



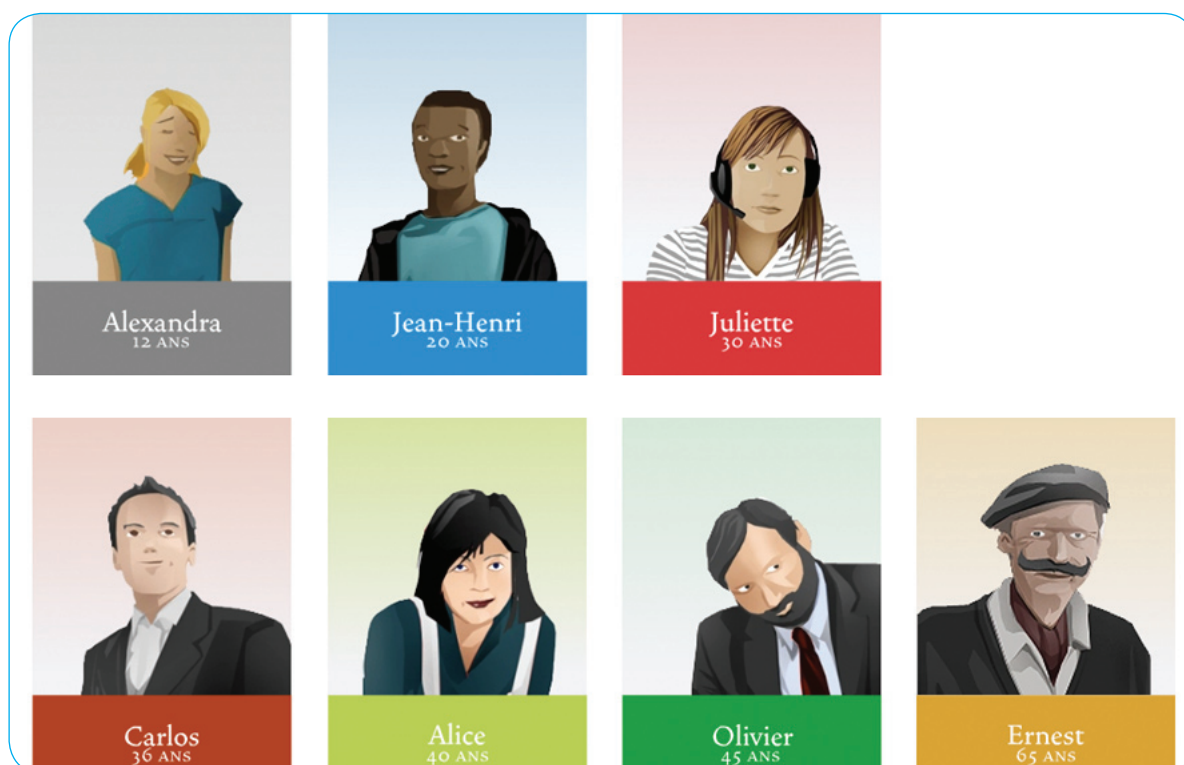
# Sheet 14:

## Preserving Biodiversity: things we can do in our everyday lives

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### A/ Description of the animation

The current climate crisis is threatening biodiversity, but it is also offering us the opportunity to take a fresh look at our current way of living. How? By reducing our footprint on the environment. To enable us to do so, there is a whole range of “good” moves which can be done on a daily basis. This animation shows some of the things we can do, both individually and/or collectively, to enable us to cut down greenhouse gas emissions produced by human beings.



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### B/ Let's take a closer look...

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#### 1/ THE CO<sub>2</sub> CALCULATOR

The CO<sub>2</sub> calculator is a tool that enables us to assess how many tons of CO<sub>2</sub> a person produces over the course of a year. This calculator distinguishes two types of emissions: direct and indirect.

##### Direct emissions

Whether it's to feed ourselves, to put a roof over our head or simply to get about, etc., we are all constantly emitting greenhouse gases. The main greenhouse gas we emit is carbon dioxide (CO<sub>2</sub>), released into the atmosphere whenever we burn anything containing carbon. This is notably the case when we use fossil fuels (such as coal, oil and natural gas), wood or plastic. For example, to move from one place to another, we use oil that has to be burnt in order to give our cars the energy they need to operate. Although there are sources of energy that do not produce CO<sub>2</sub> (forms of renewable energy such as hydraulic, wind, solar, etc.), fossil fuels (i.e. which produce CO<sub>2</sub>) remain those most widely used in the world today.

##### Indirect emissions

Indirect emissions come from the energy which is used to manufacture goods, to transport them and then to dispose of them, etc. Each stage of a product's lifecycle produces greenhouse gases indirectly. Generally speaking, these indirect emissions are far more important than direct emissions and are especially problematic when the item's actual service life is short. For example, 0.9 kWh of energy is required to produce an aluminium can, which is the same amount needed to burn a 15W light bulb for 60 hours. It takes up to 50 times more energy to manufacture an alkaline battery than the battery itself will ever produce during its lifetime! A vegetable, grown through industrial agriculture, like most of the ones we eat, also hides a lot of indirect emissions compared to the energy it will actually produce.

