Chapter 2: Natural Resources

Science, Ethics, Spirituality, Action

http://healingearth.ijep.net/natural-resources

Introduction

The *Healing Earth* team asks that when you use any aspect of this teacher guide or the lesson modules that you please send an email sharing: 1) how you used the resource, 2) how your students responded to the resource, activity, or lesson, and 3) what changes you would recommend for future versions of the guide. Please email Dr. Michael Schuck (mschuck@luc.edu) and Dr. Nancy Tuchman (ntuchma@luc.edu). The information that you share will help improve these resources for your and others' use. We appreciate your feedback.

Overview

This chapter presents the science of natural resources in connection with ethical issues, environmental spirituality, and actions throughout the world. Natural resources may be a boring or unfamiliar topic for some students, so it is especially important to integrate the topics in this chapter to students' lives. Connecting the processes of mining or collecting resources with ethical considerations can help students to consider costs and benefits of natural materials they may have taken for granted. Prompting students to reflect on their own internal resources and connections with the planet can help them develop empathy and care for the earth. Creating and carrying out ways to use and preserve natural resources in their communities and the world can provide them with tangible opportunities to put their knowledge into action. This integrated approach can help to connect students with the material and hopefully take actions to use or preserve natural resources in more sustainable ways.

By the end of the chapter, students should understand basic terms and science connected to natural resources and how they are extracted or collected. Additionally, students should learn some tools for ethically evaluating decisions related to natural resource use and extraction. They should be able to connect their personal spirituality with the abundance of natural resources and how humans use them.

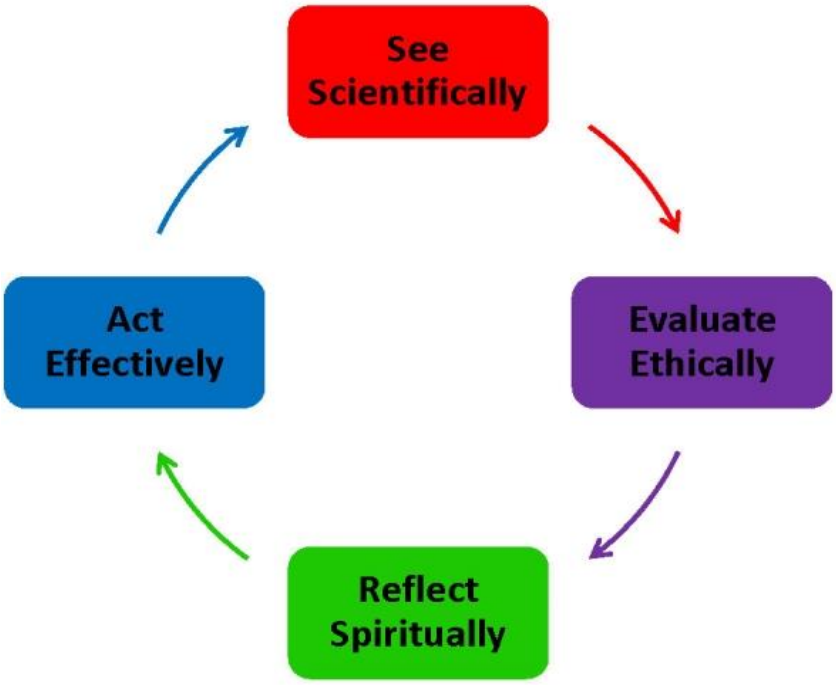
Finally, students should become aware of actions that communities around the world are taking to use natural resource better, then identify possible actions in their own life or communities.

Learning Objectives

1. Investigate a case study that raises issues of natural resource extraction and protection, ethics, spirituality, and action.
2. Explain the science behind natural resources: Earth's tectonic plates, spheres, elements, and biogeochemical cycles.
3. Describe Earth's resources and the challenge of human extraction.
4. Analyze potential innovations for future natural resource availability and protection.
5. Study key ethical issues that bear on the conservation, preservation, restoration, and preemptive care of Earth's natural resources.
6. Discover a variety of ways human beings have historically linked Earth's magnificent resources with spiritual experience as well as teachings and rituals in the world's religions.
7. See environmental actions people are taking around the world to protect natural resources and consider actions you can take in your own community.

