



Steps towards a greener future

Teacher Toolkit

Produced with the generous support of the
Staples Foundation for Learning



TEACHER TOOLKIT

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PROGRAM PARTNERS



TakingITGlobal (TIG) is an international organisation led by youth and empowered by technology. TIG serves youth worldwide through innovative education programs and a multilingual online learning community that provides access to resources and action tools intended to inspire, inform and involve. Often described as a "social network for social good," the award winning www.tigweb.org offers a diverse set of tools and resources including blogs, wikis, discussion boards, podcasts, an online gallery, a member-driven e-zine, guides to action and more. Since launching in 2000, 20 million people have accessed the website to learn, grow, and realise their potential.



Launched in 2006, the TakingITGlobal for Educators (TIGed) program supports thousands of educators in over 100 countries to integrate global issues and perspectives into their classrooms through the use of technology. The TIGed website (www.tiged.org) offers: a social networking platform that allows teachers to connect in order to connect, collaborate and share; a range of global education resources; and virtual classroom communities that teachers create, moderate and control to meet the needs of their students and the objectives of their curriculum.



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As the cornerstone of Staples community efforts, the mission of Staples Foundation for Learning (SFFL) is to support organizations that provide educational opportunities and job skills. Since its inception in 2002, SFFL has awarded millions of dollars in grants. SFFL is pleased to provide financial support to TakingITGlobal to establish the Tread Lightly climate change education program, through which this toolkit was developed. For more information on Staples Foundation for Learning, visit www.staplesfoundation.org.

INTRODUCTION

“In the end, we will protect only what we love. We will love only what we understand. We will understand only what we are taught.”

~ Baba Dioum, Senegalese poet and naturalist

No environmental issue better illustrates our unhealthy relationship with the planet, and the risks that we collectively face, than climate change. The world’s foremost authority on climate change, the Intergovernmental Panel on Climate Change (IPCC), has determined that “warming of the climate system is unequivocal” and that human activities have caused “most of the observed increase in global average temperatures since the mid-20th century.”¹

Yet, despite the undeniable fact that our survival depends on our ability to live within the means of our planet, we continue to push the Earth’s capacity to sustain us. According to the Worldwatch Institute, private consumption expenditures (the amount spent on goods and services at the household level) in 2000 exceeded 20 trillion USD – up over 400% from 4.8 trillion in 1960.² If current production methods and rates of consumption continue, by the middle of the next decade, humanity will need the equivalent of 2 Earths to sustain its population.³

Considering that certain greenhouse gases (GHGs) such as carbon dioxide (CO₂) remain in the atmosphere and contribute to climate change for many years after they are released, it is clear that youth will be disproportionately affected by the future consequences of consumption decisions that are made today.

In this context, environmental education is the most effective tool in the fight against climate change, as it facilitates the development of environmental knowledge and concern among youth, which leads to the adoption of more sustainable behaviours. With this goal in mind, Tread Lightly provides educational resources to build environmental knowledge as well as opportunities to engage youth in environmental actions. In providing opportunities for curriculum connections, online collaboration, and creative expression, Tread Lightly empowers youth and educators to work together to take steps towards a greener future.

¹ IPCC. Climate Change 2007: Synthesis Report (Valencia, Spain: UN, 2007).

² Worldwatch Institute. “State of the World 2004: Consumption by the Numbers” (2004).

³ Global Footprint Network. “World Footprint” (2009).

PROGRAM OVERVIEW

The Tread Lightly program was established in order to empower young people worldwide to become active global citizens and environmental leaders in the fight against climate change.

Through the Tread Lightly program, students have the opportunity to:

- Investigate how human activities are contributing to climate change;
- Understand how climate change and other environmental issues are interconnected;
- Foster a sense of personal and collective responsibility for the Earth;
- Identify and adopt eco-friendly attitudes, behaviours and skills;
- Become more informed about climate change policy at the local, national and international levels; and
- Communicate and collaborate with classrooms around the world to learn about climate change together, and explore opportunities for joint action.

The program provides free tools and resources and multiple pathways for students and educators to engage with the material.

Teacher Toolkit

Tread Lightly's secondary school lesson plans help students to understand and assess the environmental impacts of their consumption patterns. The lessons can be accessed by downloading the full toolkit,⁴ creating a Tread Lightly thematic classroom,⁵ or accessing individual lessons through the TIGed Activities Database.⁶

Tread Lightly Challenge

Leveraging the power of the TIG commitment tool, the *Tread Lightly Challenge* is a global campaign that engages youth in minimising their ecological footprints in 5 categories: energy, food, water, waste, and transportation. To take the challenge, go to (www.treadlightly.me/challenge).

Imprints Art Contest

If you could visualise your ecological footprint, what would it look like? The *Imprints Art Contest* asks youth around the world to submit their artworks exploring the themes of ecological footprints and climate change. For more information about *Imprints*, please visit (www.tigurl.org/imprints).

⁴ <http://store.takingitglobal.org/files/treadlightly/TL-Teacher-Toolkit.pdf>

⁵ <http://www.tigweb.org/tiged/projects/treadlightly/>

⁶ <http://www.tigweb.org/tiged/activity/>

Tread Lightly Thematic Classroom

Take advantage of the free virtual classroom community offered to all Tread Lightly teachers in order to collaborate with other schools and classes participating in the Tread Lightly project. The collaboration feature of the TIGed virtual classroom platform makes it easy to learn with the world, providing a deeper understanding of the local and global dimensions of climate change. Suggested ways of using your Tread Lightly thematic classroom are included in each Tread Lightly lesson. Each classroom is preloaded with all Tread Lightly lessons, along with instructions for implementing them in an online or offline setting, and additional online resources. To create your classroom, go to (www.tigurl.org/tlclass).

Video Conferences

Connect with other classrooms around the world through video conferencing to discuss climate-related issues. Students will have a chance to learn from guest speakers and interact with students in different locations, fostering global awareness and understanding. For more information on Tread Lightly video conferences, contact info@treadlightly.me or visit the Tread Lightly program page at (www.treadlightly.me).

TEACHER TOOLKIT OVERVIEW

The Tread Lightly Teacher Toolkit is an interdisciplinary educational resource developed to help secondary school students around the world learn about climate change through the lens of the ecological footprint – a measurement of the demand that humans place on the planet.

Core Subjects and Skills

The Tread Lightly teacher toolkit was designed to support curriculum objectives across a wide range of subject areas and 21st century skills.⁷ Teachers of various subjects can use this guide to incorporate considerations of sustainability into their teaching. The interdisciplinary nature of the toolkit also makes it possible for educators to deliver the curriculum independently or in collaboration with colleagues in their school.

Core Subjects	21st Century Skills
<ul style="list-style-type: none">• Art• Civics• Communications• Environmental Studies• Geography• Global Issues• History• Language Arts• Math• Media Studies• Science• Social Studies• Technology	<ul style="list-style-type: none">• Creativity and Innovation• Critical Thinking and Problem Solving• Communication and Collaboration• Information Literacy• Media Literacy• ICT Literacy• Flexibility and Adaptability• Initiative and Self-Direction• Social and Cross-Cultural Skills• Productivity and Accountability• Leadership and Responsibility

⁷ For information on 21st century skills, visit www.p21.org.

Activity Overview

The toolkit contains 9 activities, organised into 3 modules, which would ideally be used in sequence, as follows.

Module 1: Stepping In

This module is designed to help students “step into” the concepts of climate change and ecological footprints. Through investigating the basic causes and effects of climate change, students will comprehend the importance of living sustainably.

- Activity 1.1: Our Changing Climate helps students understand what climate change is and what its major causes are.
- Activity 1.2: Climate Change Impacts explores how the various consequences of climate change will impact the environment and living creatures.
- Activity 1.3: Learning from the Past explores what can happen to civilisations that push the limits of the natural environment.

Module 2: Stepping Up

This module is designed to help students “step up” to the *Tread Lightly Challenge* and commit to a greener lifestyle. Students assess their personal ecological footprints and reduce their consumption in 5 categories, and are invited to submit climate change themed art to the *Imprints Art Contest*.

- Activity 2.1: Where We Stand provides students with tools to measure their personal ecological footprints and introduces the *Tread Lightly Challenge*.
- Activity 2.2: Visualising Footprints allows students to explore their ecological footprints through creative expression and introduces the *Imprints Art Contest*.
- Activity 2.3: Taking Stock helps students green their consumption decisions and behaviours at home.

Module 3: Stepping Forward

This module is designed to help youth “step forward” into the international forum of global climate change policy and action. Students will reflect on the knowledge and skills gained through *Tread Lightly* and to use their experience as a catalyst to extend learning beyond the classroom.

- Activity 3.1: Climate Policy and Solutions challenges students to create public service announcements on climate change.
- Activity 3.2: Global Climate Change Debate helps students to understand the international climate change negotiation process.
- Activity 3.3: Stepping Forward asks students to reflect on and evaluate their *Tread Lightly* experience, and encourages students to engage in environmental actions at school, at home, and in the global community at large.

Activity Planner

While it is recommended that educators follow the full curriculum, those with limited time can tailor a shortened version of the program, or select individual lessons on their own. Core activities (lessons that are fundamental to the program) have been identified to guide educators who need to prioritise which activities they cover. The activities check-marked below comprise a shortened program that includes all the core activities.












Activity Title	Running Time	Core Activity	Subjects
Module 1: Stepping In			
Activity 1.1: Our Changing Climate	30 mins	✓	Communications, Environmental Studies, Science
Activity 1.2: Climate Change Impacts	60 mins	✓	Environmental Studies, Science
Activity 1.3: Learning from the Past	60 mins		Environmental Studies, Geography, Global Studies, History, Social Studies
Module 2: Stepping Up			
Activity 2.1: Where We Stand	60 mins	✓	Civics, Environmental Studies, Geography, Math, Science, Social Studies
Activity 2.2: Visualising Footprints	60 mins	✓	Art, Communications, Environmental Studies, Media Studies
Activity 2.3: Taking Stock	60 mins		Civics, Environmental Studies, Science, Social Studies
Module 3: Stepping Forward			
Activity 3.1: Climate Policy & Solutions	60 mins		Civics, Communications, Environmental Studies, Global Issues, Language Arts, Media Studies
Activity 3.2: Climate Change Debate	90 mins	✓	Civics, Communications, Environmental Studies, Global Studies, Geography, Social Studies
Activity 3.3: Stepping Forward	30 mins	✓	Art, Civics, Communications, Environmental Studies, Geography, Global Issues, Language Arts, Media Studies, Social Studies, Technology

The full program takes approximately 8 hours and 30 minutes of classroom time to complete.

The shortened core program takes about 5 hours and 30 minutes to complete.

Key to Recommended Resources

Each activity is linked to extension ideas and online resources to expand the learning beyond the classroom and foster the development of 21st century skills. Below is a key to the list of recommended resources that accompany each activity.

	Extension Ideas to extend learning beyond the classroom.
	Web Resources carefully selected to enhance the activity.
TIGed Resources Joining the TIGed community at (www.tiged.org) allows you to connect with educators around the world and access a tools and resources to take your classroom global.	
	Community: Connect with over thousands of global educators and students in more than 100 countries around the world who are interested in collaborating, sharing, and learning together.
	Resources: A resource centre with lesson plans, activities, games, and thematic classrooms linked to international curriculum benchmarks and 21st century skills.
	Virtual Classroom: The free Tread Lightly thematic classroom is preloaded with content and tools to enable digital learning in a safe, moderated environment.
TIG Resources The TIG community for young global leaders, (www.tigweb.org) provides educational resources and opportunities for interactive learning.	
	Community: Features discussion boards and member stories that can be used to discuss important topics with, and gain inspiration from young leaders from across the globe.
	Action Tools: Facilitates activism by providing youth with online tools to manage projects and groups, create and sign petitions and commitments, and download action guides.
	Resources: A global database of youth-serving and/or youth-run organisations as well as event and opportunity listings to help youth get involved in social and environmental initiatives.
	Youth Media: Includes blogs, educational games, an online art gallery, and the Panorama e-zine of member-generated content.
	Global Issues: Information and resources to learn about more than 40 global issues.
	Regions: Information about, and community pages for, every country and territory in the world.






