

Educational Resource Guide for
The 11th Hour

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Screening Guidelines for *The 11th Hour*

We have a choice: will this century be one of human activities that increase the likelihood of local and global social disruption and collapse, or will this time become the century of environmental recovery? *The 11th Hour* promotes the idea that people can "vote" every day by making small changes—from buying compact fluorescent light bulbs to recycling—in order to reduce our individual "carbon footprints."

Environmental education often begins close to home, encouraging learners to forge connections with and understand their immediate surroundings. The awareness, knowledge, and skills needed for these local connections and understandings provide a base for a more sophisticated comprehension of causes, connections, and consequences. For each environmental issue there is not just one right answer or solution. Environmental education cultivates the ability to recognize uncertainty, envision alternative scenarios, and adapt to changing conditions and information.

To this end, the following guidelines can be used by classroom and community educators in a variety of contexts—from a formal classroom setting to an evening program or workshop—to foster crucial dialogue about the critical status of our environment, and how individuals—through education, awareness, and simple actions—can make a positive difference.

Recommended Audiences

The 11th Hour is appropriate for any young adult or adult audience interested in exploring environmental issues and solutions. In particular, this film provides an opportunity for institutions of higher learning to lead the way towards environmental recovery, as tomorrow's leaders are on college campuses today. The film provides viewers with opportunities to construct their own understanding of a variety of complex issues relating to the environmental crisis. Post-viewing discussions can help transition viewers from absorbing information, to taking action.

Note to Facilitators

Before screening *The 11th Hour*, watch the video, creating a list of the film's main points for post-screening discussion. These points might include, among others:

- climate change/global warming
- overpopulation
- excessive consumption
- biodiversity loss
- speed of devastation
- air and water pollution
- social justice
- "green" decision making and "redesigning design"
- "biomimicry" – looking to nature's operating system for sustainable solutions
- renewable energy
- local community action

In addition, as you preview the film, consider and take note of places that would be good to stop the film for interim discussions.

Pre Viewing Guidelines for *The 11th Hour*

1. Give a brief introduction to the film, outlining the four primary focus areas of the film:
 - testimony from experts regarding current environmental crises

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- the history of attitudes and actions that have led to the current situation
 - a showcase of some innovations in technology
 - actions people can take individually and collectively to stop the current trend towards global devastation
2. Write some or all of the following ISSUES on chart paper for use during a post-screening discussion:
 - climate change/global warming
 - overpopulation
 - excessive consumption
 - biodiversity loss
 - pollution
 - social justice
 - sustainable “green” building
 3. Prepare another piece of chart paper for listing ACTIONS individuals and groups can take.

Note to facilitators: This list will be elicited from the audience as part of the post-viewing activity.

4. Distribute index cards to the audience and ask viewers to write thoughts, feelings, and questions that come to mind during the screening. Let them know that you will not be collecting the cards, but that the cards are for their own use to help them remember what they were thinking during the viewing of the film.

Note to facilitators: Keep in mind that each viewing group will be different. Be sensitive to the level of maturity and experience of each audience and structure activities to reflect each group’s abilities and interests.

5. Before screening the film, use some or all of the following questions as a way of encouraging the viewers to use their knowledge, personal skills, and assessments of environmental issues as a basis for environmental problem solving and taking action.
 - What do you see as today’s most urgent environmental crisis?
 - Where have you gotten information about environmental issues?
 - Do you think the mainstream media present environmental issues clearly and accurately?
 - What actions have you taken to conserve and preserve the earth’s resources?
 - In assessing your skills as an advocate for something you care about, what do you see as your strengths?

Post Viewing Guidelines for *The 11th Hour*

Post-viewing extensions can support the development of an active learning community where people share ideas, expertise, and prompt ongoing inquiry. Ultimately, the goal of environmental education is to develop an environmentally literate population capable of exercising their rights and responsibilities as global citizens.

Use some of the following ideas to extend the learning of *The 11th Hour*:

1. Lead a post-viewing discussion using some or all of the following questions:

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- Describe some of the emotions you felt during the film. Which aspects of the video had the greatest impact on you and why?
 - What information contained in the video was new to you?
 - What topics presented in the film would you like to explore further? Do you know what you need to know in order to continue learning about environmental issues? If the answer to that question is no, how can you find out what you need to know?
 - Discuss the ways that eating locally produced food is an environmental issue. What can individuals do to support the local production and consumption of foods?
 - Who should see this film and for what purposes? Who might be unreceptive to the ideas in the film and why?
 - Share one issue or item that you wrote on your index card while you were watching *The 11th Hour*.
 - As a result of your having seen this film, what, if any, specific actions do you think you will take?
2. To ensure understanding of some of the basic concepts, conduct a Glossary Activity by dividing the viewing audience into five groups and assigning each small group one of the words from the *Handout: Selected Glossary* to discuss and present to the whole group. Allow about 15–20 minutes for small group discussion and 5 minutes for each group’s presentation. Allow time for questions at the end of the activity.
 3. Have members of the audience create personal action plans that include ten things they could start doing immediately. [See *Handout: Taking Action*.] Suggest that they monitor progress and add to their lists regularly. An alternative to this could be to post three pieces of chart paper in the room labeled START DOING, STOP DOING, and DO DIFFERENTLY. Have members of the audience write their ideas on each of the three charts. When everyone has had a chance to write, read the list aloud to the group and allow for questions and comments.
 4. Create an Action Plan Activity by dividing the audience into groups using the following categories: AT HOME, AT SCHOOL, AT WORK, IN THE COMMUNITY, TRANSPORTATION, GOVERNMENT AND PUBLIC POLICY, and EDUCATING OTHERS. Give each small group chart paper and markers and have the groups brainstorm and chart ideas to share with the whole group. Allow 15–20 minutes for small group discussion and 5–10 minutes for each small group to present its ideas. Allow time for questions and comments.
 5. Alternately, elicit a list of Action Ideas from the whole group and list them on the prepared chart paper. Divide the audience into five groups and assign each group one or more of the Action Ideas listed. Give the groups 10–15 minutes to brainstorm ways that their Action Ideas could be implemented locally. Reconvene as a large group and allow 5–10 minute for each small group to present its ideas, and field questions and comments.
 6. Research some of the organizations mentioned in the film and listed in the attached *Handout: Resources* to find out what you can do to assist these organizations in achieving their goals.
 7. Take a trip to a transfer station in your community and find out how the various kinds of waste are disposed of. Research how decisions are made about where such transfer stations are located in your community.
 8. Take part in existing environmental service projects in your community. If such opportunities do not currently exist, consider organizing projects in some of the following areas: trash clean-

