

# FPCS Pedagogy Footprint calculator for schools FPCS



PÄDAGOGISCHE  
HOCHSCHULE TIROL





## Imprint :

**Publisher:**

Federal Ministry for Education, Science and Research  
1010 Wien, Minoritenplatz 5

**Authors:**

Mag. Michael Eder; Institut für Prozess- und Partikeltechnik, TU Graz, 8010 Graz  
Dr. Hans Schuster, 5400 Hallein

**Editor:**

Mag. Angela Kohl, e-Lisa academy, 1010 Wien

**Translation:**

Dr. Christine Lechner, PHT

**Print:**

Own duplication.

Reprinted: November 2014

**Layout:**

Reiterer-Grafik, 1170 Wien

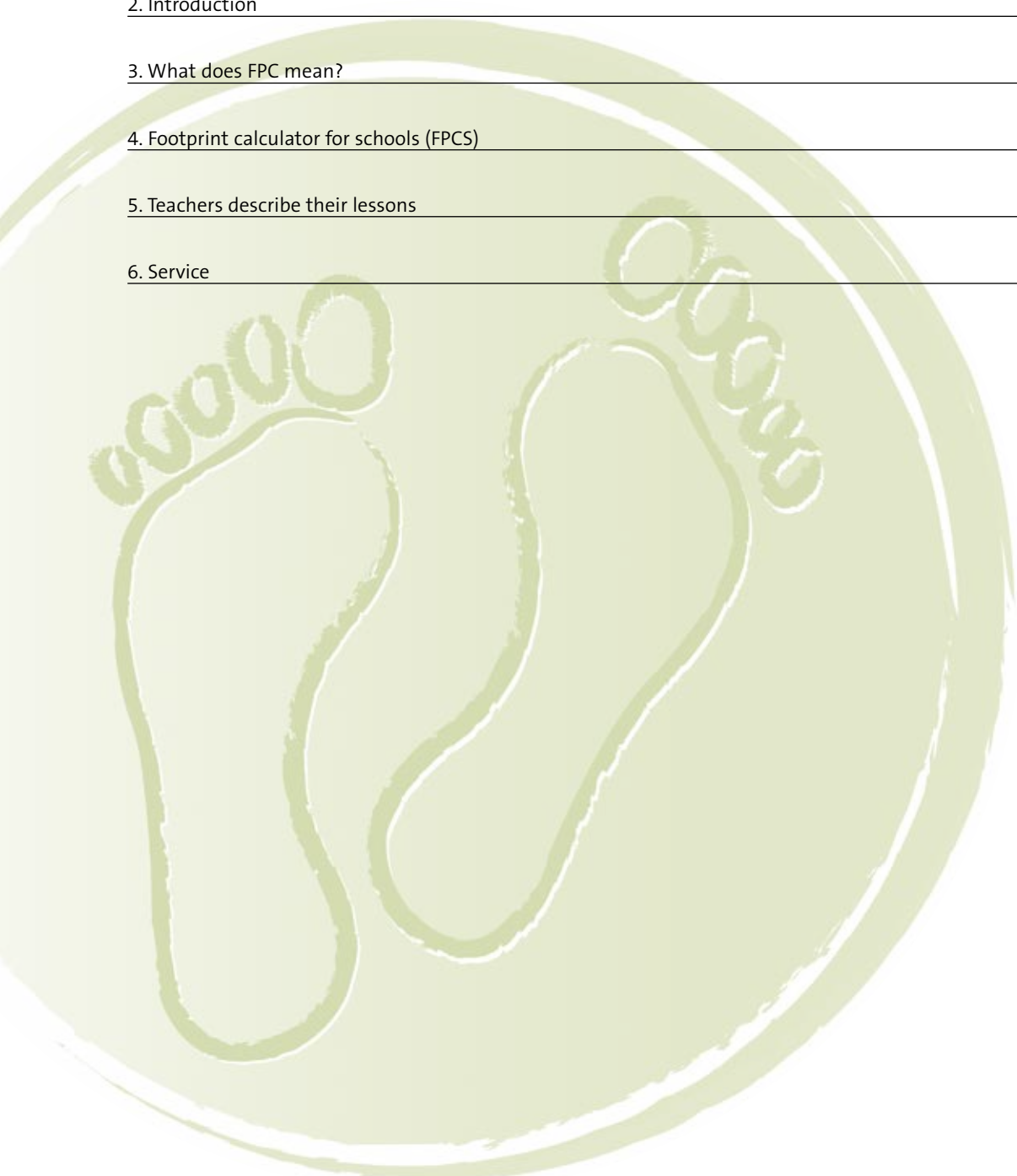
**Layout English Version:**

Jasmin Lunze



## Table of contents

<u>1. Preface</u>	<b>4</b>
<u>2. Introduction</u>	<b>5</b>
<u>3. What does FPC mean?</u>	<b>6</b>
<u>4. Footprint calculator for schools (FPCS)</u>	<b>7</b>
<u>5. Teachers describe their lessons</u>	<b>13</b>
<u>6. Service</u>	<b>24</b>





# 1. Preface

## Our Earth - a world of traces

Our earth is full of inorganic and organic traces. The dynamics of the earth's crust and the underlying mantle left volcanic cones, lava flows and mountains; the erosion formed alluvial fans; glaciers have left glacial cuts, boulders and moraine hills; the wind has piled loess layers and sand dunes. Living beings have left traces of creep, food and footprints, which have been preserved for posterity as prints or body fossils.