MODULE 1: STEPPING IN

“Climate change is real and it is happening right now. Its reality can be seen in melting ice, dying coral reefs, rising sea levels, changing ecosystems and prolonged and more severe droughts. According to the [World Health Organisation], 150,000 people are dying every year as a result of climate change. It is for this reason that the world needs to take action now before our planet becomes damaged beyond repair.”

~ Greenpeace International

Lesson 1.1: Our Changing Climate

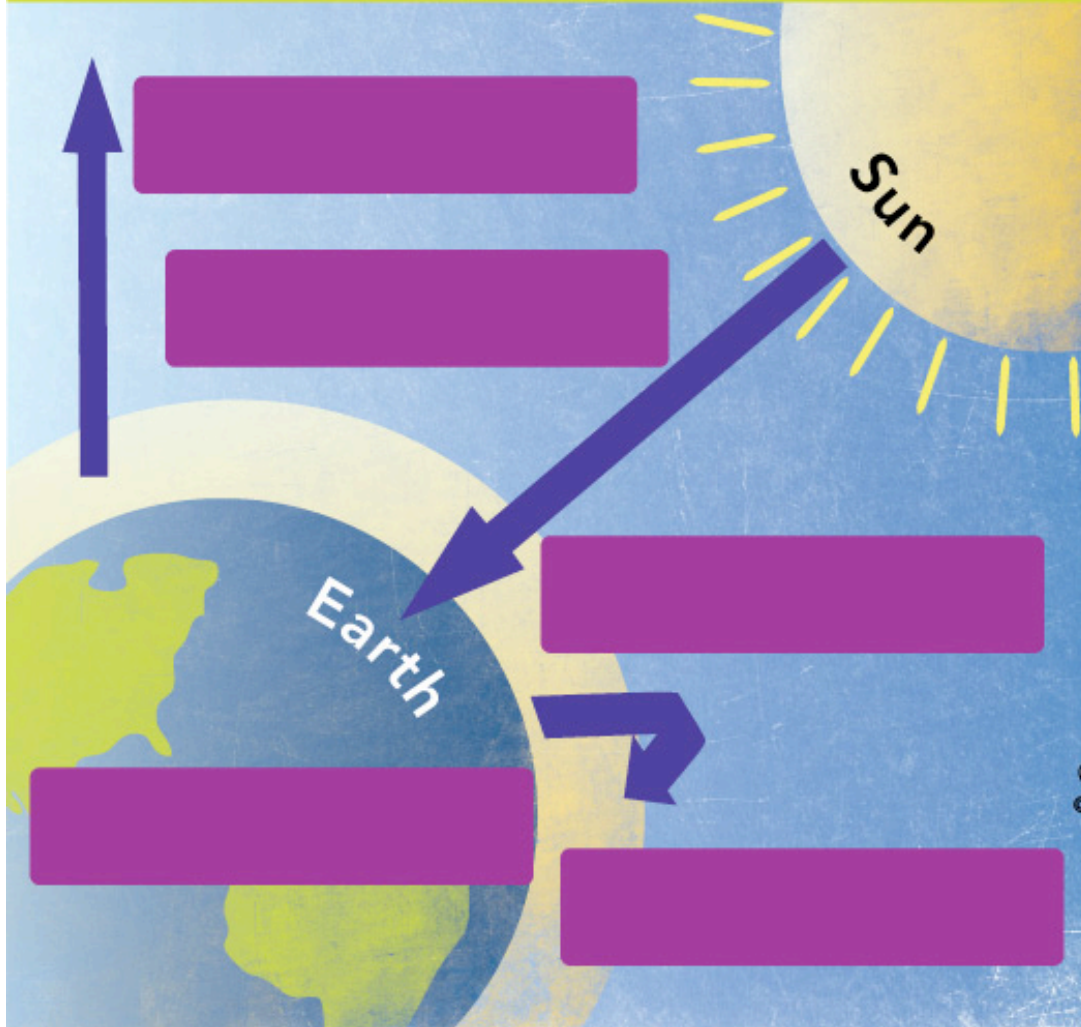
Overview	The first step to taking action on climate change is to understand the basic science behind it and what factors contribute to the problem. This activity introduces students to the greenhouse effect and investigates how human activities contribute to climate change.
Grades	7-12
Time	30 mins
Subjects	<ul style="list-style-type: none"> • Communications • Environmental Studies • Science
21st Century Skills	<ul style="list-style-type: none"> • Critical Thinking and Problem Solving • Communication and Collaboration
Materials	<ul style="list-style-type: none"> • <i>The Greenhouse Effect</i> handout • Video: <i>Greenhouse Effect: Climate Control and Global Warming</i>
Key Terms	<p>Climate change: Accelerated and long-term changes in the climate that differ from natural climate variability patterns.</p> <p>Fossil fuels: Carbon-rich fuels, such as coal, tar sands, oil and natural gas, that are formed in the earth through the physical and chemical transformation of deposits of ancient organic matter, under high temperature and pressure, over millions of years.</p> <p>Greenhouse effect: Warming of the Earth due to trapping of solar radiation in the atmosphere by GHGs.</p> <p>Greenhouse gases (GHGs): Gases in the atmosphere that absorb and emit thermal solar radiation and are responsible for the greenhouse effect.</p> <p>Global warming: Increase in the Earth’s global average temperature due to the enhanced greenhouse effect.</p>
Objectives	<p>Through this activity, students will:</p> <ul style="list-style-type: none"> • Develop a basic understanding of the science of climate change. • Describe how the greenhouse effect is related to climate change. • Understand that human activities and GHGs contribute to climate change.
Procedure	<ol style="list-style-type: none"> 1. Show a short video on the Greenhouse Effect, such as the <i>Greenhouse Effect: Climate Control and Global Warming</i> (5:01 min) by Green Planet Films (see link below). 2. Ask students to listen for and take notes on the following terms while watching the video: <ul style="list-style-type: none"> • Climate change • Fossil fuels • Global warming • Greenhouse effect

	<ul style="list-style-type: none"> • GHGs <p>3. After the video, ask the class to contribute to definitions for each term.</p> <p>4. Provide students with Handout 1.1 A: The Greenhouse Effect, and allow time to complete in class.</p> <p>Discussion</p> <p>Lead a discussion to connect the greenhouse effect with climate change:</p> <ul style="list-style-type: none"> • How do human activities result in excess GHG emissions? • How do excess GHGs influence the greenhouse effect and contribute to climate change? • What is the difference between climate change and global warming?
Homework	Ask students to find a news article or video that describes the causes of climate change and write a brief summary.
	Challenge students to create a crossword puzzle using words related to climate change.
	Video: <i>Greenhouse Effect: Climate Control and Global Warming</i> , (www.youtube.com/watch?v=RGIIIMbG22Y).
	Reading: <i>Climate Change Youth Guide to Action</i> , “Get Informed” (p.16-19) (www.tigurl.org/climategta).
	Climate Change Issues Page, (www.issues.tigweb.org/climate).
	Start a class discussion thread asking students to respond to the question: “How can we limit our GHG emissions?”

Handout 1.1 A: The Greenhouse Effect

The Greenhouse Effect

Adapted from the Greenhouse Effect Worksheet by CAFOD.



Cut out the labels below and stick them on the correct place on the greenhouse effect diagram.

Greenhouse gases in the atmosphere, such as carbon dioxide (CO₂), form a layer around the Earth.

Some heat energy escapes back into space. Without the greenhouse gases the average temperature of Earth would be -18°C, too cold for human habitation.

Heat energy from the Sun beams down onto the Earth. Some of it passes through the layer of gases in the atmosphere.

Some of the heat energy is absorbed by the greenhouse gases. The natural greenhouse effect ensures that the average temperature of Earth is warm enough to support all forms of life.

Human activities, such as the burning of fossil fuels, are creating excess greenhouse gas emissions. The higher concentration of greenhouse gases in the atmosphere exaggerates the greenhouse effect, increasing the amount of heat energy that is absorbed, which leads to global warming and climate change.

Lesson 1.2: Our Changing Climate

Overview	Climate change is a global problem that affects all aspects of the environment. This activity is designed to help students understand how climate change can impact entire ecosystems and reduce the Earth's biological productivity. Through role-playing, students will appreciate the importance of preserving biodiversity.
Grades	7-12
Time	60 mins
Subjects	<ul style="list-style-type: none"> • Environmental Studies • Science
21st Century Skills	<ul style="list-style-type: none"> • Creativity and Innovation • Critical Thinking and Problem Solving • Communication and Collaboration • Information Literacy • Media Literacy
Materials	<ul style="list-style-type: none"> • Handout 1.2 A: Climate Change Scenarios • String/Yarn
Key Terms	<p>Biodiversity: Diversity of plant and animal life within a region or ecosystem. Diversity can be understood in terms of the number and variety of species as well as the genetic variations.</p> <p>Ecosystem: A complex system, within a particular area or region, where organisms exist in communities and interact with the living and non-living components in the environment around them.</p> <p>Interdependence: The dynamic relationships between entities (living and non-living) that are mutually dependent for the success or survival of each individual constituent and the whole unit.</p>
Objectives	<p>Through this activity, students will:</p> <ul style="list-style-type: none"> • Understand the concepts of ecosystem, biodiversity and interdependence, and carrying capacity. • Consider how climate change can impact different components of an ecosystem.
Procedure	<p>Preparation</p> <p>1. Create a list of animals and plants in the categories below. Make sure the number of animals decreases for each category as you go up the food chain, so that plants is the largest category and carnivores is the smallest.</p> <ul style="list-style-type: none"> • Plants (3 layers of vegetation – herbs, shrubs, trees) • Insects and Bugs (try to include pollinators) • Herbivores • Carnivores <p>Ask students to choose a plant or animal and prepare a name tag for themselves with a picture and their plant/animal's name.</p>

2. Ask students to do research to find out the following about their chosen plant/animal:
 - What do they eat to survive?
 - Who are their predators?
 - What kind of habitat do they live in?
3. Provide students with Handout 1.2 A: Climate Change Scenarios and ask them to research and investigate how their plant/animal would be affected by each of the climate change scenarios.








Activities

1. Ask students to wear their animal/plant tags and stand in a big circle.
2. Starting with the plants, pass a ball of yarn between students until all the plants are connected by the thread, then move on to next category and up the food chain until all the other components of the ecosystem have been connected. The end product should look like a web, with every student holding on to the yarn. Make sure that there is not too much tension in the yarn because the web will need to be manipulated.
6. Introduce each of the climate change scenarios in Handout 1.2 A: Climate Change Scenarios and discuss the potential impacts on individual species and/or ecological categories as a group.
7. Each person representing the species/category that is negatively impacted in the climate change scenario should sit down.
8. Species that are dependent on the species that has been negatively impacted should also sit down. For example, if pollinators are decimated by the changes in weather patterns, many plants will not reproduce. If the plant population is also reduced by extreme weather, the herbivores will lose their food source.

As the herbivore population declines, the carnivores succumb to starvation and also decline in number.

