a time of environmental and climate crisis: a narrative review. *Annual Review of Environment and Resources*, 46 (2021), 35–58. https://doi.org/10.1146/annurev-environ-012220-022716

Paek, H. J., & Hove, T. (2017). Risk Perception and Risk Characteristics. *Oxford Research Encyclopedia of Communication*. Oxford University Press.

Peter, F., & Niessen, P. (2022). Resilienz als Konzept für die Klimakrise. Ein Wegweiser zu einem ganzheitlichen Resilienzverständnis. In K. Van Bronswijk & C. M. Hausmann (Hrsg.), *Climate Emotions Klimakrise und psychische Gesundheit* (1. Aufl., S. 229–256). Psychosozial-Verlag.

Petri, Annette (2018): Emotionssensibler Politikunterricht. Konsequenzen aus der Emotionsforschung für Theorie und Praxis politischer Bildung (1. Aufl.). *Wochenschau Wissenschaft*.

Pfister, H. R., & Böhm, G. (2008). The multiplicity of emotions: A framework of emotional functions in decision making. *Judgment and decision making*, 3(1), 5–17. https://doi.org/10.1017/S1930297500000127

Pidgeon, N., Poortinga, W., Steentjes, K., Corner, A., Mays, C., Poumadère, M., Tvinnereim, E., Böhm, G., Arnold, A., Ruddat, M., Scheer, D., & Sonnberger, M. (2017). *European Perceptions of Climate Change (EPCC). Topline findings of a survey conducted in four European countries in 2016*. https://orca.cardiff.ac.uk/id/eprint/98660/7/EPCC.pdf

Rönnau-Böse, M. (2013). *Resilienzförderung in der Kindertageseinrichtung. Evaluation eines Präventionsprojekts im Vorschulalter*. (Dissertation, Frühpädagogik). FEL-Verl. Forschung - Entwicklung - Lehre (Materialien zur Frühpädagogik, Bd. 11).

Sanson, A. V., van Hoorn, J., & Burke, S. E. L. (2019): Responding to the Impacts of the Climate Crisis on Children and Youth. *Child Dev Perspect* 13 (4), https://doi.org/10.1111/cdep.12342

Schirrmacher, T. (2012). *Zur Konstanzer Methode der Dilemma-Diskussion* (KMDD). https://www.afet.de/wp-content/uploads/2023/01/Schirrmacher_KMDD.pdf

Schreiber, J. (2020). Grundverständnis nachhaltiger Entwicklung in Deutschland. Ökologische Modernisierung oder Postwachstum. *Soziologiemagazin*, 13(2), 19–27. https://doi.org/10.3224/soz.v13i2.04

Schreiber, J. R. (2012). Globales Lernen und neue Lernkultur. In G. Lang-Wojtasik & U. Klemm (Hrsg.), *Handlexikon Globales Lernen* (1. Aufl., S. 126–129). Klemm + Oelschläger.

Schreiber, J. R., & Siege, H. (2016). *Orientierungsrahmen für den Lernbereich Globale Entwicklung im Rahmen einer Bildung für nachhaltige Entwicklung*. https://www.globaleslernen.de/sites/default/files/files/link-elements/orientierungsrahmen_fuer_den_lernbereich_globale_entwicklung_barrierefrei.pdf.

Secretariat of the Convention on Biodiversity (2000). *Sustaining life on Earth. How the Convention on Biological Diversity promotes nature and human well-being*.

Siegel, D. (2017). *Das achtsame Gehirn*. Arbor Verlag.

Singer-Brodowski, M., Förster, R., Eschenbacher, S., Biberhofer, P., & Getzin, S. (2022). Facing crises of unsustainability: Creating and holding safe enough spaces for transformative learning in higher education for sustainable development. *Frontiers in Education* 7(2022). https://doi.org/10.3389/feduc.2022.787490

Slovic, P., Finucane, M. L., Peters, E., & MacGregor, D. G. (2007). The affect heuristic. *European Journal of Operational Research* 177 (3), 1333–1352. https://doi.org/10.1016/j.ejor.2005.04.006

Slovic, P., Fischhoff, B. & Lichtenstein, S. (2000). Facts and Fears: Understanding Perceived Risk. In P. Slovic (Hrsg.), *The Perception of Risk* (S. 137–153). Sterling, VA: Earthscan.

Slovic, P., & Peters, E. (2006). Risk Perception and Affect. *Curr Dir Psychol Sci* 15 (6), 322–325. https://doi.org/10.1111/j.1467-8721.2006.00461.x

UNESCO World Conference on Education for Sustainable Development (2021). *Berlin Declaration on Education for Sustainable Development*. https://en.unesco.org/sites/default/files/esdfor2030-berlin-declaration-en.pdf

United Nations (2015). *Transforming our World: The 2030 Agenda for Sustainable Development*. New York: United Nations, Department of Economic and Social Affairs.

United Nations. *Convention on Biological Diversity*. Vom 5. Juni 1992. Abgerufen am 13. September 2023 unter https://www.cbd.int/doc/legal/cbd-en.pdf

Waldow-Meier, S. (2022). Zwischen Zukunftsangst und Zukunftsmut: Zur Rolle von Emotionen in der Auseinandersetzung mit gegenwärtigen Krisen und antizipierter Unsicherheit von Zukunft. *iF- Schriftenreihe*, 3 (22), 1–68. http://dx.doi.org/10.17169/refubium-36910

Weyringer, S., & Patry, J. (2005). Values and Knowledge Education (VaKE) – can they be combined? In *EJOP* 1 (4). https://doi.org/10.5964/ejop.v1i4.375

Appendix Quality declaration for digital ESD material

This educational material takes account of the quality criteria for digital ESD materials in accordance with the resolution of the National ESD Platform dated 9 December 2022. Source: ESD Portal

Criteria			Fulfilment
	Yes	No	Not applicable / Comment
1. Contents			
1.1 Sustainable development	✓		
1.2 Accuracy and timeliness	✓		Block 3 provides examples of research paths and reputable sources of information that were available at the time of publication. No liability can be accepted for the content and continuity of the links.
1.3 Formation of judgement	✓		
1.4 Heterogeneity	✓		
1.5 Transparency	✓		In the methodological variants, we suggest the use of Mentimeter and emotional monster cards, among other things. These free suggestions and ideas are aimed at teachers in preparation for the study units.
2. Methodology			
2.1 Controversy and multiplicity of perspectives	✓		
2.2 Target group and lifeworld orientation	✓		
2.3 Competence orientation	✓		Particularly fulfilled in the topic of fake news
2.4 Action orientation	✓		
2.5 Participation	✓		Although digitally accessible, the material is primarily designed for group learning processes and interaction in real-life interactions. It is not yet available in easy language.
2.6 Cooperative, creativity-promoting methods	✓		
3. Formal design			
3.1 Data protection and data security	✓		
3.2 Copyright	✓		
3.3 Accessibility	✓		
3.4 User-friendly design	✓		
3.5 Interconnectivity		✓	Although digitally accessible, the material is primarily designed for group learning processes and interaction in real-life interactions..

ESD 2030

DEVELOPING SKILLS IN DEALING WITH UNCERTAINTY

Material package on the topic

Declining Insect Populations & Agriculture

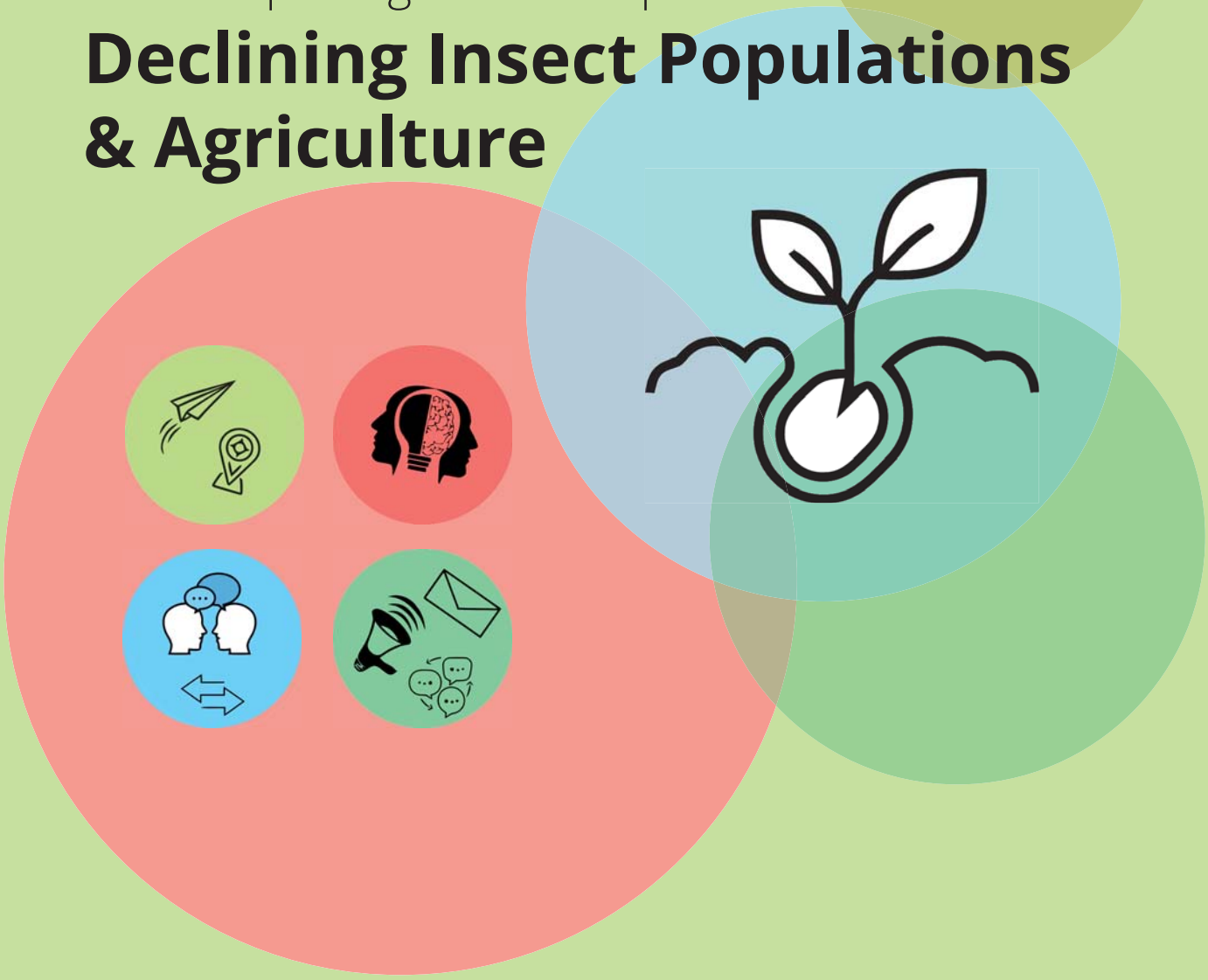


TABLE OF CONTENTS

Entry

Block 1

Block 2

Block 3

Block 4

WHAT IT‘S ALL ABOUT ...

Sustainability issues are associated with multi-layered problems, complex interrelationships, and a wealth of information. This makes it difficult to reach decisions and take action at personal and societal levels. There is often no clear right or wrong, it is rather a matter of weighing up the options and developing one‘s own position. This can lead to uncertainty and overwhelm, which hinder motivated, goal-orientated action.

This is where the project comes in. It aims to support pupils in being able to act even in the face of complexity and uncertainty. This addresses important aspects of organisational competence that have been given little attention in ESD to date. Therefore, in 2021 the project titled ”Education for Sustainable Development: Learning to manage dilemmas, risks, and trade-offs” saw the launch, funded by the German Federal Environmental Foundation and realised by Institut Futur and the Fields Institute in cooperation with the German Society for Environmental Education. The project centres on the development of learning materials for stage 1 secondary schools (age 10-16) that enable pupils to engage with dilemmas relating to (un)sustainable development in the context of biodiversity.

DECLINING INSECT POPULATIONS & AGRICULTURE

One of the reasons why efficient agriculture is so popular is that it is more land-efficient and cost-effective compared to sustainable agriculture. However, monocultures and pesticide use have multiple consequences, including declining insect populations and biodiversity loss. However, sustainable agriculture also harbours problems. Food is becoming more expensive and not everyone can afford it.

Food is a central basis for the survival of mankind. But how do we ensure that everyone is taken care of without causing too much damage to the environment? How can we deal with these different conflicting goals? What approaches to problem solving are conceivable?

The pupils gain knowledge on the topic and engage with various positions and possible approaches to problem solving. The pupils‘ feelings and values play a central role here.

THE CONCEPT

Each study unit is divided into four 90-minute blocks. Within a defined framework, the pupils are given the opportunity to engage with the subject of declining insect populations & agriculture independently, following their personal interests and setting their own priorities.

The aim is to develop an independent attitude with regard to possible courses of action in complex situations. This is done by looking at the dilemma more closely. Individual positions are adopted, in-depth research is carried out and arguments are discussed. By alternating between emotion and cognition, their engagement with the subject is deepened and condensed. The aim is always to develop the ability to act in complex situations.

The study materials are available for schools to use free of charge. They can be used in lessons in subjects such as ethics, biology, geography, and politics. In addition, the materials can also be used on project days or weeks and in open all-day working groups. In terms of the time to be allocated, at least four 90-minute blocks should be reserved. However, we recommend planning an additional block as a buffer in order to respond to the pupils‘ pace of work and working methods in a flexible manner and allocate more time as needed or delve more deeply into particular aspects.

Block 1: Opening
Practical opening stimulus
Entering the topic from the viewpoint of everyday life
Approaching the problem

Block 2: Knowledge
Engaging with the topic in greater detail
Acquiring additional knowledge
Illuminating the complexity

Block 3: Positioning
Discussing different positions
Reflecting on emotions
Developing one‘s own point of view

Block 4: Courses of action
Developing courses of action and potential solutions
Transfer to everyday life

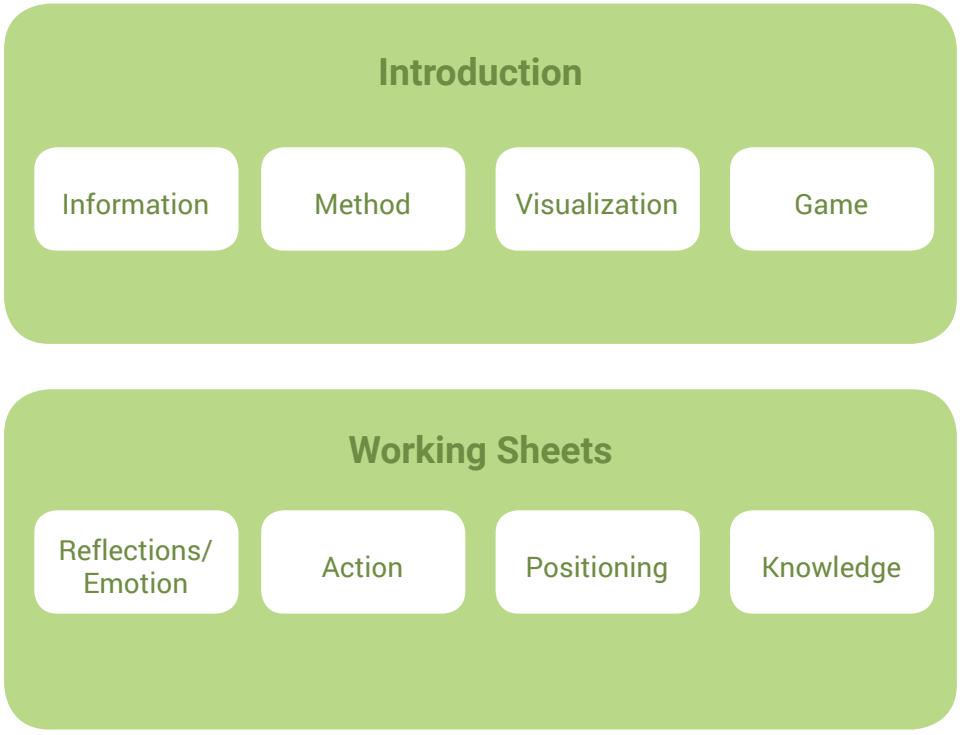
USE OF MATERIALS

The introductions are the central element of the material and are used as an entry point to familiarise pupils with the study units. They offer suggestions and instructions on how the individual blocks can be organised.

The **information sheets** mainly serve as a source of information on various aspects of the material or topic. They provide an insight into background information on the topic of declining insect populations & agriculture. Visualisations are provided in order to illustrate complex interrelationships or different positions. The individual blocks also comprise games and discussion rounds. These are explained in more detail on the information sheets by means of instructions for the games and methods.

As a side note for you: The information sheets can be shared with students in some cases. Notes are provided in the introduction in such cases.

The **worksheets**, in turn, are aimed at the pupils. They help pupils explore and consolidate their positions. They also help them to reflect on their own emotions and record the knowledge they have acquired in order to prepare for the discussion, for example. There are also worksheets that show various courses of action.