This is the history of the Earth and now let us think about the situation today. Geological processes continue as natural phenomena such as landslides, volcanic eruptions, earthquakes and tsunamis constantly remind us. With the appearance of man and his life activities, the world of traces has been enriched with new facets. This is what the Ecological Footprint is all about.



- A renowned footprint in the history of technology: On July 19th, 1969, Neil Armstrong was the first human to step upon the ground of our Earth's satellite, leaving the first footprint on the moon, the first "small step"
- Traces of the first human being: footprints found by Mary Leakey in Tanzania
- Not famous but necessary: Tractor tracks in a farmer's meadow



## 2. Introduction

### Ecological Footprint - What Does It Mean?

From the first developments of “environmental awareness”, critical people have tried to understand the impact of human activities on the environment to collect, calculate and evaluate activities from the point of view of ecology. At the same time or shortly after people began to search for solutions. There are many different approaches to the survey, such as life cycle assessments, the Ecological Backpack, SPI (Sustainable Process Index), MIPS (Material Intensity per Service Unit), CO<sub>2</sub> equivalent, Carbon Footprint, Global Warming Potential and others. Calculations of toxicological potential, ozone depletion or potential as photooxidants demonstrate further details.

In recent years, the concept of Ecological Footprint has become widespread. It was developed by the scientists Rees and Wackernagel in 1994, and aims to provide a vivid, easily understood measure of how people’s lifestyles and behaviour affect the environment. The Ecological Footprint is the area on our planet that is necessary to enable the living standards (and lifestyle) of a person or a society, if we continue to operate as usual. Of course, this depends on the country in which the person lives and on which social class he / she belongs - accordingly the range of variation lies between Dubai and Malawi.

The areas are not only those used for food production and energy sources such as wood or elephant grass, but include all areas as stated below (from exhaust catalyst to auxiliary heating). The difficulty lies in the conversion of these environmentally relevant aspects into area.



The focus can be laid on various areas of human life:

- Raw materials such as aluminum, petroleum, gold, wood or uranium
- Products such as car engines, beer cans, milk cartons or plastic bags
- Services such as waste disposal, amusement parks, food supply, power supply or transport
- Energy sources such as natural gas, coal, solar power or hydropower
- People as individuals, families, tribes or peoples
- Waste, heating, consumer goods, mobility
- Human habitations such as a single-family home, block of flats, settlement or city
- Parts of it such as hospitals, swimming pools or schools.



### 3. What does FPC mean?

Ecological Footprint Calculators (FPC) are computer programmes in which data entered on one's own consumption behaviour, energy supply or mobility are converted to hypothetical land consumption. The calculator then shows how environmentally friendly or polluting our lives and lifestyles are. The number of earths that we would need if everyone in the world lived like we do in industrialised countries can be extrapolated as comparative data from other countries - from the poorest states to Japan or the USA - are available. Through changing individual parameters such as mobility behaviour, the effects on the Ecological Footprint can be calculated.

Besides the FPC, there are several other calculators, such as the common electricity calculator of E-Control and Forum Umweltbildung (Quick Check and Profi Check for consumption calculations) and there are other CO2 calculators such as those of the Forum Environmental Education (for cars, aircraft, aquariums, Austria) or the German Foundation "Warentest" electricity calculator.



Before using the calculator take a careful look and read reviews if possible. For example, Austrian Airlines offers a CO2 calculator for flights, which only takes about one third of the actual climate impact into consideration, as criticised by environmental organisations. Further calculators can be found in the list of links in the section "service".

#### **By the way:**

#### Friends of the environment



A word about "environmentally friendly - harmful to the environment": Strictly speaking, every action of man in nature, be it the creation of a nature trail, the construction of a wind power plant or the construction of a solar city is an environmentally harmful action. Even mountain bikes leave strong traces in nature. Thus, "environmentally friendly" is a relative term meaning low environmental impact.

#### Barefoot into the global crisis?



A word about the footprint: This metaphor, usually portrayed as an imprint of a naked human foot, tempts us to trivialise the actual situation. Prints of boots or mountain boots, traces of tractor tyres, caterpillars or bulldozers would do more justice to reality. And just think about the impact of huge opencast mines, fire clearance or motorway junctions, high-speed rail lines, shipping channels or major airports ... The FPCS is not about disaster education, but it is important to get things into perspective.





Above all, the concept of the Ecological Footprint serves to promote people's awareness of the consequences and effects of their activities, their lifestyle, their consumption patterns, etc. Only then can reasonable alternatives of action be considered, solutions found and lifestyle sacrifices made.

## 4. The Footprint Calculator for Schools (FPCS)

The FPCS has been developed specifically for the institution of school with all its implications - from waste and procurement to energy and mobility, food and water use. Schools are complex systems bringing together many different players with very different decision-making powers. Over the course of a year, considerable flows of material and energy flow through this system. The FPCS can help visualize and measure these flows. Here weaknesses are identified where improvement measures can be taken. For the use of the FPCS there is a user manual, written by the authors of the calculator, which explains the technical background and provides assistance in the use of the calculator. In addition, the method of the Sustainable Process Index (SPI®), which was used to calculate the footprints, is also described. This information is important, as this method differs substantially from the well-known Rees / Wackernagel calculation method.

### The use of the FARS in the classroom

The application possibilities for the FARS are manifold and are listed below according to increasing complexity:

- Subject teaching in biology, computer science, ethics, geography and economics, history and social studies, information technology, philosophy, physics, religion, commodity economics etc.
- Interdisciplinary, project-oriented teaching sequences
- Interdisciplinary teaching projects in one class
- Interdisciplinary teaching projects in several classes, in all classes of one age group
- School projects: All classes work in a co-ordinated way on this general topic
- Projects within the eco-label for schools
- Projects within the ÖKOLOG program
- Projects including cooperation between several schools at the same or at different locations

The use of visual material is recommended to introduce the topic. Thus, e.g. a series of images of traces in nature (footprints, shoe prints, tire marks, etc.) can be very motivating and initiate discussion.





