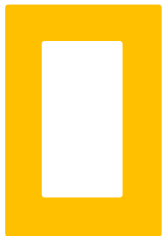




[www.e-co-foot.eu](http://www.e-co-foot.eu)

Teaching material on Ecological Footprint



## LEARNING UNIT 2 – MINI HECTARE WORKSHOP

AGE GROUP 2      14-18 YEARS

Version 2 | June 2020



This material is part of a course on Ecological Footprint for students. The course consists of the following modules for two age groups

Age group 1 10-13 years	Age group 2 14-18 years
Calculator	
General Introduction	General Introduction
Mini Hectare Workshop	Mini Hectare Workshop
Nutrition	Nutrition
Housing	A. Housing core B. Housing additional
Mobility	Mobility
Other Consumption	Other Consumption
Background information	

You are here

All the material can be downloaded for free at [www.e-co-foot.eu](http://www.e-co-foot.eu) in different languages.

[calculator.e-co-foot.eu](http://calculator.e-co-foot.eu) is an online tool that allows students to log their daily activities and trace the Ecological Footprint of their habits. Group functions for teachers make it suitable for a warm-up or later check-up-session.

[elearning.e-co-foot.eu](http://elearning.e-co-foot.eu) is an e-learning with selected content from the lectures. E-learning can be used for blended learning of this course, as homework or as training and competence check after in-class lectures.

#### IMPRINT

akaryon GmbH, Austria [www.akaryon.eu](http://www.akaryon.eu)

Plattform Footprint, Austria [www.footprint.at](http://www.footprint.at)

Colegiul „Vasile Lovinescu” Fălticeni, Romania [www.agricolfalticeni.ro](http://www.agricolfalticeni.ro)

Eötvös Loránd University (ELTE), Hungary [savariakemia.elte.hu](http://savariakemia.elte.hu)

Environmental Education Center (K.P.E.) Pertouliou-Trikkeon, Greece [www.kpe-pertouliou-trikkaion.gr](http://www.kpe-pertouliou-trikkaion.gr)

#### DISCLAIMER

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## LEARNING UNIT 2

### THE ECOLOGICAL FOOTPRINT – MINI HECTARE WORKSHOP

#### TEACHING MATERIALS FOR AGE GROUP 1 (14–18 YEARS)

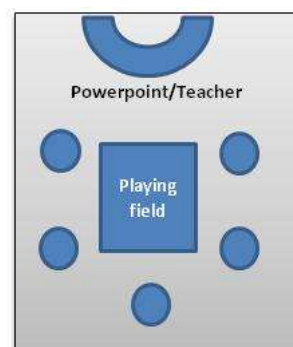
#### Short Overview

**Duration:** 90-100 minutes (2 lessons)

- |   |               |
|---|---------------|
| 1. Introduction depending on prior knowledge and group formation without prior knowledge of the students: | 20 minutes    |
| with prior knowledge:   | 10 minutes    |
| 2. Group work:  | 60 minutes    |
| 3. Input to the Grey Footprint and final discussion:  | 20-30 minutes |

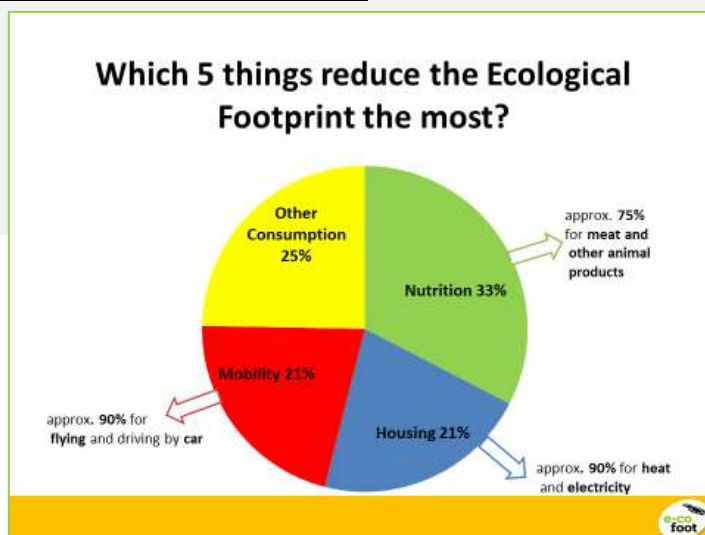
#### Setting

Pupils arrange chairs in circles with 4-6 persons per group. The groups are arranged in a U-shape facing the PowerPoint presentation or teacher. In the middle of the room is the playing area.



#### Materials

- Game pieces: 230 A4 sheets - 60 in red, 50 in blue, 60 in green and 60 in yellow
- rope for a field of 210x150 cm
- tape to fix the rope on the ground
- Laptop, beamer and projection area
- Teachers Input by the teacher (this PDF)
- Background information on the Footprint concept (<https://www.e-co-foot.eu/materials-downloads/>)
- The Five Footprint Rules and Final Discussion

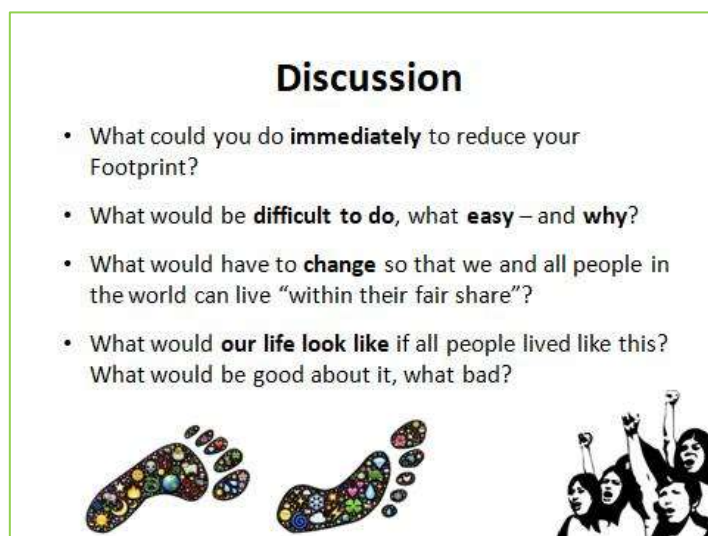




At the end of the workshop, ask the students which five most important things they can remember that are essential to “live within the fair share”. Normally the pupils can identify 5-F rules already on their own!



The rules can then be shown in the PowerPoint Presentation to summarize the message of the mini-hectare workshop and to give a clear and easy-to-remember guide to one's own actions.



In the discussion, the pupils think about their own everyday life and about possible things they could change. It also should be discussed – openly and without blaming anybody – which things are quite difficult to change (either because of habits, comfort, money,...). Only by also speaking about the obstacles, ways can be found to eventually overcome them. Some of the obstacles will be related to social and economic structures, which would have to be changed fundamentally. On the other hand, some things are possible quite easily without changing any habits or even having to invest a lot of money (e.g. switching to green energy – if this is an available option in your country). Also it should be made clear that there is no general “right solution” – each pupil can place personal emphasis on different parts of the Footprint. E.g. if the student chooses to reduce the nutrition Footprint drastically (e.g. by becoming vegetarian), (s)he has more options regarding mobility and the other way around.

Part of this discussion (third question) is also to focus on the societal level – individual choices alone are clearly not enough to really reduce the Footprint, infrastructures (like a good public transport system, affordable zero energy houses, available green energy) have to be transformed by political measures and economic activities. It is important to notice that societal conditions are made by us humans and therefore changeable. They should serve us - not the other way around. How can this societal change be achieved? How can we, as citizens, contribute to make it happen?

The last question challenges the students to think more precisely about the vision of a society with a small Footprint.

## Exercises & more

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### 1. Write an essay guided by the questions of the “Discussion”-slide

The pupils write an **essay** guided by the questions of the “Discussion”-slide. They try to find personal answers to these questions and think about the possibilities and obstacles to change their own lifestyle. Back in class, the whole class reflects on these questions together and tries to come up with ideas to make the transition to a life with a small Footprint for the whole society more realistic.

### 2. Discuss the results of the game with their parents

The pupils **discuss the results of the game with their parents** (the PowerPoint Presentation, e.g. the pie chart, and the worksheet can be used as a support) and ask them the following questions:

- Which things are we already aware of as a family?
- Regarding which points could we imagine a change of our lifestyle? Regarding which points is it difficult and why?
- What do the parents think about the issues of ecological boundaries and the social and ecological impact of our European lifestyles? Are these thoughts relevant in their lives? If so, how?

Back in class, the pupils share their experiences of the discussions with their parents with each other: first in groups of two, then with the whole class.

### 3. Try out the Ecological Footprint Calculator

Pupils try out the **Ecological Footprint Calculator** (<https://calculator.e-co-foot.eu/>) at home, in which they can enter different activities they do each day in a log and find out how they influence their individual Ecological Footprint. Then they try to stay within their fair share of 1.6 gha by adapting their activities in a second log. Back in class, they compare the results of the two logs and share their experiences with the other pupils.