Discussion

1. After completing the web of life activity, have a class discussion to explore the following questions:
 - How would humans have been affected by the loss of each plant/animal community?
 - Which plant/animal species was most vulnerable to climate change?
 - Which plant/animal species was most resilient to climate change?
2. Divide into groups to come up with definitions the following terms:
 - **Biodiversity**

	<ul style="list-style-type: none"> • Ecosystem • Interdependence <p>3. Have students come together to share their definitions at the end.</p> <p>4. Ask students to connect their understanding of the terms with what they learned in the web activity.</p>
Homework	Ask students to write a profile of a plant or animal that is on the International Union for the Conservation of Nature (IUCN) Red List of Threatened Species, highlighting how the species will be impacted by climate change.
	Ask students to create a postcard sized image that can be uploaded as an e-card (see link below) and used to advocate for the protection of an endangered plant or animal. Plan an awareness campaign or event around the International Day for Biological Diversity (www.cbd.int/idb/).
	IUCN Red List of Threatened Species (www.iucnredlist.org).
	E-cards: Upload original artwork to create promotional material for an awareness campaign (www.tigweb.org/connections/ecards).
	Upload images to the TIG Global Gallery www.tigweb.org/express/gg/index.html .
	International Days: May 22 - International Day for Biological Diversity www.days.tigweb.org/55 .
	Update your collaboration details, and then search the TIGed community (www.tiged.org/community) for teachers who have listed an interest in dealing with biodiversity and ecosystems and propose to start a collaborative international project on endangered species, migratory animals or invasive species.
	Ask students to post their endangered animal and plant profiles in the class files, augmented by a blog or writing entry. Invite students to read the profiles submitted by other students. Create a poll in a discussion thread for students to vote on which endangered plant or animal they would like to work to protect.

Handout 1.2 A: Climate Change Scenarios

Overview of threats to species and habitat

Changes in climate affect the living conditions of animals and plants – both for individual species and for entire ecosystems. Many terrestrial and aquatic species will not thrive if their habitats become drier, colder, wetter, or warmer. Climate models predict that a warmer climate will bring more precipitation worldwide, especially during winter and in mid-to high latitudes. A warmer climate is expected to lead to more frequent and intense droughts. This makes fires more likely and also makes crops and trees more vulnerable to pests and disease.

Arctic ice loss

The decline of sea ice in the Arctic has been accelerating for the past 3 decades. The atmosphere in the Arctic is warming twice as fast as anywhere else on Earth. Warming is amplified by a decrease in the reflectivity of the Earth's surface as ice and snow melt. Ice and snow reflect solar energy back into space, while darker surfaces like bare tundra and open ocean absorb more solar energy, and then radiate it to heat the air above. As the reflective surfaces disappear, the darker surfaces release heat into the immediate environment that results in accelerated melt, with devastating effects for Arctic plants and animals.

Sea level rise

The last IPCC assessment forecasts that global sea levels will rise between 18 and 59 cm in the coming century from the thermal expansion of warmer oceans and the melting of mountain glaciers (www.ipcc.ch/publications_and_data/ar4/wg1/en/contents.html). The predicted rise for the 21st century is equivalent to 30 cm. Coastal ecosystems and wetlands will be impacted by rising sea levels. Coastal fresh water systems will become inundated by saltwater. This is a problem for fresh water species, but may increase the range of saltwater species.

Seasonal shifts, extreme weather, unpredictable weather patterns

As temperatures and weather conditions fluctuate beyond the natural range of variability, plants and animals that depend on certain climatic conditions will be affected. Long term changes in temperature and precipitation will cause the ecozones, or habitat ranges, of plants and animals to shift. Changes in the timing of seasonal shifts will also cause disruptions for the reproductive health of plants and animals and the timing of migration and feeding cycles.

Water scarcity

Water scarcity is the long-term imbalance between available water resources and demands. Climate change is projected to further reduce water availability in many scarce regions, particularly in the subtropics, due to increased frequency of droughts, increased evaporation, and changes in rainfall patterns and run-off. Water scarcity is set to increase in magnitude and scope.

Soil degradation and desertification




Desertification is land degradation in dry lands, resulting from various factors, including climatic variations and human activities such as logging. The world's soils hold more organic carbon than vegetation and the atmosphere. Soil has the capability to sequester and to literally "breathe in" the excess blanket of CO₂ and help cool the planet. Where soil is depleted, soil carbon sequestration is impaired. Depleted soil is not biologically productive, which means that plants cannot grow in it.

Ocean acidification

Most CO₂ released into the atmosphere as a result of the burning of fossil fuels will eventually be absorbed by the ocean, with potentially adverse consequences for marine creatures. When atmospheric CO₂ dissolves in water, it forms carbonic acid, which increases the acidity of the ocean. Experimental evidence suggests that if these trends continue, key marine organisms such as corals and some plankton will have difficulty maintaining their external calcium carbonate skeletons due to acidity dissolving them. Marine life and coastal species are most impacted by this problem.

Lesson 1.3: Learning from the Past

Overview	No discussion of climate change would be complete without considering what could happen if we do not change our path to a more sustainable one. This activity explores the ecological consequences of societies living beyond the Earth’s carrying capacity through looking at case studies of 3 ancient civilisations: the Vikings in Greenland, the Easter Islanders and the Anasazi of south western North America.
Grades	9-12
Time	60 mins
Subjects	<ul style="list-style-type: none"> • Environmental Studies • Geography • Global Studies • History • Social Studies
21st Century Skills	<ul style="list-style-type: none"> • Critical Thinking and Problem Solving • Communication and Collaboration • Information Literacy • Media Literacy • ICT Literacy • Social and Cross-Cultural Skills
Materials	<ul style="list-style-type: none"> • Handout 1.3 A: Societies Past – The Vikings • Handout 1.3 B: Societies Past – The Easter Islanders • Handout 1.3 C: Societies Past – The Anasazi • Handout 1.3 D: Societies Collapsed – The Vikings • Handout 1.3 E: Societies Collapsed – The Easter Islanders • Handout 1.3 F: Societies Collapsed – The Anasazi
Key Terms	<p>Biocapacity: The measurement of the capacity of a given area of land to produce biological resources and absorb wastes in terms of global hectares.</p> <p>Carrying capacity: The maximum number of individuals that can be supported in a given area or habitat indefinitely so that the depletion of resources does not diminish the biological capacity of the area.</p>
Objectives	<p>Through this lesson, students will:</p> <ul style="list-style-type: none"> • Learn about the concept of carrying capacity. • Investigate what can happen to civilisations that live beyond the carry capacity of the natural environment by investigating the fall of civilisations of the past.
Procedure	<p>Part A – Societies Past</p> <p>1. Divide students into 3 groups and assign 1 of the 3 collapsed societies described in Handouts 1.3 A-C to each group:</p> <ul style="list-style-type: none"> • The Vikings

	<ul style="list-style-type: none"> • The Easter Islanders • The Anasazi <p>2. After reading their handouts, ask students to extrapolate what they think may have happened to the society in question. They should try to predict the fate of the society by picking up on clues contained in the handout text.</p> <p>3. Have groups report back to the class, describing their assigned society and what they think its fate may have been.</p> <p>Part B – Societies Collapsed</p> <p>1. Distribute Handouts 1.3 D-E, which provides extensive explanations of the factors that led to the collapse of each of the 3 societies, and have students work in groups to establish what could have been done in each case to avoid collapse.</p> <p>2. Have each group present their explanations to the rest of the class.</p> <p>Discussion</p> <p>Engage the entire class in a discussion to define the concepts:</p> <ul style="list-style-type: none"> • Biocapacity • Carrying capacity <p>Ask students to use these terms to describe what might have led to the decline of past civilisations. Ask students to extrapolate lessons that are relevant to societies today.</p> <ul style="list-style-type: none"> • Were these societies living beyond the carrying capacity of their area? • Can you identify any mistakes that we are repeating now? • Do you think we are living beyond the carrying capacity of our land today?
Homework	Ask students to write a blog post on a news article about how climate change is affecting society today. Ask students to reflect on whether or not the article indicates that we are living beyond the Earth’s carrying capacity.
	Ask students to explore the World Mapper Biocapacity data map (see link below) and determine whether the city where you are living is in a biologically productive area of the world.
	World Mapper, Biocapacity Data Map (www.worldmapper.org/display.php?selected=321).
	Start a class discussion thread asking students to respond to the question: “Are we living beyond the Earth’s carrying capacity?”



Handout 1.3 A: Societies Past – The Vikings

Norse Vikings began settling in Greenland in A.D. 984. Excavations show that, at the time of their arrival, Greenland had large expanses of forest, with birch trees 4-6 meters high and hills covered by grass and willow bushes.

Initially, the Vikings prospered, establishing 2 main settlements on the southern tip of the island. From the 400 or so farms, whose stone ruins can still be seen, archaeologists estimate that the Viking population in Greenland may have risen to a peak of about 5,000.

The Vikings herded various livestock, taking advantage of the countryside for grazing and growing enough hay in the summer to feed their animals during the winter months. They also established dairy farms. They cut down small trees in order to build fires and produce charcoal.

Merchant ships from Iceland and Norway travelled to Greenland once or twice every year in order to trade. The Vikings were highly dependent upon European trading partners for iron (which they used wood-fed fires to forge into tools and weapons), wood (for boat building), supplemental foods, and social contacts. In exchange, they hunted walrus, narwhals and polar bears to trade with Europe.

They also traded with the Inuit, who reached the northern part of the island around A.D. 1000, and first came into contact with the Vikings in the 12th century. Relations between the Vikings and the Inuit seem to have been friendly at times, and downright hostile at others. Prior to the arrival of the Inuit, the Vikings had the island, its waters, and its resources to themselves. After the arrival of the Inuit, the Vikings found themselves competing for hunting territory and other resources.

What do you think happened to the Vikings of Greenland?

Handout 1.3 B: Societies Past – The Easter Islanders



Easter Island, also known as Rapa Nui, is a tiny island in the Southern Pacific Ocean formed by a series of major volcanic eruptions. It lies 3,200 km west of the coast of Chile, and around 2,100 km from the nearest Polynesian island. It is so remote that, after it was settled by seafaring Polynesians around A.D. 800, no one else landed there until Europeans arrived on Easter Sunday in 1722.

When the Polynesians arrived, Easter Island was covered by a lush tropical forest that included the world's largest palm tree and dandelions of tree height, despite a dry climate and only 100 cm of rain per year. The Polynesian settlers used the island's trees for firewood, to make room for gardens, to build canoes and buildings, and to use as rollers and levers to raise giant statues, called *moai*. Carved out of volcanic rock, *moai* were created as testaments to deceased ancestors and may have also been used to pay respects to powerful chiefs. A total of 887 *moai* have been found across the island. Weighing up to 80,000 kg, they were transported and raised vertically onto platforms without any animals and pulleys. Only tree trunks and human muscle power were used as tools.

The island was also home to at least 6 species of land birds and 37 species of breeding sea birds, the largest collection of breeding sea birds anywhere in the Pacific. The Polynesians hunted both the land birds and the sea birds, and also used their canoes to catch porpoises and tuna. They also harvested the island's plants and fruits.

The ample resources provided by the island allowed the population to flourish to an estimated 10,000 people by A.D. 1550, with distinct clans and population centres forming around the island as its population grew.

What do you think happened to the Easter Islanders?

Handout 1.3 C: Societies Past – The Anasazi



In what is now the American southwest, the Anasazi (a Navajo word meaning "ancient ones" or possibly "ancient enemies") built dramatic adobe dwellings, or pueblos. Remains of buildings up to 6 storeys tall, with up to 600 rooms, can still be found in the 4 corner areas of Arizona, New Mexico, Colorado and Utah that form the heart of what once was Anasazi territory. Chaco Canyon was the hub of Anasazi civilisation, with its numerous large pueblos serving as administrative and ceremonial centres for a widespread population. The expansion of the Anasazi civilisation began around A.D. 600, with the arrival of corn, squash and bean crops from Mexico. It was at this time that Anasazi in Chaco Canyon and other settlements abandoned hunting and gathering in favour of cultivating these newly arrived crops.

The Anasazi demonstrated considerable ingenuity when it came to surviving in the dry American southwest, with its unpredictable rainfall and nutrient-poor soil. In order to grow their crops, the Anasazi hoarded rainwater and used it both sparingly and effectively. Evidence of dams, canals, and other water control features found by archaeologists demonstrates the degree to which water was valued by the Anasazi people. In some areas, irrigation methods were used to carefully channel water to flood out over the fields. Thanks to their ability to feed themselves through agriculture, the Anasazi population expanded. They cut down trees for construction and firewood. Archaeological evidence demonstrates that the Anasazi tended to abandon their sites after a few decades and relocate. This meant that the population became spread over a wide area.