Declining Insect Populations & Agriculture
Block 1 – Opening Dilemma
Introduction

Introduction to Block 1 – Opening Dilemma

GOALS

The first block of the Declining Insect Populations & Agriculture study unit focuses on opening up the dilemma situation.

The aim is that the pupils

- grasp the dilemma situation described in the vignette and the corresponding constituent parameters,
- adopt a position on the dilemma based on their experiences and everyday knowledge without having researched the background in detail,
- become aware of their own motives and reasons for their positioning and
- exchange views on the various positions and the respective reasons and motives behind them.

SEQUENCE

Entry — 35 min

- Dialogue rules (15 min.)
- Opening the dilemma situation (20 min.)

Material

- Info: Dialogue rules
- Info: Vignette
- Info: Landscape paintings

Approaching the topic — 50 min

- All those who ... (15 min.)
- Importance of insects (20 min.)
- Quiz (15 min.)

Material

- Info: All those who ...
- Importance of insects (Variant A/B)
- Info: Importance of insects
- Info: 1, 2 or 3 game
- Info: Online quiz with Mentimeter
- Laptops/tablets/smartphones (if applicable)

Conclusion — 5 min

- Looking ahead to the next block (5 min.)

Introduction to Block 1 – Opening Dilemma

ENTRY

Dialogue rules

The pupils discuss what they need for a good discussion atmosphere so that everyone feels comfortable and confident sharing their thoughts, opinions, and points of view. The points mentioned are noted on a poster. The poster is then hung up in a highly visible place in the room.

➲ Info Dialogue rules

Opening the dilemma situation

The first part of the vignette is read out or told. The pictures visualising the vignette are hung up in a clearly visible position. In the plenum, the pupils discuss the vignette and images based on the key questions.

➲ Info: Vignette
➲ Info: Landscape paintings

Key questions

- What can you see in the pictures? What similarities and differences do you see?
- Which landscape do you prefer and why?
- Do the pictures trigger something in you and if so, what?
- What is the story about? What do the pictures have to do with the story?
- What problem appears in the story? Why is it a problem?

APPROACHING THE TOPIC

All those who ...

The pupils form a circle with everyone standing. A statement is read out and everyone to whom the statement applies goes to the centre. The group in the centre reports on their experience/knowledge of the statement as an example. Then everyone goes back to the outer circle and a new statement is read out.

➲ Info: All those who ...

Introduction to Block 1 – Opening Dilemma

Importance of insects

Pupils form small groups and engage with the importance of insects for nature by working on WS: Importance of insects and discussing the discussion questions on the worksheet. In variant 1, the pupils assign sections of text with various functions fulfilled by insects to the diagram.

In variant 2, they use the picture to think about the functions of insects without referring to the text sections. Info: Importance of insects can be used as a solution sheet. Afterwards, the results are summarised in the plenary and the discussion questions are reviewed

.

- ➲ WS: Importance of insects (Variant A/B)
- ➲ Info: Importance of insects

Discussion questions

- How are insects important for nature?
- What is the connection between agriculture and insects?
- What could be the reasons why there are fewer and fewer insects?
- What consequences could declining insect populations have for nature and humans?

Quiz

Variant A

1, 2 or 3 game

The pupils are asked a question with three possible answers and hop back and forth between three squares. When the time is up, they stop on the square where they think the correct answer is.

- ➲ Info: 1, 2 or 3 game

Variant B

Online quiz

The pupils complete an online quiz using the Mentimeter tool. In order to take part in the quiz, the page can be accessed via an access code.

- ➲ Info: Online quiz with Mentimeter
- ➲ Laptops, tablets or smartphones with internet access

CONCLUSION

Looking ahead to the second block

The sequence for the next unit is looked over

Declining Insect Populations & Agriculture
Block 1 – Opening Dilemma
Information Sheets

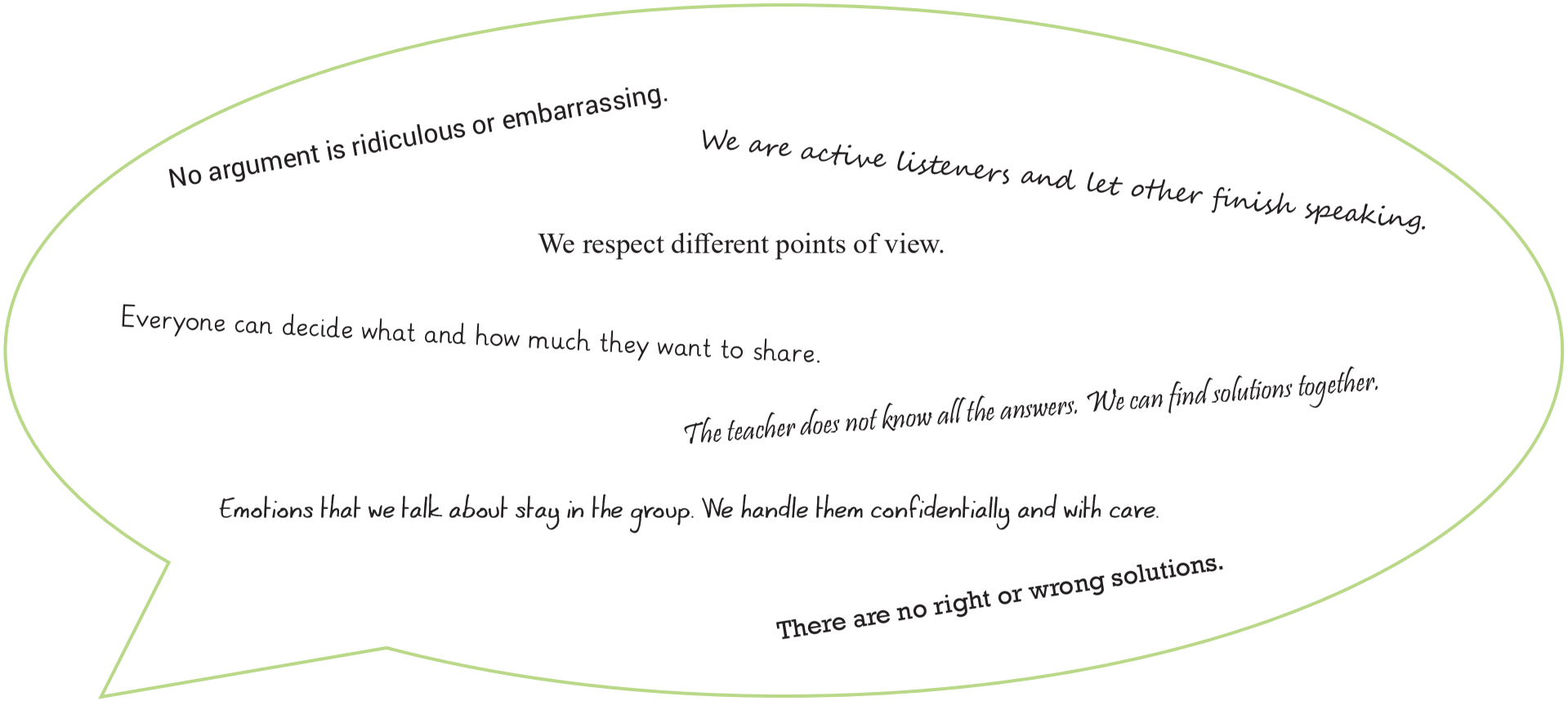
Block 1 – Info: Dialogue Rules

Contents:

Opening up and talking about personal thoughts and feelings takes time and courage. It is therefore important for the members of the group to discuss how they want to talk to each other beforehand. What do I want and what do the others want? This graphic shows what some possible needs might be.

How:

The teacher brings a pre-prepared poster showing a speech bubble to the first lesson. Before the pupils adopt a position, the pupils and teacher discuss what they want regarding dialogue rules for the project time and write their wishes on the poster. The poster is then hung on the wall, where it remains until the end of the project.



Block 1 – Info: Vignette

Part 1

Emma goes to visit her grandmother, who lives in a small village in the countryside, during the summer holidays. Emma used to spend every summer holiday there when she was younger. But she hasn‘t been there for a while now. On the journey there, she is filled with anticipation. She recalls how she and her childhood friend Thorne used to chase butterflies in the meadow, how they identified bird species by their songs or how they helped his parents on the farm. She remembers the scent of wild herbs, the buzzing of bees and the chirping of crickets.

Emma goes to see Thorne the very next day. They walk through the village and search for a picnic spot. The meadow where they used to play no longer exists. Having been merged with the neighbouring wheat field, it too is being used for farming now. The pair sit down on a bench, look out over the sea of wheat, and tell each other stories of times past. But as time goes by, Emma feels more and more uneasy. She misses the fragrant wild herbs and the buzzing around her. The cheerful birdsong has also disappeared, and in two hours only a single butterfly has flown past.

Emma shares her observations with her grandmother over dinner. She too has noticed that fewer insects and birds can be seen or heard. But the landscape has also changed a lot. She shows Emma pictures of the village‘s surroundings painted by her mother, Emma‘s great-grandmother, when Emma‘s grandmother was still a child. The landscape is almost unrecognisable.

Key questions

- What can you see in the pictures? What similarities and differences do you see?
- Which landscape do you prefer and why?
- Do the pictures trigger something in you and if so, what?
- What is the story about? What do the pictures have to do with the story?
- What problem appears in the story? Why is it a problem?

PAST

PRESENT

Block 1 – Info: Vignette

Part 2

Emma can't let the subject go. Does it just seem that way to her or is it really true that there are fewer insects than before, and if so, why is that? Does it have something to do with the change in the landscape? Even when Thorne comes round for coffee, the conversation turns to the topic of declining insect populations. Emma is not the only one who has noticed the decline in insects. Thorne tells her about a wide debate that is going on in the village. In order to create more habitat for insects and other animals, a group of local residents have joined forces and proposed turning the village into an eco-village. This would mean that all farms would have to switch to organic farming.

However, not everyone agrees with this proposal. Two camps have formed in the village: Some see organic farming as the future of agriculture, while others are sticking to conventional farming. Both camps are to present their arguments at a meeting next week, then a vote will be taken. Emma asks Thorne and her grandmother what their decision would be. They are both unsure. Emma's grandmother says she needs to find out about the advantages and disadvantages of the two farming methods first. Thorne wants more information too. He is not quite sure why a change in farming would stop insect populations from declining and wonders whether there are other options. So Emma and Thorne set to work researching agriculture and declining insect populations.

Key questions

- What is the story about?
- What decision is the village facing?
- What positions are there?
- What other positions could there be?

Block 1 – Info: Landscape Paintings

PAST

Block 1 – Info: Landscape Paintings

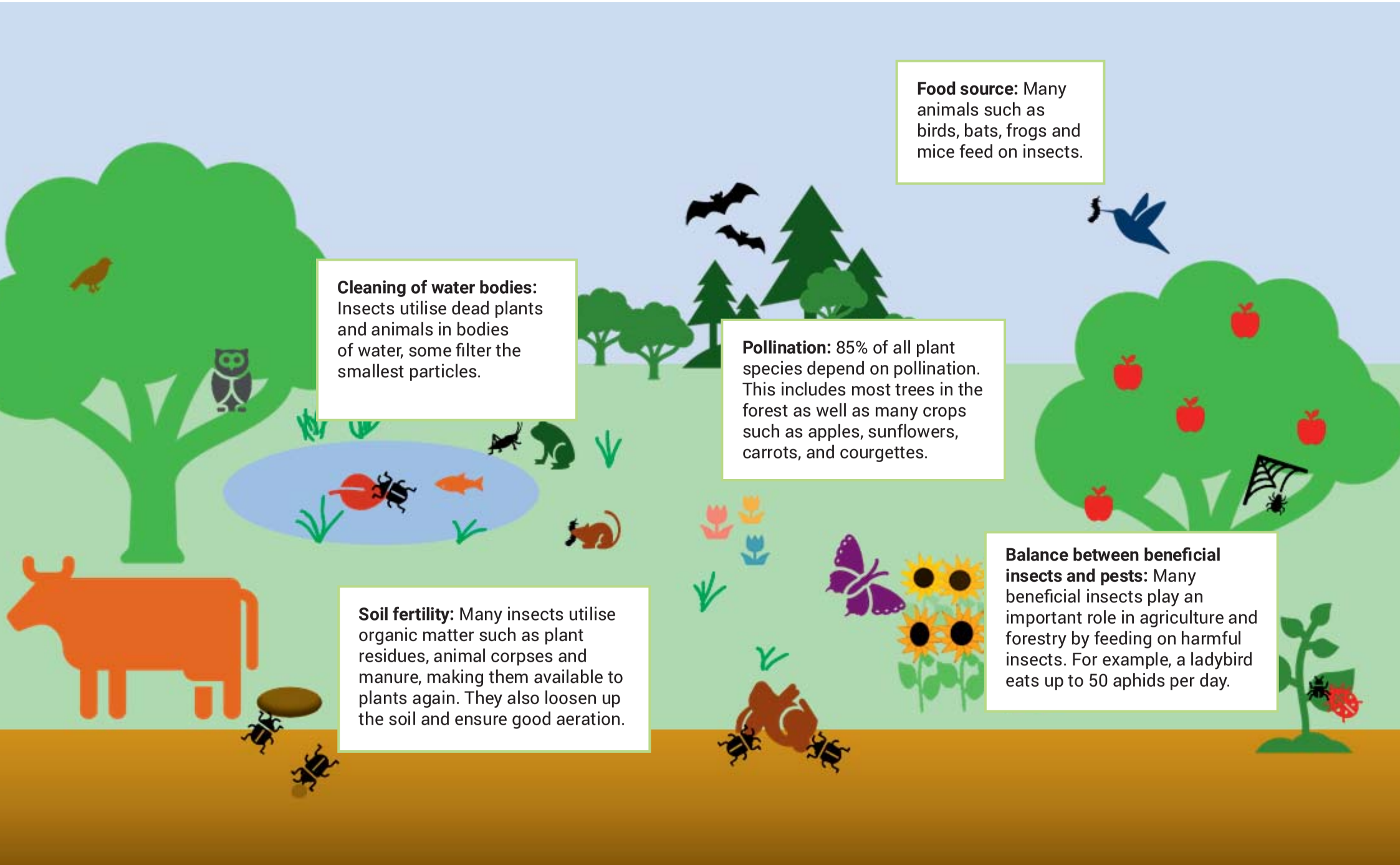
PRESENT

Block 1 – Info: All Those Who ...

The pupils form a circle with everyone standing. A statement is read out and everyone to whom the statement applies goes to the centre. The group in the centre reports on their experience/ knowledge of the statement as an example. Then everyone goes back to the outer circle and a new statement is read out.

Statement:	Questions to those in the centre:
All those who have ever been to a farm or agricultural enterprise go to the centre?	What was everyday life like there? What was particularly memorable?
All those who know somebody who works in agriculture go to the centre.	Who is it? How do you know them? Can you describe the work?
All those who have ever grown something in the garden go to the centre.	What did you grow? What do you have to watch out for in the process? What was particularly memorable?
All those who have ever eaten something they harvested themselves go to the centre.	What was it? Does it feel different to eat something you harvested yourself compared to something you bought? Does home-grown produce taste different from bought produce?
All those who have ever been stung by a bee go to the centre.	How did you get stung? How did you treat the sting?
All those who have ever heard of declining insect populations go to the centre.	What does the term “declining insect populations” mean? What do you know about declining insect populations? How do you know about it? In what context have you heard about it?
All those who know of an endangered insect species go to the centre.	Which insects are they? Why are they endangered? In what context did you hear/learn about it?

Block 1 – Info: Importance of Insects



Block 1 – Info: 1, 2 or 3 Game Instructions

The idea behind the game

Start by laying out three squares – each of which is large enough to fit several pupils. The leader of the game asks a question and presents the three possible answers. To answer, the children jump to the corresponding number (1, 2 or 3) on the floor. To make it even more exciting and to prevent the answer from being revealed straight away, all the children jump back and forth between the squares until the leader of the game shouts „1, 2 or 3, last chance... Time is up!“. The answer is only valid once „Time is up“ has been called out and they cannot move to a different square anymore.

Preparation

- Place the number signs on the floor, ensuring they are well spread out.

Block 1 – Info: 1, 2 or 3 Game Instructions

Quiz questions (easy)

What percentage of all animal species worldwide are insects?

1. **70%**
2. 20%
3. 50%

What percentage of insects are threatened with extinction worldwide?

1. 78%
2. **40%**
3. 16%

Which of the following factors is a reason for declining insect populations?

1. Overfishing the oceans
2. **Pesticide use**
3. Drone use

What are pesticides used for?

1. When pesticides are used, the air is purified, which in turn is good for the plants
2. Pesticide use helps conserve certain insect species
3. **Pesticides are used to maximise crop yields and avoid losses**

What is a negative consequence of intensive pesticide use in agriculture?

1. **Pollution of soil and water resources**
2. The plants often die from lack of oxygen due to the nitrogen in the pesticides
3. People living near the farm are often affected by lung diseases caused by the pesticides in the air

What types of farming are there?