A slide presentation on the Ecological Footprint or the presentation of a training film such “Footprint - big demands on a small planet” (36 min, as DVD including the short version lasting 14 minutes available at [www.filmladen.at](http://www.filmladen.at)) are very good ways to make the topic more concrete. For interdisciplinary projects with English or for international projects there is also an English language version. Similar materials are provided by the network [www.footprintnetwork.org](http://www.footprintnetwork.org). Working through a personal footprint calculator is usually a good way to sensitise and motivate learners after they have been given basic information. Here students can calculate their own Ecological Footprint and try out how lifestyle changes would affect their footprint.

Arguments such as “What has this got to do with me? Main thing - I’m having fun!” are to be expected and express repression processes to avoid facing the complexity of modern life or may be caused by the lack of prospects for young people and, incidentally, correspond to a widespread hedonism found in many adults. However, discussing these aspects is extremely exciting and offers opportunities for collaboration with subjects such as ethics, philosophy, German, religion and special subjects such as computer science and physics when it comes to data entry and arithmetic operations (see lesson examples from the pilot schools).

## Can schools make a difference?

The fields of action in schools are manifold. Some very important areas, for which there are calculation bases in the FPCS, are listed below and illustrated with exemplary possibilities of active interventions:

- Electrical energy (lighting, appliances)
- Heating (systems, efficiency, insulation)
- Water (drinking water, service water)
- Food (school snack, buffet, school kitchen)
- Mobility (how do school students and teachers travel to school, school trips)
- Cleaning (choice of cleaning products, quantities)
- Procurement (regional, environmentally friendly materials)
- Waste (prevention, separation, recycling)

If larger project-oriented activities or class projects are planned, using a planning grid (as shown below) is recommended. It helps to structure and maintain an overview.

Of course, such a planning grid can also be used in an adapted form for inter-class, school-wide or inter-school projects. Excellent tools for teaching projects (project guides) can be found in the literature or on the Internet.





## Planning grid for a class project:

Group/Topic	Blanc	Winter	Szabo	Larsson	Delgado	Wittek	deadlines
Waste		X					
Water					X		
Heating	X						
Cleaning			X				
School buffet				X			
Mobility						X	

## What can you do?

Here are several ways how you can reduce the school's environmental footprint in each area. The hints are subdivided into: "What everyone can do" and "What the school operator or school management can do". Depending on the school, the list can and should be supplemented, with e.g. school buffet, school kitchen or workshops.

### Electrical power

The best way to protect the environment in this area is to save electricity.



#### **What everyone can do:**

- Make sure the light is off when not in use. (Exception: Fluorescent tubes: These should not be switched off and on constantly, otherwise the service life will be shortened.)
- Switch off or unplug devices completely instead of leaving them on standby.
- Use lids or pressure cooker.

#### **What the school operator can do:**

- When buying new equipment, make sure that energy-saving equipment is purchased.
- Take a look at the power mix of the provider and change it if necessary. A high share of electricity from renewable energy sources reduces the ecological footprint.



(However, as there are also influences on nature that cannot be taken into account in the footprint such as intervention in animal and plant life by hydroelectric power plants – one should nevertheless pay attention to energy saving.)

- Replace bulbs gradually with energy-saving lamps.
- For new construction or renovation, ensure good insulation and the possibility of shading to avoid air-conditioning.
- Install a photovoltaic system.
- Turn off the heating circulation pump in the months when there is no heating.

### Heating

Depending on the heating system, insulation of the walls and ceilings, room temperature, window quality and ventilation behaviour, the heating of a school building often has a large impact and increases the footprint.

#### ***What everyone can do:***

- When ventilating, open the windows completely but only briefly (venting) instead of leaving the windows open on tilt.
- Do not overheat the rooms.

#### ***What the school operator can do:***

- When building a new building or during renovation, make sure that the building is well insulated.
- If a heating change is pending, switch to biomass or district heating from biomass if possible.
- Check the density of windows, use insulating glass.
- Install a thermostat regulator on the radiators.
- Avoid electric heating at all costs.



### Water

The footprint of water is very low in comparison.

#### ***What everyone can do:***

- Use water sparingly, especially in the warmer months, as in some regions summer water shortages can occur.
- Use hot water sparingly because a lot of energy is needed for to heat water.
- Report dripping taps or running toilet flushes to the school caretaker immediately.



What the school operator can do:

- Install greywater system.
- If possible, heat water using a solar system.
- Avoid hot water preparation with electricity at all costs.

### **Waste**

Transport makes up a large part of the waste footprint.

#### ***What everyone can do:***

- Avoid waste by choosing returnable packaging and using longer lasting products.
- Print paper double-sided.
- Separate waste because... recycled products have lower footprints.

#### ***What the school operator can do:***

- Provide your own composting facility if possible.
- Establish a waste collection and waste separation system.
- Check waste separation regularly.



### **Food**

Foods often travels a long way before reaching our table. Food production methods are also expressed in the size of the footprint.

#### ***What everyone can do:***

- Consume food from local suppliers (such as farmers in the area) to reduce transportation.
- Choose organic food.
- Reduce meat consumption: Vegetarian products have a lower footprint.