What do you think happened to the Anasazi?

Handout 1.3 D: Societies Collapsed – The Vikings

Viking settlements declined in the 14th century and, by 1440, the Vikings had completely vanished from Greenland. What caused this once flourishing population to collapse?

Deteriorating environment

The Vikings exploited their farmland to the fullest, resulting in a loss of soil fertility. The cutting of dwarf willows and alders for fuel and for the production of charcoal for use in the smelting of bog iron deprived the soil of its anchor of roots, resulting in soil erosion. Overgrazing, trampling, and feeding on regenerating scrub by the Vikings' sheep, goats and cattle damaged much of the plant life.

Climate change

Greenland's summers grew shorter and progressively cooler. This limited the time cattle could be kept outdoors and increased the need for winter fodder. Increased rain and a shorter growing season in the summer meant that the hay crop would have been reduced, making it difficult to feed the cattle through the winter.

As temperatures cooled, there was an increasing amount of sea ice making it more difficult to sail to Greenland. The number of Norwegian merchant vessels arriving in the ports dropped from 1 or 2 a year to none at all. This meant that the islanders were cut off from the major source of iron and tools needed for the smooth running of their farms and the construction and maintenance of their boats.

Hostile neighbours

The Vikings fought with their neighbours, the Inuit. There were raids by the Inuit on the Vikings which resulted in deaths and the capture of men and woman as slaves. With a small population, any losses heavily impacted the Vikings. The collapse of trading meant that the Vikings had no iron to create weapons. Therefore, they had no tactical advantage over the Inuit. The Vikings refused to learn from the Inuit. They did not adopt useful Inuit technology, such as harpoons. They didn't fish, use dog sleighs, build skin boats, or learn from the Inuit how to kill seals at breathing holes in the winter.

Handout 1.3 E: Societies Collapsed – The Easter Islanders

When Europeans arrived on Easter Island in 1722, the society there was in a state of collapse. The islanders had begun to throw down their *moai* and there was evidence of conflict and cannibalism. The population decreased from about 10,000 to an estimated 2,000 with no possibility of rebuilding the original society because of the lack of natural resources on the island. What happened?

Deteriorating environment and food sources

After settling on Easter Island, the Polynesians began to clear the forest for their gardens. They used trees for firewood and as rollers and levers to raise the *moai* and for building canoes to go out into the ocean and catch porpoises and tuna. They also ate the fruits of the palm trees. By the year 1600, all the trees were extinct. The island had become a grassland, with no native trees left standing.

The Polynesians also ate the land birds and the sea birds. By the year 1600, all of the land birds and all but 1 of the sea birds on Easter Island itself were extinct. Some of the sea birds were confined to breeding on offshore stacks. Without trees, the islanders could no longer transport and erect *moai* and they also had no firewood. The soil began to erode, therefore agricultural yields decreased. The Easter islanders couldn't build canoes, so they couldn't go out to the ocean to catch porpoises and there were few sea birds left.

Change in culture

Having lost so many of their food sources, the Easter Islanders collapsed in an epidemic of cannibalism. The spear points from that final phase still litter the ground of Easter Island today.

Handout 1.3 F: Societies Collapsed – The Anasazi

From the 12th to the 13th century, the Anasazi people moved in hordes to join other pueblo peoples to the south and east, abandoning the Chaco Canyon pueblos and, later, the smaller communities that surrounded them. Anasazi ruins can still be found in the American southwest, in the 4 corner area of Arizona, New Mexico, Colorado, Utah, as evidence of the civilisation that died out in the region by the 14th century. What happened?

Deteriorating environment

The Anasazi deforested the area around their settlements until they had to go further and further away for their fuel and their construction timber. By the end they were getting their logs from the tops of mountains up to 120 km away and about 1,220 m above their settlements. These logs had to be dragged back by people with no transport or pack animals.

When water flow is channeled, for example in irrigation ditches, large water flows begin to dig a trench within the channel. This trench digs deeper and deeper with time. The Anasazi did not have pumps to lift the water out of deep trenches so when the water level in the ditches dropped down below the field levels, they could no longer irrigate their crops. When a certain area became impossible to farm, the Anasazi moved to other areas but eventually there was no more unexploited landscape to move to.

Climate change

Climatological evidence, based on tree-ring and pollen studies, suggests that Anasazi farmers may have been kept from moving to higher, moister grounds by a worldwide cooling trend called the Little Age Ice. According to this theory, the Anasazi were squeezed from 2 directions: lower areas became too dry for farming while higher areas were too cold. The region was hit by a number of droughts lasting from 4 to 50 years in length. When this cycle of droughts began, communities were densely populated. Even with good rains, the Anasazi were using their land to its limits. Without rain, it was impossible to grow enough food to support the population.

Widespread famine occurred. People left the area in large numbers to join other pueblo peoples to the south and east, abandoning the Chaco Canyon pueblos and, later, the smaller communities that surrounded them. The Anasazi civilisation began a long period of migration and decline after many years of drought and famine.

Some archaeologists now believe that other factors such as religious upheaval, internal political conflict, and warfare may have combined to exacerbate the effects of the drought. Whatever the root causes of the famine were, the archaeological evidence clearly shows that it was devastating to the Anasazi.

MODULE 2: STEPPING UP

“[The] Ecological footprint is not about ‘how bad things are.’ It is about humanity’s continuing dependence on nature and what we can do to secure Earth’s capacity to support a human existence for all in the future.”

~ Mathis Wackernagel and William E. Rees
(Authors of *Our Ecological Footprint*)

Lesson 2.1: Where We Stand

Overview	In order to effectively reduce one’s environmental impact, it is important to have an understanding of what that impact is in the first place. By having students assess, compare and discuss their ecological footprints, this activity prepares students to take the <i>Tread Lightly Challenge</i> to green their lifestyles.
Grades	7-12
Time	60 mins
Subjects	<ul style="list-style-type: none"> • Civics • Environmental Studies • Geography • Math • Science • Social Studies
21st Century Skills	<ul style="list-style-type: none"> • Creativity and Innovation • Critical Thinking and Problem Solving • Communication and Collaboration • Information Literacy • Media Literacy • ICT Literacy • Initiative and Self-Direction • Leadership and Responsibility
Materials	<ul style="list-style-type: none"> • Handout 2.1 A: Ecological Footprint Quiz • Handout 2.1 B: Tread Lightly Challenge
Key Terms	<p>Carbon footprint – A measurement of the amount of CO₂ emissions produced as a result of human consumption activities.</p> <p>Ecological footprint – A measurement of the amount of land area in global hectares that is required to produce the resources consumed by humanity and to absorb all wastes. Ecological footprints can be calculated for individuals, groups of people, organisations, or specific human activities.</p>
Objectives	<p>Through this lesson, students will:</p> <ul style="list-style-type: none"> • Investigate how carbon footprint and ecological footprint measurements can be used to assess environmental impacts. • Distinguish between carbon footprint and ecological footprint measurements. • Investigate how to measure and reduce their personal ecological footprints by taking part in the <i>Tread Lightly Challenge</i>.
Procedure	<p>Preparation</p> <ol style="list-style-type: none"> 1. Ask students to document their personal consumption patterns in the 5 <i>Tread Lightly Challenge</i> categories (energy, food, transportation,

- waste, water) for a week or more leading up to this activity.
2. Generate a list of questions for students to consider as they document their habits. Refer to Handout 2.1 A for a list of questions.
 3. Give them the option to use a daily journal, blog, photos, or video to record their consumption activities.
 4. Students should be instructed to ask their parents to provide information on home energy and water usage from utility bills or meter readings.


Part A – Ecological Footprint Quiz







1. Introduce the following concepts to the class and discuss the difference between the 2 types of footprints:
 - **Carbon footprint**
 - **Ecological footprint**Highlight the point that footprints can be measured at different scales – for individuals, groups, cities and the world.
2. Explain the connection between the footprint measurements and climate change by pointing out that:
 - Human activities, especially the burning of fossil fuels, contribute to climate change.
 - By measuring the impacts of human consumption patterns, we can gain insight into how behaviours need to change in order to mitigate climate change.
3. Have students measure their ecological footprints using either the online calculator (<http://calculator.bioregional.com/step01.php>) or the quiz provided in Handout 2.1 A. The online calculator is recommended if internet access is available, because it provides a specific ecological footprint measurement, while the handout provides a broader overview of one's ecological impact.
4. Once students have calculated their ecological footprints and recorded the results, engage students in a large group discussion about their findings.

Discussion

- Were you surprised by the size of your ecological footprint measurement?
- What habits and consumption choices affect climate change?
- How could we change our daily routines to lower our GHG emissions and reduce carbon footprints?
- What can we do as individuals, as a school, and as a community to reduce our ecological footprints?

Part B – The Tread Lightly Challenge

	<ol style="list-style-type: none"> 1. Distribute Handout 2.1 B, which provides an overview of the <i>Tread Lightly Challenge</i>. 2. Engage the class in a large group discussion about what specific actions students and teachers could take for the <i>Tread Lightly Challenge</i>. 3. Ask students to come up with 1 action idea for each of the 5 <i>Tread Lightly Challenge</i> categories (energy, food, transportation, waste, and water). 4. There is no time limit for <i>the Tread Lightly Challenge</i>. However, it is recommended that it be implemented over a 5-day cycle, so that students can focus on 1 action and commitment per day. 5. Decide on 5 actions that the class will undertake to reduce footprints. 6. Challenge another class in your school to take the pledge to join you in reducing consumption in the 5 categories. 7. Use the Tread Lightly thematic classroom to set up a collaboration with another classroom as way to facilitate an inter-class, inter-school challenge. 8. Ask students to upload pictures and blogs to the virtual classroom as a way to document their progress through the challenge. <p>Follow-up</p> <ol style="list-style-type: none"> 1. At the end of the <i>Tread Lightly Challenge</i>, have students recalculate their ecological footprints and compare their initial and final measurements. 2. Engage students in a discussion about their experience, in 1 big group or in small groups. 3. You can also plan an event to celebrate achievements. <p>Discussion</p> <ul style="list-style-type: none"> • Has your ecological footprint changed since the start of the <i>Tread Lightly Challenge</i>? Why or why not? • What obstacles made it difficult to follow through on your commitments and meet your targets for the challenge? • How did you encourage others to change their habits and behaviours? • Why is it important to be stewards of the environment?
Homework	Ask students to document their daily progress on their commitments by blogging, photo-blogging, or creating videos.
	Organise the participation of the entire school in the <i>Tread Lightly Challenge</i> or challenge a class in another school. Time your <i>Tread Lightly Challenge</i> to coincide with an International Day (see examples below).

	Global Footprint Network (www.footprintnetwork.org)
	Have students share their daily progress on the Tread Lightly Challenge Page (www.treadlightly.me/challenge)
	International Days April 22: Earth Day (www.days.tigweb.org/49) June 5: World Environment Day (www.days.tigweb.org/15)
	Search for collaborators in the TIGed community. Express your interest in partnering with another school to do the <i>Tread Lightly Challenge</i> in your collaboration details (www.tiged.org/community).
	View the Tread Lightly LOW Carbon Lunch Activity for ideas to reduce food footprints (www.tigurl.org/lclesson).
	Ask students to post to the blogs section of your virtual classroom on the importance of environmental stewardship.