Connection of this Chapter to Ignatian Pedagogy

As stated above, an integrated understanding of natural resources engages students more fully because it engages *them* more fully as subjects, as *whole human beings* invited to connect their scientific curiosity, their moral lives, their deepest beliefs, and their energy to act. This follows the spirit of Ignatian Pedagogy, the method at the heart of *HE*. In *HE*, you are first invited to "see scientifically" and relate what you see to your own experience. Next, you are asked to reflect on the values ("evaluate ethically") and meaning ("reflect spiritually") that emerge in the study of environmental science. Finally, you are challenged to take the knowledge you have gained and act to heal the Earth ("act effectively").



When we elaborate this Ignatian Pedagogy figure with the major topics covered in the Natural Resources Chapter, the following graph emerges.

As teachers, we should be sensitive to the 'entry point' into the subject of natural resources that attracts student attention. Possibly that entry point is science, or maybe a local environmental action linked to natural resources is a better point of departure. In these cases, we can capitalize on local events and, from there, guide students through natural resources science. The same can be true of a moral issue in natural resources. Possibly students have an interest in product manufacturing, from which we can bring students to the science of natural resources. The point to keep in mind is that the major topic areas in each *HE* chapter are movable; you can enter the chapter at any topic area and move along to the remaining topics in the order you find most helpful.

Lesson Outline and Suggested Activities

Keep in mind that while the activities below are presented in a linear outline form, *Healing Earth* emphasizes an integrated approach that encompasses science, ethics, spirituality, and action. It is important that students do not see these as separate topics but as mutually reinforcing, interconnected dimensions of each subject, whether that be biodiversity, natural resources, energy, water, food, or global climate change.

I. Case Study: Coltan and Cell Phones	*Raises scientific, ethical and spiritual questions that will be further explored.*

The chapter opens with a case study to pique students' interests in the hopes and issues surrounding natural resource extraction and usage around the world. Topics that are introduced include, but are not limited to:

- The laborious and dangerous extraction processes involved in coltan mining
- The ethical issues involved with the individual and societal value of profits over people or the planet
- Specific environmental impacts from mining and the influx of people to the Kahuzi-Biega National Park
- The spiritual poverty apparent in the greed, mistrust, and violence near the mines
- Actions being taken by Breaking the Silence: Congo Week to raise awareness of issues involved in these coltan mining communities
- The ethical need to consider complex factors in ecosystems where resources are being extracted

Use the driving questions below to introduce the chapter through the lens of the case study.

- How is matter organized on Earth? What are the fundamental cycles of matter that form the basis of our natural resources? What are Earth's principal natural resources? What are the environmental impacts of natural resource extraction and use?
- There are many ethical questions raised today about how to best manage and maintain Earth's natural resources. What contribution do the moral principles, goals, and virtues of *Healing Earth* make in response to these questions?
- What value do the world's religions place on Earth's natural resources? What contribution can spirituality make to address problems surrounding the extent and methods natural resource extraction? Do you sense a relationship between your own

inner spirit and Earth's natural resources?
- What actions are being taken in the world today that are hopeful signs of responsible natural resource management? Are there actions being taken in your community to use natural resources sustainably?

You may also want to look at the reflection questions given at the end of this chapter and begin to ask some of them in ways related to the case study.

II. Natural Resources and Science	*Gain a solid scientific background of natural resources*

This section contains several major sections:
- The formation and composition of Earth as a terrestrial planet
- Basics of elements and atom composition
- The biogeochemical cycles including carbon, nitrogen, phosphorous, and sulfur
- The extraction and limited availability of certain natural resources
- Possible sustainable solutions for the future of natural resource use by humans

By the end of these lessons students should understand the broad history of the formation of Earth and various natural resources, the atomic structure of specific resources, the cycles which transform and transfer these resources throughout the planet, the extraction of these resources by humans with certain limits, and the future possibilities of natural resources. As you are going through the lessons, make sure to pay attention to the "Closer Look" and "Looking Ahead" boxes and expand on these as wanted. Make sure that students are continually reflecting back to the questions and objectives explained at the beginning of the chapter. Try and make connections to the students' own communities and interests.

