



Appendix 1: Student activities for Tundra Investigative Study

Created by Louise Swanson for GTANSW & ACT

The Geography Bulletin 2019 Edition 3 (Volume 51 No 3)

<https://www.gtansw.org.au/members/login.php>



For Activity 2 parts A – F, students will need a copy of the article '*Subarctic and sub-antarctic Tundra Investigative study*'

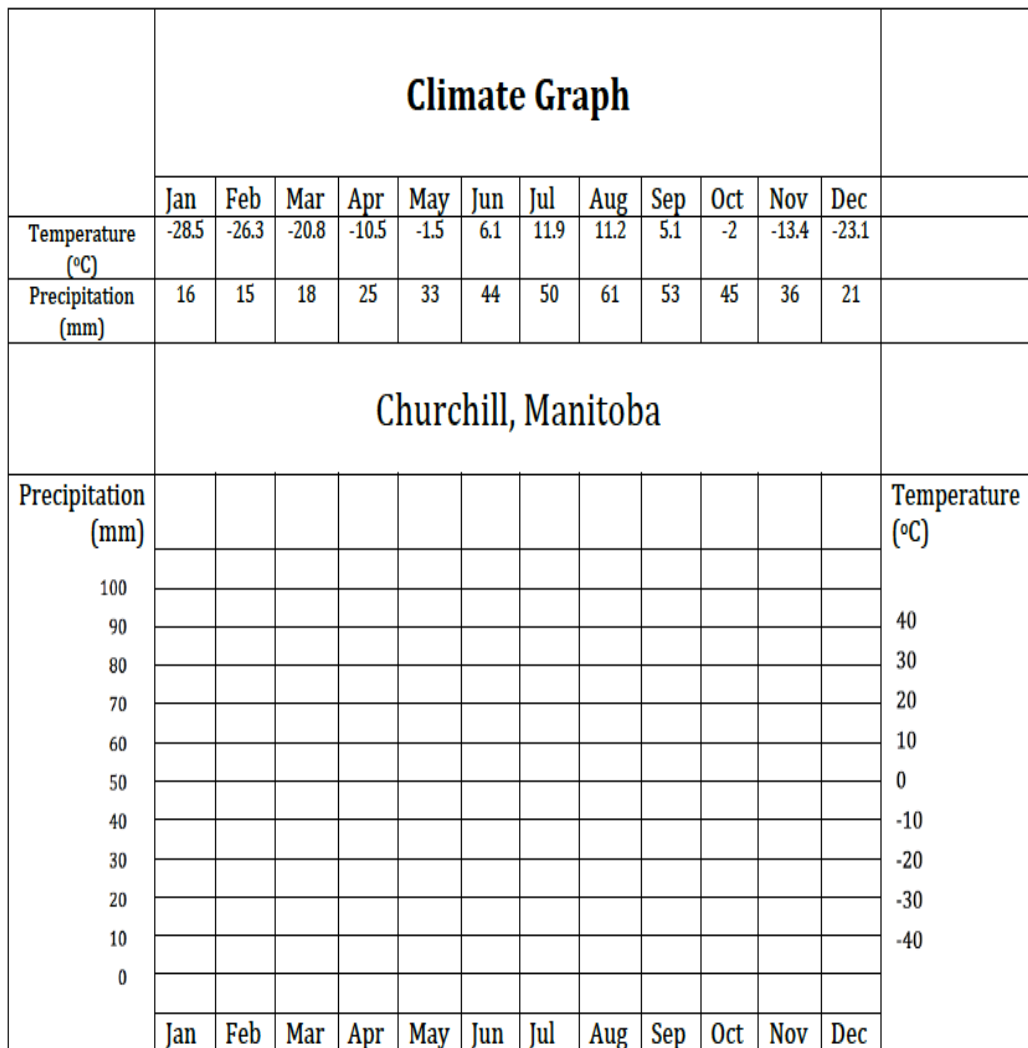
Instructions are provided with each activity.

Activity A: Skills – Climate graphs

A climate graph is a graph which shows the annual rainfall and temperature at a particular location. The rainfall (or precipitation) is indicated by a blue bar for each month.

The temperature is indicated by a line on the graph showing the temperature for each month. This line is red.

The months of the year are on the bottom axis of the graph. Temperature is usually on the right axis and rainfall is usually on the left axis.



Describe the climate at Churchill using the following concepts – maximum and minimum average temperature, annual temperature range, annual precipitation and its distribution.

