



Sustainability

GUIDING QUESTIONS

- How can sustainability promote environmental health, economic development, and human well-being?
- How are people working toward sustainable solutions to local and global issues?

Introduction to Sustainability

Jarid Manos grew up in rural Ohio, where he first fell in love with the prairie ecosystem. The prairie served as a refuge where Jarid could go when life became difficult. Jarid's childhood was not easy. As a teenager, he ran away from home. He spent years moving from one city to another, making money any way he could. As a young man he struggled with depression and drinking and eventually he resorted to selling drugs. During those turbulent times, Jarid yearned to return to the prairies he loved.

Now, Jarid's refuge is a disappearing ecosystem. In the past, prairies were found all over the United States. Today, there are fewer and fewer prairies in North America as people are building homes and farms where prairies used to be.

Jarid eventually grew from a troubled young man into a leader and role model. After spending years building a healthy life, learning about efforts to save America's disappearing prairies, and discovering how to lead a movement for change, Jarid founded the Great Plains Restoration Council (GPRC).



COURTESY OF GREAT PLAINS RESTORATION COUNCIL

Jarid Manos founded the Great Plains Restoration Council.

The GPRC restores prairie ecosystems in Texas and South Dakota with the help of people from different cultures, backgrounds, and communities. The GPRC works not only to protect natural prairie areas and the wildlife that live there, but also to help young people improve their lives by teaching them leadership skills. The Council strives to build healthy environments and healthy people. Says Jarid, “This is Ecological Health—healing ourselves through healing the Earth.”¹

Jarid’s own personal journey and the work of the Great Plains Restoration Council are connected to the idea of sustainability. **Sustainability** is the principle of meeting current needs without limiting the ability of future generations to meet their needs. Perhaps the simplest way to think about it is that sustainability involves the health of people and the planet.

Sustainability comes from the concept of sustainable development. **Sustainable development** is the process of economic, social, and political transformation using practices that raise standards of living for people around

the world without depleting Earth’s resources. In other words, it involves helping people to meet their needs for a good life without compromising the ability of future generations to meet their needs. If we allow Earth’s resources to be depleted, then we limit the ability of people to meet their needs and to have a good quality of life in the years to come.

Two fundamental principles tied to sustainability are:

1. Intergenerational responsibility:

We have a responsibility to leave ample resources for future generations on Earth.

2. Interconnectedness: Natural and

human-constructed systems cannot be separated. They interact with and impact each other.

How are intergenerational responsibility and interconnectedness part of the things we do every day? As you participate in an activity, ask yourself if it can be done in a way so that people in the future will have the same opportunities to do this activity as you do today. For example, if you live in an area surrounded by natural beauty you can enjoy your environment in ways that increase your health and happiness. If you also make an effort to maintain your surroundings by keeping the streets clean, recycling, and decreasing air pollution, you will help preserve a healthy environment for future generations. You will also support the health of your community today (for example, a decrease in air pollution can decrease respiratory issues).

When we talk about striving for sustainability, are we talking about something on a global scale or are we talking about something that applies to local communities? Yes and yes! That is, we are talking about both global and local issues. When you think about it, even global problems are local to someone. When these issues become global in scale, it is because of recurring patterns and widespread consequences. Think about the issue of poverty. Approximately 1 billion children around the world live in poverty.² This issue is clearly

one that needs to be addressed systemically. At a global level, we can look at root causes and solutions (i.e., policies that will decrease poverty by a certain year). At a local level, people can provide more immediate responses to help to alleviate poverty (i.e., food banks, shelters for homeless people).

Frameworks for Envisioning Sustainability

Sustainability is a big idea. Yet, at its core, it is also a simple idea. However, it is not always easy to visualize sustainability. Frameworks have been developed over the years in an attempt to provide a structure for exploring, analyzing, and acting on sustainability issues. As you read the two frameworks presented here, think about which one makes the most sense to you and why. How would you explain sustainability?

Environment as the Base

Some people argue that a healthy environment is the foundation of a sustainable future. Without a thriving natural environment, they argue, there would be no human society because humans rely on resources from

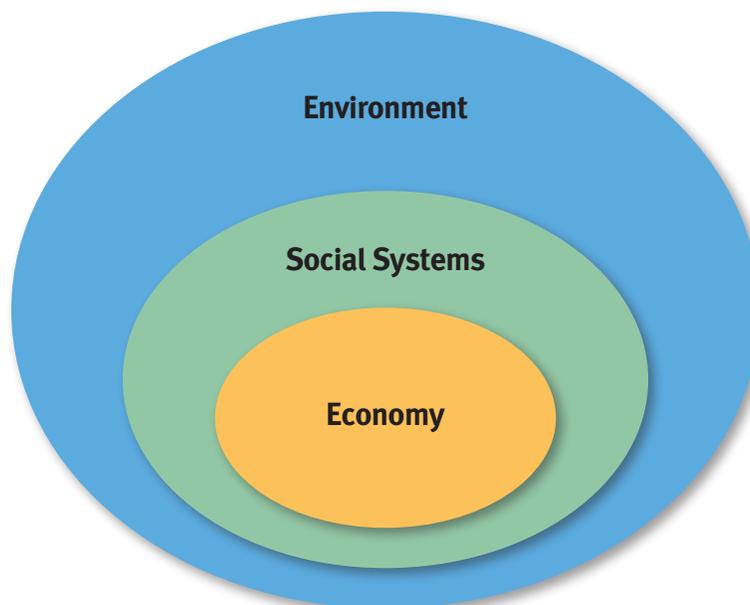
nature every day. Take, for instance, the food that you eat. If there was no healthy environment where the food could grow, you would not be able to survive. Thus, the human spheres of society and economy fall within the larger sphere of environment. Similarly, economy is a sub-system of society, so the economic sphere is further nested within the social sphere. The result of this hierarchy is a system of nested circles.

Three Equal Sectors

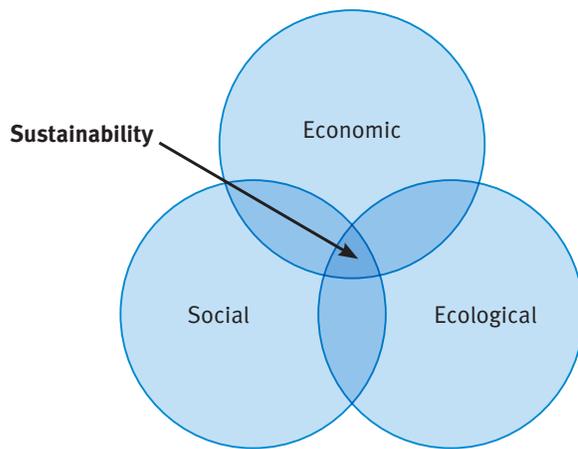
A different model suggests that all three types of systems—environmental, economic, and social—must be in good working order to support sustainable communities. This puts economy and society on par with environment.

A Venn diagram provides the simplest model for visualizing the role that the three sectors play in sustainability. The area in the middle where the three sectors overlap is where sustainability occurs.

This diagram is useful as a “lens” for looking at the sustainability of any decision, behavior, or object. For example, you can use the diagram to analyze the sustainability of a cup of fair trade coffee. **Fair trade** is the idea that fair prices are paid to those producing goods in developing countries. This coffee



Some people believe that a healthy environment is the foundation for a sustainable future.



This Venn Diagram illustrates how a thriving society, flourishing economy, and healthy environment support sustainability.

provides a living wage (income necessary to meet one’s basic needs) for coffee farmers, so we can say that it promotes economic sustainability for coffee-growing communities. If the coffee is shade-grown, meaning it grows in tropical forests alongside other species and provides habitat for native birds, we can argue that it supports ecological sustainability. Lastly, our cup of coffee can be seen as encouraging social sustainability because the fair trade

The Selva Negra Coffee Farm in Nicaragua offers organic, shade grown, bird-friendly coffee.



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model allows farmers in Nicaragua to grow coffee in a traditional manner and to sustain their local culture. If fair trade coffee promotes the well-being of the economy, society, and environment, we can conclude that it is a sustainable choice.

This Venn diagram appears throughout the book as a simple visual tool to show that building sustainable communities requires environmental well-being, social vitality, and economic health. If you take one component of the Venn diagram out, this can lead to instability and possible collapse of the others.