Please also find our **Ecological Footprint E-Learning material** here: <https://elearning.e-co-foot.eu/>



- Worksheets for each group of students<sup>1</sup> on the last page
- **Fehler! Verweisquelle konnte nicht gefunden werden.** download: [ecofoot\\_Mini-hectare workshop\\_Presentation\\_agegroup2.pptx](#)
- Calculators (or mobile phones that have a calculator) for each group
- A gong or alarm (a real one or on a mobile phone) with which the teacher indicates the end of the discussion in the small groups

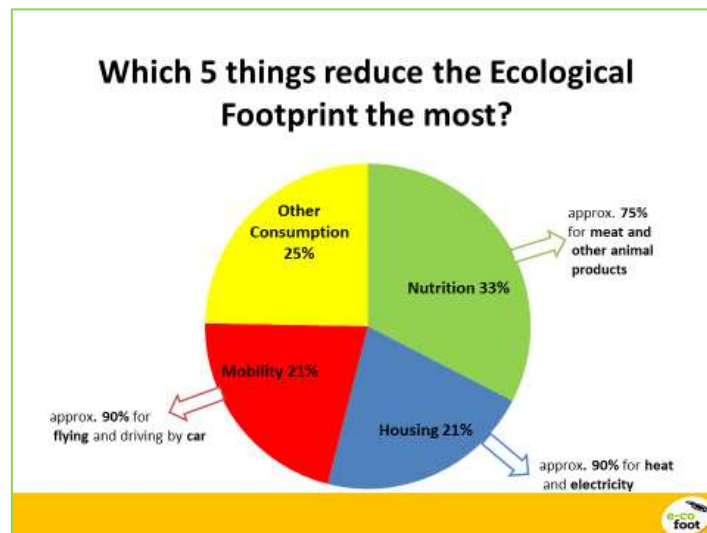
**Connection to subjects:** geography, biology, science, chemistry, physics, environmental science, national language, religion, English, project lessons

**E-learning:** <https://elearning.e-co-foot.eu/>

## Procedure

### Preparation

The teacher gets familiar with the Teachers Input (including “The Five Footprint Rules and Final Discussion



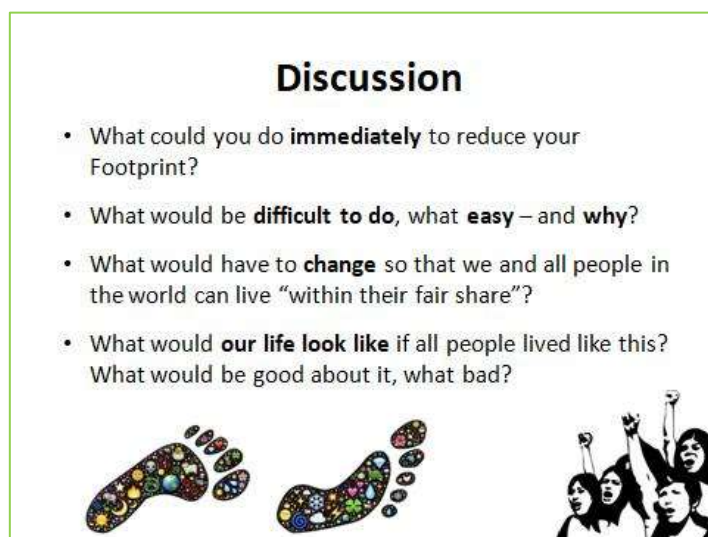
At the end of the workshop, ask the students which five most important things they can remember that are essential to “live within the fair share”. Normally the pupils can identify 5-F rules already on their own!

<sup>1</sup> The worksheet can be printed out on an A4 sheet (using the front and the back side). If the workshop is conducted regularly, it is advised to laminate several worksheets and let the pupils fill them in with a whiteboard marker which can be easily wiped out after use. That way paper is saved.





The rules can then be shown in the PowerPoint Presentation to summarize the message of the mini-hectare workshop and to give a clear and easy-to-remember guide to one's own actions.



In the discussion, the pupils think about their own everyday life and about possible things they could change. It also should be discussed – openly and without blaming anybody – which things are quite difficult to change (either because of habits, comfort, money,...). Only by also speaking about the obstacles, ways can be found to eventually overcome them. Some of the obstacles will be related to social and economic structures, which would have to be changed fundamentally. On the other hand, some things are possible quite easily without changing any habits or even having to invest a lot of money (e.g. switching to green energy – if this is an available option in your country). Also it should be made clear that there is no general “right solution” – each pupil can place personal emphasis on different parts of the Footprint. E.g. if the student chooses to reduce the nutrition Footprint drastically (e.g. by becoming vegetarian), (s)he has more options regarding mobility and the other way around.

Part of this discussion (third question) is also to focus on the societal level – individual choices alone are clearly not enough to really reduce the Footprint, infrastructures (like a good public transport system, affordable zero energy houses, available green energy) have to be transformed by political measures and economic activities. It is important to notice that societal conditions are made by us humans and therefore

changeable. They should serve us - not the other way around. How can this societal change be achieved? How can we, as citizens, contribute to make it happen?

The last question challenges the students to think more precisely about the vision of a society with a small Footprint.

## Exercises & more

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### 4. Write an essay guided by the questions of the “Discussion”-slide

The pupils write an **essay** guided by the questions of the “Discussion”-slide. They try to find personal answers to these questions and think about the possibilities and obstacles to change their own lifestyle. Back in class, the whole class reflects on these questions together and tries to come up with ideas to make the transition to a life with a small Footprint for the whole society more realistic.

### 5. Discuss the results of the game with their parents

The pupils **discuss the results of the game with their parents** (the PowerPoint Presentation, e.g. the pie chart, and the worksheet can be used as a support) and ask them the following questions:

- d. Which things are we already aware of as a family?
- e. Regarding which points could we imagine a change of our lifestyle? Regarding which points is it difficult and why?
- f. What do the parents think about the issues of ecological boundaries and the social and ecological impact of our European lifestyles? Are these thoughts relevant in their lives? If so, how?

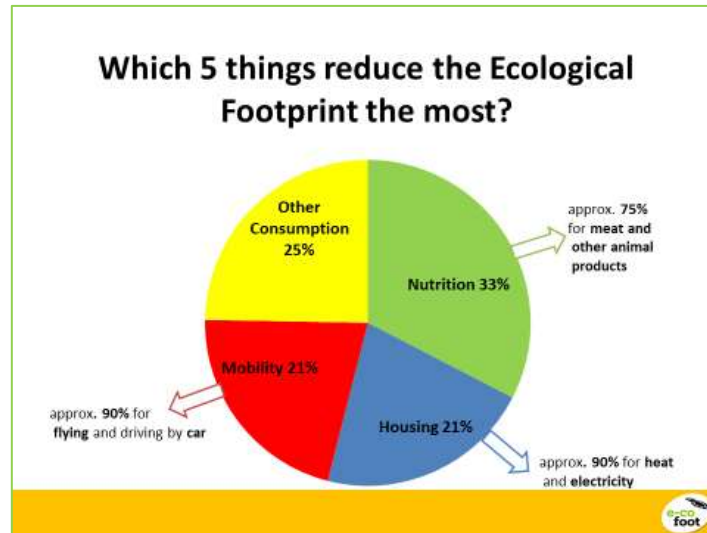
Back in class, the pupils share their experiences of the discussions with their parents with each other: first in groups of two, then with the whole class.

### 6. Try out the Ecological Footprint Calculator

Pupils try out the **Ecological Footprint Calculator** (<https://calculator.e-co-foot.eu/>) at home, in which they can enter different activities they do each day in a log and find out how they influence their individual Ecological Footprint. Then they try to stay within their fair share of 1.6 gha by adapting their activities in a second log. Back in class, they compare the results of the two logs and share their experiences with the other pupils.

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Worksheets “), the Fehler! Verweisquelle konnte nicht gefunden werden. Information on the Footprint concept (<https://www.e-co-foot.eu/materials-downloads/>) and the Fehler! Verweisquelle konnte nicht gefunden werden. (ecofoot\_Mini-hectare\_workshop\_Presentation\_ agegroup2.pptx). It is recommended to read the other Learning Units on the Ecological Footprint (1, 3, 4, 5 and 6). Depending on the numbers of groups (4-6 pupils per group), the correct number of pages of the “The Five Footprint Rules and Final Discussion”



At the end of the workshop, ask the students which five most important things they can remember that are essential to “live within the fair share”. Normally the pupils can identify 5-F rules already on their own!



The rules can then be shown in the PowerPoint Presentation to summarize the message of the mini-hectare workshop and to give a clear and easy-to-remember guide to one's own actions.

## Discussion

- What could you do **immediately** to reduce your Footprint?
- What would be **difficult to do**, what **easy** – and **why**?
- What would have to **change** so that we and all people in the world can live “within their fair share”?
- What would **our life look like** if all people lived like this? What would be good about it, what bad?



In the discussion, the pupils think about their own everyday life and about possible things they could change. It also should be discussed – openly and without blaming anybody – which things are quite difficult to change (either because of habits, comfort, money,...). Only by also speaking about the obstacles, ways can be found to eventually overcome them. Some of the obstacles will be related to social and economic structures, which would have to be changed fundamentally. On the other hand, some things are possible quite easily without changing any habits or even having to invest a lot of money (e.g. switching to green energy – if this is an available option in your country). Also it should be made clear that there is no general “right solution” – each pupil can place personal emphasis on different parts of the Footprint. E.g. if the student chooses to reduce the nutrition Footprint drastically (e.g. by becoming vegetarian), (s)he has more options regarding mobility and the other way around.

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## Exercises & more

### 7. Write an essay guided by the questions of the “Discussion”-slide

The pupils write an **essay** guided by the questions of the “Discussion”-slide. They try to find personal answers to these questions and think about the possibilities and obstacles to change their own lifestyle. Back in class, the whole class reflects on these questions together and tries to come up with ideas to make the transition to a life with a small Footprint for the whole society more realistic.

## 8. Discuss the results of the game with their parents

The pupils **discuss the results of the game with their parents** (the PowerPoint Presentation, e.g. the pie chart, and the worksheet can be used as a support) and ask them the following questions:

- g. Which things are we already aware of as a family?
- h. Regarding which points could we imagine a change of our lifestyle? Regarding which points is it difficult and why?
- i. What do the parents think about the issues of ecological boundaries and the social and ecological impact of our European lifestyles? Are these thoughts relevant in their lives? If so, how?

Back in class, the pupils share their experiences of the discussions with their parents with each other: first in groups of two, then with the whole class.

## 9. Try out the Ecological Footprint Calculator

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Worksheets “ for each group is printed out. Also, a laptop, a beamer and a projection area is needed for the PowerPoint-Presentation (alternatively, the teacher can conduct the workshop without the presentation and uses it only as a personal guideline) and 230 coloured sheets, a rope and a tape (see above).