Activity B: Tundra – Virtual Fieldwork

Fieldwork: Hudson Bay

Some schools may be able to do a field trip to Canada, however, for most schools if you use this case study, the best option would be to complete fieldwork on Environmental Change as a general topic in your local area, and complete virtual fieldwork on this case study. Below are some options to help you do this.

Observations

An important initial step in any fieldwork trip is observation. An observation helps provide the researcher with a broad view of the environment and can help frame initial research questions or provide general information about basic questions in your research.

Explore how the Google Maps team are helping build and share a [Google Maps Tour of Churchill](#)

See https://www.youtube.com/watch?time_continue=113&v=QYhoz54hpc8

Line drawing/Photosketch

Tools:

- pen,
- paper,
- eraser,
- ruler

Students:

Examine the scene and settle on a particular view

Draw a box (frame) for your sketch in the space below.

Draw a general outline of the view.

Label key features of the view on your photosketch or line drawing. The items that you label may depend on the focus of your research questions.

Include a heading, the date of the sketch and the website the view was sketched from.

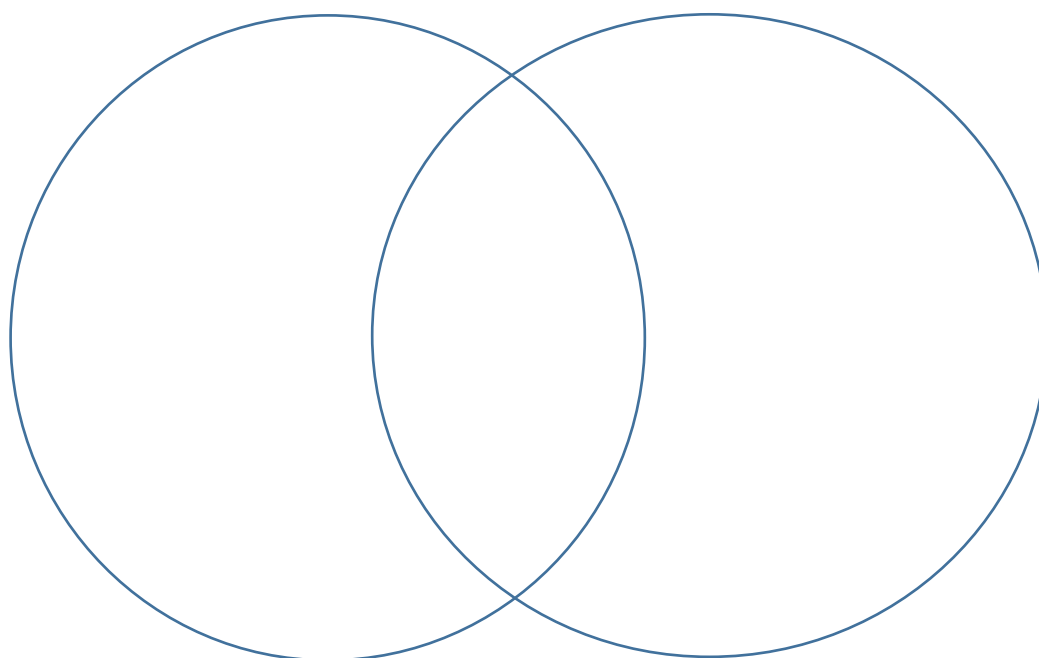
Activity 4: Topic Overview

Use the scaffold below to create a brief summary of the tundra environments investigative study.

	McDonald Island and Heard Islands Reserve and World Heritage Area, AUSTRALIA	Churchill Wildlife Management Area, CANADA
	BIOPHYSICAL PROCESSES	
Describe the biophysical processes that occur in tundra environments.		
Explain how the biophysical processes enable tundra environments to function.		
	CAUSES, EXTENT & CONSEQUENCES OF CHANGE	
Examine the causes and extent of change to tundra environments.		
Analyse the short and long-term consequences of environmental change.		
	MANAGEMENT OF ENVIRONMENTAL CHANGE	
Describe management strategies implemented to protect tundra environments.		
Discuss the factors influencing the management responses eg worldviews,		

competing demands, technology, climate change		
Compare and evaluate the effectiveness of the management responses in achieving environmental sustainability.		
Propose how individuals could contribute to achieving environmental sustainability for tundra environments.		

Use the VENN DIAGRAM below to show key similarities and differences between McDonald Island and Heard Islands Reserve and World Heritage Area, Australia AND Churchill Wildlife Management Area, CANADA.