Activities/Projects:

1. **Hydraulic Fracturing Process**: Have your students watch this video (http://education.nationalgeographic.org/media/how-hydraulic-fracturing-works/) on fracking and write up a short paragraph to explain how what fracking is and how it works, in language that a younger student (age 10-12) could understand.

2. **Landfills and Recycling Virtual Lab:** This lab encourages students to calculate the relative waste reduction in recycling or diverting certain types of waste from a landfill. http://glencoe.com/sites/common_assets/science/virtual_labs/ES19/ES19.html

3. **Investigation into Earth's Spheres from NASA images:** Assign students to find images highlighting each of the spheres mentioned in this chapter (hydrosphere, lithosphere, atmosphere, biosphere) from the Astronaut Photography Gateway (http://eol.jsc.nasa.gov). Then, they can make a poster or short presentation, outlining key features of each sphere through these photographs. A structured inquiry activity guide is available at: http://ares.jsc.nasa.gov/education/eeab/SOE.cfm.

4. **NOAA Biogeochemical Cycles Article and Activity:** Oceans play a critical role in several biogeochemical cycles. NOAA provides lesson plans

(http://www.st.nmfs.noaa.gov/nemo/pages/curriculum) to explore ocean science. Lesson 4 on the hyperlinked page focuses on the ocean's role in the carbon cycle: as both a carbon sink and a source of carbon dioxide in different regions. Have your students read the article included in the Lesson 4 Teacher's Guide and make a list as a large group of the ways the ocean participates in biogeochemical cycles. Can your students think of any other roles that the article did not mention?

5. **Biogeochemical Cycles Short Story Writing**: Primo Levi was an Italian chemist and author. His book *the Periodic Table* includes a story about an atom of carbon travelling around the world through various chemical processes. You can find a copy here: https://transitionnetwork.org/sites/www.transitionnetwork.org/files/CarbonStoryByPrimoLevi.pdf. Assign your students to pick one type of atom (Carbon, Nitrogen, Phosphorous, or Sulfur) and write a short story in the style of Primo Levi, imagining one of these atoms travelling across the world. The story should be 1-2 pages in length and include at least 10 different chemical processes, with realistic timescales for each process.

6. **Rocks, Minerals, and Mining Curriculum Resources:** The Australian government provides several resources to introduce mining and basic geology to high school students at: http://www.curriculumsupport.education.nsw.gov.au/secondary/science/minerals/ (Note: none of these activities are very detailed scientifically, but they can serve as a starting point for considering the complex science involved in mining.)

7. **The Future Availability of Natural Resources:** It might be hard for students to conceptualize how fast certain resources are being depleted. This interactive graph (http://www.daily-interactive.com/projects/resources/) gives an opportunity for students to explore a variety of resources and estimates when they will be used up. It is important to talk with your students about the difficulties and the assumptions made with these future predictions. For example, many of the resources in this graph are assumed to be 1/3 used up already. The graph also lets users choose between current production rates or increased production rates based on current trends. For a more rigorous discussion of the future of natural resources, see this report from the World Economic Forum: http://www3.weforum.org/docs/WEF_FutureAvailabilityNaturalResources_Report_2014.pdf (Note: The whole report is not appropriate at a high school reading level, but it includes an excellent infographic and discussion of arguments and assumptions about the future of natural resource use by humans.)

III. Natural Resources and Ethics	*Guide students in their navigation of the principles, goals, and virtues that will allow them to make more informed choices in healing our Earth*

It is important that you understand the logic that holds together the environmental ethic presented in *HE*. As explained in the Teacher Guide Introduction, the ethic is built on three foundations: the intrinsic value of nature, the instrumental value of nature, and the value of sustainability. The value of sustainability should shape how we use nature (instrumental value); by using nature in a way that neither exhausts nor degrades it, we honor the integrity of the natural world (intrinsic value).