1. Intergalactic, radiation and particle farming
2. **Conventional, integrated, and organic farming**
3. Throwing, aerial and jumping farming

Why is agriculture important for humans and other species?

1. Agriculture is important because it makes areas more accessible to people
2. **Agriculture is important because it ensures the food production needed to feed a growing world population; it also creates jobs**
3. Agriculture is important because the plants grown convert large quantities of CO2 into oxygen

What percentage of the world's population is undernourished?

1. **10%**
2. 32%
3. 18%

Block 1 – Info: 1, 2 or 3 Game Instructions

Quiz questions (difficult)

What percentage of all animal species worldwide are insects?

1. 20%
2. **70%**
3. 50%

What would be some alternative names for insects?

1. **Nature's rubbish collection, as many insects feed on dead plant remains and dead animals**
2. Nature's lawnmowers, as many insects feed on fresh grass
3. Nature's coastguard, because aquatic insects save bees that have fallen into the water from drowning, for example

What percentage of insects are threatened with extinction worldwide?

1. 78%
2. **40%**
3. 16%

Which of the following factors is a reason for declining insect populations?

1. The use of forage harvesters in agriculture
2. **Pesticide use**
3. Drone use

What are pesticides used for?

1. When pesticides are used, the air is purified, which in turn is good for the growth of plants
2. Pesticide use is intended to conserve certain insect species
3. **Pesticides are used to maximise crop yields and avoid losses**

What is a negative consequence of intensive pesticide use in agriculture?

1. **Pollution of soil and water resources**
2. The plants often die from lack of oxygen due to the nitrogen in the pesticides
3. People living near the farm are often affected by lung diseases caused by the pesticides in the air

What types of farming are there?

1. Three-dimensional, consumption and seed farming
2. **Conventional, integrated, and organic farming**
3. Vector, economic and elementary farming

Why is agriculture important for humans and other species?

1. Agriculture is important because it makes areas accessible to people
2. **Agriculture is important because it ensures the food production needed to feed a growing world population; it also creates jobs**
3. Agriculture is important because the plants grown convert large quantities of CO2 into oxygen

What percentage of the world's population is undernourished?

1. **10%**
2. 32%
3. 18%

Block 1 – Info: 1, 2 or 3 Game Instructions

Block 1 – Info: 1, 2 or 3 Game Instructions

Block 1 – Info: 1, 2 or 3 Game Instructions

Block 1 – Info: Online-Quiz – Mentimeter

Mentimeter

Mentimeter is an interactive presentation tool that can be used for voting, asking questions and to visualise mind maps easily. In this instance, it will be used for an online quiz. Templates for the quiz questions are provided at the bottom of this document.

Handling:

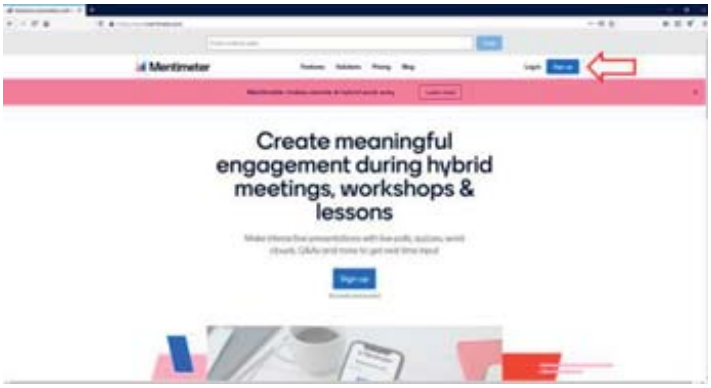
- Mentimeter is free of charge.
- To use it, all you have to do is create an account.

Data protection:

- Personal data is collected – from viewers who provide their email address as well as from participants and hosts.
- The EU General Data Protection Regulation applies

Creating an account

1. To create an account, go to https://www.mentimeter.com and click the "Sign Up" button at the top right.

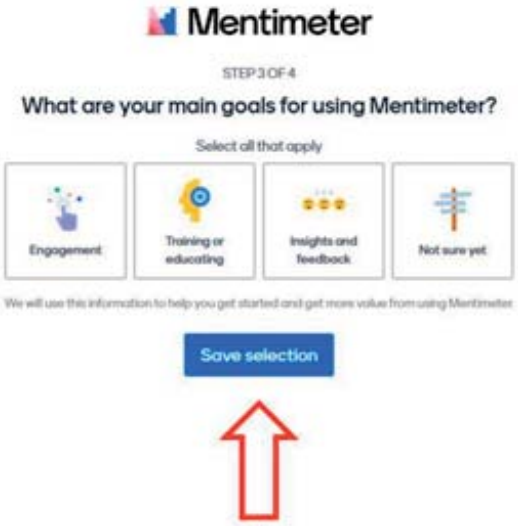


2. Register by entering a name and choose a secure password. Then click the blue "Sign up" button below.

Block 1 – Info: Online-Quiz – Mentimeter

3. Mentimeter now asks you what is your intended purpose for using this tool. Select a suitable answer and click "Save selection".

4. Mentimeter now asks you why you want to work with Mentimeter. Here too, select a suitable answer and click "Save selection".



Block 1 – Info: Online-Quiz – Mentimeter

Creating a quiz

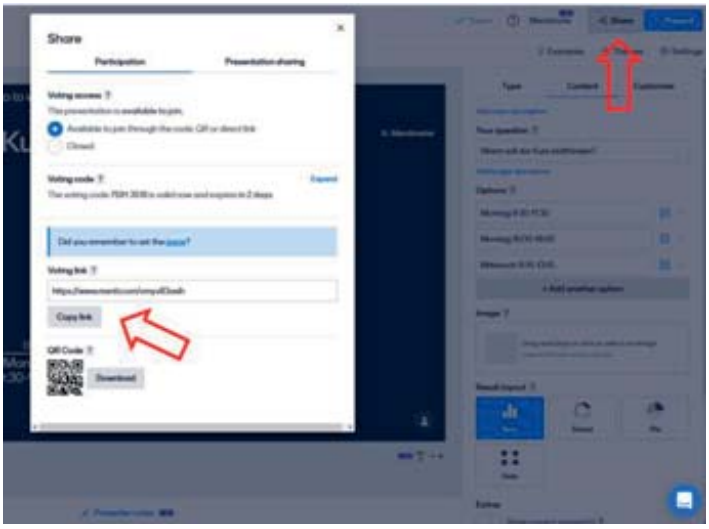
1. In the Mentimeter menu, click the "+ New presentation" button.

2. A blank Mentimeter template opens. An overview of the various application types can be displayed under the "Types" tab on the right-hand side. Select Multiple Choice.

3. You will now be taken to the next tab: "Content". Enter the questions and possible answers here.

Block 1 – Info: Online-Quiz – Mentimeter

4. To send the pupils the survey, click "Share" in the top right-hand corner. Another window containing the link to participate and the QR code for mobile access via camera will open. If you want to end the survey, click "Close"



5. This is what the survey looks like to the participants. They have to select an answer and click "Submit" to send in their selection.

6. Finally, you can present the survey findings to the pupils. For a full-screen view, click the blue "Present" button at the top right.

Block 1 – Info: Online-Quiz – Mentimeter

Quiz questions (easy)

What percentage of all animal species worldwide are insects?

1. **70%**
2. 20%
3. 50%

What percentage of insects are threatened with extinction worldwide?

1. 78%
2. **40%**
3. 16%

Which of the following factors is a reason for declining insect populations?

1. Overfishing the oceans
2. **Pesticide use**
3. Drone use

What are pesticides used for?

1. When pesticides are used, the air is purified, which in turn is good for the plants
2. Pesticide use helps conserve certain insect species
3. **Pesticides are used to maximise crop yields and avoid losses**

What is a negative consequence of intensive pesticide use in agriculture?

1. **Pollution of soil and water resources**
2. The plants often die from lack of oxygen due to the nitrogen in the pesticides
3. People living near the farm are often affected by lung diseases caused by the pesticides in the air

What types of farming are there?

1. Intergalactic, radiation and particle farming
2. **Conventional, integrated, and organic farming**
3. Throwing, aerial and jumping farming

Why is agriculture important for humans and other species?

1. Agriculture is important because it makes areas more accessible to people
2. **Agriculture is important because it ensures the food production needed to feed a growing world population; it also creates jobs**
3. Agriculture is important because the plants grown convert large quantities of CO2 into oxygen

What percentage of the world's population is undernourished?

1. **10%**
2. 32%
3. 18%

Block 1 – Info: Online-Quiz – Mentimeter

Quiz questions (difficult)

What percentage of all animal species worldwide are insects?

1. 20%
2. **70%**
3. 50%

What would be some alternative names for insects?

1. **Nature's rubbish collection, as many insects feed on dead plant remains and dead animals**
2. Nature's lawnmowers, as many insects feed on fresh grass
3. Nature's coastguard, because aquatic insects save bees that have fallen into the water from drowning, for example

What percentage of insects are threatened with extinction worldwide?

1. 78%
2. **40%**
3. 16%

Which of the following factors is a reason for declining insect populations?

1. The use of forage harvesters in agriculture
2. **Pesticide use**
3. Drone use

What are pesticides used for?

1. When pesticides are used, the air is purified, which in turn is good for the growth of plants
2. Pesticide use is intended to conserve certain insect species
3. **Pesticides are used to maximise crop yields and avoid losses**

What is a negative consequence of intensive pesticide use in agriculture?

1. **Pollution of soil and water resources**
2. The plants often die from lack of oxygen due to the nitrogen in the pesticides
3. People living near the farm are often affected by lung diseases caused by the pesticides in the air

What types of farming are there?

1. Three-dimensional, consumption and seed farming
2. **Conventional, integrated, and organic farming**
3. Vector, economic and elementary farming

Why is agriculture important for humans and other species?

1. Agriculture is important because it makes areas accessible to people
2. **Agriculture is important because it ensures the food production needed to feed a growing world population; it also creates jobs**
3. Agriculture is important because the plants grown convert large quantities of CO2 into oxygen

What percentage of the world's population is undernourished?

1. **10%**
2. 32%
3. 18%

Declining Insect Populations & Agriculture
Block 1 – Opening Dilemma
Worksheets

Block 1 – Info: Importance of Insects Variant A

Look at the diagram on the next page. Cut out the text sections and stick them on the appropriate place in the diagram. Then, hold an exchange on the discussion questions.

Discussion questions

1. How are insects important for nature?
2. What is the connection between agriculture and insects?
3. What could be the reasons why there are fewer and fewer insects?
4. What consequences could declining insect populations have for nature and humans?

Food source: Many animals such as birds, bats, frogs and mice feed on insects.

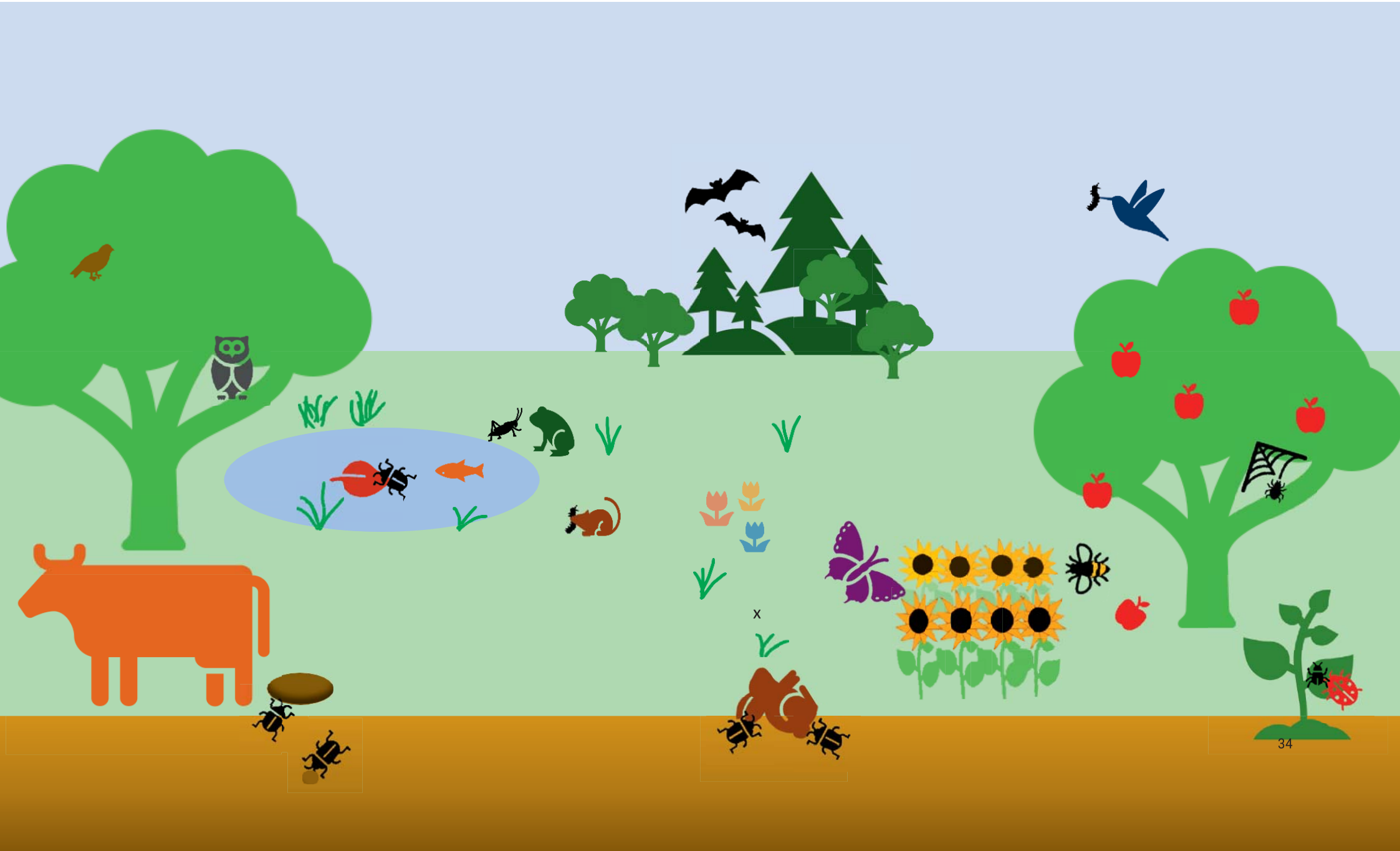
Pollination: 85% of all plant species depend on pollination. This includes most trees in the forest as well as many crops such as apples, sunflowers, carrots, and courgettes.

Cleaning of water bodies: Insects utilise dead plants and animals in bodies of water, some filter the smallest particles.

Soil fertility: Many insects utilise organic matter such as plant residues, animal corpses and manure, making them available to plants again. They also loosen up the soil and ensure good aeration.

Balance between beneficial insects and pests: Many beneficial insects play an important role in agriculture and forestry by feeding on harmful insects. For example, a ladybird eats up to 50 aphids per day.

Block 1 – Info: Importance of Insects Variant A



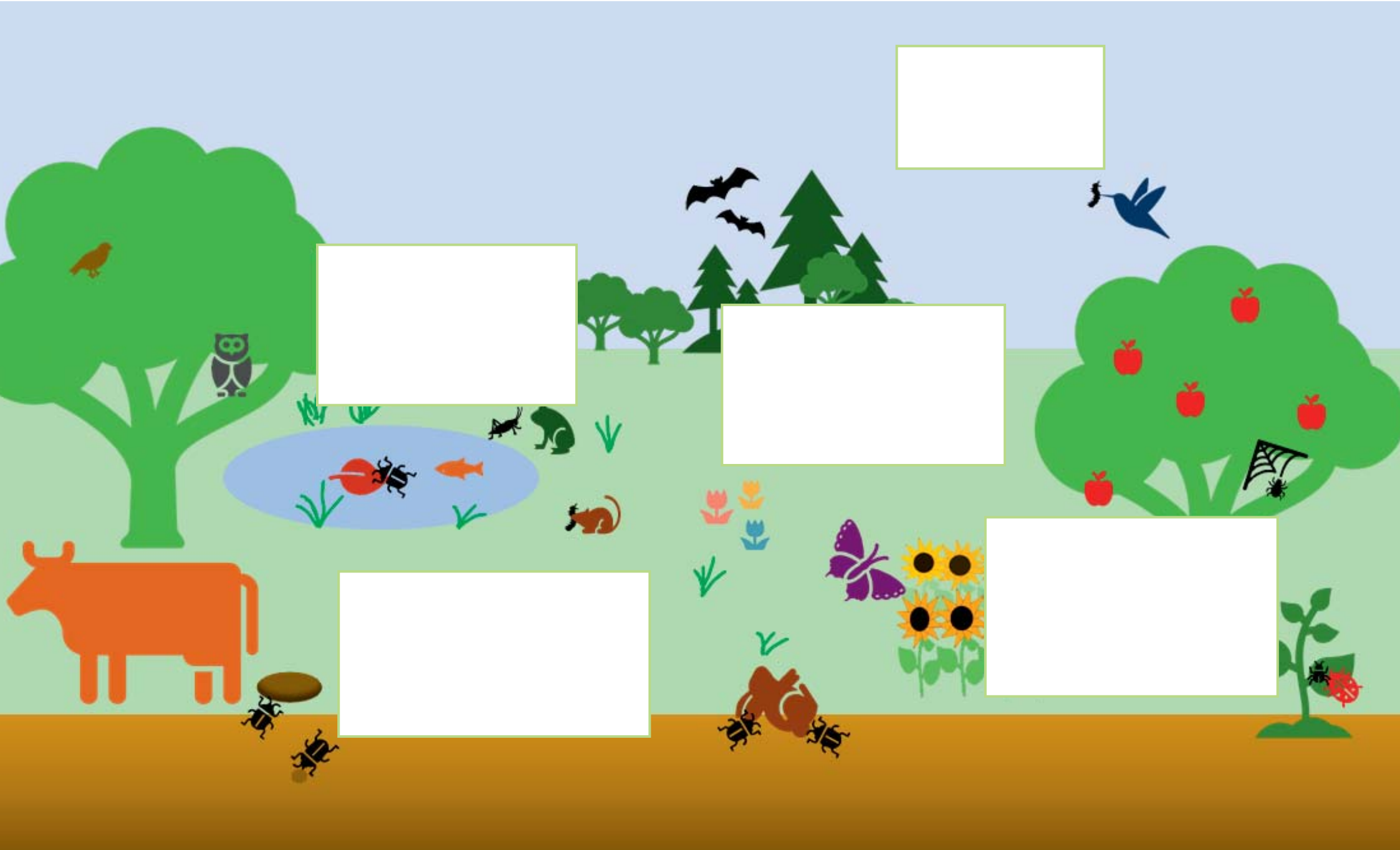
Block 1 – Info: Importance of Insects Variant B

Look at the diagram on the next page. Cut out the text sections and stick them on the appropriate place in the diagram. Then, hold an exchange on the discussion questions.