Before the workshop, a field measuring 2.1 x 1.5 m is staked out on the floor with the rope, which is fixed by a tape. This field symbolizes the "fair share" that every human being would have per year in terms of bio-productive area, i.e. 1 gha (global hectare, see **Fehler! Verweisquelle konnte nicht gefunden werden.**)<sup>2</sup>.

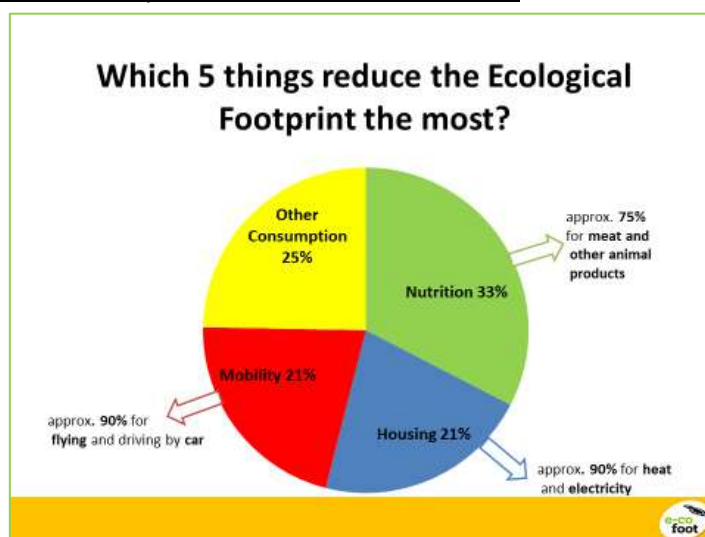
### Step 1: Introduction

The teacher introduces the concept of the Ecological Footprint and explains the rules of the game by using the **Fehler! Verweisquelle konnte nicht gefunden werden.** and the Teachers Input.

### Step 2: Group formation

The teacher divides the students into small groups of four to six people, who sit in small circles of chairs around the playing area and face the teacher or the PowerPoint-presentation.

Each group uses the The Five Footprint Rules and Final Discussion

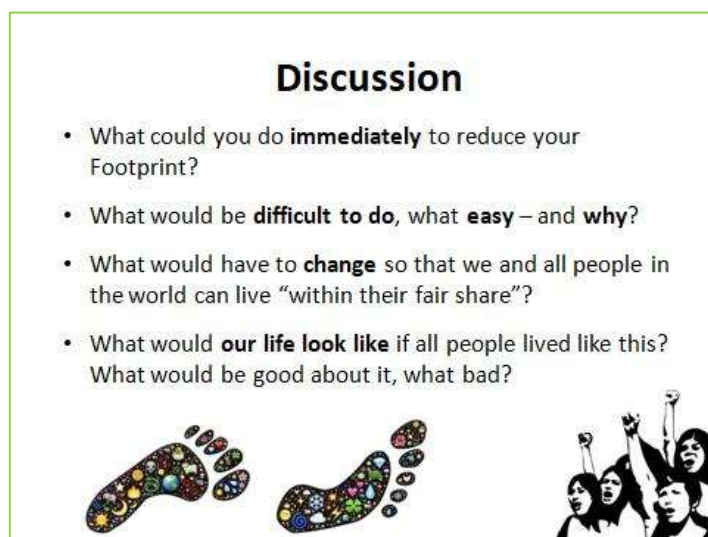


At the end of the workshop, ask the students which five most important things they can remember that are essential to “live within the fair share”. Normally the pupils can identify 5-F rules already on their own!

<sup>2</sup> Today, 1.6 gha are considered a global fair share, but this share will not be available anymore at the middle of the century. Taking into account the expected growth of the world's population in this century, additional land to conserve biodiversity and ecosystem services, and the likely decrease in biocapacity through soil sealing, salinization, loss of soil fertility and desertification, we calculate with a fair share of 1 gha per citizen. This excludes the Grey Footprint (see below) and concerns only the part of the Footprint individuals can influence directly.



The rules can then be shown in the PowerPoint Presentation to summarize the message of the mini-hectare workshop and to give a clear and easy-to-remember guide to one's own actions.



In the discussion, the pupils think about their own everyday life and about possible things they could change. It also should be discussed – openly and without blaming anybody – which things are quite difficult to change (either because of habits, comfort, money,...). Only by also speaking about the obstacles, ways can be found to eventually overcome them. Some of the obstacles will be related to social and economic structures, which would have to be changed fundamentally. On the other hand, some things are possible quite easily without changing any habits or even having to invest a lot of money (e.g. switching to green energy – if this is an available option in your country). Also it should be made clear that there is no general “right solution” – each pupil can place personal emphasis on different parts of the Footprint. E.g. if the student chooses to reduce the nutrition Footprint drastically (e.g. by becoming vegetarian), (s)he has more options regarding mobility and the other way around.

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## Exercises & more

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### 10. Write an essay guided by the questions of the “Discussion”-slide

The pupils write an **essay** guided by the questions of the “Discussion”-slide. They try to find personal answers to these questions and think about the possibilities and obstacles to change their own lifestyle. Back in class, the whole class reflects on these questions together and tries to come up with ideas to make the transition to a life with a small Footprint for the whole society more realistic.

### 11. Discuss the results of the game with their parents

The pupils **discuss the results of the game with their parents** (the PowerPoint Presentation, e.g. the pie chart, and the worksheet can be used as a support) and ask them the following questions:

- j. Which things are we already aware of as a family?
- k. Regarding which points could we imagine a change of our lifestyle? Regarding which points is it difficult and why?
- l. What do the parents think about the issues of ecological boundaries and the social and ecological impact of our European lifestyles? Are these thoughts relevant in their lives? If so, how?

Back in class, the pupils share their experiences of the discussions with their parents with each other: first in groups of two, then with the whole class.

### 12. Try out the Ecological Footprint Calculator

Pupils try out the **Ecological Footprint Calculator** (<https://calculator.e-co-foot.eu/>) at home, in which they can enter different activities they do each day in a log and find out how they influence their individual Ecological Footprint. Then they try to stay within their fair share of 1.6 gha by adapting their activities in a second log. Back in class, they compare the results of the two logs and share their experiences with the other pupils.

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Worksheets to calculate the amount of game pieces corresponding to the selected answer and enters it in the sheet. In each group there is a **speaker** who announces the group's result.

### Step 3: Asking the questions of one section

Now the workshop starts. Under the guidance of the teacher, the pupils discuss the sections of nutrition, housing, mobility and other consumption one after the other. Nutrition is symbolized by green pieces, housing by blue, mobility by red and other consumption by yellow pieces.

**NUTRITION**

**MOBILITY**

**HOUSING**

**Other  
CONSUMPTION**

The fair share each earth citizen can use in one year is a total of **50** such game pieces - these fill the staked playing field fully. **The game is guided by the following question:**

**What do you really need in the areas of nutrition, housing, mobility and consumption so that you can live a good life AND stay within your fair share?**

The teacher sequentially asks the **questions for the first section** (nutrition), presents possible answer options and the associated numbers of game pieces to the entire class by using the PowerPoint presentation. For example, one of the first questions is: How many portions (250 g) of meat or cheese do you want to eat per week?

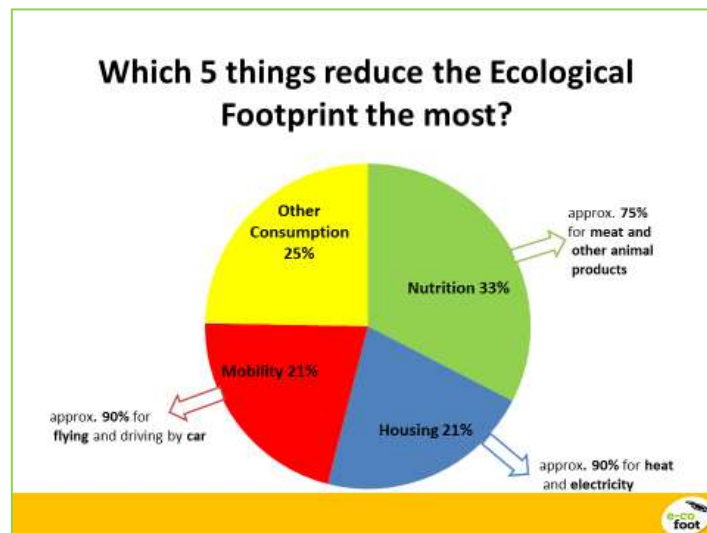


The teacher should always let the pupils think about their answers BEFORE showing the number of game pieces associated with each option in the PowerPoint Presentation (the animation of the PowerPoint Presentation is also programmed that way). The game pieces always indicate the consumption of ONE YEAR: If one chooses, for example, to eat one portion of meat every week, one would, in one year, need 1600 gm<sup>2</sup> of bio-productive area, symbolized by 8 of the total 50 game pieces.

### Step 4: Finding a common solution within the small groups

Each small group of students has to **come to a common solution** for each question of a section.  
The decision procedure can take place in this way:

- 1) The starting point for the students is their own current consumption behaviour (e.g. frequency of meat consumption).
- 2) Each pupil then states what (s)he would *really* need in the requested area to live well AND takes, at the same time, the boundaries of a “fair share” into account. Which compromise can (s)he make personally?
- 3) The group now tries to find a consensus or compromise and agree on an option. Often, it will be the “middle” of different extremes. But it is also possible that a pupil has very strong arguments and convinces other pupils.
- 4) With the help of the The Five Footprint Rules and Final Discussion



At the end of the workshop, ask the students which five most important things they can remember that are essential to “live within the fair share”. Normally the pupils can identify 5-F rules already on their own!



The rules can then be shown in the PowerPoint Presentation to summarize the message of the mini-hectare workshop and to give a clear and easy-to-remember guide to one's own actions.