How Sustainability Connects to Us

When you think about the world in 50 years, what do you think it will look like? And what do you hope it will look like? There are many different ways you can help to create your ideal future. Young people around the world today make sustainable choices all the time. These decisions range from the types of things you choose to buy and the career you pursue all the way to how you deal with conflict. Consider the following examples:

- A high school student who has witnessed violence in his local community decides to create music about increasing peace
- a student club works with their school to teach everyone how to save energy within the building
- a homeroom decides to create a public service announcement to teach youth about making sustainable choices when they shop

All of the above examples illustrate different ways we can live more sustainably. The choices we make individually can influence the choices we make as a society. And the choices we make as a society can have a global impact. The case study above illustrates one person’s sustainable choices and how his choices support his family and his community.



Raul lives in the town of Chinchero with his family.

YOUTH PROFILE

Raul Quillahuaman Huaman

Raul lives in the town of Chinchero in Peru with his family. He loves life in Chinchero because it is peaceful; people are friendly and help each other. He also loves the mountains that surround the town.

Chinchero is famous for its weaving and boys and girls learn how to weave at a young age. Many people in Chinchero are farmers. In addition to growing potatoes and lima beans, they raise sheep that provide wool for weaving blankets and clothes. The land is very important to people in Chinchero because it provides food and a way to make money. The main language spoken in Chinchero is Quechua and the second language is Spanish.

One challenge in Chinchero is that many people lack the money to complete their education. Students usually stop going to school by the time they are 16, and without a proper education they struggle to earn enough money to support their families and take care of the land.

Raul currently attends university to study

tourism so that he can help strengthen his community's economy, sustain the environment, and teach people about his culture. Raul's hope is that Chinchero can attract tourists who will support the town's economy when they eat at local restaurants, take tours of the village, buy blankets or clothes, and rent hotel rooms. The money that local people make through tourism supports their livelihood. Tourism also gives Raul a chance to share his way of life with those who come to learn about his people. He wants to make sure that in 50 years his community and family have good opportunities in life. His career choice helps him pursue this goal.

Background on Sustainability

Human history has taught us lessons related to extinct civilizations and reasons why they were not able to survive. In certain cases, civilizations were not able to make sustainable decisions for the future and this lack of foresight led to their eventual collapse. Jared Diamond, an

American scientist and author, speaks to a number of factors that lead to a civilization's collapse: environmental damage, climate change, conflict, loss of support from friendly trade partners, and responses to environmental problems. Diamond notes that some past societies failed while others succeeded: "The past offers us a rich database from which we can learn in order that we may keep on succeeding."³

Even though the term sustainability may be relatively new, the concept behind it is not. Over time, societies have made decisions that allowed them to grow, adapt, and thrive. The Iroquois League, a group of North American

Even though the term sustainability may be relatively new, the concept behind it is not.

tribes that speak the Iroquois language, is credited with the principle of seventh generation sustainability. This principle requires tribal leaders to consider the effects of their actions on their descendants through the next seven generations. How might your actions change if you had to consider whether your choices

would benefit your children, grandchildren, and great-grandchildren?

In more recent years, the United Nations formed the World Commission on Environment and Development (WECD) in 1983 after realizing that economic and social development—in short, improving people's lives—relied in part on sustaining environmental resources.

Specifically, the UN asked the Commission to focus on:

- Developing environmental strategies for achieving sustainable development
- Translating concern for the environment into greater cooperation among countries and consideration of the connections among people, resources, environment, and development
- Defining shared perceptions of environmental issues and of the efforts needed to successfully protect the environment, an agenda

for action during the decades to follow, and long-term goals⁴

In 1987, this commission, led by chairman Gro Harlem Brundtland, released a report titled "Our Common Future."⁵ The report provided a vision of hope for transforming *economic development* (increasing the standard of living within a country) into something that also supports environmental health.

Sustainability Today

Some experts working in the field of sustainability suggest that we are now approaching a full—swing revolution—a sustainability revolution, that is.⁶ As you read this book, consider whether the evidence supports the idea that we are living in revolutionary times. Is there a critical mass of people working toward sustainability? Do our existing models of sustainability provide a roadmap for ensuring the long-term well-being of people and the planet, or will new models of sustainability be required?

There are more than just a few individuals and organizations striving to create a sustainable future. According to the WiserEarth database, which connects people and organizations working on social justice, environmental stewardship, and indigenous rights, "There are more than one million organizations and many millions of us around the world who are actively working toward ecological sustainability, economic justice, human rights protection, political accountability and peace—issues that are systemically interconnected and intertwined."⁷

The following examples demonstrate the different ways educational organizations, businesses, governments, and religious groups think sustainably.

Education

Both K-12 schools and higher education are making commitments to sustainability. One example is the Goddard School

District in Goddard, Kansas, which uses sustainability as a guiding principle. Each year hundreds of students at Goddard's two high schools take an ecology course that teaches the scientific principles behind waste management, climate change, and alternative energy technologies. Students apply their understanding to implement waste management, recycling, and energy efficiency systems for their school buildings and then teach younger students about sustainability in a district-wide event. The district's emphasis on sustainability influences energy-use policies within classrooms (for example, keeping temperatures at 68°F in winter and 75°F in warmer months and using motion sensors to turn off lights when not being used) and supports the planting of native gardens on school grounds. The Goddard School District is a member of both Eco-Schools USA and the Kansas Green Schools Network, organizations that support educators and students in implementing sustainability measures at their schools.⁸

Over 650 colleges and universities in the United States have signed the American College & University Presidents' Climate Commitment. Leaders at these institutions agree that colleges and universities should model ways to reduce greenhouse gas emissions that contribute to climate change. They are also committed to educating their students about climate change and solutions.⁹

The United Nations declared 2005 to 2014 the Decade of Education for Sustainable Development (DESD). The UN requested countries “to integrate the principles, values and practices of sustainable development into all aspects of education and learning, in order to address the social, economic, cultural and environmental issues we face in the 21st century.” For example, DESD efforts in India include a National Curriculum Framework “connecting knowledge to life outside the school,” and their Supreme Court directed all schools to include environmental education at all levels. Beyond 2014 this work will be sustained at The Earth



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Goddard students plant a native prairie garden.

Charter Center for Education for Sustainable Development at the University for Peace in Costa Rica.¹⁰

Business

Businesses and industries are also starting to incorporate an ethic of sustainability into their operations. Some companies, like the Body Shop, were founded on sustainability principles. Others, like Gap, have adopted strong corporate social responsibility policies, pledging to treat workers, consumers, and the environment with respect.

Major companies—including Dow Chemical, GE, Home Depot, and UPS—are

creating “Chief Sustainability Officer” positions. These executives are typically responsible for exploring green product development and reducing the environmental impact of their business.

The green jobs movement in the United States is another example of how sustainability permeates the business world.

Green jobs, sometimes also called green-collar jobs, are typically career-track jobs that improve the environment and pay a livable wage. Green-collar workers might install solar panels on homes, create landscapes that harvest rainwater, or insulate buildings to prevent heat loss.

Green jobs organizations work in many different communities to encourage government leaders to invest in green jobs and to train the workers who will install and maintain the technologies needed to reduce our negative environmental impacts. One of the most well-known organizations in this movement is Green for All. Green for All’s approach is to lift people out of poverty by building a “green economy.” A green economy can

serve the needs of many by simultaneously providing jobs for thousands of Americans, helping homeowners reduce energy costs, and connecting people with renewable sources of energy.¹¹

Government

Governments are also getting involved in sustainability. Some of these efforts are at the local government level, such as in the city of Madison, Wisconsin. Madison has its own City Sustainability Plan. So far, the city has taken many different steps down the path of sustainability, including:

- Signing the Kyoto Protocol, an international agreement to reduce greenhouse gas emissions
- Providing help for homeowners who want to install solar panels
- Requiring recycling companies to comply with the most rigorous standards for handling international e-waste



Photovoltaic cells are attached to the roof of a shelter in a Madison city park.

COURTESY OF CITY OF MADISON

- Employing green building techniques in the construction of new libraries, a fire station, and a convention center
- Retrofitting a number of existing government buildings for energy efficiency
- Increasing the use of renewable sources of electricity from 3% in 2006 to 22% in 2009
- Purchasing furniture and cleaning products with sustainability in mind¹²

National governments are also part of the story. Federal policies, initiatives, and funding can be used to further realize goals of sustainability. Sweden's Ministry of the Environment works to ensure sustainable development, as does France's Ministry of Ecology, Sustainable Development, Transport and Housing. Going one step further, international efforts between two or more national governments demonstrate how governments can become a powerful force for change. One such international effort resulted in the Montreal Protocol on Substances that Deplete the Ozone Layer.