Discussion questions

1. How are insects important for nature?
2. What is the connection between agriculture and insects?
3. What could be the reasons why there are fewer and fewer insects?
4. What consequences could declining insect populations have for nature and humans?

Info: Importance of Insects Variant B



Declining Insect Populations & Agriculture
Block 2 – Knowledge
Introduction

Introduction to Block 2 – Knowledge

GOALS

The second block of the Declining Insect Populations & Agriculture study unit focuses on acquiring new knowledge.

The aim is that the pupils

- independently identify relevant subject areas and research paths and use these to research additional information,
- weigh up and prioritise various arguments,
- recognise and name complex interrelationships and problematic situations,
- become aware of their feelings in relation to complex social problems.

SEQUENCE

Entry — 10 min

- Recapitulation of the last lesson (5 min.)
- Vignette part 2 is read out and worked on (5 min.)

Material

- Info: Landscape paintings
- Info: Vignette

Research phase — 65 min

- Free research (20 min.)
- In-depth research (45 min.)

Material

- Laptops/tablets
- WS: Insects
- WS: Agriculture
- Info: Research tips
- Info: Insects research paths
- Info: Agriculture research paths
- Info: Insects
- Info: Agriculture
- WS: Organic farming
- WS: Conventional farming
- Info: Possible positions
- Info: Why method
- WS: Why method

Conclusion — 15 min

- Exchange about the research process (5 min.)
- Reflecting on your own thoughts and feelings (10 min.)

Material

- WS: I think … I feel …

Introduction to Block 2 – Knowledge

ENTRY

Working together, the last block is recapitulated using the materials that have been developed:

Working together, the last block and the thoughts on the various landscape paintings from the first part of the vignette are recapitulated.

- Info: Landscape paintings

Vignette part 2 is read out:

The second part of the vignette is read out. Questions on it are answered and possible positions are discussed. The various positions are written on the board.

- Info: Vignette
- Info: Possible positions

RESEARCH PHASE I

Free Research

The pupils divide into small groups with a maximum of five people. Working on their own, the pupils carry out research and gather as many reasons and arguments for conceivable positions as possible, based on the open questions and missing background information compiled. They make notes on this.

- WS: Advantages and disadvantages
- Info: Research tips
- Info: Research paths (online articles, videos & podcasts)

Within the group, the pupils discuss their research findings, arguments and reasons for possible positions. They then agree on the five strongest arguments.

Note: Depending on the pupils' knowledge level and age, Info: Research tips & Info: Research paths can optionally be distributed at the beginning of the research phase. Background information for the teacher is provided on Info: Agriculture and Info: Insects. If any pupils fail to find any information during their research, they can also refer to the information sheet.

Transition to in-depth research

After 20 minutes, the pupils meet in the plenary and discuss their findings by providing some examples. They then divide into four to six groups, depending on the size of the class, to carry out in-depth research into either conventional or organic farming. There should be an equal number of groups researching both types of farming. As soon as the pupils have formed groups, they decide on a position that particularly interests them within the realm of organic or conventional farming. They also think about a possible position within the group and keep this position in mind during their research, as information about this position will be useful for the 3rd block.

- Info: Possible positions

Introduction to Block 2 – Knowledge

RESEARCH PHASE II

Free Research

In the in-depth research, the pupils engage more deeply with the advantages and disadvantages of organic or conventional farming and their effects on insects, depending on which group they are in. To do this, they write their findings down on WS: Organic farming or WS: Conventional farming.

- WS: Organic farming
- WS: Conventional farming
- Info: Research tips
- Info: Agriculture research paths
- Info: Insects research paths
- Info: Agriculture
- Info: Insects

After about 30 minutes, the pupils exchange ideas in their groups and identify the five to eight strongest arguments. Working together, the small group carries out research to find more in-depth information to support the arguments, based on the five to eight strongest arguments and reasons identified. The findings are noted on WS: Why method (one worksheet per argument).

- WS: Why method
- Info: Why method

Note: Depending on the pupils' knowledge level and age, Info: Research tips & Info: Research paths can optionally be distributed at the beginning of the research phase. Background information for the teacher is provided on Info: Agriculture and Info: Insects. If any pupils fail to find any information during their research, they can also refer to the information sheet.

Exchange about the research process

The pupils discuss their research process in the plenary. The following key questions can be written on the board:

- How did you approach the research?
- How easy or difficult was it to find information and sources?

CONCLUSION

Reflecting on your own thoughts and feelings

The pupils use structured sentence starters to discuss their thoughts and feelings about problems relating to declining insect populations & agriculture.

- WS: I think … I feel …

Looking ahead: The sequence for the next unit is looked over.

Note: WS: Organic farming, WS: Conventional farming, WS: Insects, WS: Agriculture, WS: Why method and the information sheets are required in the third block.

Declining Insect Populations & Agriculture
Block 2 – Knowledge
Information Sheets

Block 2 – Info: Landscape Paintings

PAST

Block 2 – Info: Landscape Paintings

PRESENT

Block 2 – Info: Vignette

Part 1

Emma goes to visit her grandmother, who lives in a small village in the countryside, during the summer holidays. Emma used to spend every summer holiday there when she was younger. But she hasn‘t been there for a while now. On the journey there, she is filled with anticipation. She recalls how she and her childhood friend Thorne used to chase butterflies in the meadow, how they identified bird species by their songs or how they helped his parents on the farm. She remembers the scent of wild herbs, the buzzing of bees and the chirping of crickets.

Emma goes to see Thorne the very next day. They walk through the village and search for a picnic spot. The meadow where they used to play no longer exists. Having been merged with the neighbouring wheat field, it too is being used for farming now. The pair sit down on a bench, look out over the sea of wheat, and tell each other stories of times past. But as time goes by, Emma feels more and more uneasy. She misses the fragrant wild herbs and the buzzing around her. The cheerful birdsong has also disappeared, and in two hours only a single butterfly has flown past.

Emma shares her observations with her grandmother over dinner. She too has noticed that fewer insects and birds can be seen or heard. But the landscape has also changed a lot. She shows Emma pictures of the village‘s surroundings painted by her mother, Emma‘s great-grandmother, when Emma‘s grandmother was still a child. The landscape is almost unrecognisable.

Key questions

- What can you see in the pictures? What similarities and differences do you see?
- Which landscape do you prefer and why?
- Do the pictures trigger something in you and if so, what?
- What is the story about? What do the pictures have to do with the story?
- What problem appears in the story? Why is it a problem?

PAST

PRESENT

Block 2 – Info: Vignette

Part 2

Emma can't let the subject go. Does it just seem that way to her or is it really true that there are fewer insects than before, and if so, why is that? Does it have something to do with the change in the landscape? Even when Thorne comes round for coffee, the conversation turns to the topic of declining insect populations. Emma is not the only one who has noticed the decline in insects. Thorne tells her about a wide debate that is going on in the village. In order to create more habitat for insects and other animals, a group of local residents have joined forces and proposed turning the village into an eco-village. This would mean that all farms would have to switch to organic farming.

However, not everyone agrees with this proposal. Two camps have formed in the village: Some see organic farming as the future of agriculture, while others are sticking to conventional farming. Both camps are to present their arguments at a meeting next week, then a vote will be taken. Emma asks Thorne and her grandmother what their decision would be. They are both unsure. Emma's grandmother says she needs to find out about the advantages and disadvantages of the two farming methods first. Thorne wants more information too. He is not quite sure why a change in farming would stop insect populations from declining and wonders whether there are other options. So Emma and Thorne set to work researching agriculture and declining insect populations.

Key questions

- What is the story about?
- What decision is the village facing?
- What positions are there?
- What other positions could there be?

Block 2 – Info: Possible Positions

A few positions that can be taken in the discussion are listed below. They can be as examples or suggestions if pupils have difficulties finding a position.

Positions in favour of organic farming:

- Environmental activists and conservationists
- People who prefer sustainable food
- Scientists working on declining insect populations
- Farmers who are already operating fully organic farms
- Politicians who want to promote organic farming

Positions in favour of conventional farming:

- Citizens or conventional farmers who are concerned about food profitability and prices
- Politicians who represent the interests of the agricultural industry
- Farmers who believe that organic farming is not practicable or that its yields are too low

Undecided positions:

- Farmers and citizens who have no experience with organic farming and are therefore unable to make a decision

Solution-orientated positions:

- Scientists working on the economic and environmental aspects of agriculture

Block 2 – Info: Research Tips

Tip 1: Work your way from the general to the specific

Firstly, get a rough overview and deduce important keywords, sub-areas and questions for your further research. If you come across something interesting or something seems particularly important to you, follow it up. This will allow you to delve into the topic more deeply and find new areas.

Tip 2: Carry out the quality check

Good, reputable sources that you can use ...

- are relevant, i.e. important for your topic,
- have clearly recognisable authors who are ideally experts in the field,
- do not indicate any dubious intentions (e.g. propaganda or clear intentions to sell),
- are written in a factual manner,
- comprise subjective points of view, such as opinions and evaluations,
- are current,
- create the overall impression of being serious and of good quality (e.g. do not contain conspicuously prevalent spelling mistakes),
- are based on verifiable facts, data and figures.

Tip 3: Take a look outside Google

Without a doubt, Google is the best-known and largest search engine. But it‘s not the only one! In addition to Bing, Ecosia, and Yahoo, there are also meta search engines that comb through the popular search engines for you. These include, for example the German meta search engine MetaGer (https://metager.de/).
The European search engine Startpage (https://www.startpage.com/) works on the basis of Google by anonymising search queries and sending them to Google. This ensures very good protection of privacy.[1]
News portals and newspaper and magazine archives are also good places to start for a really broad search.

Tip 4: Make the best possible use of Google search for your purposes

By using various little search tricks in your Google search, you can reach your goal more quickly and more efficiently. For example, by inserting a hyphen in front of the term, you can exclude certain search terms or entire pages from the search (e.g. -site:bild.de).

Based on: https://www.cornelsen.de/empfehlungen/referat/recherchetipps (more search tricks are provided on this website) and https://www.focus.de/familie/lernen/lernhilfen/richtig-recherchieren-lernen-referate_id_1763033.html

[1] https://www.test.de/Suchmaschinen-im-Test-Eine-schlaegt-Google-5453360-5453367/

Block 2 – Info: Insects Research Paths

The following questions may be helpful for your research. Examples of how you can find useful websites are provided to help you:

How important are insects for the environment and for humans?

Search terms: *Importance of insects; insects and humanity; insects and ecosystems*

Examples

NABU.de → Environment and resources → Ecological living → Balcony and garden → Animals → Insects
https://www.nabu.de/umwelt-und-ressourcen/oekologisch-leben/balkon-und-garten/tiere/insekten/22683.html

Youtube.de → Search box: Why are insects important? → #in a nutshell: Why are insects so important to us?
https://www.youtube.com/watch?v=B0lideVMx7M

Ardmediathek.de → Drop-down menu: Navigation → Transmitter → Radio → Programmes from A to Z → O → OZON → Video: Insect mortality
https://www.ardmediathek.de/video/ozon/insektensterben/funk/Y3JpZDovL2Z1bmsubmV0LzEyMDE0L3ZpZGVvLzE2MTY1Nzg

Youtube.de → Search box: Why are insects important? → Federal Ministry for the Environment: Why insects are important and how we can protect them
https://www.youtube.com/watch?v=-ovXqjjOOIY

Why are insects endangered?

Search terms: *Declining insect populations, declining insect populations reasons, why are insects endangered*

Examples

NABU.de → Rider: Animals & plants → Insects & spiders → More from this category: Insect decline → On the brink: Why insects are endangered and what we can do about it
https://www.nabu.de/tiere-und-pflanzen/insekten-und-spinnen/insektensterben/22696.html

Kinder.wdr.de → neuneinhalb - for you in the thick of it → Tab: Lexicon → Lexicon videos → Scroll to the letter i → Insect mortality
https://kinder.wdr.de/tv/neuneinhalb/neuneinhalb-lexikon/lexikonvideos/lexikon-video-insektensterben-100.html

Youtube.de → Search field: Reasons for insect mortality → Insects: If they die, our ecosystem dies/Quarks
https://www.youtube.com/watch?v=Y3Db_1hZ1aQ

Fluter.de → Topics: Country → Article: In all silence
https://www.fluter.de/insektensterben

Google.de → Search field: WDR report on insect mortality → Insect mortality - WDR.de
https://reportage.wdr.de/insektensterben#26637

Are there solutions to the problems and, if so, what are they?

Search terms: *Agriculture & declining insect populations solutions*

Examples

Youtube.de → Search field: Solutions for insect mortality and agriculture → How organic farming could save insects I Quarks
https://www.youtube.com/watch?v=Ld6Eh0piU58

Kinder.wdr.de → Neuneinhalb - For you right in the centre → Rider: Lexicon → Lexicon videos → Insect mortality → Programme links: Save the insects - Why we need to protect moths, beetles and co.
https://kinder.wdr.de/tv/neuneinhalb/sendungen/natur-und-tiere/sendung-rettet-die-insekten-warum-wir-falter-kaefer-und-co-schuetzen-muessen-100.html

Bmuv.de → Themen: Naturschutz & Artenvielfalt → Naturschutz/Biodiversität → Allgemeines/Strategien → Aktionsprogramm Insektenschutz
https://www.bmuv.de/insektenschutz

Block 2 – Info: Agriculture Research Paths

The following questions may be helpful for your research. Examples of how you can find useful websites are provided to help you:

How has agriculture changed over the course of history and what is the connection to nature conservation?

Search terms: *History of agriculture, famine agriculture in the past, interaction between agriculture and nature conservation in the past and today, production of species through agriculture*

Examples

Fluter.de → Topics: Country → Article: All the fields in the world
https://www.fluter.de/geschichte-der-landwirtschaft

Nabu.de → Nature & Agriculture → Dropdown menu: Agriculture → More in this category: Biodiversity & Agriculture → More in this category: Nature conservation services of agriculture
https://www.nabu.de/natur-und-landschaft/landnutzung/landwirtschaft/artenvielfalt/23701.html

ARD.de → Search field: History of agriculture
https://www.ardmediathek.de/video/odysso-wissen-im-swr/geschichte-der-landwirtschaft/swr/Y3JpZDovL3N3ci5kZS9hZXgvbzE2NDE1NTA

Youtube.de → Search field: History of pesticides → Pesticides - danger to humans, animals and the environment?/Quarks
https://www.youtube.com/watch?v=pK-lowQZ8Qo

What are the differences between conventional and organic farming?

Search terms: *Comparison or advantages and disadvantages of conventional and organic farming, environmental costs of organic and conventional farming*

Examples

Quarks.de → Search field: Organic and conventional farming advantages and disadvantages → Is organic always better?
https://www.quarks.de/umwelt/landwirtschaft/oekologische-vs-konventionelle-landwirtschaft-ist-bio-immer-besser/

Tagesschau.de →Search field: Environmental costs of agriculture → More organic farming - lower costs?
https://www.tagesschau.de/wissen/klima/oeko-landwirtschaft-109.html

Youtube.de → Organic & conventional farming compared → Organic vs. conventional: Is organic farming really better? 13 questions/unbubble
https://www.youtube.com/watch?v=UcFXteZIqkU

What challenges do agriculture and politics face?

