Human Footprint

by Joanna Bruno

*Adapted from **"Human Footprint"** by Michelle Logan and Jen Varrella*

This module is meant to be taught independently or in conjunction with the Colorado Department of Education Instructional Unit Sample for 8th grade Science, "Matter Responds to Energy", found at: http://www.cde.state.co.us/standardsandinstruction/instructionalunits-science

Students will consider the impact their personal habits have on the environment, and their responsibility as global citizens to take action. Human Footprint, as referenced throughout the module, is the metaphor for the lifetime use of fuel, with the lifetime of one's waste and the impact these have on the environment.

This module has been written with the intent of implementation third quarter of 8th grade as part of a larger energy unit. This unit transitions us from topics related to chemistry then to physics covering Colorado State Standard one: physical science. This LDC module may be incorporated into Learning Experience # 10 of the CDE unit or on its own. Learning Experience 10 is the final experience prior to the culminating performance assessment.

GRADES	DISCIPLINE	COURSE
7 - 8	⚗ **Science**	☰ **Physical Science 8**

Section 1: What Task?

Teaching Task

Task Template 2 - Argumentation

Why should/shouldn't humans limit their impact on the environment? After reading various text/articles, conducting independent research, and viewing documentary accounts of humans and the environment, write an extended essay in which you address the question and argue your position. Support your position with evidence from the text(s).

D 1 Be sure to acknowledge competing views.

Common Core State Standards

Reading Standards for Literacy in Science and Technical Subjects 6—12

RST.6-8.1 Cite specific textual evidence to support analysis of science and technical texts.

RST.6-8.2 Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.

RST.6-8.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6—8 texts and topics.

RST.6-8.10 By the end of grade 8, read and comprehend science/technical texts in the grades 6—8 text complexity band independently and proficiently.

Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects 6—12

WHST.6-8.1   Write arguments focused on discipline-specific content.

     WHST.6-8.1.e   Provide a concluding statement or section that follows from or supports the argument presented.

     WHST.6-8.1.d   Establish and maintain a formal style.

     WHST.6-8.1.c   Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), counterclaims, reasons, and evidence.

     WHST.6-8.1.b   Support claim(s) with logical reasoning and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources.

     WHST.6-8.1   Introduce claim(s) about a topic or issue, acknowledge and distinguish the claim(s) from alternate or opposing claims, and organize the reasons and evidence logically.

WHST.6-8.4   Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

WHST.6-8.5   With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed.

WHST.6-8.9   Draw evidence from informational texts to support analysis, reflection, and research.

WHST.6-8.10   Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

Additional Standards

Colorado

Colorado Academic Standards for Science

CO   Use technology resources such as online encyclopedias, online databases, and credible websites to locate, organize, analyze, evaluate, and synthesize information about human impact on local ecosystems

CO   Identify evidence that suggests that matter is always conserved in physical and chemical changes

CO   Examine, evaluate, question, and ethically use information from a variety of sources and media to investigate physical and chemical changes

CO   Analyze and interpret data about human impact on local ecosystems

Texts

▤ "Human Footprint" (National Geographic 2009)
This documentary asks exactly how much waste a single person will generate, as well as how much fuel a single person will use over the course of their entire lifetime. The video highlights the long-term impact that our lives have on the world we inhabit. ~ Jason Buchanan, Rovi "Video -- Human Footprint -- National Geographic." Video -- Video Home -- National Geographic. N.p., n.d. Web. 28 May 2012. <http://video.nationalgeographic.com/video/national-geographic-channel/all-videos/av-6256-6460/ngc-human-footprint-1/>.

▤ "Treading Lightly"
Economist (9/21/2002)— This article focuses on the ecological footprint of mankind. The idea is to translate human demands on the environment into a common unit, so they can be added up. The footprint is the physical area required to meet man's needs and wants. In its report "Living Planet Report 2002," the World Wildlife Fund (WWF), a conservation group, says that mankind's ecological footprint is already 1.2 Earths. WWF defines the footprint for fossil fuels as the area of forest required to absorb emissions of carbon dioxide. Growth in the energy footprint then drives almost everything else. The energy footprint increased from 2.5 billion hectares in 1961 to 6.7 billion in 1999. Growth in the ecological footprint excluding energy was much smaller than growth in global population between 1960 and 2000.

▤ "Sustainability--The Facts"
New Internationalist (Nov2000)— Presents facts and trivia about the issue of sustainability. Impact of habitat destruction on planet Earth's biodiversity; Number of countries experiencing chronic water shortages; Increase in world food production; Decline in natural forest cover.