During the 1980s, scientists discovered that the ozone layer in Earth's atmosphere was thinning in some places. A large hole in the ozone formed above Antarctica. The ozone layer protects us from some of the sun's harmful ultraviolet radiation that can cause skin cancer and eye cataracts. People all over the world were alarmed by the depletion of the ozone layer and its implications for global health. Once scientists traced the damage to halogen gases used in products such as refrigerators and fire extinguishers, it was clear that the ozone would continue to disappear unless people stopped using these gases.

In 1987, the Montreal Protocol established limits on the amounts of ozone-depleting gases any nation could produce or consume, eventually phasing out the destructive gases altogether. Ozone-depleting gases were replaced with other gases that provided the same functions (refrigerants and propellants) without destroying the ozone. The Protocol, now ratified by 196 countries, has been successful at slowing the rate of ozone depletion.



Religions from around the world share similar values around sustainability.

Scientists predict that by the middle of this century, ozone levels will return to pre-halogen gas product levels.¹³

Religion

Many of the world's religions have sustainability-focused principles. For example, the Jewish Torah (or the Christian Old Testament) and the Islamic Qur'an each state that God made all the lands and waters on Earth, as well as all living creatures. The idea that humans have an obligation to care for all the resources on Earth is a form of reverence to God's creation.¹⁴ Though we now refer to this principle as sustainability, you may have also heard it called *stewardship*.

Over the last several decades, many of the world's religious leaders have begun to address global sustainability challenges. Historically, religious leaders have worked on securing social well-being through reducing poverty and suffering. More recently, many of these leaders have come together to work on ensuring

environmental well-being.¹⁵ Consider the breadth of just a few of these partnerships:

World Wildlife Fund

In 1986, the World Wildlife Fund (WWF) sponsored an interreligious meeting in Assisi, Italy. Buddhist, Christian, Hindu, Muslim, and Jewish leaders came together to discuss how their faiths could help protect the environment. After that initial meeting, WWF also began working with additional religious groups—Baha’is, Daoists, Jains, and Sikhs—on conservation projects.¹⁶

The United Nations Environment Programme

The United Nations Environment Programme (UNEP) in North America established an annual Environmental Sabbath and distributes materials to communities of faith in the United States and Canada.¹⁷

The Parliament of World Religions

In 1993, the Parliament of World Religions held a meeting in Chicago attended by 8,000 people. They issued a resulting statement, *Towards a Global Ethic: An Initial Declaration*, that claims, “Our world is experiencing

a *fundamental crisis*: A crisis in global economy, global ecology, and global politics.” In response to this crisis, the Parliament put forth a set of common ethical principles that all religious and non-religious persons could agree upon to foster socially beneficial, peaceful, and environmentally friendly ways of living.¹⁸

Pathways to Progress: Sustainability

What does sustainability look like in action? And what are ways institutions, communities, and people can work to make sustainable choices?

The following examples demonstrate sustainable actions that communities, organizations, and individuals can take.

Community Growth: Moss Point, Mississippi

A sustainable community strives for:¹⁹

- A better quality of life for everyone in the community, without negatively impacting other communities



Moss Point citizens attend a community meeting.

COURTESY OF MOSS POINT COMMUNITY

- Healthy ecosystems
- Effective governance supported by active citizen participation
- Economic security

Moss Point is a city of around 20,000 people that lies along the Gulf Coast of Mississippi. Moss Point was particularly devastated by Hurricane Katrina, which happened in 2005, in part due to previously existing poverty. The hurricane destroyed homes and washed out the entire downtown area. With the help of the Institute for Sustainable Communities, Moss Point turned the devastation into an opportunity to build a stronger community. Rebuilding sustainably means that they are not only rebuilding damaged neighborhoods, but also that citizens and government are working together to solve long-term problems such as environmental degradation, poverty, and loss of jobs and industry.

The Moss Point community is now engaged in developing thriving environmental, social, and economic systems. New city buildings are being constructed with environmentally minded practices. The community now recognizes the need to preserve natural ecosystems such as wetlands, which provide a barrier against powerful storms and can generate tourism. A task force was developed to ensure that a range of affordable housing options is available for all, including low-income residents. In all of Moss Point's rebuilding efforts, citizens are involved in making decisions in partnership with government and nonprofit organizations that are working to restore the community.²⁰

Nonprofit Support: Snow Leopard Trust

Snow Leopard Trust is a nonprofit organization that works to protect endangered snow leopards living in the mountains of Central Asia. Although they have roamed the mountains for centuries, snow leopards face threats due to the overlap in landscape and resource use between themselves and humans. Snow



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Snow leopards face extinction due to human activities; many are illegally hunted by poachers.

leopards are hunted illegally by poachers and are losing habitat and wild prey as people and their livestock (like goats and sheep) move into new areas. In some cases, livestock herders have killed snow leopards in retaliation for the leopards eating herders' goats and sheep.

The Snow Leopard Trust realized that the people living in snow leopard habitats should be involved in finding a solution to help protect snow leopards. It was also clear that a lasting solution would have to take into account the well-being of both snow leopards and people. Because people in the region make very little money, a long-lasting solution would have to provide livestock herders with income. This approach to conservation of endangered species or wildlands is called community-based conservation; it takes into account the unique challenges, needs, skills, and resources of a particular community.

A unique conservation program developed by Snow Leopard Trust in partnership with communities in Mongolia assists people living in the mountains alongside snow leopards with the sale of wool handicrafts, such as rugs and slippers. To participate in the program, communities in snow leopard areas must agree not

Do you ever wonder how creatures organize themselves around their landscape? Why one living thing depends on another for its survival? How vital nutrients cycle through an ecosystem? Ecologists make a career out of questions like these; they study how living things interact with each other and with their environments. Ecology is a subset of biology. There are all sorts of careers that apply ecology, from computer-based modeling of ecosystems to conducting field research on wetlands. Opportunities to work in the field are diverse, since ecologists study many different aspects of ecosystems such as biodiversity, habitat, niche, and geography. There are also opportunities to work in the realm of human ecology, contributing to fields such as resource management and urban development.

Sasha Kramer, Ph.D., has a lot of jobs, not the least of which is her work as an ecologist. She is



Sasha emerges from a toilet installed by SOIL.

the cofounder of SOIL (Sustainable Organic Integrated Livelihoods), an international aid organization in Haiti, and an adjunct professor of International Studies at the University of Miami. Sasha's training in ecology prepared her for her current work, but it was her passion for human rights that inspired her to begin a civil engineering nongovernmental organization (NGO). "While

working as a human rights observer in Haiti in 2004," she says, "I became acutely aware of how much most people in the United States take toilets for granted; it is painfully obvious when you cannot find one and you need one." The absence of sanitation infrastructure and the environmental impact of dumping sewage into aquatic ecosystems create a crisis for human health and ecosystems. SOIL began by building toilets where human wastes, instead of being dumped into waterways, were recycled into organic compost.

This compost can then be used to rejuvenate nutrient-depleted soil, which helps crops to grow. SOIL installs toilets designed with ecological sanitation principles in mind in communities throughout Haiti. These seemingly simple toilets effectively handle two of the foremost problems (sanitation and agricultural development) that otherwise compromise human rights and quality of life.

to kill snow leopards and their prey. If everyone in a herding community keeps their agreement, herders receive cash bonuses once a year. If just one person in the community breaks her or his agreement, no one receives a bonus. This community-based conservation strategy frees people from poverty while also protecting an endangered species.²¹

Citizens Taking Action

When faced with the big challenges that must be addressed to build a sustainable future, it can be difficult to imagine how a single individual can create real change. You might wonder what personal action you can take. As illustrated by

Raul's story earlier in the chapter, it is possible for one person to influence her or his own life and the life of the planet through her or his own choices. Your actions, from small to large, do matter. This might mean taking personal responsibility to recycle or reuse discarded items or to purchase sustainably produced products. You can also make a difference by voting for laws and government representatives that will support sustainability. Or you can take part in your community's efforts to improve quality of life—for example, by volunteering for a community organization—to contribute to lasting change.

If you are passionate about creating a sustainable future, you can help drive change by taking a leadership position. People young and

old from all backgrounds can get involved in community decision-making. This might mean becoming a member of a group that works to protect the environment or alleviate poverty, or even becoming a member of a governmental group (like student council). Another approach is to question and change structures that present obstacles to sustainability. Are there policies in your community or state that make it difficult for people to transition out of poverty? Does an absence of laws or restrictions allow people to destroy the natural environment? You might imagine long-term solutions to these issues, such as financial assistance to help people move out of poverty or legislation to prevent forests from being overharvested. And you can take part in making those solutions a reality by joining a social or political movement to effect dramatic and long-term change.