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up, soil testing, composting, planning, planting, and maintaining a rainwater garden or other native habitat area, monitoring water quality, and educating others about the environment.

9. Find the source of your food and water. Where does your water come from? What is the water cycle in your local area? Where does the food you eat come from? How is it transported and processed? How much of what you eat comes from local areas? What can you find out about what is in your food, water, and air?
10. Contact people in your community with expertise in related environmental issues to present their perspectives; people to consider include park rangers, natural history museum staff, members of local Green Decade Coalitions, science teachers, government agents with oversight of waste disposal, to name a few.

Handout: *The 11th Hour*: A Synopsis of Film

The expression “the eleventh hour” means the last moment when change can happen to avert possible disaster. In the film *The 11th Hour* a variety of world experts explore how humanity has arrived at the current convergence of environmental crises while exploring steps that people can take to avert global disaster. In summary, the earth is nearing meltdown, beyond climate change. The process began with the Industrial Revolution, when people started mistakenly looking on nature as external to themselves and exploitable without limits. Forests have undergone major destruction. The ocean is becoming stagnant. Almost everywhere, the soil itself is largely damaged. In addition, 50,000 species a year are becoming extinct; no ecosystem can be identified as improving.

Humans suffer from increasing numbers of diseases caused by pollution. At fault is the overproduction of non-sustainable manufactures, immense waste and destruction, and an unsupportable population. The primary cause for much of the crisis is the fuels we use, petroleum being the primary one.

Through nature itself, the technology exists to solve some of these crises, and part of the solution is for people to live more consciously in harmony with nature as opposed to dominating it. According to the film, in a few years we will have reached the point of no return. We are not only at the eleventh hour, but at the last few seconds of that hour. Within this century, if nothing effective is achieved, planetary damage will be dramatic and total in every area. Although impossible to predict, extreme disaster could be quick once the balance is decisively tipped in the wrong direction, and it will happen everywhere.

The 11th Hour features leading experts from around the world, including former Soviet Prime Minister Mikhail Gorbachev, scientist Stephen Hawking, former head of the CIA James Woolsey, and sustainable design experts William McDonough and Bruce Mau, along with over 50 other scientists and world leaders who discuss the most important environmental issues facing the earth while presenting strategies to avert the crisis.

Handout: Taking Action: Minimizing Your Impact on the Planet

- The most important thing individuals can do is to become educated about the global crisis and act in accordance with newly acquired information. Follow local and federal legislation and contact your elected officials regularly to let them know how you want them to vote on issues affecting the environment. Write letters to the newspaper so that your commitment becomes public and energizes others.
- Shape policy by voting with your dollar. Support corporations that have good business practices and respect the environment by buying their products
- Form community groups around the topics that are important to you by visiting www.11thhouraction.com. There, you can provide and find support, share ideas and solutions, and learn how to make a difference in your communities policies and programs.
- Recognize that small steps can be important. Turn off heat and air conditioning when you leave a room. Buy low wattage light bulbs. Use compact fluorescent bulbs. Recycle everything that can be recycled. Turn off and unplug appliances that drain energy when not in use. Buy local and organic food. Eliminate chemicals from your life as much as possible. Be vigilant but not sanctimonious so that others are inspired, but not turned off, by your commitment.
- Avoid paper and plastic plates and cups whenever possible. If you have regular committee meetings have committee members bring their own coffee mugs to the meetings and serve snacks that do not require plates.
- Whenever possible, carpool with others to avoid using a car, walk, or ride a bike, or use public transportation. If you do drive, keep car tires inflated appropriately; under-inflation uses excess fuel. Be conscious about all decisions regarding transportation.
- Use Energy Star appliances and wash clothes in cold water.

Handout: Selected Glossary

Global Warming

Climate change is the long-term fluctuations in temperature, precipitation, wind, and all other aspects of the earth's climate. Global warming is defined by the United Nations Convention on Climate Change as “change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.”