#### ***What the school operator or school management can do:***

- Wherever possible, choose organic and regional products for school milk, buffets, school-meals and catering.
- Promote and support activities such as “bio fair breakfast”, “cocoa workshop” etc.

### **Mobility**

Consumption of fossil energy, CO2 emissions, land use, particulate matter, and road accidents - the footprint of private transport to and from the school is enormous.



***What everyone can do:***

- If possible, walk, take the bicycle or board the train, tram, metro or bus instead of driving by car or moped and motorbike.
- Choose trains or buses rather than aeroplanes for school trips.
- Organise climate-active school trips.

***What the school operator / school management can do:***

- Initiate a mobility concept for the school.

**Procurement*****What everyone can do:***

- Print double-sided.
- Buy environmentally friendly products.
- “Eco-friendly schoolbags”.

***What the school operator can do in general:***

- Obtain energy-efficient equipment.
- Pay attention to the longevity of the products.
- Choose reusable products rather than disposable products.
- Invest in a photovoltaic system.



The following lesson examples are from projects that have actually been carried out.

## Teachers describe their lessons

### Excerpts from reports from pilot schools

The project reports were developed in the wake of a pilot seminar organised by the Ministry of Education together with e-LISA academy at BG / BRG Wels in December 2008 on the subject of FPCS. At that time, the test version of the FPCS was still an approximate version and had a number of practical flaws. These were criticized in detail, which corresponded exactly to the purpose of the seminar. Many feedback comments flowed directly into the programming. Subsequently, the teachers used different FPCs and FPCS in the classroom, collected experiences and feedback from the students and wrote reports with appropriate summaries and other points of criticism and suggestions for improvement. Communication was handled via a Moodle platform, which everyone involved could access at any time.

On the one hand, the excerpts from the reports serve to show the variety of possible uses of the FPCS and to stimulate others, on the other hand, they serve to highlight hurdles, stumbling blocks and weaknesses, from which every teacher can draw conclusions. The excerpts from the project reports, which do not correspond to a uniform scheme, have been shortened, especially as far as the student feedback comments are concerned. The choice is subjective but attention was paid to maintain a certain balance. Overall there are more positive than negative statements by both the students and teaching staff.

#### **School: Vocational Compulsory School Linz 6**

---

**Goal:** To collect and document footprint data for the school

**School type / class:** 2nd year of vocational school for office clerks (apprentices) / practical training / 15 students.

**Theme:** Ecological Footprint (personal and school)

**Time expenditure:** 1 teaching unit to start, then 3 to 4 teaching units for data recording and documenting.

**Impulse:** Presentation of the film "Footprint - Great demands on a small planet" - Collect impressions from the film on the board or on a pin board - Short discussion about it (e.g. Comparison of footprints from USA - EU - Ethiopia, where do the differences come from?)

#### **Embedding the lesson sequence within a larger context:**

The resource- and climate protection project at the school is explained (survey of status quo – critical areas – suggestions for improvements - implementation of improvement measures). Explain the project and make it clear that we are in the first phase and that students are contributing to this larger project.



**Assignment:**

The students collect the resource consumption data from the school caretaker so that they can later be entered in the “Footprint Calculator for Schools”. An accompanying documentation is created in order to be able to produce a climate and resource report for the school (as a precursor to a sustainability report). When comparing the different years, the development of consumption quantities and waste volumes, etc. can be read in addition to the footprint result of the respective calendar years. The climate and resource report also provides documentation of the framework conditions.

**Organisation:**

- Small groups of three people are formed. Each group is assigned a survey topic (e.g., energy / electricity, waste, water, paper, food, cleaning supplies, etc.). Students receive in advance blank data sheets from the footprint calculator on the respective topic from the teacher.
- In a discussion with the school caretaker the necessary data according to data sheets are noted down as well as other information recorded (e.g. heating system not only related to kWh, but also supplier, technology, where the values can be read, possibly (electric) meter together with another school, how the value for own school was calculated, ...).
- Finally, there is a visit to the technical facilities (heating system, waste container room, electricity and water metre, photovoltaic system, paper storage room, etc. depending on available time).
- The results of the footprint calculator are dealt with later in a separate lesson sequence. In particular, the areas that have the largest footprint are addressed, especially those where there are possibilities for students to influence the size of the footprint through a change in their behaviour (especially mobility, school buffet, paper consumption).

**Documentation:**

Each group transfers the hand-written results of their survey topic to the computer in the second double lesson. These will later be used in the footprint calculator and as the first basis for the school’s climate and resource report.

**Materials:**

Printed blank datasheets of the footprint calculator for each student. Suitable footwear and clothing for subsequent inspection of the school building.

**Prior knowledge:**

The questions should be checked with the school caretaker in advance so that he / she can prepare documents for student enquiries accordingly.

**Feedback from students:**

- a) Interesting topics, interesting to work on; it was very interesting, as we looked at the electricity and boiler rooms in the basement. We now know who pays for all that and how high the costs are. You also see everything (which has to do with the school caretaker, author’s note) from a different perspective - not just the school rule to wear slippers inside the school building. We now have a better connection to the school caretaker. On the negative side, everything was very disorganized and too spontaneous. In addition, the summarizing (Note: in the 2nd double lesson) was difficult.





b) It was actually interesting ... Almost everyone took part in it. But I think it's a pity that no organic products are sold in the canteen. We ended up in the boiler room. In my opinion, the school should be heated better. Car or tram? It's certainly a lot more eco-friendly to go by tram but to be honest I would not give up my car.

**Feedback from a colleague:**

I was surprised by the student interest. They would not have estimated the cost of the school for sewers, electricity, water, heating, waste disposal, cleaning products, etc. as being nearly as high. Some said that this information should be shared with all students at our school, which would make a lot of them use the resources of our planet more consciously, economically and carefully.