Handout 2.1 A: Ecological Footprint Quiz

How large (or small!) is your ecological footprint? Find out by taking this quiz! Circle the numbers next to the answers that best represents your lifestyle, add the numbers together, and enter the total at the bottom.						
Food						
How often do you eat meat?	None (vegetarian)	1	1-4 days per week	2	Almost every day	3
How often does food go to waste in your household?	Very rarely	1	Occasionally	2	Almost every day	3
Where does most of your food come from?	Home grown or purchased at local markets (no packaging)	1	Grown nationally and purchased from supermarkets (packaged)	2	Imported from other countries and purchased from supermarkets (packaged)	3
Transportation & Travel						
How far does your family travel each week?	Less than 100km	1	100-300km	2	Over 300km	3
Where do you tend to go for family vacations?	Locally	1	Nationally	2	Internationally	3
How do you travel to school each day?	On foot or by bicycle	1	Public transportation	2	Private vehicle	3
Does your family have a car?	No	1	Yes, a small one	2	Yes, a large one (or more than one)	3
Power & Energy						
What power source does your house use?	Some or all solar/wind energy	1	Only electricity	2	Wood, coal, and/or paraffin	3
What measures does your household take to save energy?	All energy-efficient appliances and light bulbs and turn them off when not in use.	1	Some energy-efficient appliances and light bulbs but sometimes leave them on when not in use.	2	Do not use energy-efficient appliances or light bulbs and regularly leave them on when not in use.	3
Water						
How much water does your household use per day? (Check your water meter or water bill.)	700 litres or less	1	700- 1200 litres	2	Over 1200 litres	3
Do you drink bottled water?	Never	1	Occasionally	2	Frequently	3
Waste & Recycling						
Do you recycle paper, tin cans, plastic, glass and make compost?	all 5 of these	1	3-4 of these	2	0-2 of these	3
Do you pack your lunch in reusable containers?	Always	1	Occasionally	2	Never	3
Grand Total						

Adapted from UNESCO, "Teaching and Learning for a Sustainable Future: A Multimedia Teacher Education Program.

How did you score?

Check your total score against the descriptions below to see how your consumption affects our planet.



16 or Less

You tread lightly on our planet and have a small footprint compared to many others. It would be great if more people treated the planet like you do!



17 to 30

You have an average sized footprint and your presence on the planet is damaging. The natural environment cannot support very many people like you. It is important that you learn to tread more lightly on the planet.



30 or More

Lighten up! If everyone had footprints like this, we would need several more planets to provide all the resources we need and to absorb our wastes!

Handout 2.1 B: Tread Lightly Challenge








The *Tread Lightly Challenge* encourages youth around the world to commit to reducing their consumption in 5 categories and to challenge their friends and peers to do the same. Are you ready to step up to the challenge?

Step 1: COMMIT to the *Tread Lightly Challenge* (www.treadlightly.me/challenge) by pledging to reduce your footprint. Use the table to write down at least 1 action you will take to reduce your ecological footprint in each category.

Step 2: CHALLENGE your friends or family to join you in committing to the 5 actions.

Step 3: DOCUMENT your progress with a journal, pictures or a video.

Step 4: REFLECT on the challenge and share your experiences on the web page.

	I commit to reducing my energy footprint	
	I commit to reducing my waste footprint	
	I commit to reducing my food footprint	
	I commit to reducing my water footprint	
	I commit to reducing my transportation footprint	
<p>I, _____, commit to reducing my footprints over the next ____ days.</p> <p>I invite _____ to join me in the <i>Tread Lightly Challenge</i>.</p>		

2.2 Visualising Footprints

Overview	Young people around the world are encouraged to submit creative reflections on the themes of ecological footprints and climate change to the annual Tread Lightly <i>Imprints</i> Art Contest. This activity provides students with an opportunity to experiment with making art using environmentally-friendly materials and to explore creative representations of ecological themes.
Grades	6-12
Time	60 mins
Subjects	<ul style="list-style-type: none"> • Art • Environmental Studies • Communications • Media Studies
21st Century Skills	<ul style="list-style-type: none"> • Creativity and Innovation • Critical Thinking and Problem Solving • Communication and Collaboration • Initiative and Self-Direction
Materials	<ul style="list-style-type: none"> • Handout 2.2 A: Imprints Art Contest Guidelines • Found and salvaged materials • Natural materials • Old magazines • Environmentally friendly art supplies
Key Terms	Environmental art: Artwork that is made with minimal impact on the environment, using environmentally-friendly materials and/or incorporating the environment and sustainability as themes.
Objectives	Through this activity students will: <ul style="list-style-type: none"> • Create ecological artwork using environmentally-friendly materials. • Represent environmental themes through art. • Explore the potential of using art as a means of advocacy and communication.

Procedure Preparation

1. In the week(s) leading up to this activity, ask students to collect environmentally-friendly and recycled materials to use for their artwork. These can include: found materials, waste paper, recyclable materials, biodegradable and natural materials.
2. Students should document the process of collecting materials through a journal, blog, or video diary.

Activities

1. Introduce students to the concept of environmental art and ask them to consider how environmental themes and environmentally-friendly materials can be used to make ecological art. Show examples of environmental art from UK artist Andy Goldsworthy, or other artists listed in the Green Museum (see link below).
2. Provide student with Handout 2.2 A: Imprints Art Contest Guidelines and let them know that they will be creating art that will be submitted to the contest. (Artwork can also be submitted after the contest closes, to be displayed as part of the *Imprints* collection.)
2. As a group, brainstorm images and symbols that represent the concepts of ecological footprints and climate change. Ask students to name images or symbols that represent each concept.
3. Divide students into groups and assign 1 of the following categories to each group (energy, food, transportation, waste, and water).
Ask students to come up with a list of images and symbols that represent their category, and to experiment with the materials available to create 1 collaborative artwork per group.
4. Explain that they can choose to incorporate environmentally-friendly materials, an environmental theme, or both. The choice of medium will depend on the facilities and materials available in your class. Suggested mediums include painting, drawing, sculpture, printmaking, photography, video, collage, mixed media, etc.
5. Try to document the entire process.
6. Ask each group to share their pieces with the class.
7. Allow students the opportunity to work on individual pieces.
8. Scan and upload to the *Imprints* Art Contest website.

Homework

Ask students to finish their artwork and write an artist statement to accompany their piece, detailing the materials they used, the process, and the message they hope to convey.



Ask students to read through the *Culture, Identity and Climate Change* issue of TIG Magazine (see link below) and select a piece of artwork about which to write a short blog or review. This can be uploaded as a blog post or writing in virtual classroom.



Andy Goldsworthy – Environmental Artist
(www.goldsworthy.cc.gla.ac.uk)

Green Museum – Online Museum of Environmental Art
(www.greenmuseum.org)



Upload original artwork and send as an e-card
(www.tigweb.org/connections/ecards)



Culture, Identity and Climate Change issue of *TIG Magazine*
(www.tigweb.org/express/magazine/cultureidentitychange.pdf)



Imprints Art Collection (www.tigurl.org/imprints)



Have students write a blog or review about a piece of artwork in the *Imprints* Art Contest Collection. Student artwork can be uploaded to the class gallery before submitting to the *Imprints* Contest.

Handout 2.2 A: Imprints Art Guidelines



“I hope people can love our only planet more. Think of the Earth as an egg; hold it in your hands carefully so you don’t break it. The Earth is like that, we need to protect it, and love it for the next generation and the rest of our lives. “

~ Betty, 13, Taiwan
2009 Imprints Art Contest Winner

Young people aged 13-30 from around the world are encouraged to submit creative reflections on the themes of ecological footprints and climate change to the annual Tread Lightly *Imprints* Art Contest.

Here’s how to take part:

Step 1: REFLECT on your personal impact on the environment and consider the impact of the society you live in or of humanity on the whole.

Step 2: CREATE artwork that has a small ecological footprint using environmentally friendly materials and/or addresses environmental themes.





Step 3: DOCUMENT your creative process with a blog, photos, or video. Write an artist’s statement about your piece describing your environmental message and how you made the artwork.

Step 4: SUBMIT your image, along with an artist statement highlighting the materials you chose to use, the process of making the artwork and the message you hope to convey through your artwork. Upload your work at www.tigurl.org/imprints/.

2.3 Taking Stock

Overview	When it comes to opportunities to combat climate change, why not start at home? Not only do homes tend to be responsible for a large portion of GHG emissions, but most people tend to spend a significant amount of time in their homes. Through this lesson, students will complete an environmental audit and a lifecycle assessment for a household product or service to determine how to reduce their household ecological footprint.
Grades	9-12
Time	60 mins
Subjects	<ul style="list-style-type: none"> • Civics • Environmental Studies • Science • Social Studies
21st Century Skills	<ul style="list-style-type: none"> • Creativity and Innovation • Critical Thinking and Problem Solving • Communication and Collaboration • ICT Literacy • Initiative and Self-Direction • Productivity and Accountability • Leadership and Responsibility
Materials	<ul style="list-style-type: none"> • Video: <i>The Story of Stuff</i>
Key Terms	<p>Eco-efficiency: Efficiency of energy and resource use which maximises value and minimises waste throughout the lifecycle of a product or service while creating neutral or positive impacts on the environment.</p> <p>Environmental audit: An independent inventory and assessment of the environmental impact of existing practices and/or functions of an organisation or building.</p> <p>Lifecycle assessment: The investigation and evaluation of the environmental impacts of a given product or service, through looking at the material and energy flows involved in the creation and use of the product or service. Also known as cradle-to-grave analysis because this method takes into consideration at all inputs and outputs throughout the life cycle of a product or service from the extraction of resources (cradle), to production, distribution, consumption and disposal (grave).</p>
Objectives	<p>Through this activity students will:</p> <ul style="list-style-type: none"> • Conduct an environmental audit of their household consumption patterns. • Complete a lifecycle assessment for a household product or service. • Assess environmental impacts in terms of material and energy flows.

	<ul style="list-style-type: none"> Identify ways to increase the eco-efficiency of their homes.
<p>Procedure</p>	<p>Preparation</p> <p>1. In the week leading up to this activity, ask students to pay attention to their consumption habits at home. Ask them to take notice of the following:</p> <ul style="list-style-type: none"> Energy use Water use Household consumer products (cleaners, toiletries) Food consumption Waste disposal <p>Part A – The Story of Stuff</p> <p>1. Show a video that exposes the lifecycle of consumer products, such as <i>The Story of Stuff</i> (see link below).</p> <p>2. Ask students to make note of the inputs and outputs of materials and energy at each stage in the life cycle of the products described in the video.</p> <p>3. After the video, engage the class in a discussion to introduce the following concepts:</p> <ul style="list-style-type: none"> Eco-efficiency Environmental audit Lifecycle assessment <p>Part B – Environmental audit</p> <p>1. Divide students into 4-5 groups and assign each group 1 of the following rooms:</p> <ul style="list-style-type: none"> Kitchen Living room Bedroom Bathroom Garage <p>2. Have the student brainstorm activities and consumption patterns related to each room.</p> <p>3. Ask students from each group to present their list of activities.</p> <p>4. Ask each group to identify 1 household item or function related to their assigned room that they would like to do a lifecycle assessment for.</p> <p>Part C – Lifecycle Assessment</p> <p>1. To do a lifecycle assessment for a product or service related to the home, students should ask the following basic questions:</p> <ul style="list-style-type: none"> Where does this object/service originate? What resources and materials is it made up of?

	<ul style="list-style-type: none"> • How is it used (what is its function)? • Where does it go after it has been consumed? <p>Students should consider the flows of natural resources, energy, materials and wastes involved in production, distribution, consumption and disposal.</p> <p>2. Ask students to create a flow diagram to illustrate the inputs and outputs. Different colours should be used for each type of material flow. Allow students the option to use digital tools to illustrate their assessments such as the free Exploratree online diagramming application (see below).</p> <p>3. Ask students to present their flow diagrams.</p> <p>4. Engage the class in a discussion on eco-efficiency and consider the difference between a linear flow and a cyclical flow of resources, materials and energy. A linear flow implies that there is no material or resource recovery, whereas a cyclical or closed-loop flow implies that the output of wastes or by-products are recovered and reused as inputs for a new product and/or service (cradle to cradle rather than cradle to grave).</p> <p>Discussion</p> <ul style="list-style-type: none"> • What are the impacts of the product/service beyond the household? • What are some ways to enhance the eco-efficiency of the home? • What household wastes or by-products can be recovered and reutilised as a resource?
Homework	Ask students to write a short report on 1 action they can take to increase efficiency and reduce waste in their household.
	Ask students to create an animated video illustrating the lifecycle of a consumer product or service.
	Video: <i>The Story of Stuff</i> (www.storyofstuff.com)
	Exploratree: Free online diagramming software (www.exploratree.org.uk)
	Take the <i>Tread Lightly Challenge</i> to reduce ecological footprints (www.treadlightly.me/challenge)
	Create a discussion thread asking students to answer the following question: “What is 1 action that you can take to increase the eco-efficiency of your household?”