Greenhouse Gases

Greenhouse gases are chemical compounds in the atmosphere that trap heat there. They retain a proportion of the sun's heat through a mechanism known as the greenhouse effect. Greenhouse gases, mainly carbon dioxide (CO₂), are naturally present in the atmosphere in small quantities (less than 1%). Greenhouse gases are those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of infrared radiation emitted by the earth's surface, the atmosphere and clouds. It is very likely that greenhouse gases released by human activities are responsible for most of the global warming observed in the past 50 years. The warming is projected to continue and to increase over the course of the 21st century and beyond.

Biodiversity

The variety of life on earth—or its biological diversity—is commonly referred to as biodiversity. The number of species of plants, animals, and microorganisms, the enormous diversity of genes in these species, and the different ecosystems on the planet, such as deserts, rain forests, and coral reefs are all part of a biologically diverse earth. Biodiversity boosts ecosystem productivity where each species, no matter how small, has an important role to play, and it is this combination that enables the ecosystem to possess the ability to prevent and recover from a variety of natural disasters. This is useful for humanity as a larger number of species of plants means more variety of crops and a larger number of species of animals ensures that the ecosystem is naturally sustained.

Carbon Footprint

A carbon footprint is made up of the sum of two parts: the direct, primary footprint and the indirect, secondary footprint. The primary footprint is a measure of the direct emissions of CO₂ from the burning of fossil fuels. This includes domestic energy consumption and transportation from, for example, cars and planes. The secondary footprint is a measure of the indirect CO₂ emissions from the whole life cycle of products we use, those associated with their manufacture and eventual breakdown.

“Green” Building

“Green” building is the practice of increasing the efficiency with which buildings use resources—energy, water, and materials—while reducing building impacts on human health and the environment, through better site planning, design, construction, operation, maintenance, and removal—the complete building life cycle. Other similarly used terms include sustainable design and green architecture.

Handout: Selected Resources

Organizations and Websites

Global Green USA
www.globalgreen.org

New American Dream
www.newdream.org

Green Seal
<http://www.greenseal.org>

The Higher Education Associations Sustainability Consortium (HEASC)
<http://aashe.org/heasc>

Rocky Mountain Institute
<http://www.rmi.org>

Second Nature
<http://www.secondnature.org>

Clean Air - Cool Planet
<http://www.cleanair-coolplanet.org/>

David Suzuki Foundation
http://www.davidsuzuki.org/climate_change/

Green Facts
<http://www.greenfacts.org>

Intergovernmental Panel on Climate Change (IPCC)
<http://www.ipcc.ch/>

Natural Resources Defense Council
<http://www.nrdc.org/globalwarming>

Sierra Club
<http://www.sierraclub.org/globalwarming/>

Union of Concerned Scientists
http://www.ucsusa.org/global_environment/global_warming

World Wildlife Foundation
<http://www.worldwildlife.org/climate/>

Bioneers
<http://www.bioneers.org>

The Association of University Leaders for a Sustainable Future (ULSF)

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<http://www.ulsf.org/resources.html>

Books

Fight Global Warming Now: the Handbook for Taking Action in Your Community by Bill McKibben (2007)

The Weather Makers: How Man Is Changing the Climate and What It Means for Life on Earth by Tim Flannery (2006)

How to Save the World in Your Spare Time by Elizabeth May (2006)

The Quest for Environmental Justice: Human Rights and The Politics of Pollution by Maxine Waters and Robert D. Bullard (2005)

Nature's Operating Instructions Edited by Kenny Ausubel and J.P. Harpignies (2004)

About This Lesson

The “environmental crisis” is about more than just global warming. This lesson provides educators with context for a productive conversation about this complex and crucial topic, helping students to see how there are a multitude of issues that each affect the environment, and how together they can compound each other’s impact as a whole.

Curriculum Connections

This lesson aligns with curriculum connections in language arts, social studies, civics, life science, earth science, media studies, health, thinking and reasoning, and working with others.

Key Words and Phrases

Biosphere, organism, ecosystem, sustainable, environment, biological, life system/ living system, evolution, ecological, consumerism, economics, *homo sapiens*, species, atmosphere.

Rationale

The purpose of this lesson is for students to acquire a “big picture” perspective on the environmental crisis. Specifically, the lesson encourages students to consider how human health, the weather, economics, politics, consumption, and different ecosystems are affected by, and affect, the environmental crisis.

Student Objectives

- Students will discuss their understandings about the environmental crisis
- Students will analyze visual and aural images that relate to the environmental crisis and discuss their relevance and importance
- Students will relate specific topics to the larger issue of planetary impact
- Students will use debate to explore perspectives on the environmental crisis
- Students will work in small groups to explore specific topics relating to the environmental crisis
- Students will use observation techniques to further understand how human behavior affects the environment

Requirements

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Materials

- Chalkboard and chalk, or chart paper and markers
- *Student Handouts: Climate and Habitat; Health and Consumption; War, Politics, Power and the Economy; Seamless Planet*
- DVD player, television or monitor, a DVD of *The 11th Hour*

Time

- 45 minutes to 1 hour

Techniques and Skills

Vocabulary building, large group discussion, public speaking, small group work, critical and analytical thinking, literary analysis, reading comprehension, supporting ideas with examples, research, expository writing, creative writing, comparing and contrasting information sources.