Taking Action: Global Youth Action Network

Global Youth Action Network (GYAN) is a youth-led group that started in 1999. GYAN believes young people have the power to make a difference in the world and that by taking positive action now they can reduce the number of problems in the future. Through programs like Global Youth Service Day, GYAN helps young people in more than 125 countries work on service projects in their communities. For example, teenagers in Bolivia taught their community about the dangers of drinking unclean water. In the United States, youth educated people about the importance of voting. In Thailand, students taught leadership and life skills to children who were orphaned when their parents died of AIDS. Global Youth Action Network is one group of young people who truly believe they can change the world.²²

WHAT YOU CAN DO Sustainability

The steps to achieve sustainable solutions are similar to those for any other challenge: first you must gain background knowledge on important issues, build skills needed to create change, and believe that you can change things. This book will provide you with information about a wide variety of sustainability issues that challenge our world, it will help you to develop skills to solve problems, and it will show you how other people just like you are doing things large and small to bring about a more sustainable future.

Remember that you have a place in sustainable development. Keep these simple questions in mind as you read each chapter:

- What issue are we talking about?
- What are obstacles to sustainability related to this issue?
- Why does it matter to me, anyway? How does it connect to my life?
- What are possible solutions that I can be a part of?

When we think about a sustainable future, we consider our actions now and for future generations.



SHAWNA PECKHAM

Chapter

2 Sustainability

CHAPTER BIG IDEAS

- Sustainability, or sustainable development, is the process of supporting economic prosperity, social well-being, and environmental health.
- Interconnected solutions to global issues can have sustainable effects for the future.





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Guiding Questions

- How can sustainability promote environmental health, economic development, and human well-being?
- How are people working toward sustainable solutions to local and global issues?

Key Concepts

- sustainability
- sustainable development
- intergenerational responsibility
- interconnectedness
- fair trade
- green jobs

Supporting Vocabulary

- stewardship
- economic development

Summative Assessment

Chapter Test

Connections

World History connections:

collapse of past civilizations; the Earth Summit; the Brundtland Report; Montreal Protocol; Kyoto Protocol

Economics connections:

sustainable development; fair trade; green jobs

Geography connections:

global and local sustainability issues; human-environment interconnections

Civics connections:

personal and structural solutions to sustainability issues; youth-led nonprofit organizations; community growth



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Activities in Teacher's Guide: Suggested Sequence

Day 1

Reading: *Introduction to Sustainability*

Activity 1: *Apples to Apples?*—Students explore the idea of sustainability as a continuum or process by evaluating two seemingly identical apples according to various sustainability criteria.

Activity 2: *Drilling Down to Sustainability*—In small groups, students evaluate the sustainability of various resource extraction methods, from coffee farming to coal mining.

Day 2

Reading: *Background on Sustainability*

Activity 3: *From Earth Charter to School Community*—“The Earth Charter” is used as a guiding document to envision how sustainability could look within their school community.

Day 3

Reading: *Sustainability Today*

Activity 3: *From Earth Charter to School Community*, cont'd

Day 4

Reading: *Sustainability Today*

Activity 4: *Is It Sustainable?*—Students use a model to evaluate the sustainability of an object or process and to determine ways to make an unsustainable item or process more sustainable.

Day 5

Reading: *Pathways to Progress: Sustainability*

Activity 5: *Envisioning Sustainability*—Students work together to brainstorm economic, environmental, and sociocultural characteristics of a sustainable community.

Discussion Questions from the Chapter Reading

Introduction to Sustainability

1. What comes to mind when you hear the word “development”? How does your definition of development correspond to the definition of “sustainable development” provided in the chapter
2. What are some specific actions that would be examples of intergenerational responsibility?
3. Think about a choice you made recently in your life. Use one of the sustainability frameworks to determine if you think it was a sustainable choice or not.

Background on Sustainability

4. What are factors that can lead to a civilization’s collapse? In looking at our society, what can we do now to make sure that we prevent collapse?
5. The World Commission on Environment and Development created a report titled, “Our Common Future.” The report wanted to transform economic growth into something that also supports environmental health. How might considering the health of the environment when making economic decisions be helpful?

Sustainability Today

6. What are examples of sustainable choices you have seen different groups (i.e. schools, government, businesses) make in your local community? If you haven’t seen groups making sustainable decisions, what might prevent them from doing so?

Pathways to Progress: Sustainability

7. What kinds of decisions did the community in Moss Point make in order to live more sustainably?
8. Margaret Mead, a famous anthropologist once said, “Never doubt that a small group of thoughtful, committed citizens can change the world. Indeed, it is the only thing that ever has.” Do you agree with this statement? Why or why not?

Chapter Assessment: Sustainability, page 1

Recall

Match the following words on the left with their definitions on the right.

- | | |
|-------------------------------------|---|
| 1. Sustainability | raising resources of living for people around the world without depleting Earth's standards |
| 2. Sustainable development | leaving ample resources for future generations on Earth |
| 3. Interconnectedness | helping people now to meet their needs for a good life without compromising ability of future generations to meet their needs |
| 4. Intergenerational responsibility | the idea that natural and human-constructed systems interact and impact each other |

Reasoning/Explanation

Complete the following multiple choice questions by choosing one correct answer.

5. A business that sells cotton T-shirts has decided to implement some sustainability measures, in response to consumer demand. Which of the following options would **best** help them achieve their goals?
- finding a cotton supplier who will sell at lower prices than their current supplier
 - changing their trucking routes to only go through large cities
 - using cotton grown without toxic chemicals that can contaminate soil and groundwater
 - hiring sales clerks and executives that have attended college

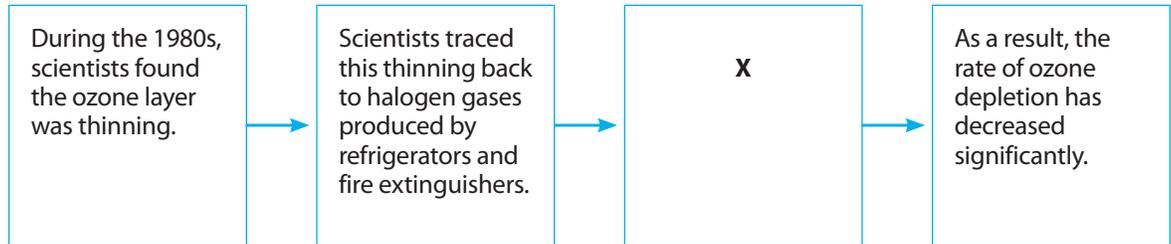
6. Consider the following story: A group of enthusiastic international visitors travel to a small island in the South Pacific. When they visit, they determine that the island does not have a reliable source of fresh water for drinking, such as a well for accessing ground water. Instead, residents have to collect rain in barrels and get water from a stream that runs through the island. Without consulting the island's residents, the international visitors decide to build a well on the island so that island residents can more easily access water on a daily basis, even on days with no rain. After the visitors build the well, island residents continue to obtain water as they always did, from rain water and the stream.

Why isn't the well project a good example of sustainable development?

- The well did not provide easier access to water.
- The visitors did not take into consideration the needs and desires of island residents.
- Rain water is healthier for drinking than other kinds of fresh water.
- Any project led by international volunteers cannot be sustained after they leave.

Chapter Assessment: Sustainability, page 2

7. Which **best** replaces X in the flow chart?



- The Montreal Protocol, created in 1987, banned the use of any ozone-depleting gases.
- The Montreal Protocol, created in 1987, established limits on how many ozone-depleting gases could be used.
- The Montreal Protocol, created in 1987, supported scientific research on the ozone layer.
- The Montreal Protocol, created in 1987, charged governments money based on a country's impact on the ozone layer.