Activity 5: Writing Task

Analyse the short, and longer-term consequences of environmental change in tundra environments. Refer to both Churchill, Canada and McDonald and Heard Islands, Australia in your response. Use this planning scaffold for your answer.

Introduction	
Short term consequences - overview	
Short term consequences - Churchill	
Short term consequences – Heard and McDonald Islands	
Long term consequences - overview	
Long term consequences - Churchill	
Long term consequences – Heard and McDonald Islands	
Conclusion	

Activity 6: Individual action

Task: Propose how individuals could contribute to achieving environmental sustainability for tundra environments.

Pre-task planning:

What is environmental sustainability?

To define environmental sustainability, we need to consider the functions of the environment: source, sink, service and spiritual.

- Source: the capacity of the environment to provide us with materials we rely on such as timber, water and soil.
- Sink: the ability of the environment to remove and breakdown waste.
- Service: processes that enable our existence such as stabilising the climate.
- Spiritual: how the environment provides us with psychological benefits or spiritual connections

Definition:
.....

Suggestion some actions that individuals can take to address the environmental sustainability of tundra environments.

Individual action	Does it address the source, sink, service, or spiritual function? Which one?	Briefly state how it addresses the function (source, sink, service or spiritual).

Task: Write a persuasive response that proposes how individuals could contribute to achieving environmental sustainability for tundra environments.

Introduction:

.....

.....

.....

.....

.....

Paragraph 1: Describe an action an individual could take and explain how it addresses environmental sustainability for tundra environments.

.....

.....

.....

.....

.....

.....

Paragraph 2: Describe an action an individual could take and explain how it addresses environmental sustainability for tundra environments.

.....

.....

.....

.....

.....

.....

Paragraph 3: Describe an action an individual could take and explain how it addresses environmental sustainability for tundra environments.

.....

.....

.....

.....

.....

.....

Paragraph 4: Describe an action an individual could take and explain how it addresses environmental sustainability for tundra environments.

.....

.....

.....

.....

.....

.....

Conclusion:

.....

.....

.....

.....

.....

Peer feedback

Swap your work with another person in your class. Read the other person's work.

- ☐ Highlight the individual actions proposed.
- ☐ Underline each example of persuasive language used.
- ☐ Circle each time the writer has referred to source, sink, service or spiritual functions.

What are the positive features of this piece of writing?

.....

.....

.....

What is something the person could do to improve their writing?

.....

.....

.....

Review

Spend a few minutes reviewing the comments and markings of your peer. Spend five minutes editing your work based on their feedback.

Activity 7: Evaluating Management Responses

Extended response

Evaluate the effectiveness of management of environmental change in tundra environments.

You will need to make a judgement about the benefits and costs of management strategies implemented to protect tundra environments.

- How effective are the management strategies?
- How can communities and governments attempt to balance environmental, economic and social criteria?
- To what extent can there be trade-offs between them?
- What are the practical and ethical dilemmas of national and international conservation programs?
- Are the management strategies addressing environmental sustainability?

In your response to this question you will need to describe the management strategy AND make a judgement about how effective it is. Use terms such as totally ineffective, somewhat ineffective, moderately effective, very effective.

What are some other words you can use? Add words to the table below.

Totally ineffective	Somewhat ineffective	Moderately effective	Very effective
Least			Most
Unsuccessful			Successful
Unproductive			Productive
Impractical			Practical
Useless			Useful
Fruitless			Fruitful
Inadequate			Valuable
Unworkable			Worthwhile
			Gainful

When you have completed your extended response, edit your work, checking for:

- ☐ Correct grammar and punctuation
- ☐ Correct spelling
- ☐ Use of geographical terms
- ☐ Is there anything that needs more depth?
- ☐ Have you indicated how effective the management strategies are?

Complete the scaffold below to help you complete an extended response on the effectiveness of management of environmental change in tundra environments.

Management Response and where it is implemented	Describe the response	Is it effective?	Does it address environmental sustainability?	Are there any practical or ethical issues?



Appendix 2 - Minnamurra River: From Source to Sea

Created by Andy Grant, Suzanne Johnson, Mark Peters and David Brennan
for GTANSW & ACT

The Geography Bulletin 2019 Edition 3 (Volume 51 No 3)

<https://www.gtansw.org.au/members/login.php>



This document has been provided in both PDF and Word formats to allow teachers to add or delete elements as appropriate to their students.

Login to your account to access the relevant GTA Bulletin article.

The following data collection sheets are to be used by students when undertaking the Minnamurra River: From Source to Sea Fieldwork activity or similar fieldwork activity in another location.