## Discussion

- What could you do **immediately** to reduce your Footprint?
- What would be **difficult to do**, what **easy** – and **why**?
- What would have to **change** so that we and all people in the world can live “within their fair share”?
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## Exercises & more

### 13. Write an essay guided by the questions of the “Discussion”-slide

The pupils write an **essay** guided by the questions of the “Discussion”-slide. They try to find personal answers to these questions and think about the possibilities and obstacles to change their own lifestyle. Back in class, the whole class reflects on these questions together and tries to come up with ideas to make the transition to a life with a small Footprint for the whole society more realistic.

## 14. Discuss the results of the game with their parents

The pupils **discuss the results of the game with their parents** (the PowerPoint Presentation, e.g. the pie chart, and the worksheet can be used as a support) and ask them the following questions:

- m. Which things are we already aware of as a family?
- n. Regarding which points could we imagine a change of our lifestyle? Regarding which points is it difficult and why?
- o. What do the parents think about the issues of ecological boundaries and the social and ecological impact of our European lifestyles? Are these thoughts relevant in their lives? If so, how?

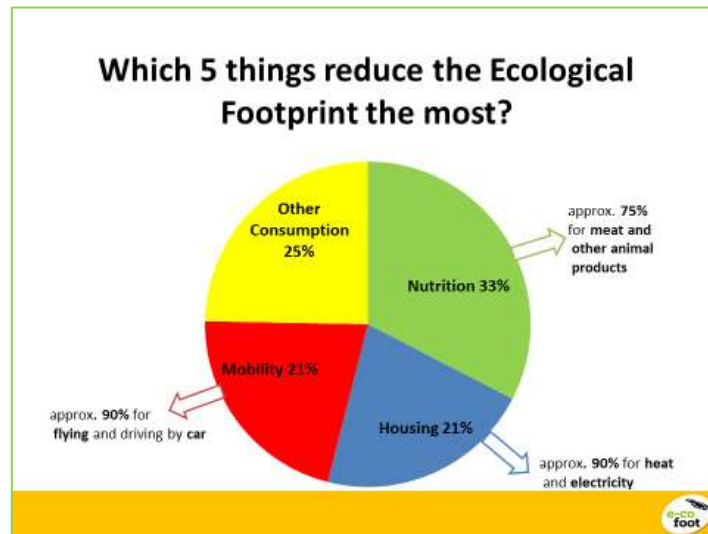
Back in class, the pupils share their experiences of the discussions with their parents with each other: first in groups of two, then with the whole class.

## 15. Try out the Ecological Footprint Calculator

Pupils try out the **Ecological Footprint Calculator** (<https://calculator.e-co-foot.eu/>) at home, in which they can enter different activities they do each day in a log and find out how they influence their individual Ecological Footprint. Then they try to stay within their fair share of 1.6 gha by adapting their activities in a second log. Back in class, they compare the results of the two logs and share their experiences with the other pupils.

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- 5) Worksheets and a calculator the groups calculate how many game pieces match the selected option.
- 6) Both the chosen option and the number of game pieces are entered in the The Five Footprint Rules and Final Discussion



At the end of the workshop, ask the students which five most important things they can remember that are essential to “live within the fair share”. Normally the pupils can identify 5-F rules already on their own!



The rules can then be shown in the PowerPoint Presentation to summarize the message of the mini-hectare workshop and to give a clear and easy-to-remember guide to one's own actions.

## Discussion

- What could you do **immediately** to reduce your Footprint?
- What would be **difficult to do**, what **easy** – and **why**?
- What would have to **change** so that we and all people in the world can live “within their fair share”?
- What would **our life look like** if all people lived like this? What would be good about it, what bad?



In the discussion, the pupils think about their own everyday life and about possible things they could change. It also should be discussed – openly and without blaming anybody – which things are quite difficult to change (either because of habits, comfort, money,...). Only by also speaking about the obstacles, ways can be found to eventually overcome them. Some of the obstacles will be related to social and economic structures, which would have to be changed fundamentally. On the other hand, some things are possible quite easily without changing any habits or even having to invest a lot of money (e.g. switching to green energy – if this is an available option in your country). Also it should be made clear that there is no general “right solution” – each pupil can place personal emphasis on different parts of the Footprint. E.g. if the student chooses to reduce the nutrition Footprint drastically (e.g. by becoming vegetarian), (s)he has more options regarding mobility and the other way around.

Part of this discussion (third question) is also to focus on the societal level – individual choices alone are clearly not enough to really reduce the Footprint, infrastructures (like a good public transport system, affordable zero energy houses, available green energy) have to be transformed by political measures and economic activities. It is important to notice that societal conditions are made by us humans and therefore changeable. They should serve us - not the other way around. How can this societal change be achieved? How can we, as citizens, contribute to make it happen?

The last question challenges the students to think more precisely about the vision of a society with a small Footprint.

## Exercises & more

### 16. Write an essay guided by the questions of the “Discussion”-slide

The pupils write an **essay** guided by the questions of the “Discussion”-slide. They try to find personal answers to these questions and think about the possibilities and obstacles to change their own lifestyle. Back in class, the whole class reflects on these questions together and tries to come up with ideas to make the transition to a life with a small Footprint for the whole society more realistic.

## 17. Discuss the results of the game with their parents

The pupils **discuss the results of the game with their parents** (the PowerPoint Presentation, e.g. the pie chart, and the worksheet can be used as a support) and ask them the following questions:

- p. Which things are we already aware of as a family?
- q. Regarding which points could we imagine a change of our lifestyle? Regarding which points is it difficult and why?
- r. What do the parents think about the issues of ecological boundaries and the social and ecological impact of our European lifestyles? Are these thoughts relevant in their lives? If so, how?

Back in class, the pupils share their experiences of the discussions with their parents with each other: first in groups of two, then with the whole class.

## 18. Try out the Ecological Footprint Calculator

Pupils try out the **Ecological Footprint Calculator** (<https://calculator.e-co-foot.eu/>) at home, in which they can enter different activities they do each day in a log and find out how they influence their individual Ecological Footprint. Then they try to stay within their fair share of 1.6 gha by adapting their activities in a second log. Back in class, they compare the results of the two logs and share their experiences with the other pupils.

Please also find our **Ecological Footprint E-Learning material** here: <https://elearning.e-co-foot.eu/>



## 7) Worksheets of each group.

The aim of the workshop is not to evaluate whether the answer option can be chosen right now in your country (e.g. green energy might not be easily available in all countries) or to discuss the obstacles to implement it. These questions can be discussed after the game.

The teacher supports the discussion and consensus building by giving additional information, for example explaining why certain options have a big or small Ecological Footprint and which possibilities for improvement there are (see reduction potential & **Fehler! Verweisquelle konnte nicht gefunden werden.**). (S)he also helps the small groups to find a compromise in a fair way (all pupils should be able to voice their opinion) and to calculate the corresponding number of game pieces for each question. After that, the teacher continues to **present all other questions of the section**; e.g. the next question in the section “nutrition” concerns the consumption of animal milk or low-fat dairy products.

**In order to save time**, it is recommended (but not obligatory) to discuss the following questions **in the whole class, not in the small groups**. The decision can be reached by asking the pupils which choice they would prefer and raise their hands accordingly. The majority decides – this option and its associated game pieces are then inserted in the worksheet of each group.

- **Housing:** The sensible choices are quite obvious in this section (e.g. living in a plus energy house and using solar energy). In the first housing slide, the pupils first choose the size of the house, then the type of house. In this case, the class average for housing is the same as the group averages.
- **Mobility:** The questions regarding flying and going by car or motorcycle should be discussed in the small groups first. The other questions (regarding e-bike, trains and public transport) can be answered by the whole class at once since they do not have a big impact on the Footprint. If the majority of the class decides to use one of these vehicles, 1 game piece per vehicle is added in the worksheet of each group.
- **Consumption** (the slide regarding the consumption of paper, furniture, holidays, sports and hobby equipment, PCs, mobile phones): The teacher shows the slide and asks the pupils about ideas for improvement: How can resources be saved in these areas? (See the Table “reduction options” and the slide in the PP regarding reducing paper consumption for ideas.) Then the whole class is asked how many of them would be willing to save resources by choosing a reduction option (e.g. use paper economically and recycle paper). If the majority agrees, all the groups fill in the reduced amount of game pieces (e.g. 4.5 instead of 8 for paper consumption) in their worksheets. If the majority says no, the higher value is filled in. This procedure takes place for each option in this slide.

### **Step 5: Calculating the group result for each section**


As soon as all question of a section are asked and answered by each group, the groups add up all numbers of game pieces of one section. The group result of the section is announced by the speaker of the group to the class.

### **Step 6: Calculation of the class average**


The teacher **calculates the class average** of the different group results for the section by entering them in the embedded Excel Sheet in the PowerPoint presentation which automatically calculates the class average of game pieces. The calculation table can be opened by exiting the presentation mode and double clicking on the table. It is important to write the correct number of groups in the first line, so that the class average is calculated correctly.

The teacher then places, with the help of one or several pupils, the number of game pieces representing the class average in the correct colour on the **playing field**, starting at the left upper corner and filling the field from one side to the other.

### Calculation of the class average for nutrition



Number of groups	3
Number of game pieces for nutrition	
group 1	
group 2	
group 3	
group 4	
group 5	
0 Sum	
0,0 Average=Number of green game pieces	



#### Step 7: Revising the results

It often becomes clear that, on the first try, these average values reflect a very high Footprint. In order to achieve an overall Footprint which does not exceed the boundaries of the playing field (= fair share per earth citizen), it is sometimes necessary to go back into the discussion of the small groups. There the students may revise certain choices and calculate their group average again or find other improvements or potentials for reduction. The new group averages are then again inserted in the Excel Sheet and a new class average is found.