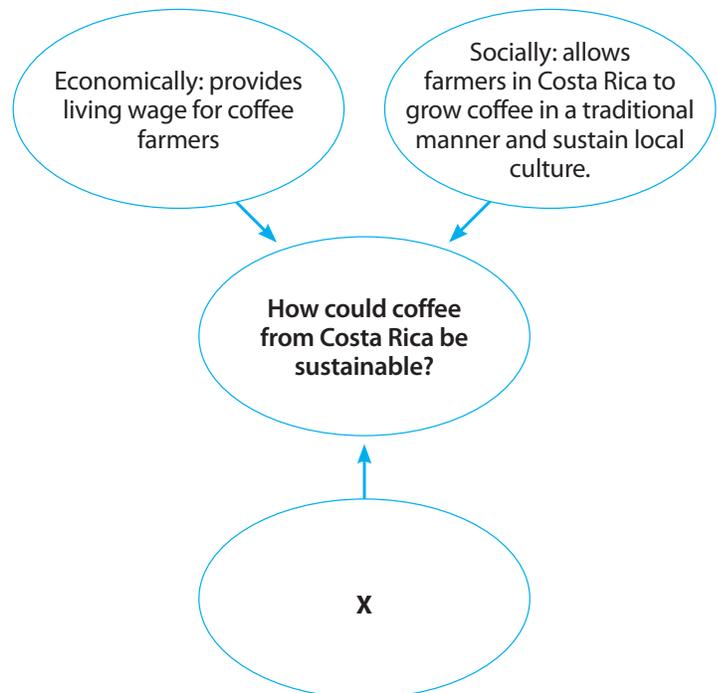
8. Which job is the **best** example of a green job?

- forest ranger who protects endangered wildlife
- medical doctor who treats patients in rural areas
- solar panel installer who installs panels in urban areas
- volunteer who cleans up garbage near rivers

9. Use the graphic organizer to the right to answer the question.

Which statement is an accurate representation that would replace the X in the graphic organizer?

- Environmentally: grown in a way that doesn't destroy wildlife habitats
- Environmentally: needs fewer resources because it's grown on coffee plantations
- Environmentally: needs less water because of rain in Costa Rica
- Environmentally: produced in bulk on plantations instead of rainforests



Chapter Assessment: Sustainability, page 3

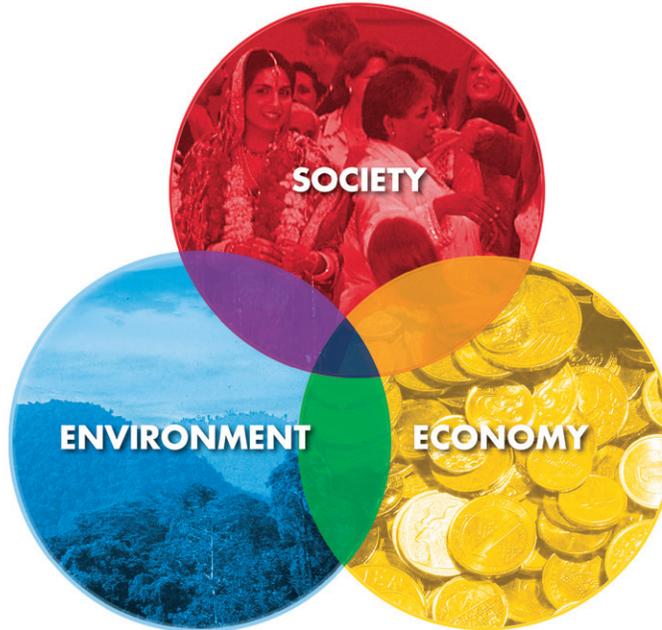
10. Which example below **best** illustrates how a government can take action to support sustainability?
- take out loans from other countries to build the economy
 - convince citizens to consume as much as possible to boost the economy
 - enforce ways citizens can enlist in the military to enhance security
 - retrofit a number of existing government buildings for energy efficiency
11. Each of the reasons below explain why a civilization may not be able to sustain itself, **except**:
- conflict
 - climate change
 - unemployment
 - environmental damage
12. Which of the following **best** demonstrates an example of a community decisions that supports a sustainable future?
- enlarging a parking lot to accommodate more drivers
 - keeping a school lawn beautiful by using lawn chemicals
 - preserving local wetlands to provide a barrier against storms
 - maximizing the amount of land available for housing development
13. Which example below **best** demonstrates how a business can make a commitment to sustainability?
- by reducing the amount of packaging created and therefore reducing waste
 - by building factories in other countries and paying workers less so goods will cost less
 - by exponentially increasing the amounts of goods sold so economies will develop
 - by marketing products to people all over the world in order to create a global community
14. Which personal decision demonstrates the concept of intergenerational responsibility?
- interviewing senior citizens and recording their stories
 - babysitting a neighbor's children while he or she runs an errand
 - playing on a sports team with people of all different ages
 - participating in river clean ups every month

Chapter Assessment: Sustainability, page 4

Application/Complex Reasoning

Answer the following short answer questions below.

15. Use the Sustainability Venn Diagram to answer the question below:



Part A. Provide one example of how sustainability can support the environment.

Part B. Provide one example of how sustainability can support the economy.

Part C. Provide one example of how sustainability can support a society.

16. In 1992, the United Nations convened a conference on Environment and Development called the Earth Summit. A document known as Agenda 21 resulted from negotiations at this Earth Summit. The document begins:

Humanity stands at a defining moment in history. We are confronted with a perpetuation of disparities between and within nations, a worsening of poverty, hunger, ill health and illiteracy, and the continuing deterioration of the ecosystems on which we depend for our well-being. However, integration of environment and development concerns and greater attention to them will lead to the fulfillment of basic needs, improved living standards for all, better protected and managed ecosystems and a safer, more prosperous future. No nation can achieve this on its own; but together we can—in a global partnership for sustainable development.¹

Part A. How does Agenda 21 support the idea of sustainability?

Part B. When thinking about solutions to global issues, why should we consider all three parts of sustainability (the environment, society, and the economy)?

¹ Excerpt from Preamble, “Agenda 21: The United Nations Program of Action from Rio,” http://www.un.org/esa/dsd/agenda21/res_agenda21_00.shtml (accessed May 2, 2011).

Teacher Master

Chapter Assessment: Sustainability

Recall (4 points total)

1. Sustainability—leaving ample resources for future generations on Earth
2. Sustainable development—raising resources of living for people around the world without depleting Earth's standards
3. Interconnectedness—the idea that natural and human-constructed systems interact and impact each other
4. Intergenerational responsibility—helping people now to meet their needs for a good life without compromising ability of future generations to meet their needs

Reasoning/Explanation (10 points total)

- | | |
|------|-------|
| 5. c | 10. d |
| 6. b | 11. c |
| 7. b | 12. c |
| 8. c | 13. a |
| 9. a | 14. d |

Application/Complex Reasoning (6 points total)

15. Part A. Answers will vary. (1 point)

- Conserving natural resources
- Creating wildlife habitats for endangered species

Part B. Answers will vary. (1 point)

- Creating policies that provide economic opportunities for people from all different sectors
- Providing livable wages for all people working

Part C. Answers will vary. (1 point)

- Allowing people to practice their religion safely in public spaces can support tolerance and respect of diversity
- Upholding different cultures' traditions and customs

16. Part A. Answers will vary. (1 point)

- Agenda 21 acknowledges there are number of issues the world faces today and believes that solutions that address people and the planet can be the answer.

Part B. Answers will vary. (2 points)

- The environment, the economy, and society are inextricably connected. Thinking of solutions to some of the world's biggest problems can therefore be considered from a systems perspective and can have long-term benefits. If we only care about a growing economy, but don't consider human needs or a clean environment, this can be detrimental to a sustainable future. There can be limits to growth if we don't consider all parts of sustainability.

Activity 1: Apples to Apples?

Overview

Students explore the idea of sustainability as a continuum or process by evaluating two seemingly identical apples according to various sustainability criteria. In a discussion, students consider how ambiguity is inherent in complex decision-making.

Objectives

Students will:

- evaluate how economic, environmental, and social concerns relate to the concept of sustainability
- recognize sustainability as a process rather than an endpoint

Inquiry/Critical Thinking Questions

- How is our idea about what is sustainable affected by the criteria we use to evaluate sustainability?
- How can we make sustainable choices based on available information?

Time Required

15 minutes

Key Concepts

- sustainability
- organic

National Standards Addressed

National Council for the Social Studies

- 3. People, Places, and Environments
- 7. Production, Distribution, and Consumption

National Science Education Standards

- F. Science in Personal and Social Perspectives

National EFS Standards

- 2.1 Interconnectedness: Systems thinking

Materials/Preparation

Two apples (or tomatoes or other locally available produce), 1 organic from a different state or country and 1 conventionally grown in-state

Activity 1: Apples to Apples? *continued*

Activity

1. Review the definition of sustainability with students.
2. Show the class the two apples, but do not reveal anything about them (*Apple 1 is the organic, non-local apple; Apple 2 is the conventional, locally grown apple*). In a class discussion format, ask students which apple they think was produced in the most sustainable manner and why. (At this point, they are only guessing based on each apple's appearance.) Also, what information would change their minds? Alternatively, you could ask students to write their answers down rather than express them verbally.
3. Reveal the following pieces of information, one category at a time. After each "reveal," ask students which apple is most sustainable and why. There is no right or wrong answer as to which apple is most sustainable—for example, Apple 1 is grown with no pesticides, but Apple 2 requires less fuel for transportation.
4. Students will likely change their minds at least once about which apple they believe to be most sustainable.