Minnamurra River: From Source to Sea Data Record

In the space below you are to record the results at 3 different locations and provide possible reasons for the results you have collected.

Site One: Minnamurra Rainforest	Coordinates
Water temperature 1. 2. 3.	Turbidity 1. 2. 3.
Flow rate 1. 2. 3.	Gradient 1. 2. 3.
Role of river at this location	
Evidence and purpose of management	
General observations	

Minnamurra River: From Source to Sea Data Record Sheet

**In the space below you are to record the results at 3 different locations and
provide possible reasons for the results you have collected.**

Site Two: Swamp Road	Coordinates
Water temperature 1. 2. 3.	Turbidity 1. 2. 3.
Flow rate 1. 2. 3.	Gradient 1. 2. 3.
Role of river at this location	
Evidence and purpose of management	
General observations	

Minnamurra River: From Source to Sea Data Record Sheet

In the space below you are to record the results at 3 different locations and provide possible reasons for the results you have collected.

Site Three: Mud Flats, Minnamurra Boat Ramp	Coordinates
Water temperature 1. 2. 3.	Turbidity 1. 2. 3.
Flow rate 1. 2. 3.	Gradient 1. 2. 3.
Role of river at this location	
Evidence and purpose of management	
General observations	

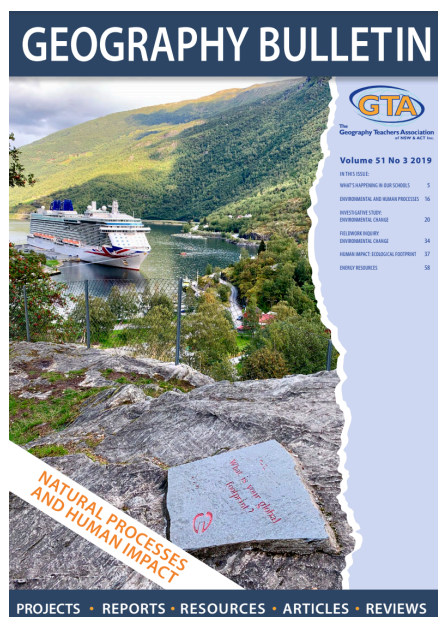


Appendix 3: Student activities for ECOLOGICAL FOOTPRINT

Created by Dr Susan Bliss for GTANSW & ACT

The Geography Bulletin 2019 Edition 3 (Volume 51 No 3)

<https://www.gtansw.org.au/members/login.php>



This document has been provided in both PDF and Word formats to allow teachers to add or delete elements as appropriate to their students.

Login to your account to access the GTA Bulletins and individual articles for printing where required.

Instructions are provided with each activity.

Students will need a copy of the article 'Ecological Footprint' by Dr Susan Bliss

INVESTIGATING ECOLOGICAL FOOTPRINTS

1. Read the following material to complete the activities below

A. What is the Ecological Footprint?

The following abstract

AUSTRALIA'S CHANGING ECOLOGICAL FOOTPRINT

This activity encourages students to view the ecology of the land, resources, liveability, and human-environmental interactions, from different perspectives.

The Palmer River, 140 km south-west of Cooktown, was originally inhabited by Aboriginal people such as the Kuku-Yalanji, who lived a **subsistence lifestyle**. Survival was dependent on the exploitation of food that varied seasonally. The uncertain supply of wild game resulted in either feast or famine.

In 1873, when gold was discovered large populations of Chinese immigrants (mostly from Guangdong Province) followed but suffered at the hands of many Europeans. From 1873-1885, Maytown became the centre of the Palmer **gold rush**. The landscape was transformed into frontier townships and prospecting camps along the Palmer River. By 1874 there were over 5,000 Europeans and 2,000 Chinese working the Palmer River. The Aboriginals were reduced to living in shanty towns.

With the demise of easily accessible gold, the Palmer River area became occupied by large landholdings, some running **cattle**.

Aboriginal people living on the eastern coast of Cape York had little contact with non-Indigenous people prior to the 1850s. However, the discovery of gold in north Queensland affected the lives of tens of thousands of people. Aboriginal people were proud of their cultural distinctiveness and were actively resistant to alien intrusion. For Oscar, an Aboriginal boy, it meant being separated from his culture and being forced to adapt to a new life as a stockman. Oscar and other Aborigines had to compete with goldminers for their own lands. They were often subjected to violence and forced to adapt to new ways of life. Through his drawings Oscar produced a detailed record of what must have been some of the most influential events of his young life.