▤ "The Trouble With A No-impact Planet"
Maclean's (9/28/2009)—Potter, Andrew In this article the author comments on issues surrounding the desire to make human activity have as little impact on the global environment as possible. Central to the article is the author's contention that the rapid expansion of the Chinese economy and the resulting environmental damage is not a cause for concern.

📖 "Human Climate Meddling Got Started Long Before the Petroleum Era"
Science News (4/23/2011)—Witze, Alexandra The article discusses the history of human effects on climate change focusing on carbon releases to the atmosphere associated with tree and forest clearing conducted for land uses including hunting and agriculture. Research cited is that of scientist Jed Kaplan and team, as reported at a March 25, 2011 meeting of the American Geophysical Union.

🔗 **Ecological Footprint Quiz**

🔗 **Global Footprint Network**

🔗 **Ecological Capital**

🔗 **Living Planet Report**

🔗 **National Geographic-Eye on Impact**

🔗 **Environmental Protection Agency- Climate Impact on Humans**

LDC Student Work Rubric - Argumentation

	Not Yet	**Approaches Expectations**	**Meets Expectations**	**Advanced**
	1	**2**	**3**	**4**
Focus	Attempts to address prompt, but lacks focus or is off-task.	Addresses prompt appropriately and establishes a position, but focus is uneven. D. Addresses additional demands superficially.	Addresses prompt appropriately and maintains a clear, steady focus. Provides a generally convincing position. D: Addresses additional demands sufficiently	Addresses all aspects of prompt appropriately with a consistently strong focus and convincing position. D: Addresses additional demands with thoroughness and makes a connection to claim.
Controlling Idea	Attempts to establish a claim, but lacks a clear purpose.	Establishes a claim.	Establishes a credible claim.	Establishes and maintains a substantive and credible claim or proposal.
Reading/Research	Attempts to reference reading materials to develop response, but lacks connections or relevance to the purpose of the prompt.	Presents information from reading materials relevant to the purpose of the prompt with minor lapses in accuracy or completeness.	Accurately presents details from reading materials relevant to the purpose of the prompt to develop argument or claim.	Accurately and effectively presents important details from reading materials to develop argument or claim.
Development	Attempts to provide details in response to the prompt, but lacks sufficient development or relevance to the purpose of the prompt.	Presents appropriate details to support and develop the focus, controlling idea, or claim, with minor lapses in the reasoning, examples, or explanations.	Presents appropriate and sufficient details to support and develop the focus, controlling idea, or claim.	Presents thorough and detailed information to effectively support and develop the focus, controlling idea, or claim.
Organization	Attempts to organize ideas, but lacks control of structure.	Uses an appropriate organizational structure for development of reasoning and logic, with minor lapses in structure and/or coherence.	Maintains an appropriate organizational structure to address specific requirements of the prompt. Structure reveals the reasoning and logic of the argument.	Maintains an organizational structure that intentionally and effectively enhances the presentation of information as required by the specific prompt. Structure enhances development of the reasoning and logic of the argument.
Conventions	Attempts to demonstrate standard English conventions, but lacks cohesion and control of grammar, usage, and mechanics. Sources are used without citation.	Demonstrates an uneven command of standard English conventions and cohesion. Uses language and tone with some inaccurate, inappropriate, or uneven features. Inconsistently cites sources.	Demonstrates a command of standard English conventions and cohesion, with few errors. Response includes language and tone appropriate to the audience, purpose, and specific requirements of the prompt. Cites sources using appropriate format with only minor errors.	Demonstrates and maintains a well-developed command of standard English conventions and cohesion, with few errors. Response includes language and tone consistently appropriate to the audience, purpose, and specific requirements of the prompt. Consistently cites sources using appropriate format.
Content Understanding	Attempts to include disciplinary content in argument, but understanding of content is weak; content is irrelevant, inappropriate, or inaccurate.	Briefly notes disciplinary content relevant to the prompt; shows basic or uneven understanding of content; minor errors in explanation.	Accurately presents disciplinary content relevant to the prompt with sufficient explanations that demonstrate understanding.	Integrates relevant and accurate disciplinary content with thorough explanations that demonstrate in-depth understanding.

Background for Students

As young adults, it is easy to think we have little impact on the world around us. We may feel our contribution to the world goes undetected. However, as individuals we contribute to global issues regarding consumption, and waste. The extended essay will ask each individual to take a close look at their own energy consumption, consider the impact their personal habits have on the environment, and determine their responsibility as global citizens to take action.

Extension

Students may create a video or Public Service Announcement around their findings.

Section 2: What Skills?

Preparing for the Task

TASK AND RUBRIC ANALYSIS > TASK ANALYSIS: Ability to understand and explain the task's prompt and rubric.