From these foundations, a set of moral principles, goals, and virtues are derived that aid us in thinking through moral challenges that surface as human beings interact with the natural world. The foundations, principles, goals, and virtues used in *HE* are rooted in Roman Catholic social thought. You can see how these are presented and employed in such texts as Pope Francis' encyclical *Laudato Si'* (2015), Pope John Paul II's message *The Ecological Crisis: A Common Responsibility* (1990), the Southern African Catholic Bishops Conference's *Pastoral Statement on the Environmental Crisis* (1999), the Australian Catholic Bishops' statement *A New Earth: The Environmental Challenge* (2002), or the United States Conference of Catholic Bishops' pastoral statement *Renewing the Earth: An Invitation to Reflection and Action on Environment in Light of Catholic Social Teaching* (1991). All these texts are available on the internet at the provided hyperlinks.

Understanding the background logic to *HE*'s environmental ethic is not, in the first instance, for the purpose of teaching it to your students. Rather, the purpose is to help you feel more comfortable taking a single foundation or norm and exploring it in depth *with* your students. You may, for example, wish to lead a class discussion on what the intrinsic value of nature means and what bearing this might have on the issue of species extinction. In other words, consider approaching the Ethics Section with an emphasis on *depth* rather than *coverage*. Your students may eventually develop a sense of what it means to have a coherent environmental ethic, but a better place to start is often with a specific ethical idea in relation to a specific moral problem.

There are many ways to conduct an informative exploration of environmental ethics as it pertains to natural resources. You may wish to facilitate small and large group discussion, a class debate, or a case study analysis.

Small and Large Group Discussion

The moral principle of subsidiarity helps us analyze the ways that governments, organizations, and individuals participate in conserving natural resources. Have your students read the following regional reports, noting the different groups (governments, organizations, or individuals) and how they participate in protecting natural resources. As a large group, discuss what your students noticed about the groups, making a concept map on the board or a poster with "Conservation of Natural Resources" at the center, the different groups as subcategories, and the variety of actions taken by these groups as the outer level.

Africa: As you learned in this chapter's case study, the great tropical forest of the Congo has long been threatened by mining-related deforestation. A hopeful event occurred in October 2015 when several European countries offered financial support to the Democratic Republic of Congo and other nearby countries for improved action against illegal logging and mining operations. To learn more, read about the Central African Forest Initiative.

North America: The Gulf of Mexico region of the United States contains an abundance of natural resources. The Gulf Restoration Network (GRN) organizes the public around protecting these resources. Go to the GRN website for news about recent actions taken to protect the Gulf of Mexico.

Europe: With the initiative of the Ministry of Environment and Natural Resources Protection in the country of Georgia, a working group including the President of the German Federal Environmental Agency was created to investigate the potential of constructing a biosphere reserve. Read more about this initiative here.

Class Debate

Should the Great Barrier Reef be classified as "in danger" by the United Nations? Have your students read the article below. As a large group, try to summarize the article, identifying the stakeholders in this debate. Then, divide students into two teams of four students each, with the rest of the students acting as stakeholders. One team will research and argue that the reef should be classified as "in danger." The other group will research and argue against this label. The stakeholders should each be assigned a particular role, such as: mining executives, native people, tourist company representatives, local citizens, government officials, UN representative, or any others that your or your students identified earlier (having multiple of each role will be helpful later). Ask the teams to research and prepare a 10 minute persuasive presentation for the stakeholders arguing for their point of view, including scientific, ethical, and possibly spiritual considerations. The stakeholders should do their own research and come to the debate prepared with a list of at least 5 priorities that someone in their position might have in considering both sides. After each team presents, they should be allowed 2 minutes to comment on the other team's presentation. Then, there should be about 5 minutes for each team when the stakeholders should ask questions to help clarify the arguments. Consider requiring each stakeholder to ask at least one question. Then, the stakeholders should consult with any people in the same role as them to decide on a consensus viewpoint. Each group of stakeholders should then have 2 minutes to present their viewpoint on the debate, including at least 3 specific connections to the arguments presented previously by each team. At the end, take a vote of all the stakeholders to decide whether the reef should be classified as "in danger." Debrief with a short class discussion where students can express their personal viewpoints (apart from the role they were assigned for this activity).