After that, the teacher continues with Step 1-7 for all sections until all four sections are depicted on the playing field on the floor using the sheets of coloured paper.

#### Step 8: Input regarding the Grey Footprint and the 5 Footprint Rules

At the end of the game, when a common solution is found, the teacher explains the "Grey Footprint" as well as the easy-to-remember "5 Footprint Rules", which summarize the most important things the pupils can do themselves (see [Teachers Input](#), **Fehler! Verweisquelle konnte nicht gefunden werden.** and **Fehler! Verweisquelle konnte nicht gefunden werden.**).

#### Step 9: Final discussion

The final discussion is optional and can take place if there is still time. Some of the questions (see [Teachers Input](#) on p. 14) can also be dealt with during the game. In this discussion, the teacher can include knowledge from the **Fehler! Verweisquelle konnte nicht gefunden werden.**. Alternatively, the questions can be dealt with as homework exercises (see

## Exercises & more

at the end of this document).

Note: The simulation can be played for two different purposes:

A) It either can be used to convey the size of TODAY'S footprints and their relative proportions in a very hands-on and very graphic way. Attention: the enormous overshoot compared to the necessary goal might frustrate pupils.

B) It is aimed at discussing as well as dreaming about and designing a set of very different societal- and economic frameworks that would allow a good living for all with a fair share of the world.

Attention: To go beyond adolescent phantasies, the latter requires transferring knowledge on alternative economic concepts, global governance, deceleration of human activities (i.e. significant reduction of work-time) and last but not least the potential of modern technologies to reduce impact per consumption. Most of these aspects cannot be provided in the materials presented herewith.

## General tips for the implementation

The teacher starts the workshop (after the introduction and group formation) with an explanation of the **nutritional area**. In the following steps, the Footprint of this area is determined.

- 1) **BASE VALUE OF VEGETABLE FOOD:** ALL students, regardless of their dietary style, have a base value for vegetable consumption of **11 game pieces**. This is the share of vegetables, grains, fruits etc. we all consume (even if only as a side dish to a portion of meat). This value is already filled in on the worksheet.
- 2) **FISH/MEAT/MILK/CHEESE/EGGS:** In the next step, the pupils add **game pieces for the consumed portions of fish, meat, milk, eggs and cheese** (see PowerPoint Presentation). It is important to know that they don't HAVE to choose any of these options. They can also decide to be vegan (which is the nutritional style with the lowest Footprint) – that means that they don't have to answer any of these questions. If they decide to be vegetarian, they only have to answer the questions regarding milk, eggs and cheese.
- 3) **EXTRA VEGETABLE FOOD:** If one group consumes **only little or no milk, eggs, cheese, meat and fish** and the total amount of game pieces for the consumed portions is **below 19.5** so far, the group needs to **add extra game pieces to reach the minimum of 19.5**. This minimum of game pieces for food corresponds to a purely vegan nutrition.<sup>3</sup> The extra vegetable food share has to be added, because people consuming little or no animal products have to eat relatively more vegetables than regular meat or fish eaters in order to take in sufficient calories. The potential for improvement is very high for vegetarians and meat eaters if they choose to eat less animal products.
- 4) Once this is done, the teacher can continue with questions regarding **beverages**. The usually too high value for nutrition of the first round can then be further reduced later (see Step 7 in the chapter "Procedure").

<sup>3</sup> So also if a vegan chooses very little portions of non-vegan food (e.g. drinks a little bit of milk) the minimum again would be at least 19.5 pieces.

Diet	Base value of GP for vegetable food	Plus game pieces for choices of meat, fish, milk, eggs or cheese	Plus game pieces for extra vegetable food:	Total game pieces
<b>Vegan</b>	11 game pieces	0 game pieces	8.5 game pieces	19.5*
<b>Vegetarian</b>	11 game pieces	Up to 75 game pieces, depending on choices	If choices lead to <19.5 game pieces, fill up to the minimum of 19.5 game pieces	19.5 to 86
<b>Meat</b>	11 game pieces	Up to 75 game pieces, depending on choices	If choices lead to <19.5 game pieces, fill up to the minimum of 19.5 game pieces	19.5 to 86

\* Possible minimum before implementing the reduction options

As an adult you can choose a vegan diet, which has the greatest effect on your Footprint. A balanced, healthy diet is also possible as a vegan if you are well informed, select the individual components of a meal and put together the entire diet correctly. As a child you should not become a vegan so that you get all the necessary ingredients for your adolescence and stay healthy. The lesson learned should be especially for kids, not to avoid animal products but to reduce them, because eating meat every day is certainly not healthy and bad for the planet.

"Crucial points" in the discussion are usually the diet - a meat-heavy diet is hardly possible within a global hectare - and **flying**: A single flight from Vienna to New York and back already claims more than the entire fair share of one hectare. Therefore, such a flight once a year is not possible within the fair share. If a complete abandonment of flying is not conceivable, however, there is the variant to, e.g., only taking a longer flight every 10 or 20 years, which only accounts for 1/10 or 1/20 of the annual Footprint. (See the paragraphs at the end of this chapter regarding how to convey this message to the pupils.)

Short distance flights have a higher Footprint than long distance flights per km, because the plane emits a lot of CO<sub>2</sub> at the takeoff and landing. Therefore, 200 km of a long distance flight and 100 km of a short distance flight account for 200 gm<sup>2</sup>, illustrated by 1 game piece.

Examples of flight distances (with return flight):

- Vienna-London-Vienna: 2.400 km = 24 pieces
- Vienna-Barcelona-Vienna or Mallorca: 2.700 km = 27 pieces
- Vienna-New York-Vienna: 13.400 km = 67 pieces
- Vienna-Bangkok-Vienna: 16.800 km = 84 pieces
- Vienna-Tokyo-Vienna: 18.200 km = 91 pieces

Also other cities can be chosen, see here: <https://www.distance.to/>

The question of how many kilometres per year **public transport** is used is difficult to estimate ad hoc. In general, this question is about the realization that the use of public transport hardly matters - 3000 km per year correspond to only one game piece! It is therefore not in the foreground to determine an exact number, but rather to make a rough assessment. It may help to illustrate these 3000 km: they correspond to approx. 8 km per day<sup>4</sup>. Based on this information, students can decide whether they want to put down 1, 2 or 3 game pieces for public transport, depending on how intensively they use it.

<sup>4</sup> E.g.: the average speed of Vienna's public transport (subways, busses, trams) is 22.4 km/h. (Wiener Linien 2016). With one game piece, one can use Viennese public transport **daily** for about 22 minutes long.

In the area of **housing**, the estimation of the square footage of living space per person can be supported by the teacher by estimating the size of the classroom before the workshop and using it to illustrate the space of 44 m<sup>2</sup>. The teacher can also ask the class whether someone knows the size of living space of one's own home in m<sup>2</sup>. If there is a pupil in class who has that information, the space can be divided by the amount of people living there.

The idea of insulation can be explained on a very basic level by comparing it to a thick jacket we all put on when it's cold outside. Like a jacket, the insulation of a house stores the heat inside and prevents the cold air from entering the house. It also prevents outside heat from entering in summer, making well insulated houses quite cool in summer. This means we don't need that much energy to heat up or cool down our houses. In the glossary of the Background information, terms such as green electricity, energy index, passive houses, etc., which are relevant in this area and which must probably be explained in more detail to students, are described more thoroughly.

In the foreground of this question is the realization that, with relatively little effort and without loss of comfort, the Ecological Footprint can be massively reduced.

In the area of **consumption** you find for the most important consumption categories (e.g. paper, furniture, holidays, hobby and sport) the average game pieces needed on average at the moment in your country (calculated by available statistical data).

The category „holiday“ consists of the consumption associated with the holiday of the average Austrian, for example the Footprint of the energy needed for the hotel, for leisure activities and for equipment (e.g. for camping). Since it is already covered in the mobility section, the Footprint of the travel (by plane, train, car...) is not a part of the "holiday" category.

As explained above, the reduction potential should be discussed with the pupils regarding the "consumption" categories.

The game pieces needed for the fodder of different **pets** the pupils might choose should NOT be added up: E.g. one pupil wants a horse shared by 3 people (this would take up a third of 30 game pieces, which is 10 game pieces), another one wants a cat on one's own. So the correct number would be 10 game pieces (not 20). Here it is also necessary to emphasise the possibility of sharing pets and of choosing smaller pets which have a much smaller Footprint.

Regarding **consumption that is not depicted in the questionnaire**, the teacher or the pupils can, if interested, find out their corresponding Ecological Footprint (game pieces, respectively) by writing an Email to: [office@footprint.at](mailto:office@footprint.at). Since the questionnaire covers all major areas of the Ecological Footprint, other types of consumption often only have a Footprint of less than 25 gm<sup>2</sup> (equal to 1/8 of a game piece; see also the last row of the worksheet).

In the solution of the task, technical **inventions** of students are allowed, if they are physically plausible, but also the development of ideas of social innovations and new forms of societal organization should be addressed and triggered.

The aim of the game is to show that a fair and ecologically sustainable lifestyle is possible and that it can also have many other positive effects. It is therefore important to communicate that "abstinence" really only means **choosing another alternative** that also can have additional benefits for the quality of life: vegetarian or vegan diets also have positive effects on health, figure and the well-being of animals. To stop flying does not mean abandoning travel altogether, but discovering other and new forms of travel:



travel by train, on foot, by bike and by sailing boats. Taking more time to travel like this, it can be even more adventurous, interesting or recreative than a plane trip. It also means to discover the huge diversity of cultures and landscapes in Europe, without having the need to travel to the other end of the world.