Reading Process

PRE-READING > TEXT SELECTION: Ability to identify appropriate texts and develop a bibliography.

ACTIVE READING > ANNOTATION: Ability to identify the central point and main supporting elements of a text. D2 In your discussion, address the credibility and origin of sources in view of your research topic. (RI8:2,3)

ACTIVE READING > ESSENTIAL VOCABULARY: Ability to identify and master terms essential to understanding a text.

ACTIVE READING > NOTE-TAKING: Ability to select important facts and passages for use in one's own writing.

Transition to Writing

BRIDGING CONVERSATION > PREPARING FOR WRITING: Ability to begin linking reading results to writing task.

Writing Process

INITIATION OF TASK > ESTABLISHING THE CONTROLLING IDEA: Ability to establish a claim and consolidate information relevant to task; draft a Thesis.

PLANNING > PLANNING THE WRITING: Ability to develop a line of thought and text structure appropriate to an argumentation task.

DEVELOPMENT > INTRODUCTORY PARAGRAPH: Ability to construct an initial draft with an emerging line of thought and structure. (D2) identifies credible sources. (W8:1, RI8:1)

DEVELOPMENT > BODY PARAGRAPHS: Ability to construct an initial draft with an emerging line of thought and structure. (D2) identifies credible sources. (W8:1, RI8:1)

DEVELOPMENT > CONCLUDING PARAGRAPH: Ability to construct an initial draft with an emerging line of thought and structure. (D2) identifies credible sources. (W8:1, RI8:1)

REVISION, EDITING, AND COMPLETION > REVISION: Ability to refine text, including line of thought, language usage, and tone as appropriate to audience and purpose.

REVISION, EDITING, AND COMPLETION > EDITING: Ability to proofread and format a piece to make it more effective.

REVISION, EDITING, AND COMPLETION > FINAL DRAFT: Ability to submit final piece that meets expectations.

Section 3: What Instruction?

PACING	SKILL AND DEFINITION	PRODUCT AND PROMPT	SCORING GUIDE	INSTRUCTIONAL STRATEGIES
Preparing for the Task				
40 mins	**TASK AND RUBRIC ANALYSIS > TASK ANALYSIS**: Ability to understand and explain the task's prompt and rubric.	**BULLETED LIST** "In your own words, what are the important things to pay attention to in order to write a good response to this teaching task?"	No Scoring	* Review scoring rubric, ask students to identify strands they will need to pay special attention. This will vary student to student depending on student growth from last writing task. * Share examples past work. Paying close attention to the thesis statement and acknowledgment of opposing view point. *Ask students to identify key features of examples. * Pair students to share and improve their individual bullets.
30 mins	**TASK AND RUBRIC ANALYSIS > TASK ANALYSIS**: Ability to understand and explain the task's prompt and rubric.	**ADDITIONAL LIST IN TASK LOG** What is your carbon footprint? For the next 7 days you will map your footprint by keeping an energy consumption log. This will help you identify your current carbon footprint and hopefully challenge you to think differently when it comes to consumption and waste.	Log is complete and daily consumption is recorded.	*Share example of a previous energy consumption logs. * Assist students in setting up their log. See attached document in "Uploaded Resources." * As part of each day's warm-up students are to update their log and analysis their current usage.
Reading Process				
1 hr	**PRE-READING > TEXT SELECTION**: Ability to identify appropriate texts and develop a bibliography.	**BIBLIOGRAPHIC LIST** Identify reliable research sources utilizing appropriate citation formats.	No scoring	*Model and guide students through writing a proper citation for the documentary, Human Footprint. *Explain that students will need to locate, analyze for reliability and cite sources they have chosen for the extended essay.
30 mins	**PRE-READING > TEXT SELECTION**: Ability to identify appropriate texts and develop a bibliography.	**FINAL BIBLIOGRAPHY** Create your Bibliography for the essay in proper citation format.	*Identify the following: author, title, publisher, date and any other needed information (for example, the volume for a periodical or the editor for an anthology).	* Review citation guide and discuss why each element of citation is needed. Use online resources such as bibme.org, http://citationmachine.net/index2.php, or other bibliography wizards. *Ask students to brainstorm what makes an author credible, valid, and/or worthy of study. (Currency, Relevance/coverage, Authority, Accuracy, Purpose/Objectivity)