#### 2/ THE VARIOUS EMISSION PROFILES

Direct emissions can vary significantly from one person to another, as shown in the table below. It compares the annual consumption for 3 different profiles in TOE (tons of oil equivalent).

	Profile 1: The average Belgian	Profile 2: A Belgian who complies with the Kyoto Protocol	Profile 3: A Belgian who does everything he/she can do to reduce his/her domestic energy consumption
At home	3,7 tons	3,2 tons	2,6 tons
On the road	3,2 tons	2,7 tons	2,2 tons
Total	6,9 tons	5,9 tons	4,8 tons

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Profile 2 produces just 15% less emissions than the average Belgian, whereas Profile 3 manages to achieve a much better result (30% less emissions) by being careful with energy consumption at home.

### Things that really work

Whatever a person's age or situation, we can all do something to help, as illustrated by the examples below.



### In general:

- Turn off the heating when you leave a room.
- Replace traditional light bulbs with low-energy bulbs that use 5 to 6 times less energy and last 6 to 10 times longer than traditional bulbs. The new LED bulbs are even more economical and can sometimes last up to 100 times longer!
- Avoid using halogen lamps, which consume a huge amount of energy.
- Turn off electrical appliances at the wall instead of leaving them in standby mode. Appliances on standby continue to consume energy and can account for so much as 10% of a family's annual electricity consumption.
- Give unwanted items and clothes a second life by donating them to charitable organisations that help the less fortunate.
- Do the same with newspapers and magazines: after having read them, leave them in a public place where other people will be glad to read them. Or recycle them!
- Invest in class A domestic appliances, which consume up to 3 times less electricity than class C appliances. Class A+ appliances consume 20% less than class A appliances.

### In the classroom:

- Encourage the school authorities to better insulate the buildings.
- Keep the temperature in the classroom nice and cool: a room that is too warm is not good for concentration. Turning the thermostat down 1°C can save 6 to 7% of energy.
- Encourage pupils to come to school on foot, by bike or using public transport if the school is not too far from where they live.
- Choose items that have multiple uses and that can be recycled and used again.
- Limit disposable products as much as possible, as these consume a lot of energy and are only designed to be used once.
- Create a container of scrap paper that can be used a second time before being recycled.
- Encourage the children to write on both sides of the paper.
- Always go for recycled paper, which requires 5 times less energy to be produced than traditional paper.
- Buy environmentally responsible supplies made from natural materials.

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#### At break time:

- Give preference to food with little packaging in order to cut down on waste. Packaging represents 250 kg a year – a quarter of a ton! – that's half of what we throw away.

#### At home, in the bedrooms:

- Keep the temperature cool where you sleep by turning down radiators (16 to 17°C is enough).
- Keep curtains and/or blinds closed at night to prevent heat loss.

#### At mealtimes:

- Give preference to vegetables and cereals over meat. 1 kg of beef produces between 50 and 100 times more greenhouse gas emissions than its equivalent in wheat. This is because producing a piece of meat requires the animal to be fed (before it can produce food for you), butchered, transported, etc. before it reaches our plate. Having said that, not all meats produce the same amount of greenhouse gas: producing 200 g of chicken emits just one-tenth of the greenhouse gas that is emitted for the same quantity of beef.
- Avoid drinking bottled water. From the time it is collected to when it actually reaches your glass, including the bottling, transport and marketing processes, bottled water emits a lot of CO<sub>2</sub>. Besides, it is 150 times more expensive than tap water.
- Set up a compost bin for organic waste.
- Use a sandwich box and avoid aluminium. Every sheet of aluminium requires 5 times the amount of energy needed to produce a plastic box. And producing 1 kg of aluminium emits between 3 and 5 kg of greenhouse gas.

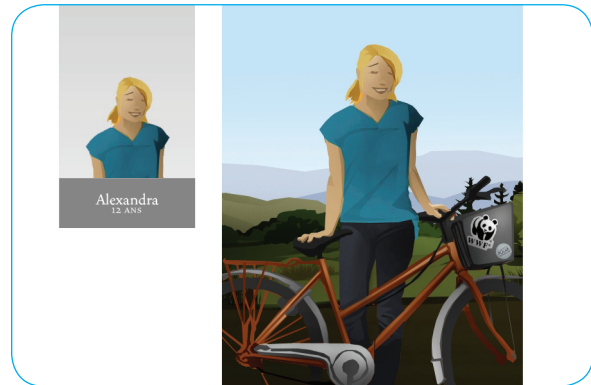
#### In the kitchen:

- Cook with a lid on the saucepan. Boiling a litre of water in a pan with a lid consumes 4 times less energy than without a lid.
- Choose a class A dishwasher.

- Always run the dishwasher with a full load and select an economic programme.
- Give preference to a low-temperature programme (30 or 40°C) and don't use the pre-wash cycle. Over the course of one year, this could save you 200 kWh of electricity and 5000 litres of water.

#### Getting from place to place:

- Use car-sharing wherever possible. This cuts down both on traffic and pollution, and also reduces your transport costs.