Search terms: *Ecology and economy of agriculture, criticism of agricultural policy, challenges in agriculture, political measures in agriculture*

Examples

ARD.de → Search field: Conventional and organic farming → Agriculture of the future - organic, conventional or both?
https://www.ardmediathek.de/video/planet-wissen/landwirtschaft-der-zukunft-oeko-konventionell-oder-beides/swr/Y3JpZDovL3dkci5kZS9CZWl0cmFnLThkNDI5MTdmLTUzMjItNDE0YS1hMzMyLThhODRkMDIzMjhiYw

Bpb.de → Criticism of agricultural policy → The criticism of EU agricultural policy explained
https://www.bpb.de/mediathek/video/245044/die-kritik-an-der-eu-agrarpolitik-erklaert/

Bpb.de → Dropdown menu: Politics → Dropdown menu : Economy & Environment → Environment → Dropdown menu: Filter → Agriculture → Dossier Agriculture → Grow or change - German agriculture undergoing structural change
https://www.bpb.de/themen/umwelt/landwirtschaft/325872/wachsen-oder-weichen-deutsche-landwirtschaft-im-strukturwandel/

Block 2 – Info: Agriculture Research Paths

Are there any solutions to the problems surrounding declining insect populations & agriculture and if so, what are they?

Search terms: *Solutions for agricultural challenges, vertical farming, solidarity agriculture, agricultural reform, crowdfunding projects, declining insect populations/agriculture, agriculture change in consumption*

Examples

Nationalgeographic.de → Search field: Solidarity agriculture → Vegetable co-operatives: The principle of community-supported agriculture

https://www.nationalgeographic.de/geschichte-und-kultur/2020/06/gemuese-genossen-das-prinzip-der-solidarischen-landwirtschaft

NDR.de → Search field: Vertical farming → Is vertical farming the future of agriculture ?

https://www.ndr.de/nachrichten/info/Ist-Vertical-Farming-die-Zukunft-der-Landwirtschaft,ndrinfo40680.html

ARD.de → Search field: Agrarian reform → Agrarian reform - deceptive packaging

https://www.ardmediathek.de/video/planet-wissen/agrarreform-mogelpackung/swr/Y3JpZDovL3dkci5kZS9CZWl0cmFnLTNjNzFkMzljLWEyOGEtNGY2NS1iZTQ1LTkwYWQzMzM0NmIyOQ

Google.de → Search field: Crowdfunding project insect mortality →Die Zeit: Insect mortality - the big meal

https://www.zeit.de/video/2019-09/6083766053001/insektensterben-das-grosse-fressen

Bmz.de → Topics → Eliminating hunger - securing food → Sustainable agriculture

https://www.bmz.de/de/themen/ernaehrungssicherung/nachhaltige-landwirtschaft

Google.de → Search field: Solutions for agriculture → Ecological Knowledge Academy: Solutions for the agricultural problem - ÖWA

https://www.öwa.org/forschung-hintergruende/loesungsansaetze-fuer-das-landwirtschaftliche-problem/

Google.de → Search field: Arte Futuremag Agroforestry → How agroforestry protects the environment

https://www.youtube.com/watch?v=UGx-X-b9c2Y

Block 2 – Info: Insects

Insects play an important role for humans and nature. They are in danger due to a variety of factors. The following information sheets show the effects this could have.

Importance of insects

Insects are the basis for a functioning ecosystem. Over 85% of all plant species worldwide depend on insect pollination to reproduce. Without insects, our plant world becomes impoverished, which in turn means that fewer animals – including insects – can find food and a habitat.[1] Insects in turn constitute a food source for many animals, such as birds, frogs, and mice. Insects also play an important role in soil fertility, as many of them feed on plant residues and animal carcasses, thus contributing to composting. They also loosen the soil through their activity in the ground.[2]

Insects are also hugely important for us humans. A significant proportion of our crops depend on pollination by insects in order to achieve high yields. Viewed globally, the pollination service provided by insects is estimated at 153 billion euros. Without insects, there would be fewer fruits, vegetables, and nuts. Several million people would die from malnutrition as a result.

Declining insect populations

Studies show a massive decline in insects. In Germany, the biomass of flying insects declined by a total of 75% between 1989 and 2014.1 Worldwide, around 40% of all insect species are threatened with extinction.[3]

There are many reasons for this. One major problem is soil sealing for the purposes of transport, residential areas, and industry. Another cause is light pollution. It is estimated that one billion nocturnal insects die on an average summer night in Germany because they fly into streetlights and burn up or die of exhaustion. Another cause of declining insect populations is industrial agriculture.

Declining insect populations & agriculture

Chemical-based pesticides are often used in conventional farming. These attack not only pests, but also other insects. In addition, the cultivation of monocultures means that insects have difficulty finding food and habitats. As a result of over-fertilisation, too much nitrogen ends up in the soil. This in turn is harmful to a variety of plants that insects feed on.

Insects and agriculture do not have to work against each other. Before agriculture became industrialised, when farms were less specialised, fields were smaller and there were more trees and hedges between the fields, it provided habitats for a variety of animals and plants.[4]

Open orchard meadows, for example, are still among the most species-rich biotopes in Central Europe.

Knowledge to go:
90% of all wildflowers and 75% of crops are pollinated by insects.[5]

What can be done?

To conserve insects, it is important to promote insect-friendly agriculture, such as organic farming.

In addition, existing nature reserves and insect-friendly green spaces must be preserved, and new ones added. More blooming meadows can also be created in the city. Only LED lamps should be used for street lighting, as these are less attractive to insects.

To support insect-friendly agriculture, you can make sure that the food you buy is produced organically, which means it is pesticide-free. If you have your own garden, you can make sure to grow native and insect-friendly plants. Pest control in the garden can be carried out using natural plant conservation products and methods. A veranda can also help conserve insects by sowing a wildflower mixture in the window box or setting up an insect hotel.

1: https://www.quarks.de/umwelt/tierwelt/darum-ist-das-insektensterben-ein-echtes-problem
2: https://www.umwelt-im-unterricht.de/hintergrund/insekten-und-ihre-rolle-im-oekosystem
3: https://www.wwf.de/themen-projekte/artensterben/insektensterben
4: https://www.nabu.de/natur-und-landschaft/landnutzung/landwirtschaft/artenvielfalt/23701.html
5: https://www.naturefund.de/en/presse/presseberichte/pressebericht/news/insekten_und_warum_sie_so_wichtig_sind

Block 2 – Info: Agriculture

Agriculture is currently facing major challenges. This information sheet looks at how it has developed in the past and what new solutions need to be found and why.

Historical development of agriculture

Working in agriculture used to mean hard physical labour. Almost all activities were done by hand, such as mowing, threshing, and milking. Farms were small family businesses and often less specialised, i.e. they cultivated a range of crops and kept various types of livestock. The invention of the mineral fertiliser by Justus von Liebig in the 1840s was a milestone in agriculture, allowing farmers to achieve higher yields.[1] Technological progress ensured that farmers were able to cultivate more and larger areas in the 20th century.[2] After the Second World War, the main goal of agriculture was to overcome food shortages. Farm enterprises in West Germany received massive subsidies. The merging of agricultural land, known as land consolidation, was also intended to make farming easier and more efficient. In East Germany, too, compulsory expropriation and amalgamation meant that farms were transformed into „agricultural production cooperatives“ (LPGs).[3]

Agriculture today

Agriculture is much more efficient today. This is due to factors such as the consolidation of land, technological progress, the use of chemical-based pesticides and fertilisers, advances in plant and animal breeding, surface irrigation and farm specialisation. As recently as 1900, one farmer produced food for around four people; in 2021, the figure was 139.[4] This is also referred to as the industrialisation of agriculture, i.e. standardised mass production. Due to the enormous increase in production and productivity, agriculture finds itself increasingly struggling to operate within the limits of natural resources, deal with harmful effects on the climate and environment, and preserve biodiversity. One concrete example is declining insect populations, for which intensive conventional farming is largely responsible. An additional challenge lies in the fact that agricultural production needs to be increased by at least 50% by 2050 in order to secure global food supplies in the face of a growing world population.[5] Today‘s developments in agriculture should not be regarded at national level only, as agriculture too has been globalised for a long time. Much of the food consumed in Germany comes from abroad.

Organic & conventional farming in comparison

Conventional farming is the most common form of agriculture in Germany. Organic farming is currently practised on 10.9% of the total land available for agriculture.
In contrast to conventional farming, organic farming is free from synthetic pesticides and fertilisers, which helps protect the environment and biodiversity. It also uses a method called crop rotation whereby various arable crops are grown in rotation in order to keep weeds and pests at bay and to maintain soil fertility. This ensures more diversity in the fields as well as a more varied food supply for insects.[6]

The dilemmas

The topic of agriculture is very complex. Other issues such as climate protection, species conservation, food security, globalisation, as well as the personal livelihoods of farmers and the provision of affordable food pose major challenges for agriculture, politics, and

1: https://www.planet-wissen.de/gesellschaft/landwirtschaft/geschichte_der_landwirtschaft/index.html
2: https://www.ndr.de/geschichte/chronologie/Landwirtschaft-im-Wandel-Vom-Handwerk-zur-Robotertechnik,landleben135.html
3: https://www.bpb.de/mediathek/video/245044/die-kritik-an-der-eu-agrarpolitik-erklaert/
4: https://www.situationsbericht.de/1/12-jahrhundertvergleich
5: https://www.bmz.de/de/themen/ernaehrungssicherung/agrarforschung-innovation
6: https://www.bmel.de/SharedDocs/Downloads/DE/Broschueren/OekolandbauDeutschland.pdf?_blob=publicationFile&v=4
7: https://www.bpb.de/mediathek/video/245044/die-kritik-an-der-eu-agrarpolitik-erklaert/
8: https://www.bpb.de/mediathek/video/245044/die-kritik-an-der-eu-agrarpolitik-erklaert/
9: https://www.bmel.de/SharedDocs/Pressemitteilungen/DE/2022/05-oekolandbau-bekanntmachungen.html
10: https://www.br.de/nachrichten/bayern/kritik-an-studie-weniger-umweltkosten-durch-oeko-landwirtschaft,TYUY1xD
11: https://www.boell.de/de/2015/01/08/futtermittel-viel-land-fuer-viel-vieh

Block 2 – Info: Agriculture

society. This results in frequent discussions between various interest groups, agricultural businesses, environmentalists, and politicians.

The following are a few positions to provide a general understanding.[8]
On the one hand, there is the position that the environmental requirements of EU agricultural policy are too strict, that the policy restricts farmers in terms of their ability to make a profit and does little to support them in this respect. Another position is that EU agricultural policy promotes the intensification of agriculture, which in turn leads to environmental damage.
For example, large farms in particular receive considerable support. The larger the area of a farm, the more money it will receive. In addition to the intensification of agriculture and environmental damage, this also means that the number of small farms is steadily declining.
And what about consumers? Many would like to see organic farming expanded.[9]
This is very important in times of climate change and species decline. However, the social dimension also needs to be taken into account. Not everyone can afford organic products. There are those who disagree, saying that organic farming protects the environment and therefore saves costs in the long term.[10] However, this position also has a counter-argument: in order to achieve the same yields as conventional farming, the cost of food rises, as organic farming achieves lower yields and takes up more land.[10]

Knowledge to go:
In the EU, 60% of arable land is used for animal feed production.[11]

Approaches to solving the problem

What can you personally do?
You can try to make your surroundings as green as possible so that you offer insects a place to shelter. Thus, you can **plant greenery on your veranda or garden or a flowerbed in your street**.
Perhaps you and your classmates or family would also like to build a **bee hotel** in the garden?
Maybe there is an opportunity to do these things **at your school**. It's best to ask your teacher about this.
As a lot of land in agriculture is used for animal feed production, there is less green space, which is important for many animal species. You could therefore try to **eat less meat** or do without it altogether. If many people ate less meat, some of the land that would otherwise be used to grow animal feed could be used for grassland. This would create more habitat for insects.
You can also protect the environment by buying **organic food**. To strengthen regional supply chains, you can also look for items produced in the local region, e.g. when buying fruit and vegetables.

What could others do?
In order to secure the supply of food for the growing world population, innovative cultivation methods could be invested in or researched. These include indoor farming, precision farming and urban farming, for example on rooftops.

1: https://www.planet-wissen.de/gesellschaft/landwirtschaft/geschichte_der_landwirtschaft/index.html
2: https://www.ndr.de/geschichte/chronologie/Landwirtschaft-im-Wandel-Vom-Handwerk-zur-Robotertechnik,landleben135.html
3: https://www.bpb.de/mediathek/video/245044/die-kritik-an-der-eu-agrarpolitik-erklaert/
4: https://www.situationsbericht.de/1/12-jahrhundertvergleich
5: https://www.bmz.de/de/themen/ernaehrungssicherung/agrarforschung-innovation
6: https://www.bmel.de/SharedDocs/Downloads/DE/Broschueren/OekolandbauDeutschland.pdf?_blob=publicationFile&v=4
7: https://www.bpb.de/mediathek/video/245044/die-kritik-an-der-eu-agrarpolitik-erklaert/
8: https://www.bpb.de/mediathek/video/245044/die-kritik-an-der-eu-agrarpolitik-erklaert/
9: https://www.bmel.de/SharedDocs/Pressemitteilungen/DE/2022/05-oekolandbau-bekanntmachungen.html
10: https://www.br.de/nachrichten/bayern/kritik-an-studie-weniger-umweltkosten-durch-oeko-landwirtschaft,TYUY1xD
11: https://www.boell.de/de/2015/01/08/futtermittel-viel-land-fuer-viel-vieh

Block 2 – Info: Why method

The „Why method“ is used to engage with a particular aspect of declining insect populations & agriculture in greater detail. Asking the question followed by scrutinising the answer leads the pupils to the actual causes of the argument.

EXAMPLE

Argument:

More insect habitats should be created through agriculture.

Why?

Insects are the basis of our ecosystem. They ensure the survival of plant life, contribute to soil fertility, and exert a regulating effect.

And that‘s because?

85% of all plant species depend on pollination by insects. Without pollination, plants would not produce seeds and could not reproduce. Many of our crops also need to be pollinated by insects in order to achieve high yields.

Many insects feed on dead plant remains and dead animals. They ensure that these are composted, and nutrients are returned to the soil. In addition, insects living in the soil loosen up the soil through their activity, allowing plants, for example, to send their roots to deeper reaches, thereby accessing nutrients found further down.

True to the phrase „eat and be eaten“, some insects feed on other insects. This ensures that no one species of insect becomes dominant. Ladybirds, for example, eat aphids, which are harmful to many crops, and thus have a pest-regulating effect in agriculture.

Declining Insect Populations & Agriculture
Block 2 – Knowledge
Worksheets

Block 2 – WS: Insects

Find out how important insects are and what endangers them. Enter the answers in the boxes.

How important are insects for humans and the environment?

What endangers insects and what can be done to conserve them?

Block 2 – WS: Agriculture

Find out how important agriculture is and the challenges it faces. Enter the answers in the boxes.

How important is agriculture for humans and the environment?

What challenges does agriculture face and how can they be solved?

Block 2 – WS: Organic farming

Find out about the advantages and disadvantages of organic farming.

What are the advantages of organic farming?

What are the disadvantages of organic farming?

Block 2 – WS: Conventional Farming

Find out about the advantages and disadvantages of conventional farming.

What are the advantages of conventional farming?

What are the disadvantages of conventional farming?

Block 2 – WS: Why Method

Argument:

Why?

And that's because?

Block 2 – WS: I Think … I Feel …

Gaining an overview of complex relationships and understanding how you yourself think about them takes time and is sometimes not so easy. The following sentence components can help you to gain a better overview of your thoughts and feelings.
You don't have to answer all the questions. Choose the boxes that interest you. Whenever you can grasp a thought or a feeling on the spur of the moment, that is a good place to start.

When I hear that the situation of declining insect populations poses a significant threat to our ecosystem and to us humans, ...

… I think:

… I feel:

When I hear that insects are dwindling due to agriculture, ...

… I think:

… I feel:

When I hear that conventional farming is damaging the ecosystem, ...

… I think:

… I feel:

When I hear that organic farming involves more work for the farmers and this means the products are usually more expensive than those from conventional farming, ...

… I think:

… I feel:

When I hear that EU agricultural policy mainly promotes large farms and thus tends to support conventional farms, ...

… I think:

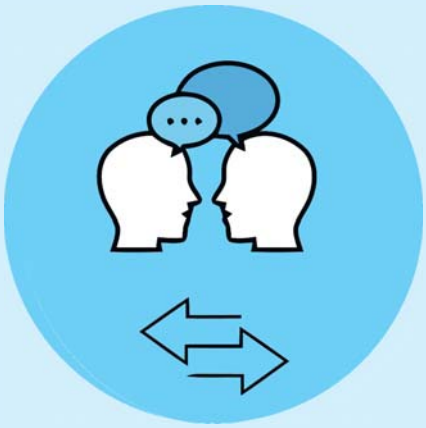
… I feel:

When I hear that organic farming protects the environment, which means it saves costs that would be incurred in the future due to environmental damage, but at the same time it requires more land, therefore produces less overall, ...