Human Footprint

PACING	SKILL AND DEFINITION	PRODUCT AND PROMPT	SCORING GUIDE	INSTRUCTIONAL STRATEGIES
1 hr	**ACTIVE READING > ANNOTATION**: Ability to identify the central point and main supporting elements of a text. D2 In your discussion, address the credibility and origin of sources in view of your research topic. (RI8:2,3)	**SHORT CONSTRUCTED RESPONSE** Not Provided	Follow active reading protocol and addresses each part of the close reading.	*First read: Highlight unknown words and identify the thesis of the article. *Brainstorm a list of terms as a class and possible thesis statements. Address technical terms and academic vocabulary. *Second read: Summarize the big idea for each chuck of text in 3-5 words. *Discuss findings on small groups. Third read: Identify and mark the three strongest pieces of evidence to support the author's thesis. Explain why each piece is essential to the argument. *Small group discussion and full class discussion.
10 mins	**ACTIVE READING > ESSENTIAL VOCABULARY**: Ability to identify and master terms essential to understanding a text.	**LIST OF ESSENTIAL VOCABULARY (ONGOING)** Essential Vocabulary: "In your notebook, list and describe/define words, phrases, and/or diagrams that challenge your understanding of the texts."	* Provides accurate definitions and/or explanations or graphic representations as needed while conducting independent research.	*Highlight unknown terminology from text sources. Make a list of terms for online sources. * Write definitions in their own words
30 mins	**ACTIVE READING > NOTE-TAKING**: Ability to select important facts and passages for use in one's own writing.	**TASK LOG NOTES AND TEXT ANNOTATION (ONGOING)** "For each text and video, take notes and/or annotate elements relevant to the task. Make sure you have the information to do a citation when needed to avoid plagiarism."	* Identifies relevant elements – facts, quotes, explanations. * Includes necessary citation information to support facts, questions, etc.	* Teach two column note taking and/or annotation. * Check that early student work is in the assigned format
1 hr and 30 mins	**ACTIVE READING > NOTE-TAKING**: Ability to select important facts and passages for use in one's own writing.	**"HUMAN FOOTPRINT" DOCUMENTARY NOTES** While watching, National Geographic: Human Footprint. (2009), take notes on each section of the documentary. I have provided a few key points to look for from the first section of the documentary to get you started.	Actively engaged in taking notes during the documentary.	* Set up notes according to each main section of the documentary. Accomodations: Use Graphic Organizer.

PACING	SKILL AND DEFINITION	PRODUCT AND PROMPT	SCORING GUIDE	INSTRUCTIONAL STRATEGIES
1 hr	**ACTIVE READING > NOTE-TAKING**: Ability to select important facts and passages for use in one's own writing.	**COMPARE NOTES FROM DOCUMENTARY AND PERSONAL LOG** After viewing the documentary: compare your energy usage to the average American by analyzing your personal energy usage log.	No Scoring	* Calculate your average energy usage of resources from the log. Use the seven totals and calculate your average use for a month, year, decade and lifetime. *Compare your averages to those from the documentary. *Determine if your data can be used as evidence to support your viewpoint.
Transition to Writing				
30 mins	**BRIDGING CONVERSATION > PREPARING FOR WRITING**: Ability to begin linking reading results to writing task.	**LISTING KEY POINTS** "Review the task and identify key points and information from text(s) that will help you address the task."	No Scoring	* Review the task and discussion-based strategies, such as seminar. * Small group discussion using question.
Writing Process				
15 mins	**INITIATION OF TASK > ESTABLISHING THE CONTROLLING IDEA**: Ability to establish a claim and consolidate information relevant to task; draft a Thesis.	**WRITING A THESIS** Thesis statement: Write 1-3 sentence thesis to establish the focus and purpose of your work.	* Writes a concise summary statement or draft opening. * Provides direct answer to main prompt requirements. * Establishes a thesis (focusing idea). * Identifies key points that support development of argument.	* Ask class to discuss what makes their thesis strong or weak. * Offer examples of thesis statements.
40 mins	**INITIATION OF TASK > ESTABLISHING THE CONTROLLING IDEA**: Ability to establish a claim and consolidate information relevant to task; draft a Thesis.	**OUTLINE OPPOSING VIEWPOINTS** Acknowledge the opposing viewpoint.	Completes the frame statement.	*Discuss the relevance of acknowledging that there are other viewpoints. *Examine examples of how this has been addressed. *Complete framed response from "They Say, I Say" by Graff, Birkenstein and Durst.
1 hr and 30 mins	**PLANNING > PLANNING THE WRITING**: Ability to develop a line of thought and text structure appropriate to an argumentation task.	**INITIAL DRAFT** Initial Draft: "Write an initial draft complete with opening, development, and closing; insert textual evidence." (D2) identifies credible sources.	* Provides complete draft with all parts. * Thesis is supported in the later sections with evidence and citations.	* Encourage students to re-read prompt partway through writing, to check that they are on-track. * Work with students on a logical, reasoned organization of the paper. * Provide students with an opportunity to do peer review on each other's work.