- Use a bicycle or public transport whenever possible. 20% of all journeys by car travel less than 1 km. The greatest engine wear and exhaust emissions occur during the first few kilometres of each journey.

#### At the supermarket:

- Give preference to local products. This makes it possible to reduce the greenhouse gas emissions that are brought on by transportation. For example, transporting kiwi fruit from a local producer (within a radius of 25 km) emits about a thousand times less greenhouse gas than kiwi fruit flown in from New Zealand.

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- Give preference to seasonal fruit and vegetables to avoid them having to be imported from other countries.



- Use reusable bags or baskets when out shopping. Plastic bags create a huge pollution problem for the environment and are, on average, only used for 20 minutes before being thrown away.

### **In the bathroom:**

- Cut down on water consumption as much as possible.
- Take a shower rather than a bath as this enables you to cut the amount of water you use by at least 3. An average shower consumes between 30 and 80 litres of water compared with 150 to 200 litres of water for a bath.
- Turn off the tap while you are soaping yourself or when cleaning your teeth.

### **In the garden:**

- Build rainwater tanks.
- Use rainwater to water the garden, wash the car, clean the house, etc.

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### C) Group activity to be carried out in class

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#### “CO<sub>2</sub> AND VOLCANOES”

##### Aims

- Emit and collect carbon dioxide (CO<sub>2</sub>)
  - ➔ Draw a parallel with the natural CO<sub>2</sub> emission of volcanoes
  - ➔ Expand the discussion by talking generally about things human beings have invented that release CO<sub>2</sub> and contribute to global warming

##### Equipment

- 1 test tube
- baking soda
- vinegar
- 1 balloon

##### Timing

55 minutes

##### Step 1 Challenges a

How do we collect the gas that escapes from the test tube?

##### Step 2: Procedure a (5 minutes)

Place the opening to the balloon around the brim of the test tube.

##### Step 3: Observation a

The balloon blows up!

##### Equipment

- 350 g flour (+/- 2 cupfuls)
- 30 ml bubble bath or dishwashing soap
- 250 g salt
- 50 g baking soda
- 150 ml water
- 100 ml vinegar
- red food dye
- 30 ml vegetable oil
- a large bowl
- a tray
- a soup spoon
- a small brown plastic bottle (250 ml)
- a funnel
- pot of poster paint or wax
- 1 plastic cup

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### Step 1: Procedure b (20 minutes)



1. Pour the flour, salt and oil into a bowl and mix with a spoon.
2. Add 100 ml of water to the mixture.
3. Stir the paste until it is no longer sticky (+/- 2minutes). If it is still sticky, add a little flour.
4. Place the bottle on the tray and build a volcano's rock face around the bottle using the paste.
5. Allow the volcano to dry overnight.
6. Create and paint lava traces on the volcano using the wax and poster paint.
7. Mix 50 ml of lukewarm water with the baking powder in a cup, add a few drops of red food dye and the liquid soap.
8. Use the funnel to pour the mixture into the bottle.
9. Add the vinegar gradually to the bottle.  
Suggestion: do the volcanic eruption in front of the children and leave their volcano intact. Give them the baking powder mixture so that they can do the eruption at home.

### Step 2: Observation b (5 minutes)

Volcanic eruption, the liquid comes out of the bottle in the form of bubbles.

### Step 3: Explanation b (10 minutes)

The vinegar reacts with the baking powder to form carbon dioxide (CO<sub>2</sub>). When the gas has filled all of the space available in the bottle, the pressure rises and the gas pushes the coloured liquid out of the bottle. Real volcanoes also emit gases, including carbon dioxide.

There are three types of terrestrial volcanoes:

- "Plinian" volcanoes: mainly eject ash and stones that come from the explosion of the volcano's summit, after gas has accumulated in the volcano chimney (e.g. Vesuvius).
- "Strombolian" volcanoes: expel ash and molten lava (e.g. Stromboli).
- "Hawaiian" volcanoes: do not create an explosion but expel molten lava that generally comes out as streams and looks like lava rivers.

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### Step 4: Expand the discussion (10 minutes)

Do you know of anything else invented by human beings that produces CO<sub>2</sub>?

A few examples:

internal combustion engines in cars, motorcycles;  
aircraft engines;  
central heating units in houses, etc.

### D/ Resources / References

- The website at [www.info-durable.be](http://www.info-durable.be) pulls together all sorts of news, events and campaigns, etc. that relate to sustainable development in Belgium. The aim of this website is to arouse the interest of the public at large for sustainable development and to demonstrate that everyone can make a contribution, no matter how small. Different sections are dedicated specifically to the wider public, youngsters and business people.
- The WWF educational file: "The climate is us!" at [www.wwf.be](http://www.wwf.be)
- The CO<sub>2</sub> calculator developed by the climate coalition: [http://www.natuurpunt.be/klimaatcoalitie/data/fr\\_calculatoren.html](http://www.natuurpunt.be/klimaatcoalitie/data/fr_calculatoren.html)
- The website for the non-profit organisation Cap Sciences [www.capscience.be](http://www.capscience.be)