Option: Allow students to taste samples of each apple.

Discussion Questions

1. In determining sustainability, is one aspect more important than the others? For example, do you think concerns about environment are more important than concerns about society or the economy?
2. What piece of information was most helpful in informing you about the sustainability of the apples?
3. What other pieces of information would help you to determine whether Apple 1 or Apple 2 is the more sustainable choice?
4. Explain the meaning of the following phrase: "sustainability is a process, not an endpoint."
5. Do you think people should be given more information to help them make more informed decisions about what to consume? Why or why not? If yes, who should provide that information and where? (At supermarkets? In the news? At school?)

	Apple 1 (Organic, Non-Local)	Apple 2 (Conventional, Local)
Price to consumer	\$1.00	\$0.50
Amount of money received by farmer	\$0.50	\$0.25
Miles traveled (from farm to grocery store)	1000	200
Pesticides used	none	insecticides to kill insect pests (side effects include damage to aquatic invertebrates, pollinator insects, farm workers' health, and groundwater quality)
Impact of production on soil health ¹	good soil quality	poor soil quality
Taste	slightly sweet	slightly tart

¹ Soil quality is defined as "the capacity of a soil to sustain biological productivity, maintain environmental quality and promote plant and animal health." J.P. Reganold et al., "Sustainability of three apple production systems," in *Nature*, April 2001.

Activity 2: Drilling Down to Sustainability

Overview

Students discuss and debate the sustainability of various resource extraction methods and determine if alternatives would be more sustainable.

Objectives

Students will:

- identify methods by which natural resources are extracted and the ways in which these methods affect people and places
- apply the principles of sustainability to a critical examination of natural resource extraction
- make connections between sustainability and human behavior

Inquiry/Critical Thinking Questions

- What are impacts of natural resource extraction on societies, environments, and economies?
- How do our individual actions connect to sustainability?
- How can we make sustainable choices?

Time Required

One 45-minute class

Key Concepts

- sustainability
- natural resource extraction

National Standards Addressed

National Council for the Social Studies

1. Culture
3. People, Places, and Environments
5. Individuals, Groups, and Institutions
6. Power, Authority, and Governance
7. Production, Distribution, and Consumption
8. Science, Technology, and Society
9. Global Connections
10. Civic Ideals and Practices

National Science Education Standards

- D. Earth and Space Science
- F. Science in Personal and Social Perspectives

National EFS Standards

- 2.2 Ecological Systems: Respect for limits
- 2.2 Ecological Systems: Tragedy of the commons

Materials/Preparation

Handout: *Extraction & Sustainability*, 1 set of cards for each group of 5 students (for each sheet, cut out 4 role cards and give 1 to each student in a group)

Handout: *Is It Sustainable?*, 1 per student group

Activity 2: Drilling Down to Sustainability *continued*

Activity

Introduction

1. Ask students to recall the meaning of sustainability, based on the chapter reading.
2. Use student-generated definitions to generate a mutually agreed-upon definition of sustainability. Write this on the board for students to refer back to throughout the activity.
3. Let them know that they will use this definition to explore the sustainability of different ways that we use Earth's resources.

Steps

1. Divide the class into groups of 5.
2. Give students the following instructions: "Each group will consider the sustainability of different natural resources that are extracted from the earth for human needs. When a resource is *extracted*, it is removed from the environment so that we can use it to create products that we use. Each person within your group will receive a role card that provides some information about your perspective on the extraction of that resource. Each person should read aloud their role card to the group; as you work together during this activity, try to retain the perspective presented on your role card. As a group, work together to determine how resource extraction impacts the long-term well-being of people and the planet. Work as a group to complete the handout, *Is It Sustainable?* You will have to reach consensus to recommend whether or not extraction of the resource should continue. Choose one person in your group to record answers on the handout and another person to report to the class your group's analysis of the sustainability of resource extraction."

3. Hand out *Extraction & Sustainability* role cards to each group so that one group has 5 different role cards for gold, another group has 5 different role cards for timber, and so on.
 - **Note:** These cards represent just a few perspectives on and types of natural resource extraction.
4. Pass out 1 *Is It Sustainable?* worksheet to each group.
5. Allow groups ample time to read their roles and work through the handout together. Leave 10 to 15 minutes at the end of class for each group to share their analysis of the sustainability of the resource extraction method(s). What is the resource, and how is it currently extracted? Is it extracted sustainably? If not, how could it become more sustainable?
6. Wrap up with a short class discussion using one or more of the following questions.

Discussion Questions

1. Are any natural resources extracted near where you live? If so, how does that extraction affect the local environment, economy, and society?
2. What drives natural resource extraction? What part do our individual choices play?
3. What are positive results of resource extraction?
4. What are some negative impacts of resource extraction?
5. What possible action could consumers take to support sustainable extraction?
6. Based on the different perspectives you heard in your groups, what are the challenges to implementing sustainable practices?

Activity 2: Drilling Down to Sustainability *continued*

Writing Extension

Choose a specific natural resource to study further. Develop a policy for sustainable resource extraction that can be used by countries that want to ensure that their citizens are only buying sustainably extracted (mined, harvested, drilled, etc.) resources. Include ideas for making extraction better for individuals and communities, local and global economies, and the environment. Have students share their ideas with appropriate stakeholders (government representatives, nonprofit organizations, retailers, consumers, etc.).

Additional Resources

- **Video:** *Congo's Bloody Coltan*
www.pulitzercenter.org/openitem.cfm?id=177
This short video produced by the Pulitzer Center focuses on how the extraction of the mineral coltan (for use in electronics like cell phones) has helped to support the current civil war in Congo.
- **Website and Video:** *The Goldman Environmental Prize*
www.goldmanprize.org/2009/northamerica
2009 Goldman Environmental Prize Winner, Maria Gunnoe, witnessed the pollution of her homeland and drinking water by toxic coal mining waste. She was able to stop future environmental devastation by testifying against the practice of mountaintop removal. This website includes a 5-minute video about Maria's work, alongside information about the impacts of mountaintop removal mining on West Virginia communities.
- **Article:** *The Real Price of Gold*
<http://ngm.nationalgeographic.com/2009/01/gold/larmer-text/1>
In this *National Geographic* article from January 2009, Brook Larmer writes for *National Geographic* about different cultures' perspectives on gold and how gold extraction around the world has had serious impacts on both humans and the environment.

Websites for further research on natural resource extraction:

- *Monterey Bay Aquarium (seafood)*
www.seafoodwatch.org
- *World Diamond Council (diamonds)*
<http://diamondfacts.org>
- *Earth Justice (coal)*
www.earthjustice.org
- *No Dirty Gold (gold)*
www.nodirtygold.org
- *World Wildlife Foundation (timber)*
www.panda.org/what_we_do/footprint/forestry/
- *Global Exchange (coffee, chocolate)*
www.globalexchange.org/campaigns/fairtrade/
- *National Resource Defense Council (petroleum, coal)*
www.nrdc.org/energy/default.asp
- *Global Witness (coltan)*
www.globalwitness.org

Extraction & Sustainability,

Group A: Gold

I am a **gold miner** in Indonesia. I work at a large open-pit mine owned by a foreign company. Each day, I operate a machine that digs out thousands of pounds of ore (rocks and dirt that contain tiny amounts of gold). I have never actually seen the gold. The ore is transported somewhere else, where

people extract the gold. The area where we remove the ore has become a giant pit that cannot be used for anything else. I make more money than most of my neighbors. In fact, I'm paid more than \$600 each month. I have a house and a television, thanks to this job.

I am the vice president of a **cell phone company**. Most people think that gold is only used for jewelry, but our engineers have found small quantities of gold to be extremely useful in cell phones. Gold is a good conductor, meaning that electricity can run through it. This is why gold is used in many electronics. We only use a tiny amount in each cell phone. Cell phones are very important because

people can use them anywhere in the world. People in rural areas can use cell phones to communicate in places that don't even have land-line telephones. If we didn't use gold, we'd find another metal conductor that also has to be mined. Each year more and more people are buying cell phones, and we have to keep up with the demand. That's why we continue to buy gold.