PACING	SKILL AND DEFINITION	PRODUCT AND PROMPT	SCORING GUIDE	INSTRUCTIONAL STRATEGIES
1 hr and 30 mins	**DEVELOPMENT > INTRODUCTORY PARAGRAPH**: Ability to construct an initial draft with an emerging line of thought and structure. (D2) identifies credible sources. (W8:1, RI8:1)	**FORMAL DRAFT** Multiple Drafts: Use strategies which refine the work's logic, reasoning, and organization of ideas/points. Use textual evidence carefully. Decide what to include and what not to include.	* Provides complete draft with all parts. * Supports the opening in the later sections with evidence. * Improves earlier edition.	* Timely feedback for each section of essay. * Ongoing feedback that balances support for strengths and clarity about weaknesses. * At least one peer review to provide each other with feedback on those issues. Paring students up as they finish the first draft. * Use of technology-based resources when appropriate.
1 hr	**DEVELOPMENT > BODY PARAGRAPHS**: Ability to construct an initial draft with an emerging line of thought and structure. (D2) identifies credible sources. (W8:1, RI8:1)	**INITIAL DRAFT (LDC PROTOTYPE)** Write an initial draft complete with opening, development, and closing; insert and cite textual evidence.	• Provides complete draft with all parts. • Supports the opening in the later sections with evidence and citations.	• Encourage students to re-read prompt partway through writing, to check that they are on track.
1 hr	**REVISION, EDITING, AND COMPLETION > REVISION**: Ability to refine text, including line of thought, language usage, and tone as appropriate to audience and purpose.	**CORRECTING DRAFT** Correct Draft: Revise draft to have sound spelling, capitalization, punctuation and grammar. Adjust formatting as needed to provide clear, appealing text.	* Provides draft free from distracting surface errors. * Uses format that supports purpose.	* Briefly review selected skills that many students need to improve. * Teach a short list of proofreading marks. * Assign students to proofread each other's texts a second time, using the rubric as a guide.
20 mins	**REVISION, EDITING, AND COMPLETION > EDITING**: Ability to proofread and format a piece to make it more effective.	**CORRECT DRAFT (LDC PROTOTYPE)** Revise draft to have sound spelling, capitalization, punctuation, and grammar. Adjust formatting as needed to provide clear, appealing text.	• Provides draft free from distracting surface errors. • Uses format that supports purpose.	• Briefly review selected skills that many students need to improve. • Teach a short list of proofreading marks. • Assign students to proofread each other's texts a second time.
	Standards: **CCSS.ELA-LITERACY.CCRA.L.2** : Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.			
Not provided	**REVISION, EDITING, AND COMPLETION > FINAL DRAFT**: Ability to submit final piece that meets expectations.	**FINAL DRAFT** Turn in your complete set of drafts, plus the final version of your work.	* Submits final work for evaluation on time.	Collect Essays and any other materials.

Instructional Resources

Human Footprint

No resources specified

Section 4: What Results?

Student Work Samples

Not Yet

📄 **Human Footprint Essay**

Approaches Expectations

📄 **Human Footprint Essay**

Meets Expectations

📄 **Human Footprint Essay**

Advanced

📄 **Human Footprint Essay**

Teacher Reflection

Not provided

All Attachments

🔗 **Ecological Footprint Quiz : https://s.ldc.org/u/dnudwfomfnmbhw5rwoiabloa**

🔗 **Global Footprint Network : https://s.ldc.org/u/bkxynkk7hkf50k6xgibwlbte1**

🔗 **Ecological Capital : https://s.ldc.org/u/2mp7qw9nalozn24i3ttdbrf1d**

🔗 **Living Planet Report : https://s.ldc.org/u/bnm2g7zestze8vr1v2s6p1lft**

🔗 **National Geographic-Eye on Impact : https://s.ldc.org/u/adut7q8imqyb5vi3ce28fms5p**

🔗 **Environmental Protection Agency- Climate Impact on Humans : https://s.ldc.org/u/dn12pjmmhfuze8pi5gw2id0og**

📄 **Human Footprint Essay : https://s.ldc.org/u/27g3ta7wy45zif51l6ypwvfme**

📄 **Human Footprint Essay : https://s.ldc.org/u/31gjotcw2mkrbx9rm2mws0bst**

📄 **Human Footprint Essay : https://s.ldc.org/u/8od7dwtsw71hz86smwpihs3kx**

📄 **Human Footprint Essay : https://s.ldc.org/u/e252h2vts3vowb7mxws787fcg**