MODULE 3: STEPPING FORWARD

“What could be more important than the future of our world? As young people, we have the most at stake, so we should be stepping up to our roles as the major stakeholders and stand up for the kind of future we want.”

~ PauPau, TakingITGlobal member, Philippines

3.1 Climate Policy and Solutions

Overview	Climate change is a public issue that concerns us all. Policy makers and organisations concerned with public affairs often work to educate the public and create awareness of climate change solutions as a way to build consensus. Through this activity students will create a public service announcement (PSA) to promote a particular climate change policy or solution and advocate for change in public policy or public opinion.
Grades	9-12
Time	60 mins
Subjects	<ul style="list-style-type: none"> • Civics • Communications • Environmental Studies • Global Issues • Language Arts • Media Studies
21st Century Skills	<ul style="list-style-type: none"> • Creativity and Innovation • Critical Thinking and Problem Solving • Communication and Collaboration • Information Literacy • Media Literacy • Leadership and Responsibility
Materials	<ul style="list-style-type: none"> • Handout 3.1 A: Climate Change Policies and Solutions • Handout 3.1 B: How to Create a Public Service Announcement • Video – The Story of Cap and Trade
Key Terms	<p>Carbon Capture and Storage: Biological, chemical and physical methods to collect and contain carbon emissions and remove carbon from the atmosphere.</p> <p>Carbon Tax: Taxes can be levied on the use of fossil fuels or on the emissions that result from fossil fuel consumption.</p> <p>Cap and Trade: A cap and trade system, also known as carbon trading, allows people to trade their emissions allowances, or carbon credits.</p> <p>Green energy: Alternative and sustainable forms of energy that have a lower environmental impact than fossil fuels.</p>
Objectives	<p>Through this activity, students will:</p> <ul style="list-style-type: none"> • Investigate and evaluate various climate change policies and solutions. • Create a PSA to promote a particular climate change policy or solution.
Procedure	<p>Part A – Climate Change Policies and Solutions</p> <p>1. Present students with a video that discusses a climate policy or solution, such as <i>The Story of Cap and Trade</i> (see link below).</p>

	<p>2. Introduce the topic of PSAs and discuss the relative benefits of using audio, video, photography, and other digital media to convey a message about climate change.</p> <p>3. Provide students with Handout 3.1 A: Climate Change Policy and Solutions and divide students into groups to research 1 of the following climate change policies and solutions:</p> <ul style="list-style-type: none"> • Carbon Capture and Storage • Carbon Tax • Cap and Trade • Green energy • Rebates and tax incentives <p>As a way to direct their research, ask students to address the following questions:</p> <ul style="list-style-type: none"> • Can you summarise the proposed policy/solution in ten seconds or 1-2 sentences? • How does the policy/solution address climate change? • What are the benefits of adopting this policy/solution? Who benefits? • What are the costs of adopting this policy/solution? Who would be negatively impacted? • What are the challenges to implementing this policy/solution? • What countries have already adopted the proposed policy/solution? <p>Part B – Public Service Announcement</p> <p>1. Provide students with Handout 3.1 B: How to Create a PSA for tips on how to create a public service announcement about their assigned policy/solution. Offer students the option to use any media or format, including: poster, flyer/pamphlet, video/television commercial, or radio announcement.</p> <p>2. Allow students time to experiment, reflect on and plan their PSA in class.</p> <p>3. Students could also create a 1 page summary of the information to accompany their PSA.</p> <p>4. Ask students to present their announcements in front of the class and vote on the most persuasive PSA.</p>
<p>Homework</p>	<p>Ask students to find a current newspaper article discussing a climate change policy or solution. Ask them to write a blog post summarising the article and stating whether they believe the policy or solution is effective or ineffective at addressing climate change.</p>
	<p>Students can use the information they gather in their research to create an advocacy or awareness campaign to educate students within the school or to share with others outside the school community.</p>

	<p>Video: <i>The Story of Cap and Trade</i> (www.storyofstuff.com/capandtrade/)</p>
	<p>Discussion Thread: “Greenhouse Development Rights: the fairest of burden sharing ideas” (www.discuss.tigweb.org/thread/31963)</p>
	<p>Create an e-petition to lobby governments and other decision-makers to adopt a particular climate change policy or solution www.petitions.tigweb.org/home/index</p>
	<p>Reading: <i>TIG’s Youth Guide to Climate Action</i> “Appendix B: Learn More” (p.64-70), (www.tigurl.org/climategta)</p>
	<p>Create a poll in the discussion forum to ask students to vote for the climate change policy or solution they believe should be implemented nationally or globally.</p>

Handout 3.1 A: Climate Policies and Solutions

Carbon Capture and Storage

Carbon capture and storage involves biological, chemical and physical methods to collect and contain carbon emissions and remove carbon from the atmosphere. There are many different methods of capture and storage being proposed, including:

- Transforming CO₂ into other compounds through chemical reactions.
- Pumping carbon into sealed containers and wells in the ground.
- Using filters to absorb and collect carbon.

Carbon Tax

Carbon taxes can be levied on the use of fossil fuels or on the emissions that result from fossil fuel consumption. While charging a carbon tax may be a deterrent and barrier to access for small independent consumers, large corporations and industrial consumers may be able to afford the tax burden. Money collected from carbon taxes may be directed to benefit the research and development of climate change technology and solutions.

Cap and Trade

A cap is a limit on the amount of emissions that can be produced by an individual, corporation or nation. A regulator would set the limit on emissions. A cap and trade system, also known as carbon trading, allows people to trade their emissions allowances, or carbon credits, so that large fossil fuel consumers can buy allowances from small emitters.

Eco Incentives and Rebates

Some governments offer tax breaks to individuals as a way to encourage and reward individuals for choosing to use sustainable products and technologies. Examples of incentives include grants and rebates for making home improvements that increase eco-efficiency.

Green energy

There are many forms of alternative and sustainable energy that can replace fossil fuels. These solutions are lower in carbon emissions and may use renewable resources:

- Wind energy
- Solar power
- Wave power
- Geothermal energy
- Biomass energy

1. Identify your goal

You message and your methods of delivery will be determined by your goal. What do you hope to achieve with this public service announcement? What are the expected outcomes? Do you want people to change their point-of-view? Do you want them to take action?

2. Identify your audience

You should have a clear idea of who you want to reach with your message because you will need to package your message differently depending on your audience. The language and communication style should cater to the audience. Are you trying to talk to adults or youth? What language does your audience speak?

3. Summarise your message in 1-2 sentences

You want to convey your main message in 1-2 sentences because you will not have a great deal of time to capture the attention of your audiences. If the sentence is particularly catchy, you could end up using it as your slogan or catch-phrase.

4. Choose your method of delivery

There are several considerations when choosing the media or format through which to deliver your message. What kind of media or format would your audience best respond to? How much time and resources do you have to create this PSA? How much information do you want to convey? How much time does your audience have to consider your message?

5. Choose a style or mood

In addition to choosing the media or format, it is important to consider how to deliver your message. Certain images, colours and sounds can generate a particular emotional response in your audience and help to emphasise your message. What is the visual look and feel of the PSA that suits your message? What style would be most appealing to your audience? For instance, the style or mood of a poster for youth would be very different from a poster for adults.






6. Test your message on a target audience




To ensure that your message is most effective, you should find 1 or more representatives of your target audience to review your PSA. Ask them tell you what they think the main message of the PSA is and what their reaction to that message is. Did they understand the message? Would they adopt the attitude, opinion, or behaviour that you intend to promote? If not, you should ask for advice on how to change the message or delivery to achieve your goal.

3.2 Climate Change Debate

Overview	World leaders convene at the Conference of Parties (COP) of the United Nations Framework Convention on Climate Change (UNFCCC) every year to develop international policies and strategies to limit the emissions of GHGs. Through this activity students will gain an understanding of the international climate change negotiations through holding a mock climate change debate.
Grades	9-12
Time	90 mins
Subjects	<ul style="list-style-type: none"> • Civics • Communications • Environmental Studies • Global Studies • Geography • Social Studies
21st Century Skills	<ul style="list-style-type: none"> • Critical Thinking and Problem Solving • Communication and Collaboration • Information Literacy • Media Literacy • Social and Cross-Cultural Skills • Leadership and Responsibility
Materials	<ul style="list-style-type: none"> • Handout 3.2 A: Alliance of Small Island States • Handout 3.2 B: India and China • Handout 3.2 C: United States • Handout 3.2 D: Least Developed Countries • Handout 3.2 E: YOUNGO • Handout 3.2 F: True Costs of Consumption • Handout 3.2 G: Footprints of the World
Key Terms	<p>Conference of Parties (COP): An association of government representatives that currently meets once a year to review the UNFCCC’s progress.</p> <p>United Nations Framework Convention on Climate Change (UNFCCC): A multilateral agreement signed by 189 nations at the 1992 Earth Summit in Rio de Janeiro that calls for world governments to commit to reducing GHG emissions. This led to the first COP in Berlin in 1995.</p> <p>Eco Incentives and rebates: Financial rewards and savings that encourage and promote environmentally friendly consumption choices and behaviours.</p>
Objectives	<p>Through this activity, students will:</p> <ul style="list-style-type: none"> • Learn about the process of the international climate change policy negotiations.

	<ul style="list-style-type: none"> • Understand the issues and challenges that decision-makers face when negotiating multi-lateral agreements on climate change. • Explore how different countries are impacted by climate change policy. • Understand the importance of youth representation and participation in the UNFCCC process.
Procedure	<p>Activities</p> <ol style="list-style-type: none"> 1. Introduce the following concepts to the class: <ul style="list-style-type: none"> • Conference of Parties (COP) • United Nations Framework Convention on Climate Change (UNFCCC) <p>Explain that the class will participate in a mock UN climate change debate in order to understand the UNFCCC process.</p> 2. Divide students into 5 teams and assign each group 1 of the 5 stakeholder groups described in Handouts 3.2 A-E. Distribute the appropriate handout to each group. 3. Ask students to formulate a position statement using the information in the handout as a starting point. Provide each group with Handouts 3.2: F-G for additional information that can be used during the debate. 4. Provide students with a list of questions to answer in order to prepare for the negotiations. Suggested questions are: <ul style="list-style-type: none"> • What do you want to get out of the negotiations? • Which countries are your allies? • What is at stake if you do not achieve your goals? • Which stakeholders stand in the way of getting what you want? • What do you think the other groups would like to get out the negotiations? <p>Have students develop a list of key talking points as well as an opening statement.</p> 5. Once the groups have had time to prepare, commence the negotiations with the following statement: <p><i>“We have gathered here today to decide upon a global agreement in response to the climate crisis. UN climate change scientists have recommended that we reduce the global atmospheric concentration of CO₂ to 350 ppm. However, it is up to you, the leaders of the world’s nations, to decide how to proceed from here. We will now hear opening statements.”</i></p> <p>Have students share their opening statements and then facilitate the negotiations.</p> 6. After each group has had the opportunity to speak, have the group vote on an agenda item that was brought up during the meeting. <p>Discussion</p> <p>Engage the class in a group discussion to debrief about the experience.</p>