I am an employee of the **national government** in Indonesia. We have seen more and more gold companies come to our country to mine gold for products that will be made and sold in other countries. Since we have been blessed with this resource, why not sell it to make money for our country? It is true that the areas where we currently allow open

pit mining are becoming toxic. However, we will make sure that those areas are safely enclosed so that they don't hurt anyone. We want to make sure that foreign companies continue doing business in our country so that we can invest the money into improving the lives of our citizens.

I am an **environmental scientist**. I worry about how open pit mining is permanently altering the environment. The deep pits that are created are so large they can be seen from space. Also, this type of mining relies on a process called cyanide leaching. A chemical called cyanide is sprayed on dirt and rocks that are removed from the pit. The cyanide bonds

to tiny bits of gold and silver as it trickles down through the ore. Cyanide is very toxic—it is a killing agent used in gas chambers. If it leaks into soil or water, it can contaminate streams, killing fish and other wildlife. Some companies recycle and reuse the cyanide to reduce their environmental impacts.

I am a **resident** of a small community in Indonesia next to a large open-pit mine. At first I thought the mine would be great because it can provide many jobs. Unfortunately, the cost of living is now much higher. The miners make good money, so they are able to pay higher prices for food, electricity, and

land to build homes. Those without mining jobs can no longer afford all of these things. We have also watched the devastation of our environment. The mining company dumps waste rocks onto our beautiful rainforests. What will be left when the mining company is finished?

Extraction & Sustainability,

Group B: Timber

I am a **forester** in Canada. I make my living by harvesting trees. These trees can be used for all sorts of things everyone needs, like furniture, construction materials, magazines, tissues, and toilet paper. Our company cuts down large areas of trees and then lets those areas grow back for 20 years or more. We

even speed the process up by planting tree seedlings in areas we've harvested. We prefer to plant fast-growing tree species, like pines. When these trees get large enough, we go back and cut them again. So long as people need wood and paper products, I'll have a job.

I am a salesperson at a large **paper company**. We sell paper to companies that print newspapers and magazines. Some of our customers now want paper that has been recycled instead of paper made only from new trees. We find that the best paper is still made mostly from new trees, but we also want to

make sure our customers are happy. If people are willing to pay more for recycled paper, we will start making more of it. Our company wants to make a profit, so we will do what we need to do to make our customers happy.

I am a **furniture maker**. Whereas some wood can be recycled, that's not always true for furniture. Some builders recycle wood to build new homes and businesses. However, I need large beautiful trees to create luxurious dining tables and chairs. As long as people pay me well to create these items, I will continue to make them. I prefer working with hardwood trees, which are typically older and

more valuable than pine trees. I don't really care where the wood comes from so long as it holds up well. A good piece of furniture can be passed down from generation to generation until it becomes an antique. Cheap furniture, on the other hand, tends to break more easily. I don't want my customers to have to keep buying new tables and chairs because their old ones broke.

I am a **wildlife biologist**. I'm concerned about the effect that large-scale timber harvesting has on ecosystems. There are many species of animals that can't survive without a healthy forest. For example, in the Southeastern United States the red-cockaded woodpecker can only be found in older forests. They create nests in dead trees in mature pine forests.

These birds are considered a keystone species because many other forest species (including insects, birds, lizards, and squirrels) use their nests. Scientists know that each species is important because it is connected to the lives of other species in its food web.

I am an **indigenous person** whose family has lived in the same forest for more than 100 years. The forest provides us with food, shelter, and medicines. Trees are one of our most valuable natural resources. Last year a portion of the forest in which my com-

munity lives was cut down by a logging company. That forced several families to move from their homes. We must protect what remains of our forests so that they can continue to provide us with essential resources.

Extraction & Sustainability, Group C: Coal

I am a site manager for a **coal mining company** in West Virginia. Most of the people I know also work for the mining company. Some of us used to work in mine shafts that went deep underground. The company I work for now prefers to get coal through mountaintop removal. It is a lot faster and doesn't require as many people. Plus, now I don't

have to worry about dying if a mine shaft collapses. In mountaintop removal, we use giant machines to basically blow the top off of a mountain to make it easier to get to the coal inside the mountain. I know my job is important because many power plants in the United States burn coal to create electricity.

I am a **coal miner**. I work in a shaft mine. It's what my father and grandfather did. I don't know how to do anything else. As soon as I graduated high school, I started working as a coal miner. Right now I work in a mine that is 700 feet deep. It is dangerous work, but the number of job-related deaths of

miners is a lot lower than it was in my father's time. Once I was in a mine that partially collapsed. Luckily, emergency crews were able to get me and my coworkers out before we ran out of air. I'm hoping I can stay healthy and safe so that I can continue to provide for my family.

I am a **citizen of a small mountain community** in the Appalachian Mountains of West Virginia. Our state has long been known for its beautiful mountains. Lately, however, these mountains have been scarred by mountaintop removal. Not only does mountaintop removal destroy the beauty of the mountains, but it's also ruined my well, which is my family's only source of drinking water. The dirt and

rocks that are exposed during mountaintop removal are usually dumped into nearby valleys. In my community, a company dumped the rubble in a valley where a stream runs through. Now the stream is discolored and cloudy. A lot of people I know have cancer and other diseases that no one used to have. We have complained, but the mining companies keep doing business as usual

I am the Chief Executive Officer for a company that owns several **coal-fired power plants**. Coal is an ideal fuel source. For one thing, we have tons of it right here in the United States. That makes it much easier and safer to access than oil that has to be imported from the Middle East or South America. For another thing, coal contains more energy that can be turned into electricity than competing fuels,

like natural gas. Our country was built on coal. Some of these people who want to use renewable fuels like wind and solar energy to generate electricity just don't understand how much better coal is. So many power plants are already set up to burn coal that it doesn't make sense to change things while we still have plenty of coal.

I am a **mechanical engineer**. I believe that we can and should stop mining coal right now. We have other technologies available right now—such as wind turbines and solar cells—that could supply us with all the electricity we need. Burning coal for

electricity releases air pollution, including greenhouse gases that result in climate change. The earth is already getting warmer from our use of these dirty fuels. Let's invest in clean alternative fuels now!

Extraction & Sustainability,

Group D: Petroleum

I am a **marine biologist**. I study organisms that live in the oceans. Petroleum oil drilling like the kind that happens off the coast of Texas and Louisiana worries me. When hurricanes blow over oil rigs (structures that house the machinery that drills into the ocean floor to get petroleum), petroleum can spill into ocean waters. Oil spills can also happen when oil is being transported by boat from one place to

another. When oil enters a marine ecosystem, it can be disastrous. Aquatic birds, mammals, and fish can all become covered in the thick oil, leading to death in some cases. The use of petroleum also has been linked to climate change, which also impacts our oceans. Climate change causes oceans to become more acidic, which can kill sensitive species like coral.

I am an **oil company spokesperson**. I believe that petroleum is hands-down the most efficient fuel source for our nation's transportation needs. We already have the technology in place to use petroleum for creating diesel, gasoline, and jet fuel. By drilling off the coast of the United States, we reduce

our need for foreign oil. This is much safer for our country than relying on oil from countries that may have unstable governments. Oil drilling is a relatively safe industry; very few accidents have occurred in recent years. Plus, it provides many jobs in the U.S.

I am a **roughneck on an oil rig**. It's a tough job, but it pays well. You have to be in good shape to work on an oil rig, that's for sure! I help to set up and carry out the drilling. I'm responsible for maintaining the pipes that carry the oil; I constantly check to make sure there are no leaks. I also help with mechanical maintenance, like making sure the engine is working right. Our rig runs

all the time, so I work long hours. I don't really mind, but my family wishes I spent more time at home. Every once in a while I hear about an accident where a rig blew up or about a storm that sank a rig into the ocean. Those accidents can be fatal for the crew on the rig. All of the factory jobs in my hometown have been moved overseas, so this job is even more important now.

I am an **alternative fuels investor**. I fund research on alternative fuels so that we can do all the things we love to do without relying on petroleum. While most people think the only way we can move our cars is with gasoline that comes from petroleum, I have found that there are quite a few other options that could be profitable. Electric cars could be the wave of the future, especially in places where the electric-

ity is provided by renewable fuel sources like wind power. These cars simply need to have their batteries recharged after use, and they don't require any gasoline. Another possibility is hydrogen fuel cells. These amazing devices convert hydrogen and oxygen into water, producing electricity in the process. Most alternative fuels don't produce air pollution like gasoline does. This could help fight climate change and smog.