Procedures

1. Begin class by writing the phrase ENVIRONMENTAL CRISIS on the chalkboard or a piece of chart paper.
2. Ask students to brainstorm all of the words, definitions, images, issues, and ideas that they can think of, relating to the phrase “environmental crisis.”
3. Chart student responses on the board or chart paper.
4. Once a sufficient number of student responses have been recorded on the board, count students off in 6’s. Instruct students to remember their numbers, as they will be used for more than one activity during class.
5. Assign students the topic which correlates to their number:
 - 1's Human Health (disease, nutrition, quality of life)
 - 2's Extreme Weather: floods, storms, drought, tornadoes
 - 3's War, Politics, and Power
 - 4's Consumption and Consumerism
 - 5's Natural Habitat Destruction
 - 6's Economics (industry, business)
6. Tell the class that they will now see the first 2 minutes of a documentary about the environment called *The 11th Hour*. These first two minutes are a series of images that all relate in some way to the many complex issues surrounding humankind’s impact on the environment.
7. Instruct students to take notes as they watch, specifically noting the images, sounds, or concepts that relate back to their assigned topic.
8. Stop the DVD when the Time code reads 2:22 (as soon as the film title appears on screen, but before the first expert speaks).

Note: It may be necessary to show the segment twice, or even three times, as the sounds and images move very quickly.

9. Once the class has had a sufficient opportunity to process and reflect on the two-minute segment they viewed, conduct a whole-group discussion about their impressions. Chart the answers on the board or on chart paper for reference throughout this activity. Use some or all of the following questions as a guide:
 - What were some of the weather-related images you remember seeing?

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- What was the significance of showing the footage of a fetus *in utero*?
- What image did you find most disturbing?
- What was something you noticed about the audio during the montage (for example, sounds or music)? What was the significance of that detail?
- One short clip showed footage of a crowd of people running away. Why do you think the filmmakers included this clip? What might be the literal, and figurative, impact of this image?
- What image did you find most beautiful?
- What image affected you the most? Why?
- What was the significance of including footage of a starving person? How do you think the issue of starvation/famine relate to the environmental crisis?
- Why was there an image of the stock market? How does that relate to the environmental crisis?
- What were some of the images you remember of the food industry?
- What were some of the images you remember of the human body?
- What are your general impressions and/or thoughts after seeing the montage?
- What questions do you have after seeing the montage?

10. After the class has had sufficient time to reflect on the montage, divide them into six groups, according to topic. Allow 5 – 10 minutes for each group to prepare two arguments, one FOR and the other AGAINST the following statement, as it relates to their topic. They should use specific examples to support their arguments.

“The planet is seamless.”

11. Reconvene as a large group and conduct a short, informal “debate,” allowing groups to share their ideas with the rest of the class. During the discussion, whenever possible, relate student responses back to their individual topics and to the film montage.
12. Distribute *Student Handouts* as follows:
- Students in Groups 1 and 4 receive *Student Handout: Health and Consumption*
 - Students in Groups 2 and 5 receive *Student Handout: Climate and Habitat*
 - Students in Groups 3 and 6 receive *Student Handout: War, Politics, Power, and the Economy*
13. If there is time, have students answer the questions on their handouts individually or in pairs. Alternatively, students can complete the handouts for homework.
14. In conclusion, have students analyze and respond to the following quote in their journals or on notebook paper. Copy the quote on the chalkboard or on chart paper, or, alternatively, distribute the quote on the *Student Handout: Seamless Planet*.

A human being is a part of the whole, called by us 'Universe,' a part limited in time and space. He experiences himself, his thoughts and feelings as something separated from the rest – a kind of optical delusion of his consciousness. This delusion is a kind of prison for us, restricting us to our personal desires and to affection for a few persons nearest to us. Our task must be to free ourselves from this prison by widening our circle of compassion to embrace all living creatures and the whole of nature in its beauty. Nobody is able to achieve this completely, but the striving for such achievement is in itself a part of the liberation and a foundation for inner security.

– *Albert Einstein*

Extension Activities and Ideas for Further Learning

1. Write an essay that answers the following question. Use specific references and examples from history to support your response.
In the last century we've dramatically increased our impact on planet earth. [What] element has emerged that has made us even more destructive, accelerating our disconnection and causing extensive damage to our climate and all other natural systems? If the human mind threw us out balance thousands of years ago, what changed in recent history?

– Leonardo DiCaprio, *The 11th Hour*
2. How does a steak (or a roast chicken) arrive on your dinner table? Research the process by which a particular animal-based food (for example, turkey, hamburger, chicken, veal) is bred, raised, slaughtered, cleaned, packaged, and shipped to your local supermarket. How might each step of this process relate to the topics from class (human health, weather, natural habitats, economy, consumption, politics)? Present your findings and your analysis to the class.
3. Write a research paper that explains, from a scientific perspective, why there is life on Earth.
4. Spend 45 minutes at a place in your local area that you consider a “natural habitat,” or somewhere that is relatively unmarred by development (a local park, beach, hiking trail, estuary, creek, or your backyard). Using a digital camera or sketchpad and a journal, document in words and pictures your observations in the following areas. Then, write one page that analyzes your findings. How “untouched” is this environment? How has humankind affected the area (visibly or subtly)? What might it have been like without the intrusion of humankind? What can you extrapolate about the environmental crisis from this experiment?
 1. Plant Life (Do you recognize any plants by name? Do they look healthy? If not, what might be causing this?)
 2. Water (Note quality and quantity. Does the water seem polluted? Clear? Scarce?)
 3. Wildlife (What animals and insects can you observe? Based on the water and flora in the area, what other animals should be present?)
 4. Soil (Is it sandy? Gritty? Wet? Dry? Does it stain your fingers? What color is it? How does it smell?)
 5. Human Impact (what do you see that was taken away, changed, or added by humans? How have humans impacted this spot in ways that you might not be able to see?)