Author of the project report: Wolfgang Brandmaier

**Schule: BG/BRG Brucknerstraße Wels (Brucknergymnasium)**

---

Following joint kick-off event different classes worked with various FPCs in biology and computer science.

**Kick-off event:**

Multi-vision show "Fair Future", 3 teaching units (lower and upper grades), 426 pupils attended the show, which was followed by a discussion.

**Summary:**

Working with the interactive learning unit was great fun for the students. They were really motivated to get involved in the topic of the "Ecological Footprint". This was also reflected by the fact that many carried on working with the homepage at home and were really enthusiastic about the voluntary homework. Following the multi-vision show, experiences with ecological footprints were discussed and questions answered. Since the computer room was not free, the students were given the personal footprint link and those interested were able to calculate the footprint together with their parents.

**1. Project class 4N (Kriechbaum): 2 lessons in biology and environmental science**

---

Computer lesson with an interactive learning unit [www.wwf.at/weltreise](http://www.wwf.at/weltreise), then calculation of personal ecological footprint. Pupils very keen to do something themselves and develop their own ideas on what they could contribute to the topic:

- Fair-trade stand at school (during long break once a week)
- Web-Blogs on various topics of sustainability (knowledge from media lessons)

Autonomous organisation, contacts made, very enthusiastic. Highly motivated, ideas not provided, intrinsic.

**Summary:**

Numbers and graphics interest pupils, but should be comprehensible and accessible for all. Independent "tackling the problem" and the ability to change something is highly motivating. Results must be visible.



### **2nd project 3rd class (Schuster): 2 lessons in biology and environmental studies**

Preparation: Interactive learning unit [www.wwf.at/weltreise](http://www.wwf.at/weltreise), (WWF-Homepage). Four species-rich habitats and their threats from humans are presented. Through this the footprint can become tangible for the pupils. Way forwards, solutions, alternatives, solutions and options for action are presented.

Students given worksheet to work out in one lesson by means of the interactive learning unit "World travel". Requirement: 2 natural habitats including the elaboration of related questions. Voluntary homework: the pupils were also able to work out the third habitat (ocean), which some did.

### **3rd project 6N class (Schuster): 4 lessons in the course of the biology and environmental studies optional course**

As an introduction to the topic, I used the exercise "Complete open sentences" from the teaching material booklet "Ecological Footprint in School" by the Forum Umweltbildung:

- "I think the conditions in our society will be ..."
- "I think the conditions in the environment will be .."
- "When I imagine the world that awaits children and adolescents, it seems ..."

This was followed by the presentation of the concept of the Ecological Footprint by means of a teacher-centred teaching sequence as content input. The presentation was supported by a PowerPoint presentation. The subject of the course was the historical development of the Ecological Footprint, the calculation based on a simple example and comparisons of countries with excessive and modest lifestyles.

Following the Power Point presentation, the educational film "Great Demands on a Small Planet - Interview with Mathis Wackernagel" (short version: <http://www.lebensart.at/images/doku/footprint80.wmv>) was shown.

Pupils then calculated their personal footprint in the various areas and then considered, which sub-areas could be improved. Areas where things can be changed on a small scale are, above all procurement of food. For some, a thinking process was set off. Students subsequently worked on a recipe calculator and compared their favourite recipes.

Following the personal footprint calculator, students looked at the school footprint calculator and tried to work out a mobility survey for students and teachers. This was done by my colleague Claudia Kriechbaum and myself. The students helped with the data entry and evaluation and gave feedback on the school print calculator. The data were also discussed.

**Summary:**

The students found the confrontation with the personal footprint calculator particularly exciting; the recipe comparison did not fare so well and was rated as bland and unspectacular. For most recipes the ingredients are missing. The personal footprint is much closer to life. One student commented: "I am amazed by the level of waste of resources and think it shows every student how much he would actually need and how he wastes resources."

**Conclusion:**

The personal Ecological Footprint is very useful as a model to introduce pupils to ecological connections and to show that every action has an impact on the environment. The school calculator is not suitable for this. It involves too much effort in obtaining data and facts, which is in no way exciting for the students. You also do not see the meaning of the whole thing. For us the time spent is completely out of proportion. Although our school will be renovated and expanded in the next few years, the footprint calculator reflects only what we already knew (obsolete heating system, no alternatives, containers, ...).

Author of the project reports: Birgit Schuster / Claudia Kriechbaum

**School: Lower secondary compulsory school 1, Schärding**

---

At this school, in each of the four grades teaching sequences were given on the topic in art education / biology and environmental science, geography and economics, computer science and social competence training (SCT). Time frame for each class: 2 to 12 lessons.

**Class 1b (23 children, 10-11 years)**

**Time required:** 5 units (3 art and 1 geography and economic science / 1 social skills training):

**Work assignment in art:** Draw your favourite place in nature. Collages created from the individual drawings. In social skills training, each child thinks about:

- What is special about this habitat?
- What negative influences does our current lifestyle have on this habitat?
- Later the children were asked to answer the following questions:
- What is my favourite food?
- Which distance does it cover until it reaches my mouth?

**Goal:** Ecological sustainable action also requires awareness that we humans should always compare our consumption and production with what nature supplies and takes back again.



### **Class 2b (21 children, 11-12 years)**

**Time required:** 9 units (2 art education and 2 biology & environmental studies, 1 geography & economics, 2 social competences training, SCT, 1 computer science)

5 teaching units as in 1st class

6th /7th unit: 2-hour workshop with the lecturer Raffaello Fraberger from the WWF (11th February) to explain the footprint and footprint calculator on the basis of the collage and the paths of the individual foods.