	<p>Suggested discussion questions are:</p> <ul style="list-style-type: none"> • Why are some parts of the globe more affected by climate change than others? What are some of the reasons for this? • What changes will take place in different regions of the globe if climate change persists? • What is the COP and the UNFCCC and why are they important? • What are some of the difficulties involved in creating an international climate agreement? • What are potential sources of conflict at the upcoming COP, such as obstacles to setting hard targets for emissions reductions? • Is it fair to ask 1 country to sacrifice economic growth to ensure the survival of another country? • Why is it important to have youth representation at the UNFCCC negotiations?
Homework	Have students write a reflection about the importance of youth participation in international climate change policy negotiations.
	Ask students to do a TIG member search to connect with young people in the countries they are representing in the debate. TIG Messenger can be used to get in touch.
	<p>European Youth Forum, <i>Guide for Youth NGOs at United Nations Meetings</i> www.youthforum.org/en/system/files/yfj_public/other_reports/en/UN_guide_web.pdf</p> <p>United Nations Framework Convention on Climate Change www.unfccc.int</p> <p>UNFCCC YOUNGO Wiki Portal (www.sites.google.com/site/unfcccyoungo)</p> <p>YouthClimate.org: Official organising site for the Youth Climate Change movement (www.youthclimate.org)</p>
	Have students contribute to the TIG discussion thread, “Climate Change and Youth: What would YOU tell the UN?” www.discuss.tigweb.org/thread/28511
	Readings: <i>Climate Change Youth Guide to Action</i> “Youth Speaking Truth to Power” (p.11), <i>Tackling Climate Change: Youth and Policy</i> (p.22-23) (www.tigurl.org/climategta)
	Reading: TIG Panorama Zine “ <i>We, Indians, Have to Wake Up to Climate Change!</i> ” (www.tigweb.org/express/panorama/article.html?ContentID=17775) “ <i>Global Climate Change: The imminent disaster in my country</i> ” (www.tigweb.org/express/panorama/article.html?ContentID=6501)

	TIG – Climate Change Issue Page (www.issues.tigweb.org/climate)
	Students can use the country pages as way to find information on their assigned country (www.tigweb.org/explore/regions)
	Set up a poll to invite students to discuss and vote for the stakeholder group who gave the most persuasive argument.

Handout 3.2 A: Alliance of Small Island States

The Alliance of Small Island States (AOSIS) is a coalition of 43 small islands and low-lying coastal countries which have many development concerns and challenges in common. It works to advocate for and negotiate on behalf of its members and observers within the UN system.

“We are not in a position to change the course of events in the world. But what you do or do not do here will greatly influence the fate of my people. It can also change the course of world history.”

~ UNFCCC Representative from the Maldives

Although AOSIS countries are amongst those least responsible for climate change, they are extremely vulnerable to its adverse effects – especially sea level rise – and some may even become uninhabitable. Sea levels are currently rising at a rate of over 2mm per year, and the IPCC estimates that over the course of the next 100 years, levels could rise by as much as 880 mm. In AOSIS countries, rising sea levels could contribute to:

- Soil erosion and land loss
- Human displacement
- Saltwater intrusion into freshwater
- Bleaching and reduced calcification of reefs
- Loss of mangrove forests
- Damage to coastal ecosystems, reducing biodiversity

AOSIS Member States

Antigua and Barbuda, Bahamas, Barbados, Belize, Cape Verde, Comoros, Cook Islands, Cuba, Cyprus, Dominica, Dominican Republic, Fiji, Federated States of Micronesia, Grenada, Guinea-Bissau, Guyana, Haiti, Jamaica, Kiribati, Maldives, Marshall Islands, Mauritius, Nauru, Niue, Palau, Papua New Guinea, Samoa, Singapore, Seychelles, Sao Tome and Principe, Solomon Islands, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Tonga, Trinidad and Tobago, Tuvalu, and Vanuatu.

AOSIS Observers

American Samoa, Guam, Netherlands Antilles, and the U.S. Virgin Islands.

Most small island states are in a poor position to adapt to and deal with the implications of climate change due to small land area, limited resources, low incomes, rapidly expanding populations, and a high susceptibility to natural disasters. To make matters even worse, despite working in a coalition through AOSIS, they hold relatively little influence in international negotiations. They have little bargaining power, can afford to send few delegates, and struggle in negotiations with large, well-paid teams sent by richer countries.

AOSIS believes that developed countries should and must take the lead in reducing GHG emissions, and quickly provide financial support to its members, not only to help support environmental sustainability, but also to help adapt to the impacts of climate change which are already being felt in these low lying countries.

Handout 3.2 B: India and China

India and China are among the fastest growing economies in the world. With considerable populations and surface areas, these countries are gaining considerable power in international trade and political systems. Their growing populations aspire to reach levels of affluence – and private consumption – experienced in developed countries.

The rapid economic development that has taken place in India and China has had the benefit of lifting masses of people out of poverty. However, this has come at a huge environmental cost, as both countries have been relying heavily on burning coal to produce energy, releasing a considerable amount of GHGs into the atmosphere.

Because coal burning power plants are long-term, capital-intensive investments, China and India are likely to continue burning coal in order to meet their rising energy needs. The Pew Centre on Global Climate Change estimates that 86% of the incremental world coal demand between now and 2030 will come from China and India.

Despite their heavy reliance on coal-fired power, both India and China are making some efforts to reduce their GHG emissions. India has been working to develop renewable energy programs, while China is working to slow the rate of its emissions through population stabilisation efforts, transitioning from coal to natural gas, and planting trees.

Because of their sheer size, efforts made by these countries to move to greener sources of energy could shift the economics of energy as we know it, making non-conventional energy sources even cheaper than the burning of fossil fuels such as coal. Moreover, efforts made by these countries to stem their GHG emissions could have a profound impact on the degree of climate change experienced around the world.

While India and China would like to move away from the burning of fossil fuels altogether, this cannot happen without substantial financial investment. Despite the economic growth that these countries have been experiencing, much of their populations are still living in poverty and they maintain the right to develop, and provide for the needs of their populations, as they see fit.

“There is no way the United States can hope to persuade China and India to adopt more environmentally friendly growth strategies without first acknowledging its own responsibility—and then doing something about it.”

~ Kenneth Rogoth, economist

Handout 3.2 C: United States

For a long time, the United States was the world's leading GHG emitter. While this title has now been passed on to China, the US continues to be a major contributor to the problem of climate change. American automobiles, numbering approximately 130 million in total, constitute about 25% of the world's vehicles. Together, they emit roughly as much as the entire Japanese economy (another of the world's top GHG emitters).

While the United States has undoubtedly contributed the most to the climate change crisis facing the global community, it has been the least cooperative player in international climate change negotiations. It chose not to commit itself to the Kyoto Protocol, a legally binding addition to the UNFCCC developed in 2005.

That said, the United States is now under the leadership of President Barack Obama, a change many people think, or hope, will bring about greater leadership and commitment on climate change. President Obama seems committed to creating jobs

while investing in clean and renewable energy and large scale reductions in GHG emissions.

For the

"The issue of climate change is one that we ignore at our own peril. There may still be disputes about exactly how much we're contributing to the warming of the earth's atmosphere and how much is naturally occurring, but what we can be scientifically certain of is that our continued use of fossil fuels is pushing us to a point of no return. And unless we free ourselves from a dependence on these fossil fuels and chart a new course on energy in this country, we are condemning future generations to global catastrophe."

~ US President Barack Obama

United States to sign onto a legally binding climate change instrument, it will have to align closely with domestic policies focused on job creation and energy independence and balance both environmental and economic aims.

As one of the world's richest countries, the United States is also one of the least vulnerable to climate change impacts, with abundant resources available to fund adaptation measures.

It remains unclear whether the United States will agree to any legally binding legislation developed at the next UNFCCC meeting. What do you think?

Handout 3.2 D: Least Developed Countries

Least Developed Countries (LDCs) are those which, according to the UN's Human Development Index, have the lowest indicators of socioeconomic development in the entire world. The current list of countries classified as LDCs includes 49 countries: 33 in Africa, 15 in the Asia Pacific region, and 1 in Latin America.

Representing the poorest and weakest segment of the world's population, LDCs are characterised by:

- Extreme poverty – Almost 50% of the population in LDCs live on less than \$1 USD per day, often in slums.
- Weak economies – In 2004, exports from LDCs accounted for a mere 0.6% of world merchandise exports.
- Heavy debt burdens – LDC's debt burden increased to USD 158.9 billion in 2003.
- Lack of basic infrastructure and social services – less than 60% of the population in LDCs have access to clean, safe drinking water.
- Poor health indicators – The average life expectancy in LDCs is the lowest in the world, at 51 years of age.
- Rapid population growth – The average annual population growth rate in LDCs is the highest in the world, at 5%, compared with the average annual population growth rate in other developing countries is 1.2%.

Africa

Angola, Benin, Burkina Faso, Burundi, the Central African Republic, Chad, Comoros, the Democratic Republic of the Congo (DRC), Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gambia, Guinea, Guinea-Bissau, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Niger, Rwanda, São Tomé and Príncipe, Senegal, Sierra Leone, Somalia, Sudan, Togo, Uganda, Tanzania, and Zambia.

Asia Pacific

Afghanistan, Bangladesh, Bhutan, Cambodia, Kiribati, Lao People's Democratic Republic, Maldives, Myanmar, Nepal, Samoa, Solomon Islands, Timor-Leste, Tuvalu, and Yemen.

Latin America

Haiti

LDCs are also struggling to battle diseases such as malaria and HIV/AIDS, raise low education levels, and tackle environmental problems like desertification, soil erosion, and biodiversity loss. The range of challenges facing LDCs leave them more sensitive to climate change and less capable of adapting to it. This is a cruel irony, considering that LDCs have contributed very little to the problem of climate change. Unless global trends in GHG emission are reversed, these struggling countries will pay the price of the development and prosperity enjoyed by industrialised states.

"Climate justice means pollution has a cost and those costs must be borne by the polluter. The 15 least developed countries contribute less than 1% of global carbon emissions, and yet it is they who suffer the most."

~ Kofi Annan, former UN Secretary General

Many LDC leaders have only recently started to see climate change as a priority issue on the same level as pressing development concerns. It is now becoming increasingly clear to LDCs that climate change is a development issue, and not just an area of concern to industrialised countries. Unlike developed nations, however, LDCs are more concerned about what can be done to adapt to the impacts of climate change that are already being felt than to reduce emissions, as their emissions are already minimal.

Like AOSIS countries, LDCs believe that developed countries should take strong steps to reduce GHG emissions while also providing necessary financial support to impoverished countries ill equipped to deal with the climate change that is already taking place. That said, even working as a coalition, LDCs hold very little power in international governmental negotiations.

Handout 3.2 E: Youth NGOs - YOUNGO

Youth have been making their mark at UNFCCC gatherings from the very beginning, starting with the youth conference held outside the main COP1 activities in Berlin in 1995. Young people have been official participants in other significant international events, through avenues such as the global youth caucus at the 2002 World Summit on Sustainable Development in Johannesburg. However, the international youth climate change movement did not gain official constituency status until 2009, in time for COP15. As a constituency, youth non-governmental organisations (YOUNGO) are able to have representatives speak at the COP sessions and can take part in the UNFCCC process. This status is currently probationary and will be finalised in time for COP17 in 2011. In order to ensure that youth are afforded a permanent place at the UNFCCC negotiations, the collaboration and involvement of youth around the world is required.

As a constituency, YOUNGO are guaranteed the following rights under the UNFCCC process:

- A direct channel of communication with the UNFCCC secretariat;
- Inclusion in ongoing discussions with other civil society constituencies – labour, gender, indigenous, peoples, etc.;
- A time slot to make statements at plenary sessions;
- Representation at workshops;
- Meetings with the Executive Secretary and officials during sessions;
- Access to information on the UNFCCC progress, deadlines and other relevant updates.

There are several important issues that concern youth:

- Youth are inheriting the problems that were created by past generations.
- Youth participation should not be a form of tokenism. Youth should be allowed a greater role in decision making.
- Youth from underrepresented nations should be given funding to attend the COP negotiations.

