THE HUMAN ELEMENT

EDUCATOR INTRODUCTION

"For thousands of years, many people believed that nature was made up of four elemental forces: earth, air, water, and fire. But I've come to realize there's a fifth element: people. We are a force of nature, too. People are changing the other elements. At the same time, the elements are changing us."

—James Balog, *The Human Element*

OVERVIEW OF EDUCATIONAL RESOURCES

The Human Element offers educators something unique in teaching about climate science. It balances the study of the human causes of environmental change—especially climate change—with personal stories of people directly affected by those changes, along with scientists studying the problems. Through compelling scientific and visual evidence, students will learn how the **Anthropocene**—the current epoch of systemic human change in the environment—is affecting four foundational elements: earth, air, water and fire.[1]

The need for students to understand the Anthropocene is more urgent than ever. As of 2018, our global population is 7.6 billion people. By 2100, it will likely reach 11 billion.[2] Our earth's ballooning population exacerbates existing environmental problems, like the industrialization of agriculture, the burning of fossil fuels, continuing deforestation, and much more. As a result, humans are witnessing sustained warming temperatures, rising sea levels, compromised air quality, and more frequent occurrences of megastorms and megafires. These events touch large swaths of the world's population, and America—the focus of ***The Human Element***—is not immune.

"Climate protection is people protection," says James Balog, the environmental photographer who is our guide throughout the film. Incorporating ***The Human Element*** and the lesson plans that follow is one achievable step toward fostering greater climate awareness and protection. Educators will discover an accessible, highly engaging, and visually compelling resource to meet numerous science standards and expand their students' understanding of the Anthropocene. Students will also have the opportunity to lead local efforts toward a more sustainable and environmentally-equitable future for all.

This series of classroom lessons is aligned to Next Generation Science Standards. Each lesson includes a note catcher to keep students engaged while watching the full film or the film chapter. Some lessons include research appendices students can work from when internet is not available to support independent research. Below is an outline of the lesson set:

FULL FILM LESSON:

For educators who screen the full film with their students, this lesson focuses on the broad concepts introduced in the film, includes some media literacy prompts, and can be used as a stand-alone lesson or as an introduction to the full series of lessons.

Run time: 78 minutes

The password is: **THEedu**

ELEMENTAL LESSONS:

Each of the separate **Earth**, **Air**, **Water** and **Fire** lessons can be used as stand-alone lessons, or as part of a series

Run times
Water: 17:13
Fire: 19:41
Earth: 14:25
Air: 14:00

The password is:
THEedu

CULMINATING LESSON

This lesson can be taught at the end of the elemental series for students to compile their insights and art projects to share as a classroom or larger community exhibit.

Each ELEMENTAL LESSON contains the following sections:

1. **Opening Exercise:** More information about one of the scientists or scholars featured in the film.

2. **Explore the Human Causes:** Students will use scientific evidence to explore how human activities influence each of the elements.

3. **Effects | Visual Evidence:** These sections ask students to use visual evidence from the film or their own projects to explain the impacts of human activity on the elements, and/or how the element changes are impacting humans.

4. **The Human Element of Change:** A culminating project in each lesson suggests reaching out to people in the local community, creating an art project, and answering more advanced research questions.

WHY USE *THE HUMAN ELEMENT* IN YOUR CLASSROOM?

1. *The Human Element* Incorporates Climate Science Literacy Standards

> *"Science, mathematics, and technology have a profound impact on our individual lives and our culture. They play a role in almost all human endeavors, and they affect how we relate to one another and the world around us. . . Science literacy enables us to make sense of real-world phenomena, informs our personal and social decisions, and serves as a foundation for a lifetime of learning."*[3]

Climate science literacy is defined as gaining the knowledge and competencies to understand how human actions influence the climate, how the climate influences individuals and society, and how humans can take actions to reduce further climate change.

In an interagency guide published by the U.S. Global Change Research Program (USGCRP) **"Climate Literacy: The Essential Principles of Climate Science"**, seven principles were recommended for educators to integrate into their classroom curriculums. ***The Human Element*** lesson plans address all of these literacy priorities:

a. The sun is the primary source of energy for Earth's climate system.

b. Climate is regulated by complex interactions among multiple components.

c. Life on Earth depends on, is shaped by, and affects climate.

d. Climate varies over space and time through both natural and man-made processes.

e. Our understanding of the climate system is improved through observations, theoretical studies, and modeling.

f. Human activities are impacting the climate system.

g. Climate change will have consequences for Earth's system and human lives.[4]

2. *The Human Element* Uses Clear, Comprehensible Scientific and Visual Evidence to Teach a Controversial Subject

Humans' contributions to climate change can no longer be ignored or denied. The evidence is incontrovertible. For instance, multiple studies indicate that at least 97 percent of actively working climate scientists agree that climate change is happening, and that it is at least partially caused by human activities.[5]

Visual evidence supports these scientific findings. James Balog's poignant environmental photographs and human portraits draw students in, facilitating immediate connections to our changing climate and how the consequences affect human lives.