8th unit: Calculate the personal footprint: [www.mein-fussabdruck.at](http://www.mein-fussabdruck.at). Estimate the size, then discuss and compare the results.

#### **Feedback from the students:**

Do you feel sufficiently informed? - All: Yes. The lessons were: Interesting, varied, ... positive? .... and 9 children thought the workshop was "boring".

**Teacher's impressions:** Fraberger overwhelmed the 2nd class children with his lecture, especially because of the numerous technical terms.

Did the workshop get you thinking? - 9 yes, 12 no, 0 do not know.

Have you told anyone about it? - 11 parents, 1 friend.

Were you inspired to change your lifestyle? - 12 yes, 7 no, 2 don't know

### **Class 3b and 3c (32 children, 12-14 years)**

**Time required:** depending on the child 2-4 hours

Calculation of the personal footprint: [www.mein-fussabdruck.at](http://www.mein-fussabdruck.at)

At the beginning estimate the size, then discussion and comparison of the results.

The children of these classes were responsible for collecting the data and entering it into the FPCS. For some children it was a great challenge (and sometimes only possible with the guidance of a "trusted teacher") to go to the head, school kitchen manager, school caretaker, baker or the cleaning staff and ask them to fill in the forms or to help to do so. Thus, in these classes the focus was not on the footprint calculator itself, but the activity was more to be seen as a social competences training unit.

### **Class 4b (24 children, 13-16 years)**

**Time required:** 12 units (3 art education and 3 biology and environmental studies, 2 social competences training SCT, 4 computer science)

Based on a collage as in the 2nd class and the question about the favourite food and its journey to the consumer, there was also a 2-hour workshop with the lecturer Raffaello Fraberger from the WWF (on February 11th), who explained the footprint and the footprint calculator.

8th unit: Calculation of the personal footprint: [www.mein-fussabdruck.at](http://www.mein-fussabdruck.at). Estimate the size, then discussion and comparison of the results. In art and applied computer science the children presented their thoughts on the footprint graphically.

**Feedback from the students following the project:**

Do you feel sufficiently informed? - All: Yes.

The lessons were: Interesting, varied, ... positive? - All: Yes, but here again 6 children thought the workshop was "boring". The children (15 mentions) thought that the creation of their graphic designs were great, some of which were also ironed onto vests & T-shirts.

Did the workshop get you thinking? All: Yes.

Have you told anyone about it? 8 to parents, 4 to friends.

Were you inspired to change your lifestyle? 12 yes, 12 no

Fairly high level of interest in the subject in the fourth grade and attention held, despite very different topics being currently in their centre of interest. In some cases, the teachers involved had the impression with 2-3 boys that the result of the personal footprint caused a "guilty conscience". Here it was also a pedagogical task to relativize. As one pupil said: "Getting a moped to replace my bike is the coolest thing – and I stress the environment much less than my father with his car."

Author of the report: Klaus Bernauer

**School: Secondary Compulsory School Lembach**

---

Third and fourth grade students were first confronted with the personal FPC in physics lessons. Afterwards the footprint of the school was calculated.

**Comments as food for thought:**

Initial situation: Pupils of the 3rd and 4th grades received only a short introduction to the topic "Ecological Footprint" in the physics lesson. Then we tried together (each student on their own PC) to enter their own data.

**Problem:** Pupils, of course, did not know the data from their homes. The data entries were very vague and therefore inaccurate. But: The students became curious and asked for home data. Important outcome: They started thinking about their own environment.

**2 weeks later:**

The students asked about entering the data. After some additional information and the use of a "child-friendly PowerPoint presentation" we sat down at the PC again and entered the data. The children were surprised by their results, pleased, some needed "comfort" because their benchmarks were so poor, others re-entered the data and tried to "gloss over" or deliberately provoked very bad scores (also to attract attention).

The data for the ecological footprint of our school was provided, the teacher collected and entered by me with the help of

- the school caretaker (energy, garbage, water)
- the baker (school snack)
- the local restaurant (lunch)
- the nutrition teacher (school kitchen)

The committed school caretaker and the cleaning staff were delighted by the "very good" comparative values.



### **Our school**

- was renovated in recent years (new windows, insulation improved ...)
- was connected to the local heating supply
- has a very large photovoltaic system on the roof of the school ...

When discussing the school data with the students, they were very impressed by the comparatively large data, but not by the final result. For our students it was almost natural that we had to do well as an ÖKOLOG school.

### **Feedback from the students:**

They had to report on their experiences, opinions by mail to the teachers. Here are some of the statements:

I think that this website is very good. It allows students or parents to find out what their household and environment are like.

This programme helps me, e.g. to know more about my life (house)! Personally, I think it's great that you can calculate the footprint yourself. I think the footprint makes you think more!

This website should make people pay more attention to the environment!

Through this "personal footprint" many students appreciate the food and many other things they take for granted more.

I think it's good that there are people who come up with such programmes. The footprint programme is a good thing because it tells you how much electricity, water, etc. you use. I would like to thank you for giving us a great physics lesson.

I don't really care about the footprint calculator because I do not have all the data in my head! I'm also very little interested in how much I spend a month. I do not care if someone buys BIO or not. This programme is an advertisement for BIO products! In my view, it is also ridiculous that we start with ourselves. Because when I think about what airplanes do or garbage that is delivered somewhere, I can only laugh that WE should save water. Or electricity, if a lot more is produced in the big cities anyway. In addition, all adults should be aware of whether they drive too often or not. But like I said, I do not really care. Since I know that if I change my behaviour, it would not change anything!!