“We all know what a massive undertaking it would be for our leaders to agree on a set of achievable, equitable and implementable goals for climate change. What can youth do to help? The truth is, we’re probably far more powerful together than any of us can imagine or could be individually! While we may not hold high office nor will we be sitting at the negotiation table, we can persuade and influence key decision-makers in government, business and media, galvanize public opinion and mobilize grassroots movements.”

~ YOUNGO, YouthClimate.org

Handout 3.2 F: True Costs of Consumption

Consumer Spending and Population by Region (2000)		
Region	Percentage of the world's population	Percentage of world private consumption expenditures
United States and Canada	5.2	31.5
Western Europe	6.4	28.7
East Asia and Pacific	32.9	21.4
Latin America and the Caribbean	8.5	6.7
Eastern Europe and Central Asia	7.9	3.3
South Asia	22.4	2.0
Australia and New Zealand	0.4	1.5
Middle East and North Africa	4.1	1.4
Sub-Saharan Africa	10.9	1.2

Spending on luxury items vs. Funding needed to meet selected basic needs			
Product	Annual Expenditure (USD)	Basic Need	Additional Annual Investment to Achieve Goal (USD)
Make-up	18 billion	Reproductive health care for all women	12 billion
Pet food in Europe and the United States	17 billion	Elimination of hunger and malnutrition	19 billion
Perfume	15 billion	Universal literacy	5 billion
Ocean cruises	14 billion	Clean drinking water for all	10 billion
Ice cream in Europe	11 billion	Immunising every child	1.3 billion

Source: Worldwatch Institute. "State of the World 2004: Consumption by the Numbers" (2004).


Handout 3.2 G: Footprints of the World





Country	Population (1995)	Ecological Footprint (hectares/person)	Available Capacity (hectares/person)	Ecological Deficit (hectares/person)
Argentina	34,768,000	3.0	4.4	1.4
Australia	17,862,000	9.4	12.9	3.5
Austria	8,045,000	4.6	4.1	-0.5
Bangladesh	118,229,000	0.6	0.2	-0.3
Belgium	10,535,000	5.1	1.7	-3.4
Brazil	159,015,000	3.6	9.1	5.6
Canada	29,402,000	7.2	12.3	5.1
Chile	14,210,000	2.3	2.6	0.3
China	1,220,224,000	1.4	0.6	-0.8
Colombia	35,814,000	2.3	4.9	2.6
Costa Rica	3,424,000	2.8	2.0	-0.8
Czech Repub.	10,263,000	3.9	2.6	-1.4
Denmark	5,223,000	5.9	4.2	-1.7
Egypt	62,096,000	1.4	0.5	-1.0
Ethiopia	56,404,000	0.7	0.5	-0.2
Finland	5,107,000	5.8	9.9	4.1
France	58,104,000	5.3	3.7	-1.6
Germany	81,594,000	4.6	1.9	-2.8
Greece	10,454,000	4.2	1.6	-2.6
Hungary	10,454,000	3.1	2.6	-0.5
Iceland	269,000	5.0	6.8	1.9
India	929,005,000	1.0	0.5	-0.5
Indonesia	197,460,000	1.3	2.6	1.4
Ireland	3,546,000	5.6	6.0	0.4
Israel	5,525,000	3.5	0.3	-3.1
Italy	57,204,000	4.2	1.5	-2.8
Japan	125,068,000	4.2	0.7	-3.5
Jordan	4,215,000	1.6	0.2	-1.4
Malaysia	20,140,000	3.2	4.3	1.1
Mexico	91,145,000	2.5	1.3	-1.3
Netherlands	15,482,000	5.6	1.5	-4.1
New Zealand	3,561,000	6.5	15.9	9.4
Nigeria	111,721,000	1.0	0.6	-0.4
Norway	4,332,000	5.5	5.4	-0.1
Pakistan	136,257,000	0.9	0.4	-0.5
Peru	23,532,000	1.4	7.5	6.1
Philippines	67,839,000	1.4	0.8	-0.7
Poland	38,557,000	3.9	2.0	-1.9
Portugal	9,815,000	3.7	1.8	-2.0
Russia	148,460,000	4.6	4.3	-0.4
South Africa	41,465,000	3.0	1.0	-2.0
Spain	39,627,000	3.8	1.4	-2.5
Sweden	8,788,000	6.1	7.9	1.8
Switzerland	7,166,000	4.7	1.8	-2.9
Thailand	58,242,000	1.9	1.3	-0.7
Turkey	60,838,000	2.1	1.2	-0.8
U.K.	58,301,000	4.6	1.5	-3.1
United States	267,115,000	9.6	5.5	-4.1
Venezuela	21,844,000	4.0	4.7	0.7

Source: Worldwatch Institute. "State of the World 2004: Consumption by the Numbers" (2004).

3.3 Stepping Forward

Overview	Having learned about the causes of climate change and taken part in actions to reduce their ecological footprints, students are now ready to take their environmental initiatives beyond the classroom. By introducing students to the 6 TIG Steps Towards Change and the TIG Youth Guide to Climate to Climate Action, this activity prepares youth to make an impact in their local communities and to extend their reach into the global community.
Grades	9-12
Time	30 mins
Subjects	<ul style="list-style-type: none"> • Art • Civics • Communications • Environmental Studies • Geography • Global Issues • Language Arts • Media Studies • Social Studies • Technology
21st Century Skills	<ul style="list-style-type: none"> • Creativity and Innovation • Critical Thinking and Problem Solving • Communication and Collaboration • Information Literacy • Media Literacy • ICT Literacy • Flexibility and Adaptability • Initiative and Self-Direction • Social and Cross-Cultural Skills • Productivity and Accountability • Leadership and Responsibility
Materials	<ul style="list-style-type: none"> • Handout 3.3 A: TIG's 6 Step Action Process • TIG Guide to Action • TIG Youth Guide to Climate Action
Key Terms	Climate Hero: An individual who is doing outstanding work to address climate change
Objectives	Through this activity students will: <ul style="list-style-type: none"> • Identify local issues related to climate change that are most relevant and important to them. • Formulate a project idea to address a local climate change related issue.

	<ul style="list-style-type: none"> Follow the TIG 6-step process to start a climate change project.
Procedure	<p>Preparation</p> <p>Ask students to bring in a story about a young climate change hero – a young person who is taking action to address a local or global issue related to climate change. Direct them to search the Member Stories section of the TIG website (see link below) or the My Hero Project (see link below) for profiles of youth leaders.</p> <p>Activities</p> <ol style="list-style-type: none"> Ask a selected number of students to share the stories of leaders in class highlighting the following points: <ul style="list-style-type: none"> Location Age Local challenges and issues Global challenges and issues How these problems related to climate change How the youth addressed the problems What help or resources they used Ask students to name the qualities leaders should possess, drawing from the examples of the youth climate heroes shared in class. Brainstorm a list for the entire class to see on a blackboard/whiteboard. Ask students to privately write down in two columns, the leadership characteristics that they themselves possess and those they wish to develop. Ask students to brainstorm local issues related to climate change that they would like to take action on. Then ask students to come up with 1 action idea for each issue. Introduce students to the idea that they are capable of making a change and taking action on the issues that they are most passionate about. Encourage students to pursue their ideas using the TIG Guide to Action (see link below) and/or the Youth Guide to Climate Action (see link below) as a resource. Provide students with Handout 3.3 A, which is an overview of TIG’s 6-step action process. Direct students to the TIG Action Tools section on the website for ways to start and organise their project online.
Homework	Ask students who did not share their youth action story in class to write a profile of their chosen climate hero.
	Ask students to create a TIG project page to organise their climate change action initiative.

	<p>My HERO Project (www.myhero.com) National Geographic (www.nationalgeographic.com)</p>
	<p>Member Stories (www.tigweb.org/connections/stories/)</p>
	<p>TIG Action Tools (www.tigweb.org/action/) TIG Guide to Action (www.tigweb.org/action/guide/) TIG Youth Guide to Climate Action (www.tigurl.org/climategta)</p>
	<p>Create a collaboration page to invite another class to join your students in initiating a climate change action project.</p>

Handout 3.3 A: TIG's 6 Step Action Process

Are you ready to take action on climate change? Check out the TIG 6-Step Action Process to get started:

1. REFLECT AND GET INSPIRED
 - Think about local climate change issues that affect you.
 - Research a local or international climate change story.
 - Find a climate hero's story.
2. IDENTIFY AND GET INFORMED
 - Identify the issue that you feel most passionate about.
 - Research the issue, challenges and opportunities to address the problem.
3. LEAD AND GET OTHERS INVOLVED
 - Identify your leadership skills and characteristics.
 - Build a team of people you want to work with who share your passion.
4. GET CONNECTED
 - Attend events in your area to connect with people and organisations dealing with the specific climate change issue you are interested in taking action on.
 - Search your personal networks to connect with people who can help you with your project.
 - Start by connecting with the Youth Climate Coalition in your area.
5. PLAN AND GET MOVING
 - Choose a simple project idea with clear goals.
 - Create an action plan identifying how you will achieve your goals.
 - Implement your action plan using the tools and resources at your disposal (you can start by using the free TIG Action Tools).
6. HAVE A LASTING IMPACT
 - Evaluate your progress to make sure that you recognise areas for improvement.
 - Sustain your action by ensuring that you have the help and support you need to ensure the continuity of your project.

The 6-Step Action Process is adapted from the Youth Guide to Climate Action. To access the full guide, go to www.tigurl.org/climategta.

REFERENCES

- CAFOD. "The Greenhouse Effect Worksheet." (2010).
www.cafod.org.uk/resources/primary/climate-environment/panels/resources-to-download/the-greenhouse-effect-worksheet.
- Climate Hot Map. "Global Warming: Early Warning Signs." (1999)
www.climatehotmap.org/harbingers.html.
- European Commission. "What Is Climate Change?"
http://ec.europa.eu/environment/climat/campaign/what/climatechange_en.htm.
- Garret, Kirsten. "Why Societies Collapse: Jared Diamond at Princeton University." Australian Broadcasting Corporation (October 2003). www.abc.net.au/rn/talks/bbing/stories/s743310.htm.
- Global Footprint Network. "World Footprint: Do we fit on the planet."
www.footprintnetwork.org/en/index.php/GFN/page/world_footprint/.
- Green Learning. "Effects of Climate Change on Ecosystems."
www.greenlearning.ca/climate/science/ecosystem-effects/2.
- Intergovernmental Panel on Climate Change (IPCC). Climate Change 2001: Synthesis Report. Cambridge, UK: Cambridge University Press, 2001.
- Intergovernmental Panel on Climate Change (IPCC). Climate Change 2007: Synthesis Report. Valencia, Spain: UN, 2007.
- Pew Center on Global Climate Change. "Coal and Climate Change Facts."
www.pewclimate.org/global-warming-basics/coalfacts.cfm.
- Schreiner, Camilla. "How Are People Changing the Climate?" ESPERE (March 2004).
www.atmosphere.mpg.de/enid/1e21d32123fc1e20410c05fccf4ff972,0/basics/2_What_willthe_future_be_like_1w9.html.
- Science Daily. "Ocean Grows More Acidic Faster Than Once Thought: Increasing Acidity Threatens Sea Life." (November 2008). www.sciencedaily.com/releases/2008/11/081124141053.htm.
- United Nations Department of Economic and Social Affairs (UN-DESA) (Population Division). World Population to 2300. New York, USA: UN, 2004.
- United Nations Environment Program (UNEP) (Division of Early Warning and Assessment). GEO Year Book 2004/5: An Overview of our Changing Environment. Nairobi, Kenya: UN, 2005.
- United Nations Environment Program (UNEP) (Division of Early Warning and Assessment). UNEP Year Book 2009: New Science and Developments in our Changing Environment. Nairobi, Kenya: UN, 2009.
- United Nations Educational, Scientific, and Cultural Organisation (UNESCO). "Teaching and Learning for a Sustainable Future: A Multimedia Teacher Education Program."
www.unesco.org/education/tlsf/.

Global Footprint Network. "World Footprint" (2009),
www.footprintnetwork.org/en/index.php/GFN/page/world_footprint/.