

WEEK FOUR Ecological Footprinting

This week students will:

1. Increase knowledge and awareness of the impact of human decisions on the environment.
2. Learn about environmental impacts in terms of carbon, water and land used/saved.
3. Learn about ecological foot-printing and how to create their own.
4. Learn about footprints in different areas of the world.
5. Encourage students to look at their individual behaviors.

Learning outcomes

Year 3

Mathematics ACMSP068, ACMSP069

Digital Technologies ACTDIK007,
ACTDIK008

Year 4

Geography ACHGK025, ACHGS032,
ACHGK029

Science ACSHE061, ACSHE062

Digital Technologies ACTDIK007,
ACTDIK008

Year 5

Science ACSSU043, ACSHE217, ACSIS218

Year 6

Science ACSSU094, ACSHE220, ACSIS221

Mathematics ACMSP147, ACMSP148

The Game

The Habitat the Game Team partnered with Sydney University to develop algorithms that measure players' ecological footprint based on indicators like water consumption and greenhouse gas emissions. In addition to promoting outdoor activities, the point system in the game incentivizes players towards a 25% reduction in their carbon, water and land use and shows their impact through an ecological footprint calculator.

Players will be able to see how much carbon, water and land they have saved. These measurements are represented as:

1. Buckets
2. Footprints
3. Balloons

The players will be learning:

"The number of buckets represents the litres of water you have saved. The measurements are based on an averaged sized 10 litre bucket (2.64 gallons). 70% of the world's surface is water and only 2.5% is freshwater with less than 1% of the freshwater accessible to humans."

"The number of footprints represents the area of land that you have NOT disturbed by your actions. The measurement is based on a typical human footprint area of 300 cm² (47 square-inches). By reducing your resource use, by consuming different sorts of products or by reducing waste, you are treading more lightly on the planet."

"The number of balloons represents the volume of greenhouse gas emissions that you have saved. Measured in terms of volume of CO₂ gas, 1 kg (2.2 pounds) of CO₂ is equivalent to 140 typical party balloons. CO₂ is the most important greenhouse gas contributing to global warming."

We have based the point system in the game around incentivising the players towards a 25% reduction in their carbon, water and land use – compared with the national average.

Below is our most current calculations showing the player reductions and the links to the point (reward) system:

Indicator	Value	Units	Value	Units	Reduction	Total Reduction	Factor
Total emissions	17,119	kg CO ₂ -e	2,445,618	balloons	25%	611,405	1
Total water consumption	693,943	L	69,394	buckets	25%	17,349	20
Total land disturbance	30,227	m ²	1,007,579	footprints	25%	251,895	1.5

The correlation between points and player reductions

Materials required:

1. A tablet or smartphone.
2. Habitat the Game installed on the device.
3. Have a computer so students can do their own footprint.

Activities

1. Open the app and go to your real world action page. Undertake some real world actions that you have done today. Look at your profile and see how much land, water and carbon you have saved. Work out how much water, land or carbon these simple actions have saved you. Work out how much your class would save if you collectively undertook these actions.
 - a. Discuss why carbon, land and water are measured.
 - b. What is the difference between a carbon footprint and an eco footprint?
2. Write down all the environmental actions you undertake in your every day life. Appendix 2 shows a list of 38 environmental actions that are included in Habitat the Game and explains why they are important actions. Beside each of your actions identify why you think they may be important.

3. Calculating your footprint:

Open one of the footprint calculators and have students enter their data.

<http://calc.zerofootprint.net/>

http://www.wwf.org.au/our_work/people_and_the_environment/human_footprint/footprint_calculator/

- a) Get students to tell you how many worlds they would need to support their lifestyles.
- b) Do they think people in other countries would need the same amount of resources?
- c) Discuss what are some of the activities that consumed the most resources?
- d) Discuss the different make up of your individual ecological footprint.
- e) What are three actions the students can undertake that will reduce their ecological footprint?