For educators or students who encounter resistance to this empirical and visual data, the following resources may support constructive dialogue:

- NASA: **Global Climate Change** - Vital Signs
- National Oceanic and Atmospheric Organizations (NOAA): **Annual Greenhouse Gas Index**
- United Nation Intergovernmental Panel on Climate Change (UN IPCC): **Special Report - Global Warming of 1.5C**
- Watch **this short video** from the "Our Climate Our Future". Its main message is that an argument based in facts and figures rarely changes minds, whereas a conversation based on mutual respect and listening will enable people to learn.
- For information and ideas that will directly address the most common myths about climate change, explore this article from **Conservation International**.

3. *The Human Element* Communicates Hope

> *"There is such a thing as truth. I'm trying to find it and one way or another reveal it through the images."*
>
> **—James Balog**

There are several reasons why students may resist the reality that humans are altering Earth's climate. Learning about climate change can evoke emotions of discomfort, fear, hopelessness, anger and despair. Students may also feel guilt, political resistance, or a frustrating lack of scientific understanding. Research shows that these emotions are likely to make young people disengage from learning about climate change.[6] Trusted adults such as parents and teachers who try to protect students from an emotionally weighty topic may contribute to their disconnection and apathy. Furthermore, even if a student has a firm grasp on what's happening, their understanding will inevitably, at some point, be challenged outside of class.

Thus building a solid and careful scientific argument is essential, as is equipping students with the tools to cope with negative feelings that arise as you teach. A simple routine, such as the following, can help students acknowledge their feelings and then focus on the material:

- Ask, "What emotions come up for you when you think about climate change?"
- Invite students to share a one or two word response, and ask for a show of hands from other students who feel the same way.

Let students know their responses are normal, and then segue into the lesson by providing an optimistic top-level overview of what's to come: Students will learn about the science behind what they see in the film; the experts who are working to make a difference; and the ways students themselves can contribute to the solution.

KEY STANDARDS

The Human Element meets the following Next Generation Science Standards in Physical and Earth Science:

HS-ESS2 Earth's Systems

2-2 Earth's Systems: Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems.

2-4 Earth's Systems: Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.

HS-ESS3 Earth and Human Activity

HS-ESS3-1. Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.

HS-ESS3-4. Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.

HS-ESS3-5. Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems.

KEY TERMS[7]

Anthropocene: The period of time during which human activities have had an environmental impact on the Earth, constituting a distinct geological age.

Climate: The average course or condition of the weather at a place, usually over a period of years, as exhibited by temperature, wind velocity, and precipitation.

Climate change: A significant and persistent change in the mean state of the climate or its variability. Climate change occurs in response to changes in some aspect of Earth's environment: these include regular changes in Earth's orbit about the sun, re-arrangement of continents through plate tectonic motions, or anthropogenic modification of the atmosphere.[8]

Fossil fuels: Energy sources such as petroleum, coal, or natural gas, which are derived from living matter that existed during a previous geologic time period.

Global warming: An increase in Earth's atmospheric and oceanic temperatures widely predicted to occur due to an increase in the greenhouse effect resulting especially from pollution.

Human Tectonics: James Balog has coined the term "Human Tectonics" to describe the mechanisms of human impact driving the Anthropocene age.

Weather: The specific conditions of the atmosphere at a particular place and time, measured in terms of variables that include temperature, precipitation, cloudiness, humidity, air pressure, and wind.

ENDNOTES

1 The Smithsonian Institute has created a three-minute animated video explaining the Anthropocene that educators may find helpful to use as ***The Human Element*** is introduced. See **https://www.smithsonianmag.com/videos/category/science/what-is-the-anthropocene/?jwsource=em**

2 **https://www.un.org/development/desa/en/news/population/world-population-prospects-2017.html**

3 From the American Association for the Advancement of Science, Atlas of Science Literacy, Volume 2, Project 2061. Quoted in "Climate Literacy: The Essential Principles of Climate Science" (2019) **https://www.globalchange.gov/**

4 **https://www.globalchange.gov/**

5 **https://climate.nasa.gov/scientific-consensus/**

6 **https://journals.sagepub.com/doi/abs/10.1177/0013916518763894**

7 Unless cited otherwise, all term definitions were excerpted from Merriam-Webster Online Dictionary (2019), **https://www.merriam-webster.com/**

8 **https://downloads.globalchange.gov/Literacy/climate_literacy_lowres_english.pdf**