Adapted: <https://www.sbs.com.au/gold/story.php?storyid=102>

In the days of Palmer River gold rush this goldfield was the centre of activity for the whole Cape York Peninsula. Today it is a **historical site**. The Kuku-Yalanji people registered a Native Title Claim over parts of their traditional land in May 1995.

- Draw a timeline showing how human activity has changed the environment of the Palmer River area.
- Identify who had the smallest ecological footprint (EF)? Provide reasons for your answer.
- Describe how the different ecological footprints changed the fragile Australian landscape in a short period of time.
- Investigate how Aboriginal peoples had been able to live productively on the resources available. Present as a short report using ICT

- Comment on this quote: *"Indigenous peoples have contributed the least to world greenhouse gas emissions and have the smallest ecological footprints on Earth. Yet they suffer the worst impacts such as climate change"*.
https://www.eurekalert.org/pub_releases/2008-04/unu-iph040108.php
- Literacy: Write a narrative depicting life and the EF in the year 3000.
- Visual literacy: Provide two photographs. One related to traditional Aboriginal lifestyles in a small community/village and another showing present day Australians living in a capital city. Compare these two lifestyles and the use of energy, water and waste generated.

2. Read

B. How does the EF measure the impact of humans on the environment?

- What does the EF measure?
- By adding up six withdrawals, we can calculate the human footprint (a measure of how much we are using the Earth's natural resources). The withdrawals come in six categories: List them.
- Explain why this measurement is considered as an indicator of sustainability.

3. Refer to the Graph Global EF Trends to answer these questions

- What was the largest component of the EF in 1961 and 2014?
- Calculate the changes to the six components from 1961 to 2014.
- Discuss the reasons for these changes.

4. Refer to the graphs showing the countries with the largest EF and largest EF per person to answer these questions

- Name the country that has the largest EF and the largest EF per person.
- Calculate the global hectares (gha) of carbon per person for Qatar and United Arab Emirates (UAE). Investigate reasons for the large production of carbon per person.

5. Refer to the graph - Share of World's carbon footprint

- Use the carbon footprint tool to calculate your footprint. Compare your footprint with the rest of your classmates. Summarise your findings
<https://footprint.wwf.org.uk/#/>

6. Read:

Running shoes leave large carbon footprint. Huge carbon footprint of a sandwich

- Greenhouse gas emissions are produced by growing crops, aquaculture, rearing animals, as well as processing, transporting, storing, cooking and disposing of food you eat.
What are the impacts of food on the carbon footprint?
How can you reduce your food carbon footprint?
<http://www.greeneatz.com/foods-carbon-footprint.html>

- Refer to the composite column graph: Compare the carbon footprint between the urban very rich and the rural very poor. <https://www.bbc.com/news/science-environment-46459714>

7. Refer to:

C. What is the demand side of EF? Let's look in your wardrobe!

- What resources are required to produce clothes (cotton, synthetics) that contributes to the EF?
- Explain how recycled clothes can reduce the EF.
- Research the EF of a pair of jeans. Divide into environmental and social costs.
<https://www.activesustainability.com/sustainable-life/do-you-know-your-clothes-ecological-and-social-footprint/>;
<https://bronwynvanvugt.wordpress.com/2013/01/26/the-cost-of-a-pair-of-jeans/>;
https://www.vice.com/en_au/article/kzzpjm/your-jeans-are-ruining-the-earth-v24n7;
<https://theconversation.com/sustainable-shopping-for-eco-friendly-jeans-stop-washing-them-so-often-75781>; <https://globalaspect.wordpress.com/2014/01/24/life-cycle-of-a-jean-and-our-clothing-footprint/>
- Suggest solutions to sustainable fashion

8. Read:

What do you throw away?

Where is the missing plastic?

What do you do with the waste from consumption?

- What is the carbon footprint of plastic? <http://stopplastics.ca/carbon-footprint-plastic>;
<https://timeforchange.org/plastic-bags-and-plastic-bottles-CO2-emissions>;
<https://sciencing.com/carbon-footprint-plastic-bottle-12307187.html>
- What can you do as an active, informed citizen to reduce the use of plastic?
- In groups research the Great Pacific Garbage Patch. Include where it is, source of the garbage, its size, quantity of rubbish, effects on humans and marine life, solutions and research. <https://www.theoceancleanup.com/great-pacific-garbage-patch/>;
<https://www.nationalgeographic.org/encyclopedia/great-pacific-garbage-patch/>;
<https://www.wwf.org.au/news/blogs/how-can-we-destroy-the-great-pacific-garbage-patch#gs.1ywbgi>

9. Read:

D. What is the supply side of the EF? Biocapacity

E. What is the environmental problem?

F. What is meant by Ecological Overshoot? Is this a problem?

- In groups mind map responses to the following question. "How do we decrease our resource use and at the same time create a future that provides food, water and energy for about 9 billion people that will share the planet in 2050"?
- Suggest how we could return to 'one-planet living' by 2050.
- Explain this statement. "The best tool for measuring human impacts on the planet may be a dashboard of environmental indicators, not a footprint."