Week 4 — Ecological Footprinting

An Ecological Footprint

Human activities consume resources and produce waste, and as our populations grow and global consumption increases, it is essential that we measure nature's capacity to meet these demands. The Ecological Footprint has emerged as one of the world's leading measures of human demand on nature. Simply put, Ecological Footprint Accounting addresses whether the planet is large enough to keep up the demands of humanity.

The Footprint represents two sides of a balance sheet. On the asset side, biocapacity represents the planet's biologically productive land areas including our forests, pastures, cropland and fisheries. These areas, especially if left unharvested, can also absorb much of the waste we generate, especially our carbon emissions.

Biocapacity can then be compared with humanity's demand on nature: our Ecological Footprint. The Ecological Footprint represents the productive area required to provide the renewable resources humanity is using and to absorb its waste. The productive area currently occupied by human infrastructure is also included in this calculation, since built-up land is not available for resource regeneration.

It now takes the Earth one year and six months to regenerate what we use in a year.

We maintain this overshoot by liquidating the Earth's resources. Overshoot is a vastly underestimated threat to human well-being and the health of the planet, and one that is not adequately addressed.

By measuring the Footprint of a population—an individual, city, business, nation, or all of humanity—we can assess our pressure on the planet, which helps us manage our ecological assets more wisely and take personal and collective action in support of a world where humanity lives within the Earth's bounds.

Conceived in 1990 by Mathis Wackernagel and William Rees at the University of British Columbia, the Ecological Footprint is now in wide use by scientists, businesses, governments, agencies, individuals, and institutions working to monitor ecological resource use and advance sustainable development.

http://www.footprintnetwork.org/en/index.php/GFN/page/footprint_basics_overview/

1. Dark Nights

Turning off the lights you don't need at night means less electricity wasted, less green house gas emissions, and lower electricity bills!

2. Superscrub weekly

Your average shower uses about 20L of water per minute. That means that every minute you cut from your shower saves the equivalent of 10 milk bottles full of water, every minute!

3. Superscrub one off

Limiting your shower to 4 minutes means that you only use about 80L of water for your shower, and that means we don't have to put as much stress on our water ways and environment to meet our water needs!

4. Compost your food

Composting your fruit and veg scraps can make food for trees and flowers in your garden. It makes the soil super happy, as well as stops all that rubbish getting thrown into landfill!

5. Tormenting the tap

Turning off the tap when you brush stops wasted water running down the drain, and saves money on water bills! You can save around 15 litres per minute!

6. Finding Fishy

Sustainable fishing means that the fishermen catch enough fish to sell, but not so much that means there's no more left for anyone else, in a way that doesn't hurt the environment. Eating their fish means your support their hard eco work!

7. Change modes

Using public transport saves petrol, reduces pollution and traffic, and reduces stress levels. Plus, you might make new friends!

8. Share the love

Making a magazine creates about 1kg of green house gasses, that's about how much a car makes over a 3km trip. Sharing with a friend means all that pollution stays out of the air!

9. Avoid packaging

All that packaging on the stuff you buy just ends up going into the bin and going to landfill. Try buying things with less, or with biodegradable or recyclable packages.

10. Recycle paper

Recycling a pound of paper, less than the weight of your average newspaper, saves about 3.5 gallons of water. Buying recycled paper products saves water too, as it takes about six gallons of water to produce a dollar worth of paper.

11. Naturale

Chemical products can be nasty man made products that pollute the air and can get into your local rivers and streams and hurt the animals and plants that live there. Using natural products made from renewable products helps reduce the overall pollution.

12. Recycle plastic

Plastic is a man made product that uses oil, gas and coal to make. These fuels cause pollution to the air and water, and have to be dug out of the ground, destroying large areas of bushland and forest. Recycling it means we don't need to make as much new stuff!

13. Recycle Glass

Glass can continually be recycled by being crushed, melted, and reformed into new glass containers over and over and over!

14. Reduce water heat

Reducing the water heat from piping hot, to just warm enough means that there is less energy needed to make it hot. For electric and gas hot water systems, this means less carbon dioxide emissions!

15. Hit the source weekly

Electrical devices like computers, TV's and game consoles can still use electricity when you turn them off into standby mode. Turning them off at the power point makes sure this electricity isn't wasted.