Physics is a great subject & I like going to the computer room & doing an ecological footprint.

I find it interesting to find out through a programme how you actually deal with the environment. From now on I will take more care of the environment to contribute to environmental improvement. I think that's a good start for the future.

Why is that supposed to help??? I had a very high value - 26 times.

I think the footprint calculator is quite interesting. It would be cool if we did that again.

I think the Ecological Footprint is good, especially for people who want to live more environmentally consciously.

It is also more interesting for many to do the footprint test on the PC than to hear lectures about it.



**Teachers' summary:**

Own experiences with this lesson: I was surprised by the concern of some students about their comparative values; they wanted confirmation that their normal behaviour is good or very good. This reaction came mainly from children, where obviously sustainable behaviour is lived or is a current topic at home. Other children, who do not experience positive influences in the family on this topic, are partially indifferent to these values.

What I would do this differently next time:

Important: The data collection must be done earlier. The pupils have to collect the basic data together with the parents in a data sheet. Next time students should write down their own thoughts on how they see changes in their personal behavior (and possibly evaluate it after a few weeks).

You should pay attention to - (cliffs, hurdles, tips & tricks). Students who receive worse comparison values, must be able leave the classroom without feeling guilty. There are always reasons (old house, long distance to school ...) to explain these values.

Especially well received: To develop the so-called subject matter with their own data on the PC and possibly at home with the parents to look at, compare, discuss.

I will certainly work with the footprint calculator again: Pupils, teachers, cleaning staff, director, ... deal with concrete figures from the personal environment. They draw comparisons, reflect on their own behaviour and hopefully draw correspondingly sustainable conclusions.

**Author of the report: Josef Habringer**

**School: Lower secondary compulsory school Rohrbach**

---

The ecological footprint was dealt with as part of the project "Feeling well" in the 4th grade. 4 lessons were used for this purpose. The Lower secondary compulsory school Rohrbach was built in the 70s and never renovated.

**Process of the Lesson with reflection:** (lesson on personal foot print; comm. GP)

**Introduction to the Ecological Footprint:** DVD Educational Film: "Great Demands on a Small Planet". I only showed the short version. It is a lecture with some illustrations - no motivating ideas or film sequences!



**Background** knowledge on the different footprint calculation methods: Not carried out – as no supporting documents for lower secondary schools provided.

Each student calculated his / her personal footprint in the different areas (housing, nutrition, consumption and mobility).

For many students, terms and input were incomprehensible or irrelevant. In the documentary “Schools for a Living Planet” there is a calculator that I think would be more appealing to students. Unfortunately, the data has to be calculated manually and too few aspects are considered. As food for thought a comment from a pupil: “I going to be an apprentice next year, move into a small room in the place where I work, will get a moped and try to look after myself.”

As a second task, students should try to reduce their footprint. The ideas and new footprint values were recorded. The students compared their values and found that they are very different. “What values do you enter to get that footprint?” - For students, this lesson sequence was very motivating!

**Do something!** The working document was “Schools for a Living Planet” by the WWF.

#### **Discussion topics:**

“World Café” and “Silent Dialogue” on:

- “Everyone has the right to have a car” - What do you think about the statement?
- What are we entitled to?
- What is “fair”?
- What does that mean for my meal?
- What do I take responsibility for?

The statement “Everyone has the right to a car” is well suited as an impulse, but can be cut in half, without losing the meaning. I’ve held two units per class on these questions in a student-centred way. The students had great difficulty discussing thoughts on these issues.

#### **Footprint calculator for schools**

The values were collected by me (community and school caretaker). There were some problems with the distribution of electricity, gas, water and waste (the music school, the ninth-grade class and different clubs use the school). A mobility study was conducted in all classes and evaluated with a spreadsheet for the school. For a programme developed by “professionals”, the mistakes were irritating. When looking at the input data I had to accept that these are estimates and that’s how I see the results.

When I send students to search for data to teach statistics in a mathematics lesson, there are much better topics. Nevertheless, if I send students to search for data for corresponding entries, for me the time required in relation to the result is too long. Next school year, the whole thing again? Or do students enter the values from the previous year? Does this make sense? The calculator must be self-explanatory – I myself or students would certainly not read the manual!



The data determined by the calculator are discussed. What kind of behaviour change do I cause as a teacher with the discussion of the results?

The essential values of the school calculator cannot be influenced by the student.

- He / she will continue to take the school bus to school.
- The secondary compulsory school Rohrbach needs thermal renovation urgently. Neither the teachers nor the students needed an investigation to find that out!
- Heating costs will not be significantly reduced by proper ventilation, closing doors.
- Decisions on school events (Vienna Week, excursions, ...) are made according to other criteria.

The values that a pupil/student can influence (mobility during leisure time, food, waste separation, ...) become more visible in a personal footprint. The values of the schools are predictable (Upper secondary technical school with a large catchment area, lower secondary compulsory school in a city or in the countryside, thermally renovated school - school building from the 60s or 70s, ...).

One student of the lower secondary compulsory school Rohrbach has a value of about 20gha (without consideration of snack, ...). Is that even possible if his private imprint is 3 - 7gha. Which value is wrong? (gha means "global hectares", see [www.mein-fussabdruck.at](http://www.mein-fussabdruck.at), note red.)

In my opinion, the publication: "Ecological footprint in school" (published by the Forum Umweltbildung, editor's note) is only of limited use in lower secondary education.