… I think:

… I feel:

Declining Insect Populations & Agriculture
Block 3 – Positioning
Introduction



Introduction to Block 3 – Positioning

GOALS

The third block of the Declining Insect Populations & Agriculture study unit focuses on discussing, exchanging, and analysing various arguments and developing an informed position.

The aim is that the pupils

- practise discussing and arguing,
- bring different perspectives into dialogue with each other,
- analyse and reflect on the discussion and the various arguments,
- adopt a position based on the discussion and discuss the various reasons and motives for the decision,
- perceive and justify shifts in their positioning.

SEQUENCE

Review — 5 min

- Working together, the second block (Knowledge) is recapitulated and the addressed arguments, problem areas and solutions are discussed (5 min.)

Discussion — 60 min

- Preparing for the discussion (15 min.)
- Discussion phase I (15 min.)
- Break (5 min.)
- Discussion phase II (20 min.)
- Evaluation – Ball bearing (5 min.)

Material

- Info Fishbowl
- Info: Moderation – Goal and discussion sequence
- Info: Moderation – Moderation stimuli and questions
- WS: Communication
- WS: Organic farming (Block 2)
- WS: Conventional farming (Block 2)
- WS: Insects (Block 2)
- WS: Agriculture (Block 2)
- WS: Why method (Block 2)
- Info: Agriculture
- Info: Insects
- Info: Ball bearing

Positioning — 20 min

- Finding your own position (5 min.)
- Positioning in the room (5 min.)
- Exchange about the positions (10 min.)

Conclusion — 5 min

- Looking ahead to the next block (5 min.)

Material

- WS: Single-sentence positioning
- WS: What influences my decisions?

Introduction to Block 3 – Positioning

ENTRY

Entry

Working together, the pupils recapitulate the last block:

- Did anyone have a dilemma last week? How did you deal with it?
- Has anybody encountered the topics of declining insect populations & agriculture in everyday life?
- On the topic of agriculture and declining insect populations, what positions exist? What are their challenges and are there any initial solutions for dealing with them?

DISCUSSION

Preparing for the discussion

The framework and sequence of the discussion block:

- Before starting the discussion, the pupils carry out a communication exercise to practise their researched arguments, as well as active listening. The exercise is described on WS: Communication.
- After the communication exercise has been completed, the fishbowl method is explained, and the discussion process is described. The room is then prepared for the discussion. (Info: Fishbowl, Info: Moderation – Goal and discussion sequence)
- The discussion is based on the vignette. The discussion content therefore includes a referendum held in a village to decide whether farms should practise exclusively organic farming due to declining insect populations.

The discussion is divided into two phases: In the first phase, the pupils adopt positions from the vignette and argue in favour of either organic or conventional farming. Following a short break, the pupils argue from their own perspective in the second phase. Then, some time is allowed to reflect on the discussion (Info: Ball bearing).

Small groups: Recapitulating the arguments through the communication exercise

The small groups from block 2 meet again and practise arguing points and listening. They do this using WS: Communication and recapitulate the arguments and counter-arguments collected in block 2 so that the panellists are well prepared for the discussion. They appoint somebody as the first to join the inner circle discussion.

➲ WS: Communication

Worksheets from block 2:

➲ WS: Insects
➲ WS: Agriculture
➲ WS: Organic farming
➲ WS: Conventional farming
➲ WS: Why method

Note: At least two representatives from each small group of the previous block should be present in the discussion so that the range of arguments researched is represented in the discussion also.

Reorganisation: The room is then rearranged and prepared for the fishbowl discussion.

➲ Info: Fishbowl

Introduction to Block 3 – Positioning

Discussion phase I – Adopting a perspective

In the first phase, the pupils adopt the perspective which they researched in the second block during the discussion. The discussion follows the moderation questions and stimuli.

- Info: Moderation – Moderation stimuli and questions
- Info: Moderation – Goal and discussion sequence
- Info: Fishbowl
- Worksheets and information sheets from the
- second block

Break

Before the second round begins, a short break takes place so that the pupils can re-focus their thoughts and transition out of the role. This is done by playing the Count-to-10 game.

Count-to-10

The pupils stand in a circle. The task is to count from 1 to 10 as quickly as possible, without any prior agreements being made. Each person can only say a number once. If a number is repeated or is uttered at the same time, the count has to be started again from the beginning.

Discussion phase II – One‘s own perspective

In the second phase, the pupils discuss from their own perspective. The discussion follows the moderation questions and stimuli.

- Info: Moderation – Moderation stimuli and questions
- Info: Moderation – Goal and discussion sequence
- Info: Fishbowl
- Worksheets from the second block

Evaluation – Ball bearing

The evaluation is firstly carried out in alternating pairs using the ball-bearing method in line with the guiding questions. The findings are then presented to the large group as examples.

- Info: Ball bearing

Key questions

- How did the discussion go?
- What was easy to discuss? What was difficult?
- Which arguments were particularly convincing, which were not?
- Which argument triggered something in you?

Introduction to Block 3 – Positioning

POSITIONING

Finding your own position

The pupils write down their own position in relation to the discussion topic on WS: Single-sentence positioning.

Key questions: Now that I know various positions on declining insect populations and agriculture, what would my personal decision be? Should the village switch to organic farming or not?

➲ WS: Single-sentence positioning

Positioning in the room

The pupils place their single-sentence positions on the floor anywhere in the room and walk around to look at the other positions. The various positions are then grouped together and placed around the room, ensuring that they are well spread out.

Exchange about the positions

The pupils consider which reasons are important to them when making their decision.

➲ WS: What influences my decision?

The various positions and reasons for these positions are then summarised in the plenary

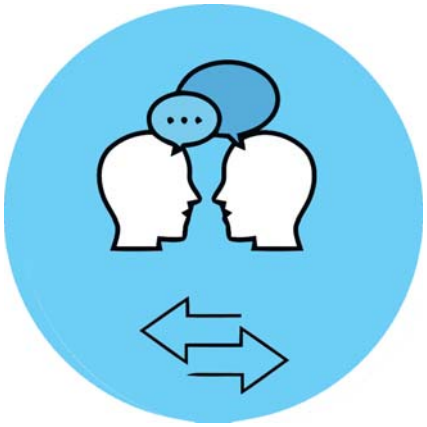
Key questions

- Why did I make this decision?
- What reasons are important to me here?
- How do I feel about the position?

CONCLUSION

Looking ahead to the fourth block:
The sequence for the next unit is looked over.

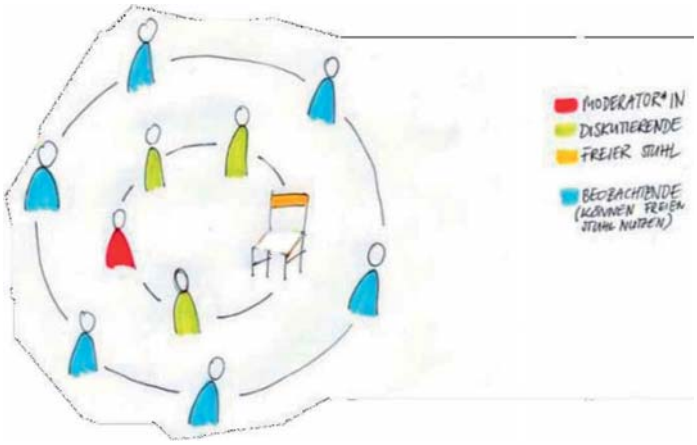
Declining Insect Populations & Agriculture
Block 3 – Positioning
Information Sheets



Block 3 – Info: Fishbowl Method

Fishbowl method

The fishbowl is a method that is suitable for dynamic discussions in larger groups. A smaller circle of panellists is surrounded by a larger circle of listeners, who can switch between the two circles at will.



Preparation

Small groups

- Before the discussion, the small groups from the previous knowledge block come back together and recapitulate the arguments they gathered so that the panellists are well prepared, then appoint somebody to start the discussion in the inner circle.

Reorganisation

- The seating arrangement for the fishbowl discussion is prepared based on the sketch.

Discussion

The discussion is divided into two phases. The arguments from the small groups are in focus during the first phase. The small groups' representatives determined during the discussion preparation phase take turns presenting the small groups' arguments. The pupils' personal opinions and the weighting of the arguments are in focus during the second phase. The circle is opened to all panellists (outer circle) and the panellists do not speak for the small group anymore, but from their personal perspective.

Moderation

- The teacher moderates the discussion (Info: Moderation – Goal and discussion sequence, Info: Moderation – Moderation stimuli and questions).

Inner circle

- The inner circle starts the discussion. Anyone who feels they have said everything they wanted to say can move from the inner circle to the outer circle.

Outer circle

- The pupils in the middle circle can use the available space in the inner circle to contribute their arguments to the discussion. If there is no space available, they stand behind somebody in the inner circle, who then finishes their thought and moves to the middle circle.

Block 3 – Info: Moderation – Goal and Discussion Sequence

Goal of the discussion

The discussion phase forms the core element of the third block. The discussion is based on the vignette. The content therefore includes a referendum held in a village to decide whether farms should practise exclusively organic farming due to declining insect populations.

The discussion is divided into three phases: Firstly, the pupils discuss from a perspective other than their own. For example, the discussion includes representatives and positions from organic and conventional farming. In the second phase of the discussion, they discuss from their own perspective. There will always be time to reflect on the discussion in between.

The aim of the discussion is to establish a dialogue between the various aspects associated with declining insect populations and conventional versus organic farming, as well as possible solutions and their associated advantages and disadvantages. The discussion is not aimed at developing a concrete result or a group consensus. The everyday world and the question of practicability also play a role here, as do the personal weighting and prioritisation of individual sub-problems. The arguments were researched and identified in small groups in the previous block.

Discussion sequence

Opening

An opening stimulus should provide the space for addressing the arguments and reasons as well as other problem areas and solutions identified in small groups and for providing an outlook on the discussion sequence.

Phase I: Adopting a perspective

Two members of each small group sit in the discussion circle. The main arguments noted by each small group on their moderation cards in the last block are presented in turn. Once all the arguments have been compiled, the circle is opened up to everyone else: The pupils may enter and leave the discussion at will via the available seat. The panellists do not speak for the small group anymore, but for themselves. If there is no space available, they stand behind somebody in the inner circle, who then finishes their thought and moves to the middle circle.

Break (Count-to-10 game)

Phase II: Opening

The floor is opened for discussion through an opening stimulus. An explanation of what the discussion is about and how it will proceed is provided by way of introduction.

Phase II: One‘s own perspective

In the second phase, the pupils discuss from their own perspective. The first step is finding volunteers who will start the discussion in the inner circle. Anyone who feels they have said everything they wanted to say can move from the inner circle to the outer circle. The pupils in the outer circle may enter and leave the discussion at will via the available seat. If there is no space available, they stand behind somebody in the inner circle, who then finishes their thought and moves to the middle circle.

Block 3 – Info: Moderation – Moderation Stimuli and Questions

Opening

The floor is opened for discussion through an opening stimulus. An explanation of what the discussion is about and how it will proceed is provided by way of introduction.

Moderation stimulus

You engaged with the topics of agriculture and declining insect populations in the last block. You researched the advantages and disadvantages of conventional and organic farming and the problems associated with declining insect populations. You decided which position you wanted to take. The starting point for this was the story about a village that wants to hold a meeting to decide whether the local farms should practise exclusively organic farming due to declining insect populations. Now imagine that you are part of the village community. Everyone has arrived in the meeting room and the vote is about to begin. It will then be a matter of presenting, then discussing all the arguments. At the end, a decision will be made on the proposal.

During the discussion, we will be guided by the following questions:

What are the problems associated with declining insect populations and why are insects important for humans and the environment?
What are the arguments for and against organic farming?
What are the arguments for and against conventional farming?
What advantages does organic farming offer in terms of insects and biodiversity?
Do any strategies to counteract the problem of declining insect populations currently exist?

Discussion phase I: Adopting a perspective

Two members of each small group from the last block sit in the discussion circle. The respective arguments of the various positions found by each small group in the last block are presented in turn.

Moderation phase 1: Arguments from the small groups

I would like to welcome you to our village meeting today. A vote on whether exclusively organic farming should be practised on our farms is on the agenda. This motion has been put forward because insect populations are rapidly declining and some of you want to do something about it. You may now come forward and share your arguments on this topic.

Moderation phase 2: Opening the discussion

After all the arguments have been shared, the floor is opened to everyone else, and the students can enter and leave the discussion at will via the available seat.

Many thanks to the representatives of the small groups. We will now open the circle and you can take the space available if you want to join in the discussion. If there is no space available, you can stand behind a chair and take the seat as soon as it becomes available. I now invite you all to share your arguments, thoughts, and concerns in relation to the motion. Please respect your fellow *speakers' opinions, even if their views are different from your own.*

Block 3 – Info: Moderation – Moderation Stimuli and Questions

Discussion phase II: Personal opinions and weightings

The second discussion phase is about expressing your own opinion on the story. Do this by finding volunteers who will start the discussion in the inner circle. At the same time, the floor is opened to everyone else, and the pupils can enter and leave the discussion at will via the available seat. The panellists do not speak for the small group anymore, but for themselves.

Moderation phase 3: Personal opinions and weightings

Welcome back to the discussion. We have now heard various arguments as to why different people would vote for or against adopting a policy of exclusively organic farming in their village. How do you feel about the situation yourselves? We will now open the circle and you can take the space available if you want to join in the discussion. If there is no space available, you can stand behind a chair and take the seat as soon as it becomes available. As in the last discussion phase, I request that you respect your fellow speakers' opinions, even if their views are different from your own.

You will not speak from the position you found in the last block anymore, but for yourselves.

Are there any any other aspects that have not been mentioned yet?
Which arguments do you find the strongest?
Which problems do you find the most urgent?
What could be done to solve the problems?
How practicable are these solutions?

Note: If a consensus is reached quickly or similar opinions are held, opposing positions or arguments may be introduced by the moderator by asking specific questions.

Open questions

Open questions can be used to encourage panellists to elaborate on their points of view, or to encourage them to talk and to think more deeply about the topic.

Examples of open questions:

What ideas/perceptions do you have on the topic?
What does ... look like to you?
What should it look like in the future?
What does it look like in more concrete terms?
What else can be said about this?
How do you imagine ...?
Can you think of any more?
What aspect of this do you find particularly important?
What would be a better alternative?
What can be done instead?
What other options are there?
Why is this particularly important?
What does this mean for ...?
Who is particularly affected?
What can be done about it? Why?
How does that make you feel?

Block 3 – Info: Insects

Insects play an important role for humans and nature. They are in danger due to a variety of factors. The following information sheets show the effects this could have.

Importance of insects

Insects are the basis for a functioning ecosystem. Over 85% of all plant species worldwide depend on insect pollination to reproduce. Without insects, our plant world becomes impoverished, which in turn means that fewer animals – including insects – can find food and a habitat.[1] Insects in turn constitute a food source for many animals, such as birds, frogs, and mice. Insects also play an important role in soil fertility, as many of them feed on plant residues and animal carcasses, thus contributing to composting. They also loosen the soil through their activity in the ground.[2]

Insects are also hugely important for us humans. A significant proportion of our crops depend on pollination by insects in order to achieve high yields. Viewed globally, the pollination service provided by insects is estimated at 153 billion euros. Without insects, there would be fewer fruits, vegetables, and nuts. Several million people would die from malnutrition as a result.

Declining insect populations

Studies show a massive decline in insects. In Germany, the biomass of flying insects declined by a total of 75% between 1989 and 2014.1 Worldwide, around 40% of all insect species are threatened with extinction.[3]

There are many reasons for this. One major problem is soil sealing for the purposes of transport, residential areas, and industry. Another cause is light pollution. It is estimated that one billion nocturnal insects die on an average summer night in Germany because they fly into streetlights and burn up or die of exhaustion. Another cause of declining insect populations is industrial agriculture.

Declining insect populations & agriculture

Chemical-based pesticides are often used in conventional farming. These attack not only pests, but also other insects. In addition, the cultivation of monocultures means that insects have difficulty finding food and habitats. As a result of over-fertilisation, too much nitrogen ends up in the soil. This in turn is harmful to a variety of plants that insects feed on.

Insects and agriculture do not have to work against each other. Before agriculture became industrialised, when farms were less specialised, fields were smaller and there were more trees and hedges between the fields, it provided habitats for a variety of animals and plants.[4]

Open orchard meadows, for example, are still among the most species-rich biotopes in Central Europe.

Knowledge to go:
90% of all wildflowers and 75% of crops are pollinated by insects.[5]

What can be done?

To conserve insects, it is important to promote insect-friendly agriculture, such as organic farming.

In addition, existing nature reserves and insect-friendly green spaces must be preserved, and new ones added. More blooming meadows can also be created in the city. Only LED lamps should be used for street lighting, as these are less attractive to insects.

To support insect-friendly agriculture, you can make sure that the food you buy is produced organically, which means it is pesticide-free. If you have your own garden, you can make sure to grow native and insect-friendly plants. Pest control in the garden can be carried out using natural plant conservation products and methods. A veranda can also help conserve insects by sowing a wildflower mixture in the window box or setting up an insect hotel.