16. Tap King

Bottled water production makes 600 times more green house gasses than tap water, and tap water has 1% of the environmental impact of bottled water.

17. Avoid personal heater/cooler

Opening a window on a hot day, or using a blanket or a jumper on a cold one can help you cut out the electricity used by an air conditioner.

18. No baggage

Plastic bags use fossil fuels in their production, and in most cases are used once and then end up in landfill or as pollution. It's estimated that around 1 trillion bags are thrown out every year! Using a reusable bag instead can help cut this number down.

19. Turn off the box

Watching TV can be fun, but the TV can use a whole lot of electricity. Turning it off and playing or doing something else can help save energy, and is good for your health!

20. Log off

Your computer is part of your life, but it needs a lot of electricity to run. Turning it off when you don't need to use it, and playing outside rather than playing games on it can help reduce energy usage!

21. Just enough

55% of household waste is food scraps. Try cooking just enough food for everyone, this way, you'll reduce landfill and save money on food bills!

22. Locally grown

Buying food that was grown and produced locally means that there is less energy used in transporting it to your plate, compared to something made on the other side of the country. Plus, you get to support your local home town farmers and usually save money!

23. Dish Tetris

Your average dishwasher uses electricity and about 17L of water per wash, regardless of how full it is. Only using it when it's full means that all that energy and water goes to its maximum use, and reduces the amount of times you use it!

24. Dining In

Everyone loves takeaway food, but the containers are such a waste of materials! If you dine-in at your favourite restaurant, or try cooking at home, you can help save all those containers ending up in landfill.

25. Decrease Room Temp (Winter)

Air conditioners take a lot of energy to run. Setting it 20° in winter means its running at its most efficient. Every degree above this increases the energy use by 10%!

26. Power of the sun

Hanging you laundry out on a clothes line on a clear day can help save electricity by not using a clothes dryer. You can get all the drying you want done for free by the sun!

27. Riding with friends

Car-pooling means you travel in 1 car with a bunch of friends, rather than each person taking their own. This makes for less traffic on our roads, less pollution, and a whole lot of road trippin' fun!

28. Tormenting the tap (weekly)

Turning off the tap when you brush stops wasted water running down the drain, and saves money on water bills! You can save around 15 litres per minute! That could mean if you spend 3 minutes brushing your teeth a day, you'd save over 300L of water in a week!

29. Vege meals

Meat generally uses around 10 times more energy, land and water than vegetarian equivalents. Swapping a few meals a week can help you reduce your overall eco footprint, plus, you might find your new favourite dish!

30. Heat Space

If you have to use heating in your home, close all the doors and windows around the area you want warm. This reduces overall energy use by stopping heat escaping outside, and by not wasting heating on an empty room.

31. Increase room temp (Summer)

Air conditioners take a lot of energy to run. Setting it 25° in summer means its running at its most efficient. Every degree below this increases the energy use by 10%!

32. Black Box

Cutting your PC, computer games, or TV usage by just 1 hour a day can cut your overall electricity usage. It also lets you go outside and play, and is great for your health!

33. Cold Wash

Washing your clothes in cold water means that no energy is needed to heat warm water, which means less energy demands! Most detergents work just as well in cold water too!

34. Recycled Paper

Using recycled paper is a great way to help the planet. It means less trees cut down, less energy, and less water! You can even try make your own at home!

35. Hit the source one off

Electrical devices like computers, TV's and game consoles can still use electricity when you turn them off into standby mode. Turning them off at the power point makes sure this electricity isn't wasted.

36. Packed Lunch

Bringing a packed lunch means you don't use wasteful packaging of take-out food and drinks. This will reduce the waste going to landfill, and saves you money!

37. Put on a jumper

Wearing a jumper or coat when it's cold inside means you won't have to have your heater working as hard. Every degree closer to the temperature outside saves 10% in energy.

38. Op Shop.

Buying pre loved clothes from goodwill or thrift shops means that all the energy used in making, transporting, and selling new clothes doesn't have to be used. Plus, you might find your new favourite outfit for dirt cheap!