<https://theconversation.com/yes-humans-are-depleting-earths-resources-but-footprint-estimates-dont-tell-the-full-story-100705>

- Ecological overshoot. Identify the main message in each of these articles

https://www.panda.org/knowledge_hub/all_publications/living_planet_report_timeline/lpr_2012/demands_on_our_planet/overshoot/

<https://theconversation.com/yes-humans-are-depleting-earths-resources-but-footprint-estimates-dont-tell-the-full-story-100705>

10. Read:

G. What are the inequalities between EF at a variety of scales?

H. How can you reduce the EF? Active citizenship

- List all the environmentally friendly activities you perform in the home and at school?
- How can you live a more sustainable lifestyle?



APPENDIX 4: STUDENT ACTIVITIES for ECOLOGICAL FOOTPRINT

Created by Dr Susan Bliss for GTANSW & ACT

The Geography Bulletin 2019 Edition 3 (Volume 51 No 3)

<https://www.gtansw.org.au/members/login.php>

This document has been provided in both PDF and Word formats to allow teachers to add or delete elements as appropriate to their students.

Login to your account to access the GTA Bulletins and individual articles for printing where required.

Instructions are provided with each activity.



Students will need a copy of the article 'Ecological Footprint' by Dr Susan Bliss

INVESTIGATING ECOLOGICAL FOOTPRINT

ADDITIONAL ACTIVITIES



<http://ecomerge.blogspot.com/2009/06/whats-your-ecological-footprint.html>

USING ICT: EF AT A PERSONAL SCALE

- Crunching the numbers. Calculate **your** ecological footprint and compare it with your **parents** and **peers**. Who was closest to 2.1 global hectares (average amount of biocapacity per person)?
<http://www.footprintcalculator.org/>
<http://www.footprintcalculator.org/signup?gclid=EAlaIQobChMIhYWvrlf54gIVViQ>
<http://www.esb.utexas.edu/dnrm/EcoFtPrnt/v7HouseHoldEcoFtPrnt.xls>.
- Follow the quiz and discover the impact you have on the planet
<https://www.earthday.org/take-action/footprint-calculator/>
- Identify ways you can become a responsible consumer.
http://www.moneystuff.net.au/teachers/print/pdfVic/10_commerce_section_f.pdf
- Imagine your lifestyle follows the sustainable path. Describe this lifestyle.
- In groups complete the **School Ecological Footprint**. Summarise your findings and suggest sustainable solutions and their implementation
<https://www.epa.vic.gov.au/~media/Publications/1216.pdf>

USING ICT: EF AT REGIONAL/NATIONAL/GLOBAL SCALES

- View the video: National Footprint Accounts – Ecological Balance Sheets for 180+ Countries, Compare two countries in the Asian Region.
<https://www.youtube.com/watch?v=T5M3MiPw4&feature=youtu.be>
Summarise your findings in a short report
- Refer to Regional Footprints at
<http://www.unfpa.org/swp/2001/english/ch03.html#2>. What region has the highest and lowest EF?
Explain the reasons for the differences.
- Answer the EF Quiz. What is the EF for five countries?
<http://www.earthday.net/footprint/info.asp> and
<http://www.lead.org/leadnet/footprint/intro.htm>
- Outline the reasons for variations in nations EF
<http://www.ecouncil.ac.cr/rio/focus/report/english/footprint/>
- Rich countries gobble up more resources. Explain this statement
<http://www.akha.org/article67.html>

OVERVIEW: IMPACT OF HUMAN ACTIVITIES

- Study the Ecological Footprint Poster at <https://www.teachstarter.com/au/teaching-resource/the-ecological-footprint-poster/>
What is the environmental impact of the following human activities?
Complete the table with your answers.