1: https://www.quarks.de/umwelt/tierwelt/darum-ist-das-insektensterben-ein-echtes-problem
2: https://www.umwelt-im-unterricht.de/hintergrund/insekten-und-ihre-rolle-im-oekosystem
3: https://www.wwf.de/themen-projekte/artensterben/insektensterben
4: https://www.nabu.de/natur-und-landschaft/landnutzung/landwirtschaft/artenvielfalt/23701.html
5: https://www.naturefund.de/en/presse/presseberichte/presseberichte/news/insekten_und_warum_sie_so_wichtig_sind

Block 3 – Info: Agriculture

Agriculture is currently facing major challenges. This information sheet looks at how it has developed in the past and what new solutions need to be found and why.

Historical development of agriculture

Working in agriculture used to mean hard physical labour. Almost all activities were done by hand, such as mowing, threshing, and milking. Farms were small family businesses and often less specialised, i.e. they cultivated a range of crops and kept various types of livestock. The invention of the mineral fertiliser by Justus von Liebig in the 1840s was a milestone in agriculture, allowing farmers to achieve higher yields.[1] Technological progress ensured that farmers were able to cultivate more and larger areas in the 20th century.[2] After the Second World War, the main goal of agriculture was to overcome food shortages. Farm enterprises in West Germany received massive subsidies. The merging of agricultural land, known as land consolidation, was also intended to make farming easier and more efficient. In East Germany, too, compulsory expropriation and amalgamation meant that farms were transformed into „agricultural production cooperatives“ (LPGs).[3]

Agriculture today

Agriculture is much more efficient today. This is due to factors such as the consolidation of land, technological progress, the use of chemical-based pesticides and fertilisers, advances in plant and animal breeding, surface irrigation and farm specialisation. As recently as 1900, one farmer produced food for around four people; in 2021, the figure was 139.[4] This is also referred to as the industrialisation of agriculture, i.e. standardised mass production. Due to the enormous increase in production and productivity, agriculture finds itself increasingly struggling to operate within the limits of natural resources, deal with harmful effects on the climate and environment, and preserve biodiversity. One concrete example is declining insect populations, for which intensive conventional farming is largely responsible. An additional challenge lies in the fact that agricultural production needs to be increased by at least 50% by 2050 in order to secure global food supplies in the face of a growing world population.[5] Today‘s developments in agriculture should not be regarded at national level only, as agriculture too has been globalised for a long time. Much of the food consumed in Germany comes from abroad.

Organic & conventional farming in comparison

Conventional farming is the most common form of agriculture in Germany. Organic farming is currently practised on 10.9% of the total land available for agriculture.
In contrast to conventional farming, organic farming is free from synthetic pesticides and fertilisers, which helps protect the environment and biodiversity. It also uses a method called crop rotation whereby various arable crops are grown in rotation in order to keep weeds and pests at bay and to maintain soil fertility. This ensures more diversity in the fields as well as a more varied food supply for insects.[6]

The dilemmas

The topic of agriculture is very complex. Other issues such as climate protection, species conservation, food security, globalisation, as well as the personal livelihoods of farmers and the provision of affordable food pose major challenges for agriculture, politics, and

1: https://www.planet-wissen.de/gesellschaft/landwirtschaft/geschichte_der_landwirtschaft/index.html
2: https://www.ndr.de/geschichte/chronologie/Landwirtschaft-im-Wandel-Vom-Handwerk-zur-Robotertechnik,landleben135.html
3: https://www.bpb.de/mediathek/video/245044/die-kritik-an-der-eu-agrarpolitik-erklaert/
4: https://www.situationsbericht.de/1/12-jahrhundertvergleich
5: https://www.bmz.de/de/themen/ernaehrungssicherung/agrarforschung-innovation
6: https://www.bmel.de/SharedDocs/Downloads/DE/Broschueren/OekolandbauDeutschland.pdf?_blob=publicationFile&v=4
7: https://www.bpb.de/mediathek/video/245044/die-kritik-an-der-eu-agrarpolitik-erklaert/
8: https://www.bpb.de/mediathek/video/245044/die-kritik-an-der-eu-agrarpolitik-erklaert/
9: https://www.bmel.de/SharedDocs/Pressemitteilungen/DE/2022/05-oekolandbau-bekanntmachungen.html
10: https://www.br.de/nachrichten/bayern/kritik-an-studie-weniger-umweltkosten-durch-oeko-landwirtschaft,TYUY1xD
11: https://www.boell.de/de/2015/01/08/futtermittel-viel-land-fuer-viel-vieh

Block 3 – Info: Agriculture

society. This results in frequent discussions between various interest groups, agricultural businesses, environmentalists, and politicians.

The following are a few positions to provide a general understanding.[8]
On the one hand, there is the position that the environmental requirements of EU agricultural policy are too strict, that the policy restricts farmers in terms of their ability to make a profit and does little to support them in this respect. Another position is that EU agricultural policy promotes the intensification of agriculture, which in turn leads to environmental damage.
For example, large farms in particular receive considerable support. The larger the area of a farm, the more money it will receive. In addition to the intensification of agriculture and environmental damage, this also means that the number of small farms is steadily declining.
And what about consumers? Many would like to see organic farming expanded.[9]
This is very important in times of climate change and species decline. However, the social dimension also needs to be taken into account. Not everyone can afford organic products. There are those who disagree, saying that organic farming protects the environment and therefore saves costs in the long term.[10] However, this position also has a counter-argument: in order to achieve the same yields as conventional farming, the cost of food rises, as organic farming achieves lower yields and takes up more land.[10]

Knowledge to go:
In the EU, 60% of arable land is used for animal feed production.[11]

Approaches to solving the problem

What can you personally do?
You can try to make your surroundings as green as possible so that you offer insects a place to shelter. Thus, you can **plant greenery on your veranda or garden or a flowerbed in your street**.
Perhaps you and your classmates or family would also like to build a **bee hotel** in the garden?
Maybe there is an opportunity to do these things **at your school**. It's best to ask your teacher about this.
As a lot of land in agriculture is used for animal feed production, there is less green space, which is important for many animal species. You could therefore try to **eat less meat** or do without it altogether. If many people ate less meat, some of the land that would otherwise be used to grow animal feed could be used for grassland. This would create more habitat for insects.
You can also protect the environment by buying **organic food**. To strengthen regional supply chains, you can also look for items produced in the local region, e.g. when buying fruit and vegetables.

What could others do?
In order to secure the supply of food for the growing world population, innovative cultivation methods could be invested in or researched. These include indoor farming, precision farming and urban farming, for example on rooftops.

1: https://www.planet-wissen.de/gesellschaft/landwirtschaft/geschichte_der_landwirtschaft/index.html
2: https://www.ndr.de/geschichte/chronologie/Landwirtschaft-im-Wandel-Vom-Handwerk-zur-Robotertechnik,landleben135.html
3: https://www.bpb.de/mediathek/video/245044/die-kritik-an-der-eu-agrarpolitik-erklaert/
4: https://www.situationsbericht.de/1/12-jahrhundertvergleich
5: https://www.bmz.de/de/themen/ernaehrungssicherung/agrarforschung-innovation
6: https://www.bmel.de/SharedDocs/Downloads/DE/Broschueren/OekolandbauDeutschland.pdf?_blob=publicationFile&v=4
7: https://www.bpb.de/mediathek/video/245044/die-kritik-an-der-eu-agrarpolitik-erklaert/
8: https://www.bpb.de/mediathek/video/245044/die-kritik-an-der-eu-agrarpolitik-erklaert/
9: https://www.bmel.de/SharedDocs/Pressemitteilungen/DE/2022/05-oekolandbau-bekanntmachungen.html
10: https://www.br.de/nachrichten/bayern/kritik-an-studie-weniger-umweltkosten-durch-oeko-landwirtschaft,TYUY1xD
11: https://www.boell.de/de/2015/01/08/futtermittel-viel-land-fuer-viel-vieh

Block 3 – Info: Ball Bearing – Discussion Evaluation

Procedure

Ball bearing

The group forms two circles of the same size – an inner circle and an outer circle. The pupils stand in such a way that they have a counterpart in the other circle. The inner circle faces outwards and the outer circle faces inwards. The pairs formed in this way discuss the first question. The conversations end after approx. 30 seconds, and the inner circle moves two people to the left, while the outer circle stays in place. The newly formed pairs discuss the second question and, after 30 seconds, the outer circle moves three steps to the right. This process is repeated until all questions have been discussed. Which circle, how many places and in which direction can be varied as desired. However, the discussion pairs should not double up.

Preparation:

- Create space for the two circles

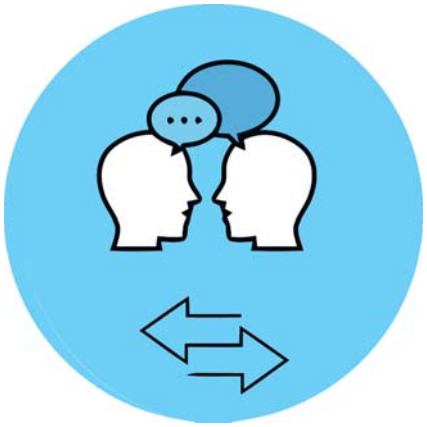
Material

- Key questions
- Stopwatch/clock

Key questions

- How did the discussion go?
- Which was easier, discussing from the role's perspective or from your own? Why?
- What was easy to discuss? What was difficult?
- Which arguments were particularly convincing, which were not?
- Which argument triggered something in you?

Declining Insect Populations & Agriculture
Block 3 – Positioning
Worksheets



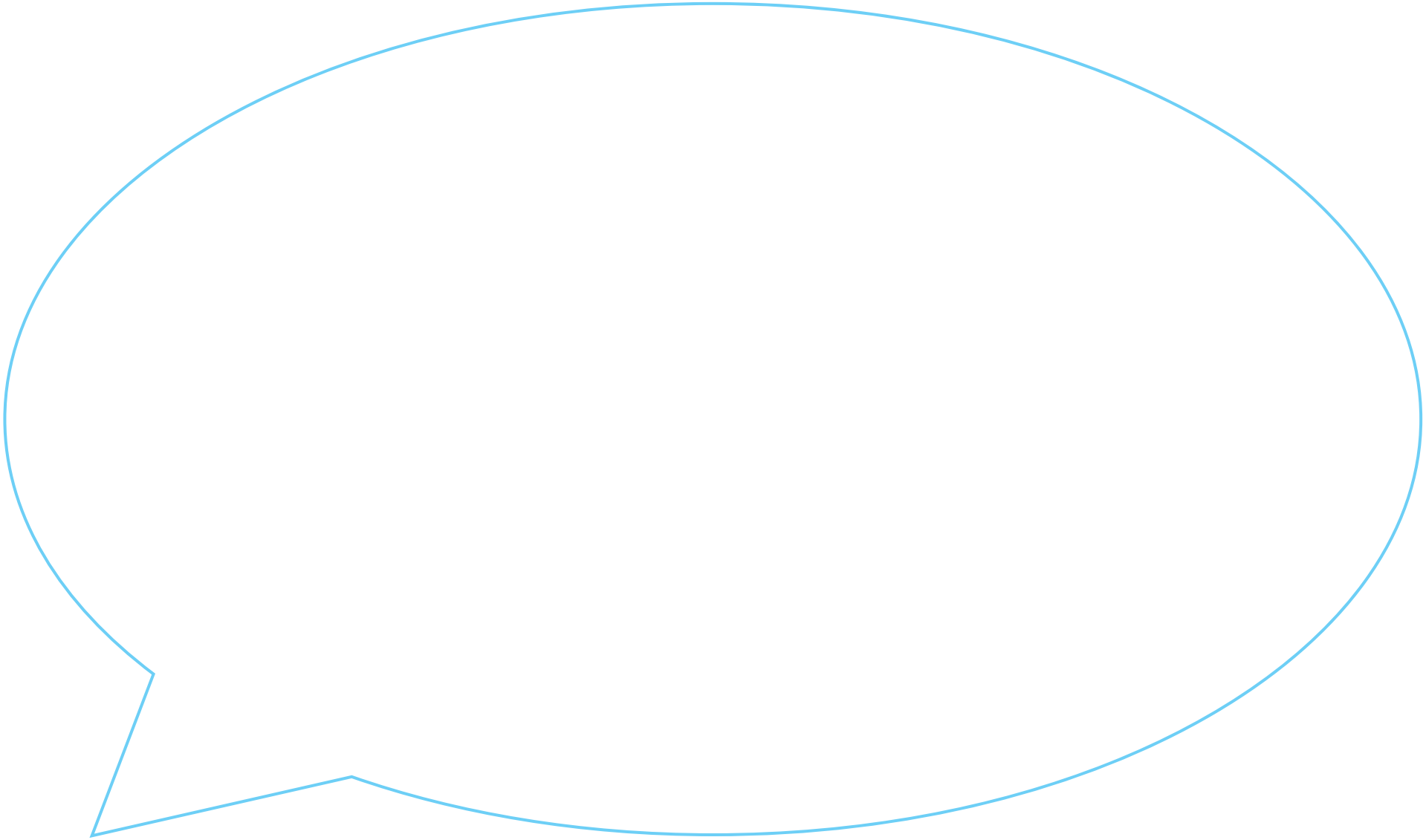
Block 3 – WS: Communication

A good discussion requires not only putting your own arguments forward, but also to listening carefully to the other person, understanding their viewpoint and arguments, and responding to them. This is exactly what this exercise is about.

1. Form pairs.
2. Take another look at the arguments and possible counter-arguments from the last block and decide who is going to start.
3. The person who starts states one of the arguments. The other person listens carefully.
4. The listener then repeats what was said. In the second step, they try to refute the argument.
5. The person who started listens carefully, then repeats the counter-argument.
6. The roles are then swapped.

Note: Engage with each other, be friendly and attentive

Block 3 – WS: Single-Sentence Positioning



Block 3 – WS: What Influences My Decision?

What could be some reasons, people or attitudes that would influence your decision? Statements are provided in the table below. Make a cross on the line, depending on the extent to which the statement applies to you. You can add statements in the empty columns.

Statements with possible reasons for the decision	**Completely true ---------- Completely untrue**
I go by what my friends decide.	
I go by what my parents decide.	
I decide based on my gut feeling.	
When making my decision, I pay attention to what is good for the environment.	
When making my decision, I pay attention to what others think of me.	

Declining Insect Populations & Agriculture
Block 4 – Courses of Action
Introduction

Introduction to Block 4 – Courses of Action

GOALS

The fourth block of the Declining Insect Populations & Agriculture study unit focuses on possible courses of action.

The aim is that the pupils

- practise solving complex problems,
- are capable of motivating themselves and others to act,
- develop their communication skills and competences,
- reflect on their learning experiences and transfer them to future actions,
- are able to contribute to solving social problems.

SEQUENCE

Review

10 min

- Working together, the discussion block is recapitulated.
  The addressed arguments, problem areas and solutions are reviewed. (10 min.)

Potential actions and approaches to communication

60 min

Variant A:

- In pairs, approaches to problem solving are developed on the basis of the discussion in the previous block and recommendations are made in the form of one-minute statements. (30 min.)
- The one-minute statements are ceremoniously presented by all sides. (30 min.)

Variant B:

- DIYLab: The pupils do something to protect wild bees by creating a bee garden, making seed balls, or building nesting aids. (45 min.)
- To-do list: The pupils consider what can be done to solve problems related to declining insect populations & agriculture. (15 min.)

Material

- WS: One-minute statement (Variant A)
- Info: Seed balls (Variant B)
- Info: Bee garden (Variant B)
- Info: Nesting aid (Variant B)
- Materials for seed balls/bee garden/ nesting aid (Variant B)
- WS: To-do list (Variant B)

Transfer

20 min

- Experience, feelings perceived, and knowledge acquired are reflected upon and transferred to future decision-making situations and actions.

Material

- WS: Web of feelings
- WS: Reflection and transfer

Introduction to Block 4 – Courses of Action

ENTRY

Review

Working together, the pupils recapitulate the discussion block in the plenary.

Key questions

- What were the central arguments of the discussion?
- Which arguments were particularly convincing?
- Based on these arguments, what would be some possible approaches to problem solving?

POTENTIAL ACTIONS AND SOLUTIONS

Quiz

Variant A

One-minute statements

The pupils divide into pairs. Each pair of pupils develops approaches to problem solving based on the arguments compiled and formulates a statement that should be less than one minute long.
The pupils consider who is to be addressed, the context in which the statement is to be given and the role from which they want to present their approaches to problem solving.

➲ WS: One-minute statement

Presentation

The pairs present their statements to the group. The other pupils take on the role of the audience and express their appreciation to the presenters.

Variant B

DIYLab

The pupils pro-actively do something to protect wild bees.

They can make seed balls that can be used to plant flowers as a food source, build nesting aids or create a bee garden in the schoolyard.