Asia Pacific: In a bid to keep the Great Barrier Reef from being reclassified by the United Nations as "in danger", the Australian government unveiled a 35-year plan to manage risks to the reef, one of the natural wonders of the world. Read more on this here.

Case Study Analysis

Reading articles online or in print is a skill that students develop over time. One way to help students become better readers is to guide them in analyzing the content, form, and function of particular articles. This Classroom Assessment Technique is described in detail by Angelo and Cross in *Classroom Assessment Techniques* (1993). For the two articles below (or another article related to this chapter), ask your students to organize the entire article including the title, pictures, paragraphs, and any footnotes into a chart with three columns, identifying the content (simply identifying the text or picture), the form (how the content is expressed: a list, prose, quotes, links, visually, in a graph, etc.), and the function (why the content is included or what purpose the writer intended each piece to serve). An example chart for the South Asia article can be found in the attachments to this guide. This activity might take significant time for students to understand and might require time outside of class to complete.

South America: Demand for Latin America's mineral, agricultural, and energy wealth is fueling regional growth. But natural ecosystems must also be conserved, along with the services they provide to society, for regional development to endure. To achieve this, the Latin America Conservation Council (LACC) renewed its commitment to address the issue of ecosystem conservation at a special conference. Go here for more on this.

South Asia: In August, 2014, representatives from each of the 8 countries that make up South Asia met in Kathmandu, Nepal to discuss how they can collaborate to address the problem of poaching. The group focused on how their countries could strengthen transboundary cooperation for intra-country law enforcement initiatives through intelligence sharing on poaching and trade trends, along with exchanging knowledge and skill for fighting wildlife crime across South Asia. Go here for more details.

IV. Natural Resources and Spirituality	*Help students identify core convictions about the meaning and value of natural resources and the historical basis of these core convictions*

It is very important, here, that you have a clear understanding of the approach taken toward spirituality in *HE*. Spirituality will undoubtedly be the most challenging part of *HE* for teachers and students to accept as related to environmental science. It will be tempting to move through the topic quickly, or not all. This would, however, degrade the very purpose of *HE*, which is to educate the *whole person* in environmental science. And spirituality is part of what makes up a whole person.

The difficulty is that most people immediately associate spirituality with either religion or some kind of mystical activity. The association of spirituality with religion is a problem for many people due to the history of some religions denying the results of science or intruding into the work of scientists. The association of spirituality with mystical activity is a problem for many people because, again, this activity seems completely unrelated or dismissive of science.

It is important that you help your students understand that spirituality is--in the first instance--a **constitutive feature of every human life**. Students need to understand that **all people have a spirituality--that *they* have a spirituality.** As stated in the Teacher Guide Introduction, *HE* begins with the view that spirituality is "the energy and content of beliefs that lie at the core of [every] human being's personal identity." This is why every Ethics Section in *HE* invites students to probe their fundamental thoughts and feelings about the natural world. This is an invitation to explore their 'inner spirit', or spirituality.

HE also relates spirituality to the particular experiences some people have of sensing a *sacred* quality in nature. Everyone has a spirituality in terms of an 'inner spirit', but not everyone experiences nature as something sacred. Additionally, *Healing Earth* relates spirituality to the beliefs and rituals of the world's religions, with a particular interest on beliefs and rituals concerning the natural world. Again, everyone has a spirituality in terms of an 'inner spirit', but not everyone's spirituality is linked to a religion.

With this in mind, the Spirituality Section of the Natural Resources chapter invites students to

explore what natural resources mean to them, how people experience natural resources as sacred, and how the world's religions treat natural resources in their beliefs and rituals.