5. With the help and under the supervision of an adult, recreate the Miller-Urey Experiment, which attempts to explain how life formed on earth (www.juliantrubin.com/bigten/miller_urey_experiment.html). As you go, document the experiment and your findings. How does this experiment support or refute the argument that pollution threatens life on Earth? Explain.

Life on Earth is possible only because a number of parameters lie in certain very narrow ridges. Some of these are clearly environmental, like the earth has the right temperature and pressure to have life with water.

– *Stephen Hawking, Lucasian Professor of Mathematics, Cambridge University*

Earth is a planet that is just far enough from the sun and has just enough of an atmosphere of a certain composition that more heat stays here than radiates out to space. The sun warms the planet and that heat radiates out and there are gasses in the atmosphere that have always trapped some of that heat. And that's why we're not an iceball. There have been scientists who have compared this whole business of the different planets going away from the sun as being like the "Goldilocks Effect." There's one that's too cold and one that's too warm and one that's just right and we just happen to be there.

–*Andy Revkin, Author and Science Reporter, New York Times*

Questions for Discussion and Further Thinking

1. What do these two scientists say about why there is life on Earth?
2. How do these two quotes relate to the environmental crisis?
3. Based on these two quotes, how does the earth's temperature (climate) relate to the earth's water supply?
4. Based on these two quotes, how might pollution affect the earth's climate?
5. Based on these two quotes, how might a change in planetary climate affect life on Earth?

Creation is the Universe. Creation is everything that we can see and probably a whole lot that we can't. Probably more that we can't see. But it's what's about us, and it's the relationship, this amazing web of life that we have here.

– Oren Lyons, Faithkeeper, Turtle Clan, Onandaga Nation, Haudenosaunee, Six Nations, Iroquois Confederacy

The amazing thing about the human body is it has 100 trillion cells and 90% of them are not human cells. They're fungi and bacteria, microorganisms ... the thing that makes us human is not human. So within us is, basically, the back story of life on earth right to that first original cell 40 million centuries ago, and if you could, for a moment, stop and feel what is happening in your body, there are 6 septillion things going on at the same time – that's a 6 with 24 zeroes after it – going on, right this instant as you sit in your chair and then in the next instant. Within 10 seconds, 100 more things have happened than in all the stars and planets and asteroids in the known universe, in your body. And that is called life.

– Paul Hawken, Author, Environmentalist, Entrepreneur

Questions for Discussion and Further Thinking

1. Based on these two quotes, how do you think these two people define “life?”
2. How do these two quotes relate to the environmental crisis?
3. What do these two quotes present as “mystical” or “mysterious”?
4. Based on these two quotes, what is the relationship between “life” and the environment in which it occurs?
5. Based on these two quotes, how is human life connected to non-human life on Earth?

Homo sapiens sapiens is an incredibly young species. We don't think of that but we are. We came very late the calendar year of the earth. On the earth calendar, where it started in January 1 and now we're December 31st, we got here 15 minutes before midnight on December 31st ... and all of recorded history has blinked by in the last 60 seconds.

–Janine Benyus, *Author, Biomimicry*

I think it was the human mind basically that threw us out of balance with the rest of nature. The tragedy is that it was the human mind that was the key to our very survival. When you think that we evolved in Africa about 150,000 years ago, and compared to the other animals that must have been on the plains at that time weren't very impressive: we weren't very many, we weren't very big, we weren't gifted with special senses ... the one thing, the key to our survival and our taking over the planet was the human brain. ... We look ahead, recognize where the opportunities are, where the dangers lay, and choose accordingly to survive. That was a great survival strategy of our species.

–David Suzuki, *Scientist, Environmentalist, Broadcaster*

Questions for Discussion and Further Thinking

1. Based on these two quotes, what role do humans (*homo sapiens*) play in the history of life on Earth?
2. How do these two quotes relate to the environmental crisis?
3. Based on these two quotes, how are humans different from other life on Earth? How are humans the same?
4. Based on these two quotes, how would you describe the importance of human beings on Earth? Explain.

Directions: In a clearly written expository essay, analyze, explain, and respond to the following quote.

A human being is a part of the whole, called by us ‘Universe,’ a part limited in time and space. He experiences himself, his thoughts and feelings as something separated from the rest – a kind of optical delusion of his consciousness. This delusion is a kind of prison for us, restricting us to our personal desires and to affection for a few persons nearest to us. Our task must be to free ourselves from this prison by widening our circle of compassion to embrace all living creatures and the whole of nature in its beauty. Nobody is able to achieve this completely, but the striving for such achievement is in itself a part of the liberation and a foundation for inner security.

– *Albert Einstein*

About This Lesson

In order to understand discussions about the environment, one must first understand the economics and the history behind our dependence on fossil fuels. This lesson provides a general background as a point of departure for a larger examination and discussion of economics and the environmental crisis.