To value these alternatives, dominant **norms and structures** in our societies **have to be challenged**: For example, flying is nowadays part of many lifestyles prevalent in the Global North. It is important to stress here that even if flying has become normal for some social groups, it is still an exception for most people on Earth: Only a minority of humans currently living (approx. 1 of 10) have ever used an airplane! Also, it is not normal to fly in a historical sense: Commercial aviation only started to appear after the Second World War. Flying is intrinsically associated with economic globalisation, communication technologies like the internet, the resulting acceleration of daily lives and new expectations regarding (global) mobility in many jobs. These interrelated phenomena have to be addressed at the same time – changing mobility patterns like flying habits also means changing economic structures. We could therefore envision a more sustainable society that, on one hand, is not that dependent on global trade anymore, and one that allows individuals to work less and therefore have also more time for leisure and lengthy travels by sustainable means of transport.

The teacher should discuss these issues with the pupils, e.g. in the final discussion by seeking answers to the question of how our society would have to change if everyone lived within his/her fair share.

Another important message of the game is that there are **surprisingly simple and uncontroversial solutions**. For example, there are rarely any fundamental objections to living in a passive house or to the consumption of green electricity, which massively reduces the Ecological Footprint compared to the conventional alternatives. Also regarding driving a car, car sharing alone already makes a great reduction of the Ecological Footprint possible (e.g. by  $\frac{3}{4}$  if a car is used by four people instead of only one person). These alternatives have **no negative impact on the individual quality of life, but a high ecological impact**.

In addition, things that are important to people usually have **no Ecological Footprint at all**. Relationships with other people, joy, exchange, love, knowledge etc. are infinite resources that do not burden the planet. **The mini-hectare-workshop should not focus on abandoning old habits, but on recognizing alternatives and gaining a new perspective on the world.**

## Variants of the game

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### 19. Hectare workshop with several playing fields

The mini-hectare workshop can also be adapted to a variant in which each group has its own playing field. Dependent on the available space, in the **“big variant”** the playing fields for each group have the size of 210x150 cm or, in the **“small variant”**, can be painted on a flipchart paper or board of 38 cm x 76 cm in size.

In the **“big variant”**, for each group a sufficient number of game pieces (approx. 60 A4 sheets per colour per group, that is 240 sheets per group) and ropes are necessary. Ideally, but not necessarily, there are also several teachers present who are familiar with the method to help out in the discussion and calculation processes of the groups of students.

In the “**small variant**”, instead of A4-sheets of paper, post-its in the size of 76 \* 76 mm are used<sup>5</sup>. The advantage of the “small variant” is that the playing field can be placed on tables and take up less space than the “big variant”, the disadvantage is that the haptic element of placing the game pieces on the floor is lost.

The **process** for both the small and big version is basically the same as in the main version, but no class average is calculated. Each group, after the collective decision for an answer, can immediately calculate and place the pieces on their own playing field. The process can take place in two forms: If the teacher wants the groups to go through the process in their *own pace*, the PowerPoint presentation can be printed out and used as a script or as an illustration. If all groups should reach their decision for each section at the *same pace*, the PowerPoint can also be projected on the wall of the classroom and all groups have to get to their results at the same time. The inputs at the beginning and at the end as well as the concluding discussion, facilitated by one person, can take place together with all pupils. At the end of the game, the different results of the group are presented to the whole class and all pupils discuss their choices of options.

The variant with several playing fields has several advantages: the choice of each option can be immediately visually demonstrated on the playing field and no average for the entire class must be calculated. In addition, at the end of the game, it becomes apparent how the groups came to different solutions with different strategies, which can then be discussed. A disadvantage may be the more difficult process of facilitation (ideally each group is supervised by one teacher) and preparation (more material is needed).

## 20. Full-day workshop: Global hectare workshop outdoors

The workshop can also be held outdoors on a real acre of land. The advantages of this method are to get a good feeling for the size of the real area of one hectare by striding up and down the hectare several times and that the physical effort provides a good balance to the group's cognitive and social performance.

Since this version of the workshop requires a lot of preparation and experience, it is recommended that it is conducted by trained workshop leaders. In Austria, this service is offered by the Platform Footprint. More information can be requested at the following email address: [office@footprint.at](mailto:office@footprint.at).

## 21. Overview of variants

Name	Playing field(s)	Materials	Process
<b>Main variant with one playing field</b>	1 playing field (210x150 cm) on the floor for the whole class	1 rope (10m), 240 sheets of coloured paper (60 per colour), worksheets for each group, PowerPoint presentation	First calculation within small groups, then calculation of class average (visualised on the playing field) after each section.
<b>Big variant with several playing fields</b>	1 playing field (210x150 cm) on the floor <i>per group</i>	Ropes and sheets <i>for each group</i> , worksheets for each group, PowerPoint presentation	Calculation and visualisation only within the small groups (no calculation of class average). At the end of the workshop comparison and discussion of the different results. Each group can finish each section at the same pace OR each group reaches its decision at its own pace (see description of process above).
<b>Small variant with several playing fields</b>	1 playing field on a flipchart/board (38 cm * 76 cm) <i>per group</i>	Flipchart/board with painted playing field and 240 post-its (76 mm * 76mm) in four colours <i>for each group</i> , worksheets for	

<sup>5</sup> This variant has a slightly higher Paper-Footprint. Note, that the post-its can be reused!

		each group, PowerPoint presentation	
<b>Outdoor variant</b>	1 playing field for the whole class in the size of 1 hectare	50 fence posts, hammers, 1000 m barrier tape, measuring tapes (50 and 20 m), carton, marker, notepad, gaffer tape, whistle or gong, catering	Discussion and calculation by the whole class. Maybe visualisation by staking off the sections on the hectare using fence posts and barrier tape connecting the fence posts.

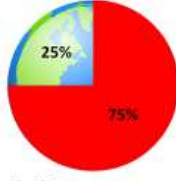
## Teachers Input

### Introduction to the mini-hectare game (without previous knowledge)

The following introduction to the mini-hectare game is suitable for students who do not have any prior knowledge of the Ecological Footprint.

### The Ecological Footprint

- **Consumption** requires resources and thus **space**.
- We can only use **25%** of Earth's surface! = **bioproductive area**
- **What kind of areas do we need to produce food, clothing or energy and dispose of waste?**  
-> These areas are part of the **Ecological Footprint!**

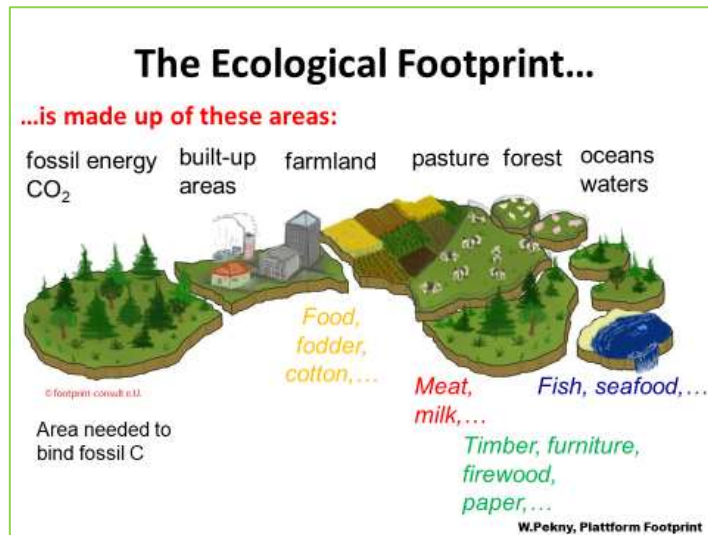


We humans need to consume in order to survive. However, how and what we consume has changed dramatically over time, and even the consumption today is very different individually and socially, e.g. depending on how much income we have or where we live.

Every type of consumption requires resources. These in turn have to be produced by nature and therefore require certain areas of land. This land is limited because we live on a limited planet. In fact, we can only use **25%** of Earth's surface! This is also because over 70% of Earth's surface is covered by water and only a little part of the oceans contains fish. The usable area is called bio-productive area.

What do you think, what types of land are needed, e.g. to produce our food, our clothes or our energy and our dispose of waste?

Possible answers: Forest, field, pasture, water, built-up land




On this slide you can see the types of **areas that make up the Ecological Footprint**: built-up areas for industry, houses and roads; farmland and pasture for food, fodder, cotton, agro-fuels, bioplastics, meat and milk; forests for timber, furniture, firewood, paper, viscose; oceans and waters for fish and seafood. The last point, the area needed to bind CO<sub>2</sub>, is related to climate change.




You've probably already heard about the climate crisis we are facing today. The pictures you see here are some of the consequences of climate change: they will take place more often and more intensively all around the world. What are these consequences? Name a few!

Students answer: floods, forest fires, droughts, sea level rise.

## Climate Change



- What is climate change?
- What causes today's climate change?
- Which human activities produce greenhouse gases such as CO<sub>2</sub>?
- Storage of CO<sub>2</sub> by oceans and trees
- "Carbon Footprint" = often more than half of the total Footprint!



What is climate change? What exactly changes when the climate changes?

Possible answers: The temperature rises on average, there will be more heat in the summer and warmer winters. Some regions will become wetter and others dryer. The ice melts on the polar caps and glaciers and the sea levels rise. Storms and floods become more intense and frequent because weather patterns change. This affects agriculture around the world (droughts, floods; areas change where crops can grow and also the types of plants that grow).

What causes today's climate change?

Answers: The greenhouse effect: warming that results when the atmosphere traps heat radiating from Earth toward space. Certain gases in the atmosphere block heat from escaping. Gases that contribute to the greenhouse effect include: carbon dioxide (CO<sub>2</sub>), water vapor (acts as a feedback to the climate, because it increases as the atmosphere of Earth warms), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), Chlorofluorocarbons (CFCs).

Over the last century the burning of fossil fuels like coal and oil has increased the concentration of carbon dioxide (CO<sub>2</sub>) in the atmosphere. This happens because when coal or oil are burned, carbon is combined with oxygen in the air and CO<sub>2</sub> is produced. To a lesser extent, the clearing of land for agriculture (e.g. for meat production), industry, and other human activities has increased concentrations of greenhouse gases.