Natural Resources and Personal Spirituality

Ask your students to write a short journal reflection (about 1 page long) in response to the following reflection:

> Have you ever described yourself as "feeling drained," "tapped out," or "running on empty?" We often use these or similar terms to describe ourselves as having a limited amount of internal resources, which get used up by our own or others' actions. Think about a few times when you felt used up by your own actions or by another person. Choose one of those times, and briefly describe what happened in a paragraph. Then journal about the following questions: if you could go back to before that moment, what would you say to yourself or the other person about your resources? Would you want to change anything about how your resources were used? How do you think your answer might compare to how the Earth would respond to humanity's use of natural resources?

After your students finish writing, briefly ask them how it went and offer appropriate resources if students want to talk about a particularly emotional issue that came up while they were reflecting. Mention the Ignatian Suscipe prayer (included below), which offers a framework to think about offering our internal resources to God in recognition of the gifts we have been given.

Natural Resources and Sacred Experience

Is there an area close to your school related to natural resources such as a mine, a cave, a forest, a farm, a river or lake, a windy prairie, or something else? Consider taking your students to visit this area or assigning them to visit an area on their own. While visiting the location, tell your students to make a list of all the natural resources they can see or that they know are present nearby (at least five resources). For each of these resources, assign them to write a specific statement of gratitude for how the resource supports the area, such as: "I am grateful for this grass, which uses the sun's energy to convert carbon dioxide and other chemicals into plant matter to nourish the soil and animals in this region." Sit in a circle as a class and ask each student to read one of their statements out loud, with the whole class responding after each statement by saying, "We are grateful for _____," filling in the blank with each natural resource. For Christian and Jewish students, this type of verbal list might be familiar as a litany prayer.

Natural Resources and World Religions

Creation stories and myths provide a basis for how many different religions and cultures view the natural world, especially the resources available and how humans should use them. Assign your students to pick two creation stories from this website: http://www.gly.uga.edu/railsback/CS/CSIndex.html. Tell them to compare and contrast how these two stories relate to each other in terms of natural resources as described in the science section of this chapter. What resources are identified in the stories? What is the relationship of humans to

these natural resources? What implications might these stories have for how these religions view our current use of natural resources? Ask students to write up their answers in a journal or short paper.

Natural Resources Examen

If your students are Catholic Christians, you may want to lead them in the following Jesuit Examen that focuses on natural resources.

> Ask your students to quiet themselves, close their eyes, and breathe deeply and calmly. Remind them that they are in the presence of God. Invite the students to take a moment in the silence of their hearts to ask the Holy Spirit to be with them in this Examen.
>
> Ask them the following questions and pause for 30 seconds in between each:
>
> When did you use natural resources today? In electronics or classroom materials? In your house? At school?
>
> Do you ever feel grateful to God for the gift of Earth's natural resources? Why or why not?
>
> Have you done any damage to Earth's natural resources today? Ask for forgiveness from God for your shortcomings.
>
> How could you better appreciate and support natural resources in the future? Ask for the strength and knowledge to conserve natural resources in ways that praise, reverence, and glorify God above all else.

Close by reciting the following Ignatian Suscipe prayer: "Take, Lord, and receive all my liberty, my memory, my understanding, and my entire will. Whatever I have or hold, you have given it all to me. I return it, wholly to be governed by your will. Give me only your love and your grace and that is enough for me. St. Ignatius, pray for us."

V. Natural Resources and Action	*Guide students in identifying personal actions to obtain and use natural resources in ways that benefit their own community, region, and nation.*

Actions in the World

Memes can provide a method of sharing cultural information in quick, dramatic ways with both serious and funny tones. In particular, the types of memes using pictures overlaid with short text phrases can use already existing cultural ideas to communicate new ideas across cultures. In this way, creating memes can be an opportunity for your students to translate the ideas from this chapter to a wider, global audience. Consider developing a project for your students to create memes around different topics in this chapter. One possible format would be to have students choose 5 important ideas from this chapter, which they think everyone should know. They could pick between scientific ideas, ethical questions, spiritual considerations, or ongoing actions. Another option would be to pick one of the inspired people and invent a new meme using a picture

of them with a quote or idea about that person. They should then create two memes for each of their 5 ideas or people, attempting to synthesize the information from the chapter into individual images. You should help your students to search for images with Creative Commons licenses through Wikipedia or Google, so that their final memes can be shared publically. They should write a short paragraph to accompany each meme, explaining how the image expresses ideas related to the natural resources chapter and including the source of the original picture. Allow them to share their memes with the class through presentations or an online class forum. Then have students choose their best one or two memes to share publically online: through their own social media accounts, with the *HE* community, or through another public venue, as appropriate.