Curriculum Connections

This lesson aligns with curriculum connections in English, language arts, social studies, civics, life science, earth science, media studies, economics, health, thinking and reasoning, and working with others.

Key Words and Phrases

Industrialization, fossil fuels, conservation, renewable, opportunism, myth, allegory, culture.

Rationale

The purpose of this lesson is to provide a basic chronological and economic history of human dependence on fossil fuels. Specifically, the lesson provides students opportunities to explore how the global economy relates to the fossil fuel industry, and how individual behaviors, environmental destruction, and the economy are interconnected.

Student Objectives

- Students will discuss their understandings about industrialization and the Industrial Revolution
- Students will analyze visual and audio images that relate to the environmental crisis and the global economy
- Students will relate the history of industrialization to the contemporary environmental crisis
- Students will learn basic information about the creation, extraction, and processing of fossil fuels
- Students will explore the impact that fossil fuels have on the economy, politics, health, and the environment
- Students will discuss and analyze the impact of contemporary consumerism

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- Students will differentiate between greed and opportunism and relate these differences to the environmental crisis

Requirements

Materials

- Chalkboard and chalk, or chart paper and markers
- *Student Handouts: Fossil Fuels: A Brief and Basic Background; Greed vs. Opportunism; Video Viewing Sheet; Well Having vs. Well Being*
- DVD player, television or monitor, a DVD of *The 11th Hour*

Time

- Two class periods (90 minutes)

Techniques and Skills

Vocabulary building, large group discussion, public speaking, working in pairs, critical and analytical thinking, literary analysis, reading comprehension, supporting ideas with examples, research, expository writing, creative writing, comparing and contrasting information sources.

Procedures

Day 1

1. Begin class with the following prompt written on the chalkboard or on chart paper. Allow 10 minutes for students to respond in writing in their journals or notebooks.

Getting and spending, we lay waste our powers:

Little we see in Nature that is ours ...

– *William Wordsworth (1770-1850)*

2. Write the word INDUSTRIALIZATION on the chalkboard or chart paper next to the quote.
3. Using students' existing knowledge about this term and their responses to the writing prompt, brainstorm words, ideas, phrases, images, definitions, and connections, recording student responses in the form of a word map on the chalkboard or chart paper.
4. Explain that some of the world's largest advances in industrialization took place during one period in history, known as the Industrial Revolution.
5. Explain to the class that William Wordsworth was a poet who lived during the Industrial Revolution and was known for his strong feelings against the impact of industrialization and his strong connections to nature.
6. Provide some basic information about the Industrial Revolution with the class. Some basic facts might include:
 - The Industrial Revolution took place in phases between 1760 and 1850.
 - It was defined by a period in which a great number of inventions were created, all of which affected major industries around the world and dramatically changed how these industries functioned.
 - Before the Industrial Revolution, agriculture was the main form of employment and all work was done by hand or powered by animals.
 - After the Industrial Revolution, some of the largest employers were factories and mines. Much of the work was powered by machines, which ran by burning coal to make steam.
 - During the Industrial Revolution, many of the inventions were technological: the development of machines that increased productivity and automated manufacturing.
 - These changes in industry had large and far-reaching effects on society, law, government, and the economy.

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7. Ask the class: How does this information fit in with what you know about the current issue of environmental conservation? How might some of these changes, which began during Industrial Revolution, have had a lasting impact on our planet?
8. Distribute *Student Handout: Fossil Fuels: A Brief and Basic Background*. Ask for volunteers to read it aloud or have students read it silently.
9. Conduct a brief discussion to ensure comprehension of the handout. Use some or all of the following questions as a guide:
 - Why are coal, oil, and natural gas called FOSSIL fuels?
 - How did energy get trapped underground?
 - Where did the energy originally come from?
 - How do we use fossil fuels (examples)?
 - Why are fossil fuels bad for the planet?
 - What are three problems with depending on fossil fuels for energy?
 - Why are fossil fuels also known as “ancient sunlight”?
10. Tell the class that they will now view a clip from the documentary film, *The 11th Hour*. In this 10-minute clip, experts discuss how industrialization changed humankind’s impact on our planet, and relate the history of the Industrial Revolution to the current environmental crisis.
11. Screen the 10-minute segment from *The 11th Hour*, starting at Time code 10:34 and ending at Time code 19:10 (DVD Chapters 3 and 4).
12. After the class has viewed the segment, discuss what they just saw. Use some or all of the following questions as a guide:
 - Why do you think humans should be (or shouldn’t be) viewed as separate from the rest of nature?
 - Give a specific example of how our economy has a negative impact on our environment.
 - What needs to change in terms of government and law in order to better protect our environment?
 - According to the film, what price are we paying for mistreating our environment?
 - How did the Industrial Revolution mark an important “rupture” from the way society functioned before?
 - What is a renewable resource? What is a non-renewable resource?
 - Explain the problems and issues with the following statement: “Our economy is based on the theory of unlimited growth, but is dependent on a limited resource.”
 - What is one way that our dependence on oil impacts our health?
 - What is one way that our dependence on oil impacts human population?
 - What is one way that our dependence on oil impacts our foreign policy?
 - What is one way that our dependence on oil impacts our economy?

- For homework, distribute *Student Handout: Greed vs. Opportunism*. Students should read the text and respond to the *Questions for Discussion and Further Thinking*.