Do you know which human activities produce greenhouse gases? Name a few!

Possible answers: mobility powered by fossil fuels (flying, driving,...), energy production by coal, gas, oil (electricity and heat), agriculture (livestock: methane emissions from animals, fertilization, deforestation of forests), industry (fossil-fuelled machines, exhaust gases).

We must drastically reduce the emissions of CO<sub>2</sub> and other greenhouse gases very soon, otherwise global warming cannot be stopped. The consequences for life on the planet will then be drastic.

CO<sub>2</sub> can also be stored. This is done by oceans and lakes, but also by plants which absorb it, transform it and use it for their own growth. To a certain extent, trees can **bind** CO<sub>2</sub>, i.e. remove it from the atmosphere.



The Ecological Footprint also includes the area of forest that would be needed to bind CO<sub>2</sub> emitted by human activities. However, we do **not** have enough area for forest on the planet to remove all "excess" CO<sub>2</sub> produced by human activities from the atmosphere! So we definitely have to reduce our greenhouse gas emissions.

Possibility to go back to slide 4 and point at the area of forests to bind CO<sub>2</sub>.


This means that the Ecological Footprint also includes those areas needed to bind CO<sub>2</sub>. This part of the Ecological Footprint is referred to as the **Carbon Footprint**. It can be up to half of the total Ecological Footprint, so it is very significant!

### The Ecological Footprint

- ... is expressed in **global hectares (gha)** per year
- 1 gha = **10,000 m<sup>2</sup>** with the **biological productivity of the world average**

$$\frac{\text{Bioproductive AREA of the planet}}{\text{Number of all HUMANS}} = \text{FAIR SHARE for every human being} = 1.6 \text{ gha}$$

- Calculation of the Footprint for **world population, countries, regions, products and persons**
- If all people lived as we do in **Europe**, we would need **THREE planets!**



The extent of the Ecological Footprint is calculated in **Global Hectares (gha)** per year. 1 gha is equivalent to 10.000 m<sup>2</sup> with the average biological productivity of the world's bio-productive area (not all areas we can use produce the same amount of resources, so we have to take the global average). You can calculate the Ecological Footprint in gha for the world population, countries, regions, products and individuals.

The area that exists in nature that we can use, the so-called "bio-productive area" is, as we have seen, not so large in total: it makes up less than 25% of the world's surface. If you divide this bio-productive area by the number of people in the world, you get the share that, under conditions of fair distribution, **every human being is entitled to: 1.6 global hectares!**

At the moment we are far away from a fair distribution of resources on this planet. If all people lived like we do in Europe, we would need **THREE planets!** Everything that we consume in too big quantities, therefore, we not only consume at the expense of nature, but also at the expense of other people.

[Continue with Introduction to the mini-hectare game (with prior knowledge).]

## Introduction to the mini-hectare game (with prior knowledge)

The following introduction to the mini-hectare game is suitable for students who have already completed Learning Unit 1 General Introduction to the Ecological Footprint.



## Mini-Hectare-Workshop

How can we live a good life without destroying our planet and without living at the expense of other people?



Available **productive area** per earth citizen = **FAIR SHARE** 1.6 gha

Fair share if you take **growth of population and resource use until 2050** into account: 1.0 gha



Today we play the **mini-hectare game** together. It shows us how we can live a good life without destroying our planet and without living at the expense of other people. That is possible, but we must part with some old ideas about what constitutes a "good life" and discover new ones. In this game, we want to find out if we can live a good life with the share we are entitled to.

This fair share, the available productive area per earth citizen, makes up 1.6 gha. If one takes the estimated growth of the population and of resource use until 2050 into account, the area per citizen is 1 gha. We will therefore work with this area in this game.

## Mini-Hectare-Workshop

**Playing field** = area that every human being is entitled to in a fair world =

**50 game pieces (GP) per earth citizen = fair share**



**NUTRITION**

**MOBILITY**

**HOUSING**

**other CONSUMPTION**

Cover the playing field with GP representing your needs in these four areas for one year

We will look specifically at 4 areas: **nutrition, housing, mobility and other consumption**. The **playing field** you see on the ground **represents the fair share of every human being: 1 gha<sup>6</sup>** in the middle of the century. One game piece *[show one game piece]* is equivalent to 200 gm<sup>2</sup>. In total, one citizen can use **50 game pieces**.

<sup>6</sup> In the 1 gha, the growth of the world population by the middle of the century, 15% additional land to conserve biodiversity and ecosystem services, and the probable decrease in biocapacity through soil sealing, salinization, etc. are included. 1 gha or the 50 game pieces that fit in this field correspond to the fair share per person in the middle of the century. See Background information!

## Mini-Hectare-Workshop

Form groups of 4-6 persons!



Agree on one option in the group:

What do you really need in the areas of  
nutrition housing mobility  
consumption so that you can live a  
good life AND stay within your fair share!

Now please form groups of 4-6 people and sit down in circles, the chairs should be arranged around this playing field on the floor.

The question that you have to ask yourself regarding all areas is the following:

Choose what you really need in the areas of nutrition, housing, mobility and consumption so that you can live a good life AND stay within your fair share!

For each area you get several alternatives to choose from. **First, take your own behaviour as a starting point of your reflection and tell it the other pupils in your group.** In many cases, you will see that you have to **adapt** your behaviour a bit in order not to take up too much “space” within the playing field. In your group, you now have to find out how your different choices can “fit” into the fair boundaries, but are still part of a “good life” for you. The job in your group now is to agree on one answer: Select one option or find a compromise between different options by debating or by calculating the average. **For now, the question is only what you can imagine as a good life within the ecological and fair limits, NOT how and whether these options are feasible right now in our society!** The topic of feasibility (and the steps necessary to make these option available to everyone) we can discuss later.

Let's start with the section of nutrition.

Please continue with PowerPoint Presentation – see additional explanations in the notes of the PowerPoint Presentation.

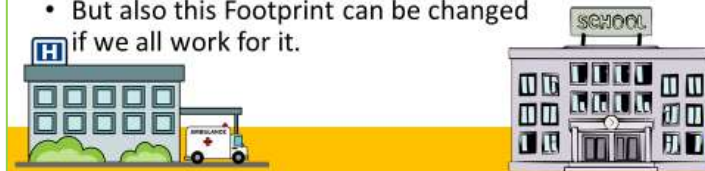
## Grey Footprint<sup>7</sup>

This part of the input (optional) takes place after querying the consumption area and before the general discussion of the results, see also method description and PowerPoint presentation.

<sup>7</sup> Additional information regarding the Grey Footprint see Fehler! Verweisquelle konnte nicht gefunden werden. for the teacher.

## The Grey Footprint

- E.g.: Footprint of roads, hospitals, schools, fire brigades, courts, police and all buildings
- Is not attributed to individual people, but to the "community", i. e. all people who use these facilities.
- Is greater than the fair share of 1.6 gha per person: **1.7 gha** per person
- But also this Footprint can be changed if we all work for it.

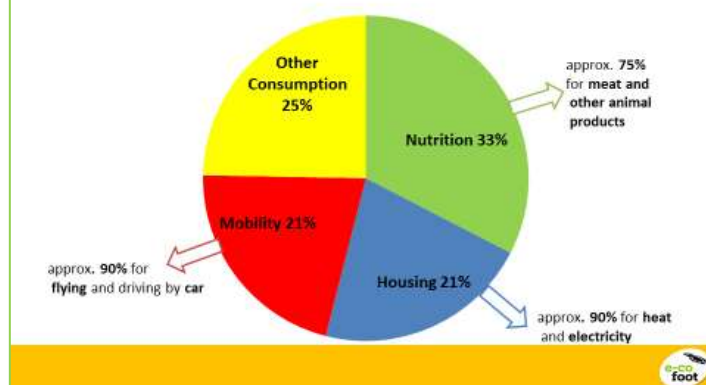


The Grey Footprint refers to the parts of the total Ecological Footprint that cannot be attributed to individuals, but more meaningfully to all of us. These are things or services that are important to all people, even when they are not using them. These include for example the Footprint of roads, hospitals, schools, fire brigades, courts, police and all buildings.

Unfortunately, this Footprint alone is more than the fair share of each of us, namely 1.7 gha in Austria. The Grey Footprint can also be changed - but only if appropriate political measures are taken. We can contribute by working together and urging politicians to take measures to lower the Grey Footprint.

## The Five Footprint Rules and Final Discussion

### Which 5 things reduce the Ecological Footprint the most?

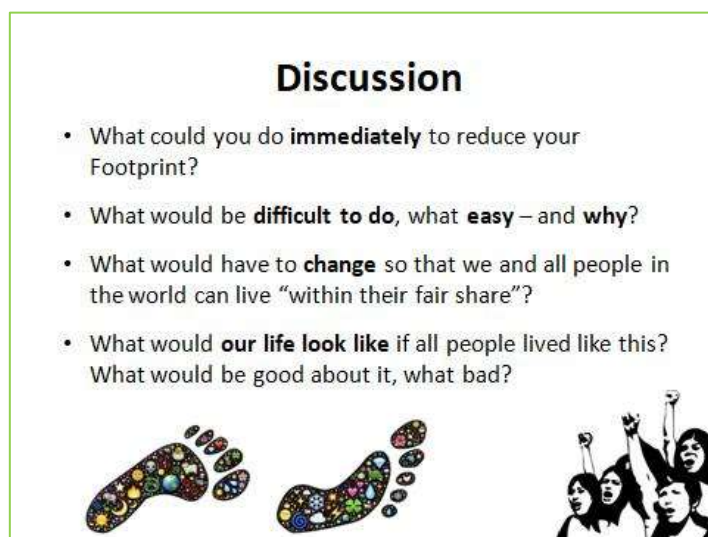


At the end of the workshop, ask the students which five most important things they can remember that are essential to "live within the fair share". Normally the pupils can identify 5-F rules already on their own!