Using of fossil fuels	Clearing forests	Disposing of rubbish in land, rivers and ocean	Clearing land for cities, mining and agriculture

- Extension. Discuss EF issues and global trends as a short report?
Ecological_Footprint_Issues_and_Trends.pdf
<https://pdfs.semanticscholar.org/86f3/6d0fbd47789b789fe82648ecfe9d37ad3f42.pdf>
- Suggest actions for a sustainable Earth.
http://www.ecovoyageurs.com/EcoSite%20English/Action/take_action.htm

PAIR ACTIVITY

- In pairs, answer these questions to determine whether you are an environmental devil or environmental angel. Adapted:
<https://www.newscientist.com/article/mg17022888-800-devil-or-angel-2-is-one-planet-enough/>



Do you:

- Have showers over 5 minutes?
- Buy packaged and processed items?
 - Have an air conditioner?
- Switch off lights in a room no longer in use?
- Leave computers and TVs on standby?
 - Walk or cycle to school?
- Recycle paper, cans and plastic containers?
- Compost organic waste?



- List the activities you performed today that used natural resources.
Compare your answer with your partner.
- What steps are you taking to leave a smaller footprint?
- Compare your footprint with the traditional Aboriginal people. Explain why they differ.
- How many Earths would be needed if everyone on the planet enjoyed your standard of living? http://www.footprintcalculator.org/?gclid=EAlaIQobChMIosjo6IWB4QIVBI-PCh2sSA39EAAAYASAAEgLsmPD_BwE
<https://www.earthday.org/take-action/footprint-calculator/>

CLASS ACTIVITY

Divide class of 28 students into continents and distribute food and wealth.
Then complete the following activities

Continents	% of population per continent.	28 students	Food distribution	Wealth distribution.
Asia (red)	59%	17	36% 9 chocolates	13% 3 cents
Africa (yellow)	11%	3	7% 2 chocolates	2 % ½ cent
Europe (black)	16	4	31% 8 chocolates	30% 8 cents
North America (blue)	8%	2	16% 4 chocolates	35% 9 cents
South America (green)	5.5%	1	9% 2 chocolates	14% 4 cents
Australia (purple)	5%	1	1% ½ chocolate	5% 1 cent

- Are these resources (food and wealth) evenly distributed amongst the continents? Explain your answer.
- Has each continent sufficient food and wealth to provide for their population? Is this fair? Explain your answer.
- Is anyone willing to share their food and wealth? If not-why not?

CARTOON INTERPRETATION

A. Are we getting too big for our house?



<http://www.yeu-international.org/en/publications/newsmail/between-the-lines/eu-countries-are-ones-with-highest-ecological-footprints-what-can-be-the-solution>

B. Who has the largest ecological footprint?



<http://whygreeneconomy.org/inequality-of-overconsumption/>

- Refer to A. Are we getting too big for our house? Provide explanations. List three countries with the largest EF and the largest EF per person.
- Refer to B. Compare the footprint of the rich versus the poor
https://www.panda.org/knowledge_hub/all_publications/living_planet_report_timeline/lpr_2012/demands_on_our_planet/footprint_income/
- Compare the City Slicker and Country Bumpkin's footprints. Who has the smaller carbon footprint? Explain reasons for the difference.
<https://www.livescience.com/13772-city-slicker-country-bumpkin-smaller-carbon-footprint.html>
- Carbon inequality between rich and poor countries is decreasing, but the urban-rural difference is increasing especially in urbanising developing countries. These inequalities need to be addressed nationally/locally. Explain this statement.
<https://www.thenatureofcities.com/2017/07/30/urban-rural-inequalities-carbon-emissions/>

COUNTRY COMPARISONS-DEVELOPED AND DEVELOPING COUNTRIES

Kerala in southern India, is noted for its successful development. It has achieved a high quality of life similar to Western countries. In spite of its lower per capita income, it has high human development and exceptionally low EF of only 0.7 gha - i.e. each person uses only 70% of the natural resources that they are entitled to for a sustainable world.

	KERALA, INDIA	CALIFORNIA, USA
Population	34 million	39 million
EF	0.7 gha	8.6 gha
HDI 2018 (1) Life expectancy, (2) Education and (3) Per capita income.	0.790 high (59 th position between Turkey and Panama) High human development	0.88 (Between Spain and Italy) Very high human development

- Compare the ecological footprint in Kerala (India) with California (USA). Explain the reasons for the large difference.
- Does a small EF mean deprivation of human wellbeing? Explain your answer.
- Does this mean we can reduce our high EF and at the same time maintain our high standard of living?

CLASS DISCUSSION

Everything involves environmental resources from sandwiches, clothes, sport trainers, to mobile phones. All the 'stuff' we consume has an impact on our ecological footprint.