Day 2

- Begin class by asking for volunteers to share their homework. Ask volunteers how the Greek myth of Daedalus and Icarus is symbolic of how humankind has managed our global power.
- Tell the class that they will now view another clip from the documentary film, *The 11th Hour*. In this 11-minute segment, experts discuss how greed influences our economy and how, in turn, the basis of our economy exists in contradiction with the health of our planet.
- Distribute *Student Handout: Video Viewing Sheet*. Students should take notes using this chart as they watch the segment. Each sector of society that is discussed in the segment (economy, culture, government, individual) is listed on the left.
- Explain to the class that as they watch the segment, they should write examples of the positive actions as well as the negative actions, or lack of action, that each of these sectors have taken towards a sustainable future.
- Tell the class that after the clip is finished they will have a chance to complete the “Effects & Outcomes” column, reflecting on what they think the impact these actions (or non-actions) have had on the environment.

Example:

SOCIAL SECTOR	POSITIVE ACTIONS/ NEGATIVE (NON) ACTIONS	EFFECTS & OUTCOMES
BUSINESS & ECONOMY	The goal of large corporations is unlimited growth and profit, without consideration of external issues.	Large corporations will continue to grow and displace natural resources/habitats on the earth until they “kill off our host.”

- Screen the 11-minute segment from *The 11th Hour*, starting at Time code 39:11 and ending at Time code 50:25 (DVD Chapters 9 - 11).

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7. After viewing, divide the class into pairs. Allow each pair time to work together to complete the 3rd column (EFFECTS & OUTCOMES) of the *Student Handout*.

8. When the pairs have finished, reconvene as a whole group and discuss their answers. Use some or all of the following questions as a guide:
 - According to the film, what are three or four basic hurdles standing in the way of passing new governmental policies that would protect the environment?
 - Based on the film, explain the basic opportunity cost of economic growth, where the economy is a subsystem and the parent system is the biosphere.
 - If public opinion and technology both favor environmentally friendly energy solutions, why are we still using so much fossil fuel?
 - Name some of the critical “services” that nature provides to humankind for free.
 - If growth isn’t the focus of a company, what should its focus be? Explain the statement that growth should be a “means, not an end” for corporate America.
 - One of the experts in the film said that we can’t promote sustainable solutions by trying to convince people they’re making the wrong choice. He says we must “change the object of desire.” What does that mean? Can you give an example of how that might happen in the local community?
 - How does television negatively impact young people? How does that affect the environment?
 - Why is it a relevant fact that college freshmen can identify over 100 corporate logos but not 10 native plants and animals?
 - Explain the difference between “well being” and “well having.”
 - What sorts of changes need to take place in our culture in order for real change to occur?
 - How has the recent increase in popularity of the Toyota Prius exemplified this kind of shift?

9. For homework, students should respond to one of the following quotes, relating the quote and their written response to their understandings about oil, the economy, and their relationship to the environment. Copy the quotes on the chalkboard or on chart paper, or, alternatively, distribute them on the *Student Handout: Well Having vs. Well Being*.

A man is rich in proportion to the number of things he can let alone.

–Henry David Thoreau

There is a pleasure in the pathless woods,

There is a rapture on the lonely shore,

There is society, where none intrudes,
By the deep sea, and music in its roar:
I love not man the less, but Nature more.

– Lord (George Gordon) Byron

Extension Activities and Ideas for Further Learning

1. Make a creative presentation to the class on the Industrial Revolution. Include the following topics in your presentation: a historical timeline, the most important innovations and inventors of the time, its economic impacts, its political and social impacts, and its environmental impacts.
2. Research the **economic** tradeoffs surrounding the preservation vs. depletion of one natural resource, for example:
 - Preserving **rainforests** vs. using the trees as lumber
 - Retaining **wetlands** as a natural resource vs. draining them for farmland and real estate development
 - Limiting fishing vs. extracting valuable food and resources from the **oceans**
 - Limiting the use of **fossil fuels** vs. focusing on oil-based solutions, such as offshore drilling

In these contexts, what is better economics – natural resource preservation or industrial growth? Or, how can both be achieved? In your report, analyze and debate the tradeoffs between the two. What are the economic factors that must be considered? What is the cost/benefit analysis?

3. Write an expository essay on the following topic:

The problem is not a problem of technology; the problem is not a problem of too much carbon dioxide; the problem is not a problem of global warming; the problem is not a problem of waste; all of those things are symptoms of the problem. The problem is the way we are thinking. The problem is fundamentally a cultural problem.

– Thom Hartmann, Author, *The Last Hours of Ancient Sunlight*

4. Develop a visual presentation about the major environmental protection policies passed in the 1960s and '70s (e.g., The Clean Air Act, The Clean Water Act, The Endangered Species Act, The Environmental Protection Act, The National Parks Bill, The Wilderness Protection Act). Present the history of how they were passed, their importance, and their lasting effects. In conclusion, propose three new environmental

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protection policies that you think the current administration should advocate and explain why you think they should be passed.

5. Read the newspaper for two weeks and each day clip all the articles that have some relevance to the environmental crisis. Present the articles according to the following topics and analyze your findings in your own editorial column.
 - Depletion of natural resources
 - The economy
 - International politics
 - Domestic policy, government and law
 - Socioeconomics and human health
 - Popular culture and the media

There are three major forms of fossil fuels: coal, oil, and natural gas. All three were formed millions of years ago. They are called fossil fuels because they consist of fossilized energy created by ancient plants that were trapped and crushed under layers of rock over the course of millions of years. Fossil fuels are, in essence, “ancient sunlight” – the energy from the sun that was converted by plants, fossilized over the past 300 million years.