Actions in the Community

Are there natural resources provided by your region such as trees, minerals, crops, water, or even social resources like labor? Help your students to list a variety of resources provided by your community, identifying the most important resources in your area. Ask if they know of any ethical issues related to these resources, such as pollution, unsafe working conditions, etc. Provide a few issue ideas of your own to help the students think of more possibilities. Allow students to conduct some research to find potential issues in your community related to natural resources. Discuss if there is a particular issue that your class can get involved with by volunteering, by raising awareness, or by advocating for the responsible use of a local natural resource. An example assignment structure is included in the attachments for communities near shale deposits or fracking sites.

Personal Habits

Our purchase and use of consumer products depends on natural resources. Ask your students to think of one product they buy or use regularly. Examples include: blue jeans, cell phones, coffee (including both the cups and coffee beans), take-out food and containers, pens or pencils, or plastic water bottles. Assign them to research the natural resources that contribute to these products, considering the following questions: What natural resources are used to create this product? Where do these resources come from? How are they transported to be manufactured and sent to you? What happens after the product is used? How are leftover materials disposed? Ultimately, have the students come up with ideas about how their personal actions can be more sustainable, based on their research of this product. Can they buy more locally? Can they bring a reusable cup or bottle? Should they buy paper rather than plastic? Remind them that it is usually preferable to reduce rather than reuse, to reuse rather than recycle, and to recycle rather than throw out. This project can be developed as a one-day journal exercise or a longer-term presentation.

VI. Reflection	*Have students analyze their role in the misuse of natural resources, their responsibility to use natural resources sustainably, and the ways in which people around the world are affected by lack of natural resources.*

Ask your students to think of one specific time when they saw natural resources being wasted, by themself or by someone else. Did they see trash on the ground in public? Did they see a faucet or hose running without anyone using it? Have they seen people cut down trees or plants without using them completely? Tell them to imagine going back and talking with the person who was

wasting those resources. Have them spend 5-10 minutes journaling about what they would tell that person, including at least one idea from each major section of the chapter: science, ethics, spirituality, and action.

Inspired Person

Sister Dorothy Stang was murdered while working to protect natural resources and rural workers in Brazil. The lesson plan found at http://www.notredameonline.org/assets/Dorothy-Stang-Resources/Ecology/Day-7-Power-of-One-Objectives.docx provides a worksheet and a plan for viewing a video about Sister Dorothy's life. Watch the video with your students and have them complete the worksheet as they watch. Have a closing discussion with your students about what connections they saw between the video and the chapter content including science, ethics, spirituality, and action.

Conclusion

By the end of this chapter, students should have a deep scientific, ethical, and spiritual understanding of natural resources by going through case studies, regional reports, identifying personal actions, and studying the sources and extraction of natural resources around the world. Important questions that students should be able to reflect on and answer by the end of this lesson are:

1. How would you explain the principle causes of Earth's natural resources?
2. What are the four primary spheres from which Earth's resources are drawn? Give examples of how these spheres are interrelated.
3. Scientifically speaking, what does the following phrase mean: "The matter we have is all we have"?
4. Are some forms of mining worse for the environment than others? Explain your answer.
5. What is the distinction between 'conservation' and 'preservation'? What ethical issues are at stake in these two perspectives on natural resources?
6. What is meant by "the tragedy of the commons"? What bearing does this have on thinking ethically about natural resources?
7. How are your ideas and actions influenced by your worldview? What bearing does your worldview have on the meaning you give to Earth's resources?
8. Discuss why art is sometimes used to convey the experience of nature as 'sacred'. Give an example.