➲ Info: Seed balls
➲ Info: Bee garden
➲ Info: Nesting aid
➲ Materials for seed balls/ bee garden/nesting aid

To-do list

Working in pairs, the pupils consider what they personally, their family and the school can do to contribute to species conservation or the expansion of renewable energies.

➲ WS: To-do list

Introduction to Block 4 – Courses of Action

TRANSFER

Transfer

The pupils start by working alone and reflecting on the experiences and insights gained using WS: Web of feelings and WS: Reflection and transfer.

- ➲ WS: Reflection and transfer
- ➲ WS: Web of feelings

Exchange

The pupils discuss their experiences in the plenary.

Key questions

- What was new to me?
- What did I find particularly surprising?
- What am I taking with me into everyday life?
- Where can the learnings be applied?
- What am I taking with me for future decisions?
- How do I feel at the end of the unit? Has my feeling changed over time?

Declining Insect Populations & Agriculture
Block 4 – Courses of Action
Information Sheets

Block 4 – Info: Seed Balls

MAKING SEED BALLS[1]

Even the smallest areas can be decorated with flowers in a very short space of time using seed balls. Seeds of different types of flowers are rolled into a protective ball together with clay and topsoil and scattered around the garden. They are also suitable for creating colourful green spaces for bees in the city.

We need:

- 1 part seeds (near-natural)
- 3 parts loam or clay flour
- 5 parts compost
- Water
- 1 bowl
- Gloves

Step 1:
Mix all the dry ingredients (seeds, loam or clay flour and compost) in a bowl.

Step 2:
Slowly add water until the mixture can be moulded. It is important to ensure that the water is added little by little to ensure that the mixture does not become too wet.

Step 3:
Finally, the mixture can be moulded into balls. They should be around the size of a table tennis ball. To prevent the seed from germinating prematurely, it firstly has to be dried well, possibly even baked in the oven at approx. 25°C, then stored in a dry place.

Ready-made seed balls
These great balls can be distributed wherever there is a bit of untouched soil. The ball shell initially protects the seeds from being eaten by birds. When it rains, the balls soak up water and the seeds begin to germinate.
When selecting seeds, be sure to avoid ornamental plants and use species that are as close to nature as possible. Of course, seed mixtures that are suitable for bee pastures are particularly suitable here.

Link: Seed mixtures are available in DIY stores, garden centres or online, e.g. at www.bluehende-landschaft.de

1: This material was created as part of Deutsche Telekom Stiftung's "I can do something!" project. It has been modified for the "ESD – Dealing with uncertainty" project.

Text based on "Mit den Bienen durch das Jahr" [Through the year with the bees]
https://mehr-wissen-mehr-tun.de/selbermachen/kompetenz-handbuecher/

Block 4 – Info: Bee Garden

LET'S CREATE A BEE GARDEN[1]

Step 1:

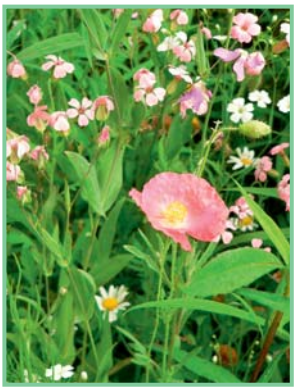
Bees need habitats where they can find food. Creating a bee garden is an excellent way to provide this. The first thing that has to be done is to select and prepare an area. Grass and fast-growing plants such as dandelions need to be cleared and the soil loosened. This can be strenuous, but working as part of the group is also fun. Note: The bee garden does not have to be large – every square metre helps!

Tip: If you want to create a larger bee garden, you can hire a rotary hoe. Equipment hire centres, e.g. in DIY stores, can be found in every town.

Note: Working with the rotary hoe is NOT for children!

Step 2:

Once the area has been prepared, you can sow the seeds together. If the area is not a protected garden but is open to the public, the children can make signs describing what kind of area it is. This allows the small plants to grow and flourish with as little disturbance as possible.



A growing bee garden

Step 3:

Of course, a bee garden also needs care. Especially on hot days, the plants need water to stay beautiful throughout the summer. It is a good idea to make a watering rota so that everyone can enjoy the colourful forest and meadow plants for a long time.

1: This material was created as part of Deutsche Telekom Stiftung's "I can do something!" project. It has been modified for the "ESD – Dealing with uncertainty" project.

Text based on "Mit den Bienen durch das Jahr" [Through the year with the bees]
https://mehr-wissen-mehr-tun.de/selbermachen/kompetenz-handbuecher/

Block 4 – Info: Nesting Aid

BUILDING A NESTING AID – BUILDING A HOME FOR WILD BEES[1]

The name that is usually given to this beehive is „insect hotel“, but we don‘t call it that, because it gives the impression that the bees are overnight guests just passing through. In fact, wild bees spend their entire development period (i.e. their entire „childhood“) in the nesting aid and only leave it when they are fully grown insects. The nesting aids should ideally be installed in a sunny, preferably south-facing location starting from the end of February, as the first insects start looking for nesting sites as early as March in warm weather.

Instructions for building a small nesting aid at home

A tree trunk nesting aid is quick and easy to install, with low material requirements and costs.

What we need:

- Thick branches or discs of wood (hardwood)
- Hacksaw
- Sawhorse
- Cordless screwdriver
- Wood drill bit (3 – 10 mm)
- Wire

Step 1:

Take the branches you‘ve gathered or bought and cut them into different-sized discs of wood using a two-handed fresh wood hacksaw. This step must be done under supervision. The children must always work in pairs.

Step 2:

Then, use a cordless screwdriver to drill holes of various diameters (3 – 10 mm) and depths into the discs. Hardwood is best suited to the bee nursery as the boreholes do not fray as much. Frayed holes are not accepted by bees as a breeding site, as they can cause injury.

The first beehive will soon be finished!

Tip: Drill the holes at a slight upward angle to prevent water ingress. This stops mould from beginning to form inside the beehive.

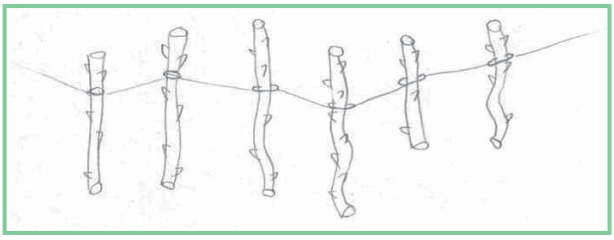
1: This material was created as part of Deutsche Telekom Stiftung‘s “I can do something!” project. It has been modified for the “ESD – Dealing with uncertainty” project. For further information on Deutsche Telekom Stiftung’s “Ich kann was!” project, see: https://www.telekom-stiftung.de/aktivitaeten/ich-kann-was

Text based on “Mit den Bienen durch das Jahr” [Through the year with the bees]
https://mehr-wissen-mehr-tun.de

Block 4 – Info: Nesting Aid

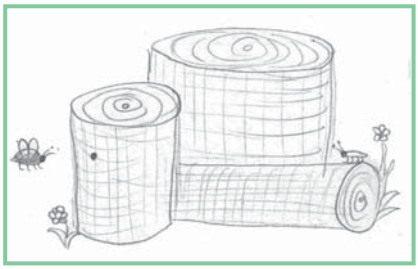
BUILDING INSTRUCTIONS FOR WILD BEE NESTING AIDS[1]

"Garland" of blackberry stems (dry) or other pithy stems of raspberry, evening primrose, mullein ...

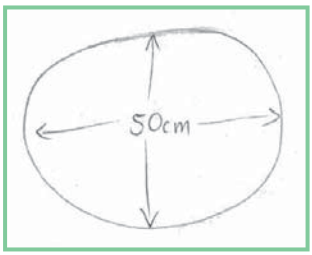


Hung individually, upright or at an angle, never in bundles.
Certain wild bee species (> 600 in Germany) dig their way into pithy stems from above and below.
These remain attached and are not replaced but can be added to.
Dry pithy stems (ideally blackberry branches) should be tied up individually and hung on a cord, then placed on a fence or wall (make sure they don't wobble or dangle)

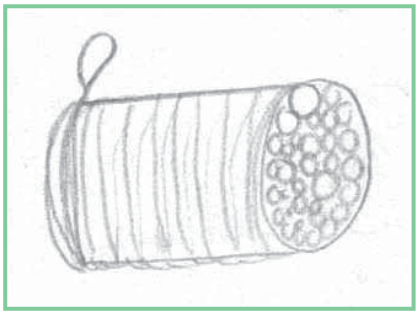
Deadwood - nesting aid
Deadwood means life. It can be left decomposing in the garden or on surfaces (upright or on the flat) in a wide variety of shapes and forms. It will attract species such as beetles and wild bees.
Deadwood can also be set up vertically: with at least 1/3 buried and the rest left protruding; preferably up to over 1 metre. Dying or dead trees and branches can also be preserved.
Deadwood is also a versatile nesting aid!
Examples include beetle bed, beetle cellar, wood bee, wooden pyramid.



Open ground or sandaria (clay content of min. 3%),
75% of wild bees nest in the soil (ground and sand bees). Areas simply kept free from vegetation and sandaria created as nesting aids can help here (free instructions via info@wilde-biene.org).
Instructions: Keep a sunny spot in the lawn or flower bed or at the house etc. free from vegetation and observe what happens (sometimes it takes a while for the bees to find it). Make sure to keep it free from vegetation!



"Bee can" model, an upcycling nesting aid
If you search online, you will find many incorrect instructions. For instance, the inner diameters are wrong, or you are told to glue the tubes using plaster (this later leads to mould).
Gather some tubes with inner diameters of 2 to 6 mm, a few more of 7 and 8 mm, e.g. from bamboo, reeds, hollow stems that you find (Japanese knotweed, for example).
These are glued in at the end (can upright) using wood glue or organic craft glue and left to dry for a long time until the can may be tilted and hung up in a sheltered place or placed on the windowsill (always facing away from the weather). Hang it using plain or coated wire. To decorate: wrap with colourful wool, for example.



[1]Instructions kindly provided by Wilde Biene e.V.
www.wilde-biene.org, info@wilde-biene.org

Declining Insect Populations & Agriculture
Block 4 – Courses of Action
Worksheets

Block 4 – WS: One-Minute Statement

You have engaged with the topics of declining insect populations & agriculture in depth. Now, it's time to work out possible approaches to problem solving. Your imagination is required: in pairs, think about which problems or sub-problems could be solved and how and by whom. Formulate a statement that is less than one minute long. Also think about the setting, role, format, and style in which you want to speak. This depends on who you want to reach with your idea. The following questions will help you with this. At the end, present your statement to the class. The statement should be less than one minute long.

Preliminary considerations

What is the problem and why? What solutions are there?

Examples:

- Conflicting goals between conventional farming and protecting the ecosystem
- Conventional farming and environmental costs
- Conflicting goals between organic farming and farmers' incomes as well as food security and product prices
- Obstacles at political & societal level
- Ideas for how to farm successfully while taking species conservation into consideration (solidarity agriculture, vertical farming, creation of green spaces)
- Change in consumption

Who should be addressed? Who can implement the solution?

e.g. politicians, society, specific people, companies ...

In what context and from what role do you want to speak? Which format will you use?

e.g. if **politicians** are to be addressed:

- As friends, you want to campaign for improved insect conservation. For this purpose, you start a petition calling on your local municipality to provide more green spaces in the area. You collect signatures from passers-by, classmates, family members and teachers and organise an information event. The local politicians take notice and invite you to a dialogue to discuss possible changes as well as challenges

e.g. if **society and individuals** are to be addressed:

- As an influencer, you explain the conflicting goals that exist between agriculture and species conservation and provide instructions for a bee hotel (via YouTube, TikTok, etc.)

e.g. if **companies** are to be addressed:

- During a presentation at an annual meeting of various farmers in the region, you propose the following as a farmer: "Let's try organic farming on just part of our land. I know it won't be possible to adopt organic farming on all of our land, but I think farming even a small area organically will already contribute a lot to insect conservation."

Which style do you want to use?

Examples:

- emotional
- personal, hopeful and inspiring
- Angry, resigned, or frustrated
- ...

Note: Voice and body language can be used to reinforce your message.

Block 4 – WS: To-do List

What can I personally do? What can my family do?

What we at school do?

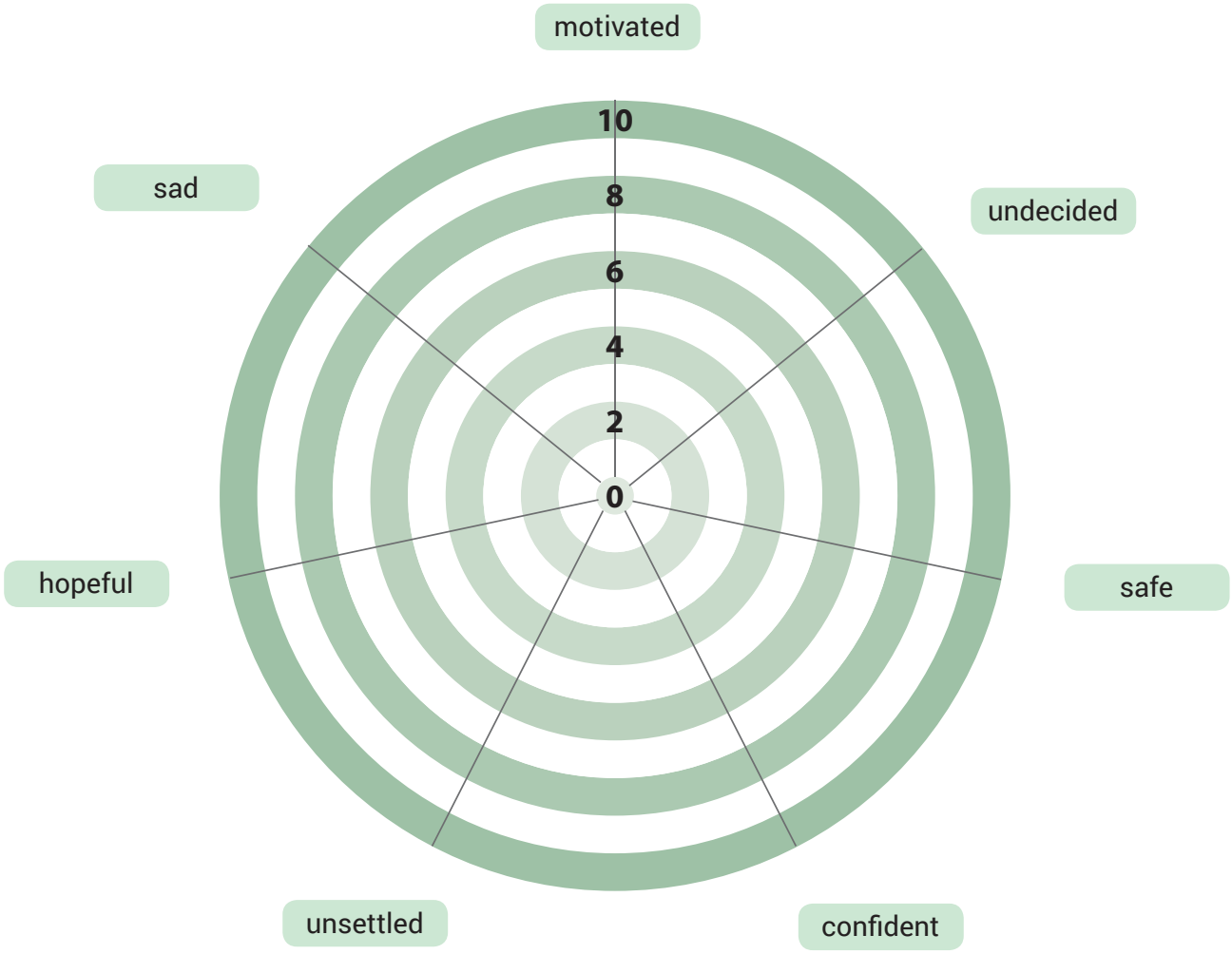
What can be done politically?

Block 4 – WS: Web of Feelings

Sometimes it's not so easy to become aware of your own feelings. The web of feelings should help you with this. You have been engaging with questions and problems relating to palm oil over the past few weeks. You have researched, discussed, adopted a position and developed possible courses of action.

How are you doing with this now?

Look at the web of feelings. Describe the feeling you are having at the moment. Place a dot in the web depending on the extent to which the feeling matches what is going on inside you. If you are not aware of the feeling at all, place a dot in the centre. If you are feeling it very strongly, place it at the very outside. If what you are feeling does not appear in the web of feelings, you can complete the diagram by writing your feeling at the side of the circle



0 = absent

10 = very strong

Block 4 – WS: Reflection and Transfer

Review the last units and answer the questions in the boxes.

What was new for me?

What surprised me the most?

Where can I apply what I have learned?

What do I take with me into everyday life?

What do I take with me for future decisions?

How do I feel when I leave the session?
Has my feeling changed over time?

ISBN 978-3-98633-016-3 | DOI 10.17169/refubium-43336

FIELDS
INSTITUTE

Freie Universität Berlin

INSTITUT FUTUR

gefördert durch
DBU
Deutsche Bundesstiftung Umwelt