All green plants are able to convert sunlight into energy. Approximately 360 to 286 million years ago (during the Carboniferous Period), the earth was covered with bodies of water that were in turn filled with algae, huge trees, ferns, and other large leafy plants. As these various trees and plants died, they sank to the bottom of the water, and, over many hundreds of years, were covered by sand and clay, rock, and other minerals. Over time, more and more rock piled on top of the plant matter, creating massive pressure. This pressure trapped the plant matter, as well as all the energy that the plants had converted from sunlight through photosynthesis, under the layers of rock. Under this great amount of pressure and heat, the carbon energy from the plant matter eventually turned into coal, oil, and natural gas – otherwise known as “fossil fuels.”

To access fossil fuels, which are all found deep underground, they must be extracted from the earth. Coal is mined out of the ground either by creating deep shafts so miners can travel underground to dig up the coal or by strip mining, a process by which huge steam shovels strip away the top layers of soil to get to the coal. To access crude oil and natural gas, companies drill through the earth to the deposits deep below the surface. The crude oil and natural gas are then pumped from below the ground by oil rigs. Then the petroleum, or crude oil, that is found underground must be changed, or refined, into other products before it can be used.

Fossil fuels are used in thousands of different ways. For instance, almost all plastic originally comes from oil. Additional products include gasoline, diesel fuel, aviation or jet fuel, home heating oil, oil for ships, oil and coal to burn in factories, and oil and coal to burn in power plants to generate electricity.

Most of the world depends on the energy that we currently get only from fossil fuels, and this creates many serious problems. For one, in order to extract the fossilized energy, fossil fuels need to be burned, and when they are burned they emit toxins that pollute the environment. Secondly, the methods by which we obtain the fuels – drilling and mining – are very destructive to the environment in both the short and long terms. Also, fossil fuels are not renewable, which means they cannot be made again. Because they are non-renewable, and the world’s economy uses them so much, they are actually starting to disappear. This leaves us with a supply and demand issue. The higher the demand, the lower the supply, the more the fuels – and all the things that are made from the fuels – will cost.

We are running out of this “ancient sunlight” – energy from the sun that shone down onto the earth in ancient times, before the time of the dinosaurs. We are also ruining our water, air, and food supply by mining for, transporting, and burning these “fossil fuels.”

Sources:

Energy Quest: The California Energy Commission, www.energyquest.ca.gov

The 11th Hour, www.11thhouraction.com

The Myth of Daedalus and Icarus

On the island of Crete there was a great inventor named Daedalus, who served as the official inventor and chief architect for the king, King Minos. Daedalus built many things for King Minos, including the famous Labyrinth, a huge, maze-like castle, full of corridors and hidden rooms. King Minos wanted the Labyrinth to serve as a prison, and since only Daedalus knew how to escape from the Labyrinth, to keep that secret, King Minos imprisoned him in a tall tower with his son, Icarus.

In an attempt to gain freedom, Daedalus made two pairs of wings from bird feathers and wax. He tied one pair onto his back, and one pair onto Icarus. Before setting out, Daedalus warned his son not to fly too close to the sun, as it would melt his wings, and not too close to the sea, as it would dampen them and make it hard to fly.

At first, Icarus heeded his father's words. But soon, he became so exhilarated by the thrill of flying that he began to feel invincible. Icarus ignored his father's warning and flew up towards the sky. Flying too close to the sun, the wax on his wings melted and he fell to his death, drowning in the sea. The Icarian Sea, where he fell, was named after him.

We are fundamentally groups of animals ... very much conditioned by two essential characters: one is opportunism, and the other one is greed. All the animals and vegetables are opportunistic creatures. They do what's necessary for them to do in order to survive.

– Paolo Soleri, *Architect, Founder, Arcosanti*

Questions for Discussion and Further Thinking

1. What is the difference between opportunism and greed?
2. How does *The Myth of Daedalus and Icarus* illustrate that difference?
3. What is an example of human behavior that illustrates opportunism? Greed?
4. What is an example of plant and/or non-human animal behavior that illustrates opportunism? Greed?
5. Analyze *The Myth of Daedalus and Icarus* as an allegory for our current economic situation.

SOCIAL SECTOR	POSITIVE ACTIONS/ NEGATIVE (NON) ACTIONS	EFFECTS & OUTCOMES
BUSINESS & ECONOMY	Positive:	
	Negative:	
GOVERNMENT & LAW	Positive:	
	Negative:	
CULTURE & MEDIA	Positive:	
	Negative:	
INDIVIDUAL & SELF	Positive:	
	Negative:	

Student Handout: Well Having vs. Well Being

Directions: Respond to one or both of the following quotes. Relate the quote and your response to your understandings and thoughts about oil, the economy, and their relationship to the environment.

A man is rich in proportion to the number of things he can let alone.

– *Henry David Thoreau (1817-1862)*

There is a pleasure in the pathless woods,

There is a rapture on the lonely shore,

There is society, where none intrudes,

By the deep sea, and music in its roar:

I love not man the less, but Nature more.

– *Lord (George Gordon) Byron (1788-1824)*