The rules can then be shown in the PowerPoint Presentation to summarize the message of the mini-hectare workshop and to give a clear and easy-to-remember guide to one's own actions.



In the discussion, the pupils think about their own everyday life and about possible things they could change. It also should be discussed – openly and without blaming anybody – which things are quite difficult to change (either because of habits, comfort, money,...). Only by also speaking about the obstacles, ways can be found to eventually overcome them. Some of the obstacles will be related to social and economic structures, which would have to be changed fundamentally. On the other hand, some things are possible quite easily without changing any habits or even having to invest a lot of money (e.g. switching to green energy – if this is an available option in your country). Also it should be made clear that there is no general “right solution” – each pupil can place personal emphasis on different parts of the Footprint. E.g. if the student chooses to reduce the nutrition Footprint drastically (e.g. by becoming vegetarian), (s)he has more options regarding mobility and the other way around.

Part of this discussion (third question) is also to focus on the societal level – individual choices alone are clearly not enough to really reduce the Footprint, infrastructures (like a good public transport system, affordable zero energy houses, available green energy) have to be transformed by political measures and economic activities. It is important to notice that societal conditions are made by us humans and therefore



changeable. They should serve us - not the other way around. How can this societal change be achieved? How can we, as citizens, contribute to make it happen?

The last question challenges the students to think more precisely about the vision of a society with a small Footprint.

## Exercises & more

### 22. Write an essay guided by the questions of the “Discussion”-slide

The pupils write an **essay** guided by the questions of the “Discussion”-slide. They try to find personal answers to these questions and think about the possibilities and obstacles to change their own lifestyle. Back in class, the whole class reflects on these questions together and tries to come up with ideas to make the transition to a life with a small Footprint for the whole society more realistic.

### 23. Discuss the results of the game with their parents

The pupils **discuss the results of the game with their parents** (the PowerPoint Presentation, e.g. the pie chart, and the worksheet can be used as a support) and ask them the following questions:

- s. Which things are we already aware of as a family?
- t. Regarding which points could we imagine a change of our lifestyle? Regarding which points is it difficult and why?
- u. What do the parents think about the issues of ecological boundaries and the social and ecological impact of our European lifestyles? Are these thoughts relevant in their lives? If so, how?

Back in class, the pupils share their experiences of the discussions with their parents with each other: first in groups of two, then with the whole class.

### 24. Try out the Ecological Footprint Calculator

Pupils try out the **Ecological Footprint Calculator** (<https://calculator.e-co-foot.eu/>) at home, in which they can enter different activities they do each day in a log and find out how they influence their individual Ecological Footprint. Then they try to stay within their fair share of 1.6 gha by adapting their activities in a second log. Back in class, they compare the results of the two logs and share their experiences with the other pupils.

Please also find our **Ecological Footprint E-Learning material** here: <https://elearning.e-co-foot.eu/>

## Worksheets for the calculation of game pieces and reduction options

See separate PDF files for printing.

### Good Living with the fair share of the world

4,2018

In a just world, every citizen would have about 10,000 gm<sup>2</sup> of biocapacity or space for 50 tiles for personal use in 2050.

Cover the playing surface with your (perceived as absolutely necessary) need for one year. Try to live a good life with it!

Average situations for AUT

NUTRITION		Real area ~gm <sup>2</sup>	n° of tiles	your choice...	sum
<b>Vegetable Food</b>					
Average for all: 1 YEAR vegetable food		2300	11		
Extra: 1 YEAR vegetable food for vegetarians (depending on animal p.)		500-1600	2,5 - 8		
Or extra: 1 YEAR vegetable food for vegans (purely plant-based nutrition)		1700	8 1/2		
<b>Animal products (1 portion = ca. 250g)</b>					
1 portion meat/eggs/cheese PER WEEK	results per year ->	1600	8		
1 portion milk/low-fat dairy products PER WEEK	results per year ->	500	2 1/2		
1 portion fish PER WEEK	results per year ->	400	2		
<b>Beverages per YEAR (tap water, syrup, herbal tee = -0)</b>					
bottled water for 1 YEAR (~100 Liter or 2 Liter/week)		100	1/2		
10 cups of coffee PER WEEK	results per year ->	200	1		
Softdrinks (1 liter PER WEEK)	results per year ->	200	1		
Beer (1 liter PER WEEK)	results per year ->	250	1 1/4		
Wine (10 liter PER YEAR)	results per year ->	200	1/2		
				total:	
<b>HOUSING (pro rata for one person)</b>					
Heating: 44m <sup>2</sup> heated living area per YEAR (average)		6200	31		
or: 44m <sup>2</sup> heated living area in a low-energy building		600	3		
or: 44m <sup>2</sup> heated living area in a zero-energy building		200	1		
Hot water: consumption for 1 YEAR (average)		900	4 1/2		
or hot water for 1 YEAR (solar)		200	1		
Electricity: consumption for 1 YEAR (average)		1900	9 1/2		
or: green electricity for 1 YEAR with energy saving		200	1		
				total:	
<b>MOBILITY (possible distance per person) - incl. production &amp; recycling</b>					
200 km by airplane (short distance ~100km) (ESP&GRC ~3000km; Nyork ~15000k)		200	1		
400 km by car		200	1		
500 km by motorbike		200	1		
800 km electric car		200	1		
900 km by electric car and car-sharing		200	1		
1600 km with 4 PEOPLE in a petrol-saving car		200	1		
3000 km with public transport		200	1		
5000 km by train (EU 3000km)		200	1		
2000 km by electric car (100% green electricity)		200	1		
2200 km by electric car (100% green electricity) and car-sharing		200	1		
10000 km by electric bike (100% green electricity)		200	1		
				total:	
<b>CONSUMPTION (aquisition of goods &amp; services per person and year)</b>					
Paper: average paper consumption PER YEAR		1700	8 1/2		
Furnishings: average home furnishings PER YEAR (e.g. furniture, home appliance)		1600	8		
Holiday: average holiday, freetime, hotel stays PER YEAR		1800	9		
Hobby: average new sports equipment & hobby PER YEAR		1600	8		
Clothing: average clothing PER YEAR (inkluding shoes etc.)		900	4 1/2		
Computer: buying a personal computer EVERY 4 YEARS		200	1		
Mobile Phone: buying 1 mobile phone		50	1/4		
<b>Pets per year (average ~400gm<sup>2</sup>)</b>					
food etc. for a cat or a dog of 5-20kg		2000	10		
food etc. for a dog of > 20kg		4000	20		
1 horse		6000	30		
other -> please ask for information (generally less than 1/8)		25	1/8		
				total:	

Grey Footprint (= impact of society; infrastructure (rail, road, school, hospital, police, military, government and there operation))

increases area by  
around 25%  
Not considered here

Game tiles for estimating "lifestyle patterns" - not suitable for calculating back to specific values  
Idea: Wolfgang Pekny & Michael Schwingshackl - all values are rounded estimates

## Reduction options

### Further reduction options (in addition to the selectable quantities!)

Nutrition	possible reduction	chosen reduction
Conscious of calories (usually simply less...)	-10%	
Throw almost no food away (at home)	-10%	
Influence food waste in general (conscious shopping, feedback to shops ...)	-5%	
Buy a lot of "organic" food (only with a low meat diet!)	-10%	
Avoid packaging	-2%	
Cooking together	-2%	
Avoid transport by plane	-1%	
<b>Sum for everything: max.</b>	<b>-35%</b>	

**TIP: A fundamental change that is lived by many people together is more effective overall than the "radical" behaviour of individuals.**

Housing (reduction potential for existing average living space)			
For every m <sup>2</sup> less per person	from the heating Footprint ->	-1%	
Thermal renovation:	from heating Footprint ->	-35%	
Three degrees cooler:	from the heating Footprint ->	-15%	
Saving use of water:	from warm water Footprint ->	-10%	
Shock ventilation not permanent open window	from the heating Footprint ->	-5%	
No stand-by:	from power Footprint ->	-5%	
Efficient lighting technology and light saving:	from power Footprint ->	-5%	

**TIP: Here you can quickly recognize that there is nothing to give away!**  
Ultimately, no one has anything against a zero-/positive-energy house, which is the future.

Mobility (reduction factors for conventional cars)		
Always a passenger		-50%
Always 2 passengers		-66%
Always 3 passengers		-75%
Driving consciously (slowly, anticipatory, correct gear selection)		-20%
Correct tyre pressure and no roof gallery		-10%

**TIP: Avoid cars with combustion engines (especially in cities) if possible! This reduces the footprint and increases the quality of life of all participants.**

Consumption		
Less paper and high recycling rate	up to max. ->	-60%
Less clothing and durable clothing	up to max. ->	-80%
Durable products and modest electronic equipment	up to max. ->	-50%
Consequent avoidance of waste		-5%

The old guideline is more valid for Footprint than ever: **refuse – reduce – re-use – recycle – rot**

- + Extending the product lifetime reduces the Footprint per year!
- + common benefit = share Footprint
- + Quality before quantity
- + Use Recycling and Second-Hand products

**What everyone realizes:**  
we have to start as soon as possible!

### Grey Footprint

Nothing can be changed quickly on an individual basis, but collectively and due to political and economic conditions! (e.g. green electricity for public institutions, "green" public procurement etc...)

Game tiles for estimating "lifestyle patterns" - not suitable for calculating back to specific values  
Idea: Wolfgang Pekny & Michael Schwingshackl - all values are rounded estimates

## Sources and Bibliography

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**Footprint data:** 2019/2016

Global Footprint Network. <http://www.footprintnetwork.org/en>

Plattform Footprint [www.footprint.at](http://www.footprint.at)

The Mini-Hectare Footprint Workshop was developed by Wolfgang Pekny and Michael Schwingshackl (Plattform Footprint).

**Picture credits** can be found at the end of the PowerPoint presentation.

### Literature:

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Sources for all pictures can be found at the end of the PowerPoint slides.