#### **Conclusion:**

The ecological footprint is a viable model for communicating environmental interrelations to students and showing them that their behaviour affects nature.

For this purpose, an attractive and student-related personal calculator is necessary. I will not use the school calculator again. In my opinion, the time invested in testing the school calculator was not worth it. Why is the point of collecting values? They are not comparable without "background knowledge" about the tested schools.

**Author of the report: Helmut Glaser**



**Service:** we do not have to reinvent a lot -  
everything already exists:

### Materials / Addresses / Links / Actions

Austrian FPC: [www.footprint.at](http://www.footprint.at)  
[www.footprint.at/index.php?id=rechner](http://www.footprint.at/index.php?id=rechner)  
[www.wwf.at/weltreise](http://www.wwf.at/weltreise)

Film shop: [www.filmladen.at](http://www.filmladen.at);  
[www.lebensart.at/images/doku/footprint80.wmv](http://www.lebensart.at/images/doku/footprint80.wmv)  
[www.mein-fussabdruck.at](http://www.mein-fussabdruck.at)

E-Control: [www.e-control.at/haushalts-tarifkalkulator](http://www.e-control.at/haushalts-tarifkalkulator)  
[www.energiesparhaus.at](http://www.energiesparhaus.at)  
<http://derstandard.at/2140579/Der-CO2-sub-rechner>  
[www.co2bilanz.at/co2-rechner-co2-bilanzen.html](http://www.co2bilanz.at/co2-rechner-co2-bilanzen.html)

Climate Alliance - Headquarters: [office@klimabundnis.at](mailto:office@klimabundnis.at);  
Climate Alliance in Federal states: [federalstate@klimabundnis.at](mailto:federalstate@klimabundnis.at)  
<http://co2rechner.klimabuendnis.at>

Ministry of Education: [www.bmbwf.gv.at](http://www.bmbwf.gv.at)

[www.umweltbildung.at/co2rechner](http://www.umweltbildung.at/co2rechner)  
[www.oekolog.at](http://www.oekolog.at)  
[www.ensi.org](http://www.ensi.org)  
[www.bmbfw.gv.at/ensi](http://www.bmbfw.gv.at/ensi)  
[www.schule.klimaaktiv.at](http://www.schule.klimaaktiv.at)

RCE - Regional Center of Expertise Sustainable Development Graz: [www.rce-graz.at](http://www.rce-graz.at)

Ministry of the Environment [www.bmlfuw.gv.at](http://www.bmlfuw.gv.at)  
[www.schuleinkauf.at](http://www.schuleinkauf.at)



Websites of the Federal states, action of the Salzburg provincial government

Zentrum Polis: [service@politik-lernen.at](mailto:service@politik-lernen.at)

[www.politik-lernen.at](http://www.politik-lernen.at)

[www.politische-bildung.at](http://www.politische-bildung.at)

[info@umweltzeichen.at](mailto:info@umweltzeichen.at)

[www.bildungsdekade.at](http://www.bildungsdekade.at), [info@bildungsdekade.at](mailto:info@bildungsdekade.at)

## Literature

“Ökologischer Fußabdruck in der Schule”

“Ecological footprint in school” an excellent brochure produced by the Forum Environmental Education

WWF Foot print calculator

“Eine Welt ist nicht genug – der Ökologische Fußabdruck” Folder des Forum Umweltbildung

(“One world is not enough - the ecological footprint” Folder of Forum Environmental Education)

“Eine Welt ist nicht genug – der ökologische Fußabdruck” Merkblatt des Lebensministeriums und Forum Umweltbildung (“One world is not enough - the ecological footprint” Leaflet of the Ministry of Environment and Forum Environmental Education)

“Mobilität” Folder des Forum Umweltbildung

(“Mobility” Folder of Forum Environmental Education)

“Mehr haben oder mehr vom Leben haben?” 2 Broschüren des Zentrum Polis

(“Have more or have more of life?” 2 brochures of polis – The Austrian Centre for Citizenship Education in Schools; ([www.politik-lernen.at](http://www.politik-lernen.at), [service@politik-lernen.at](mailto:service@politik-lernen.at)))

“Clever einkaufen für die Schule” Folder und gleichnamige Broschüre des Lebensministeriums

(“Clever shopping for the school” Folder and booklet of the Ministry of Environment)

“Projektleitfaden” der Innovationsagentur (“Project Guide” of the Innovation Agency)

Klimabündnis Zeitschrift der Österr. Klimabündnis-Koordination (Climate Alliance Journal)

“Mensch tu was – schools for a living planet” (“Man do something - schools for a living planet”)

[www.wwf.at](http://www.wwf.at)

“Handbuch Klima-aktive Klassenfahrten – eine Chance für unser Klima” (“Handbook Climate-Active School Trips - an opportunity for our climate”)

Aktionen Schulprojekt “Energie und Energieeffizienz verstehen” (Understanding energy and energy efficiency)

E-Control und Forum Umweltbildung (Actions School project “Understanding energy and energy efficiency”

E-Control and Forum Environmental Education)

## Project reports

Wolfgang Brandmaier, Compulsory vocational school Linz 6, Upper Austria

Claudia Kriechbaum, Gymnasium (BG/BRG) Brucknerstraße, Wels, Upper Austria

Birgit Schuster, Gymnasium (BG/BRG) Brucknerstraße, Wels, Upper Austria

Klaus Bernauer, Lower secondary compulsory school 1 Schärding, Upper Austria

Josef Habringer, Lower secondary compulsory school Lembach, Upper Austria

Helmut Glaser, Lower secondary compulsory school Rohrbach, Upper Austria