The big questions are:

- When will we run out of useable planet?
- How will this affect human wellbeing?
- What should you do about it?
- Are we 'talking the talk' but not 'walking the walk'? Explain this question.

PERSPECTIVES FROM WORLDWATCH

A Bangladeshi child eats a bowl of rice; an American teen uses a smartphone; a woman in Finland takes an aeroplane to Australia; a man in Zimbabwe fills his car with oil; and Japanese schoolchildren are making origami cranes.

- Name the resources used in this statement
- List the objects you buy and use in a day. Now multiply this by 7.7 billion people on Earth. Do you think there could be a problem? Is this sustainable?
- Refer to the table on **different global perspectives**. Is this equity? Explain your answer.

<ul style="list-style-type: none"> • Excessive consumption burdens societies with bulging landfills; polluted oceans, atmosphere, groundwater, rivers and soil, and declining fish stocks. Results in a large EF e.g. Luxembourg, USA, Australia, Qatar, Bahrain, Dubai. 	<ul style="list-style-type: none"> • Meanwhile, about 50% of the world's population — more than 3 billion people — live on less than \$2.50 a day. Results in a low EF e.g. Pakistan, Bangladesh, Haiti
http://www.globalissues.org/article/26/poverty-facts-and-stats	

Businesses and governments can change peoples' consumption by producing and selling fair-traded food, solar and wind energy, and fuel-cell vehicles.

- Suggest other business and government sustainable solutions.
<https://smallbiztrends.com/2017/04/how-to-reduce-your-carbon-footprint.html>
<https://www.borgenmagazine.com/fighting-climate-change-reducing-carbon-footprint/>
<https://www.oecd.org/greengrowth/how-can-governments-help-people-reduce-their-environmental-footprint.htm>

PHOTOGRAPH INTERPRETATION

Footing the Bill: Art and Our Ecological Footprint is an ongoing exhibition that addresses the urgent need to live sustainably within the Earth's finite resources. The exhibition features an exhibition of artists whose work challenges us to reflect on our **EF** and **declining biocapacity**.

- Explore the gallery with interacting features. The site Includes educational content. Select five photographs and discuss its links to an unsustainable environment
<https://www.artworksforchange.org/footing-the-bill/>

Inopportune: Cai Guo-Qiang depicts wild animals as victims of acts of violence. One such creature is the tiger, which has been hunted to the brink of extinction for fur and sport.

<https://www.artworksforchange.org/portfolio/cai-guo-qiang/>

- What are the causes of the illegal trade in animals?
- What are the impacts of illegal trade in animals on biodiversity?
- Why is this illegal practice unsustainable?



RESEARCH

- A. Ecological footprint analysis produces an **informed estimate** rather than an exact figure. It is widely used as an indicator of **environmental sustainability**.

Research how **communities** are living a more environmentally sustainable life.

Include:

- What is a sustainable community? Include a diagram.

<https://www.kenan-asia.org/lasting-communities/?gclid=EAIaIQobChMI1vXHopT84gIViwsrCh0TRQQZEAAAYASAAEgI9bfDBwE>

- What is an eco-city and eco-village?

<https://en.wikipedia.org/wiki/Eco-cities>

Include examples from three different countries

- Present your research on sustainable living as an oral presentation supported by maps, diagrams, photographs and articles.

<http://www.worldwatch.org/green-acres-communities-reduce-ecological-footprints>;

<https://www.randwick.nsw.gov.au/environment-and-sustainability/get-involved/reduce-your-footprint>;

<https://www.environment.gov.au/climate-change/local-government-and-communities>

- B. Ecological footprints give us a measure of the overall strain we are placing on the planet. Humans depend on global resources for their existence. Our homes, cars, food, and clothing all come from natural resources. The more we have and the more we use, the more strain we put on these resources.

- There are **different calculators used to determine the ecological footprint**.

Try several different ones and compare the results.

If they gave different results, explain why.

<https://www.sciencedirect.com/topics/earth-and-planetary-sciences/ecological-footprint>

YOUTUBE RESOURCES

- Why natural resource use matters?

<https://www.youtube.com/watch?v=7pPa0mRCky4>

- Managing natural resources: making more with less

<https://www.youtube.com/watch?v=ZERrpFwETgs>

- Growing Green Economies

<https://www.youtube.com/watch?v=m9AS6KT7a5Y>

- Ecological footprint: Do we fit on our planet?

https://www.youtube.com/watch?v=g_aguo7V0Q4