I am a **parent** with three children. We have a large vehicle so that everyone has plenty of room when we need to go somewhere. Unfortunately, it takes quite a lot of gasoline to power such a large vehicle. I hope that our country will continue to have enough oil for everyone's needs. I'm afraid that if our oil supply starts declining, gas prices will go up. If we have to pay any

more for gas than we already do, our family will have to cut back on other expenses. We don't have much money left after we pay our monthly bills, so I don't know how we could afford higher gas prices. I understand there might be environmental consequences from oil drilling, but my family and I try to minimize our environmental impacts in other ways.

Extraction & Sustainability, Group E: Coffee

I am a **coffee grower** in Ethiopia. Coffee is a wonderful crop to grow because everyone loves coffee! Unfortunately, I cannot get a fair price for my coffee. I sell the beans to a man who then sells them to a company that will roast them. I make hardly any profit. I feel like I have to sell my beans so cheaply because otherwise I won't sell them at all. My

son and daughters have had to drop out of school because I can't pay their fees. The village school requires money to pay for books, uniforms, and teachers. Instead of attending school, my children now help me in the fields. I enjoy their company, but I worry that they will grow up to be poor like me.

I am a **shade-grown coffee farmer** in Costa Rica. Coffee is a shrub that grows well in rainforests, where there are tall canopy trees that shade the coffee bushes. This is how coffee was meant to be grown. Unfortunately, some of the major companies selling coffee want coffee growers to grow a type of coffee that can survive in full sunlight. They can get

higher yields for growing coffee in the sun, but the higher yields come at the price of the rainforest ecosystem. To grow full-sun coffee, first all the trees and shrubs have to be cleared from an area. Once they are cleared, the rainforest ecosystem takes many, many years to regrow.

I am a **coffee supplier**. Some people call me the "middleman" in the coffee industry. I talk to coffee growers and buy their beans for as low a price as I can. Then I resell those beans to companies who roast them to make coffee for drinking. I make my living by being the person in the middle of the transaction between the people who produce coffee beans and the people who sell them to coffee

drinkers. Some coffee roasters are starting to engage in direct trade, whereby they send a representative to make deals with coffee growers directly. That means no money for me. I know that coffee growers should make more money because for a long time they haven't been paid fairly for what they grow. But how will I make a living if I'm squeezed out of the process?

I am the **owner of a coffee shop**. I have heard about "fair trade" and "direct trade" programs that provide coffee growers with more money. It makes sense—why should a coffee farmer only make pennies for a cup of coffee I sell for \$2? However, fair trade coffee is more expensive than the coffee I can get from my supplier. The same goes for organic coffee that has

been grown without pesticides or harmful chemicals. My customers complain any time I increase my prices. Since I have never heard a customer ask for organic or fair trade coffee, I'm guessing no one would even care if I did buy those types of coffee beans.

I am an **eco-tourism guide** in Costa Rica. I make my living by providing tours through the rainforest. People from all over the world come to Costa Rica to visit our rainforests. They are eager to see beautiful plants and animals that live in the forest. Sun-grown coffee threatens my business because it

requires cutting down forests to let in sunlight. Forests don't have to be cleared to grow shade-grown coffee, which is good for the animals that rely on the forest and also for people like me who make a living from the rainforest.

Is It Sustainable?, page 1

Group members: _____

Natural resource discussed: _____

1. What are impacts of resource extraction on the environment?

2. Overall, is extraction of this resource environmentally sustainable?

a. Why, or why not?

b. How could it be made more sustainable?

3. How does resource extraction affect local and national economies?

4. Overall, is extraction of this resource economically sustainable?

a. Why, or why not?

b. How could it be made more sustainable?

5. How does extraction impact people and communities?

Is It Sustainable?, page 2

6. Overall, is extraction of this resource socially sustainable?

a. Why, or why not?

b. How could it be made more sustainable?

7. On a scale of 1 to 5, where 1 is not sustainable at all and 5 is completely sustainable, rate the overall sustainability of extracting this resource.

**NOT
SUSTAINABLE**

1

2

3

4

**COMPLETELY
SUSTAINABLE**

5

8. Should the natural resource you discussed continue to be extracted?

a. If yes, is there a particular method that is most sustainable? What is it?

b. If not, why should this resource no longer be extracted?

Activity 3: From Earth Charter to School Community

Overview

Students use the Earth Charter as a guiding document to brainstorm ways that their school community could support sustainability. They envision how their school might be different if it was modeled after the Earth Charter's 16 principles encompassing ecological integrity, social and economic justice, democracy, nonviolence, and peace.

Objectives

Students will:

- translate principles of sustainable development into concrete ideas for action
- determine ways in which the school community might be modeled after the Earth Charter

Inquiry/Critical Thinking Questions

- How can principles of sustainable development be applied to a school community?
- How can the Earth Charter be used as a tool to guide sustainable living?
- What does the history of the drafting of the Earth Charter—through a global grassroots process and over many years—teach us about cooperation, consensus, and negotiation?

Time Required

Two 45-minute classes

Key Concepts

- sustainable development
- Earth Summit
- diversity
- ecological integrity
- justice
- peace
- nonviolence

National Standards Addressed

National Council for the Social Studies

- 3. People, Places, and Environments
- 5. Individuals, Groups, and Institutions
- 6. Power, Authority, and Governance
- 10. Civic Ideals and Practices

National Science Education Standards

- F. Science in Personal and Social Perspectives

National EfS Standards

- 2.2 Ecological Systems: Environmental justice
- 2.4 Social and Cultural Systems: Social justice
- 2.4 Social and Cultural Systems: Governance
- 3.2 Collective Action: Organizational and societal change skills and strategies

Materials and Preparation

Online Article: *Earth Charter*, 1 copy per student. You can access the article here, <http://www.yesmagazine.org/issues/a-new-culture-emerges/earth-charter>

Handout: *The Earth Charter*, 2 per group of 4 students (4 pages). You can access the Earth Charter to print for students here, <http://www.earthcharterinaction.org/content/pages/Read-the-Charter.html/>

Handout: *From Earth Charter to School Community*, 1 per group of 4 students

Activity 3: From Earth Charter to School Community *continued*

Activity—Day 1

Introduction

1. In a think-pair-share format, ask students to consider specific ways in which their school is working toward sustainability.
2. Ask volunteer pairs to share their ideas.
3. Now ask students if they think there are areas in which their school community could be more sustainable.
4. Ask student volunteers to name 1 thing that might make the school more environmentally, socially, or economically sustainable.
5. Explain to students that the Earth Charter is an international declaration of principles created to build a just and peaceful society for the 21st century. It was drafted between 1994 and 2000 by thousands of people and hundreds of individuals all over the world as an initiative from the United Nations World Commission on Environment and Development.
6. Have students read the *YES! Magazine* article on the history of the Earth Charter and the challenging and tumultuous process of building consensus across nations and cultures in the drafting process.

Steps

1. Divide the class into groups of 4.
2. Give each group 2 copies of *The Earth Charter* to share and 1 copy of the handout, *From Earth Charter to School Community*.
3. Instruct students to work in their groups of 4 to complete *From Earth Charter to School Community*. Their ideas for how the school can support each principle may take the form of actions, behaviors, rules, and structures.

Option: Have students read more about how youth have used the Earth Charter:

www.earthcharterinaction.org/content/

(see Areas of Work: Youth), and have students explore the Earth Charter Youth and Student Activists blog: ecyg.wikispaces.com/home.

Activity—Day 2

Steps

1. Allow students time to complete the handout from Day 1, if they have not already.
2. Ask each student group to review their ideas within each of the 4 categories (I, II, III, and IV) and choose 1 idea from each category that they think is most important. Have them put a star by those 4 ideas.
3. Have each group present their top 4 ideas to the class. You may want to take notes, or ask a representative from each group to write their ideas in a shared space where each group's top 4 priorities can be included.

Option: Have the class vote on their favorite ideas from all of the ones shared. Use these ideas to guide students in an action project that will result in their school community supporting 1 or more of the Earth Charter's principles.

Discussion Questions

1. Is your school already engaged in any of these ideas for supporting environmental, social, or economic sustainability?
2. Do you think the new ideas generated during this exercise would be easy or difficult to implement?
3. Why do you think that these steps have not yet been taken?

Activity 3: From Earth Charter to School Community *continued*

4. How could you move from ideas to action?
Take 1 idea and explain how you think it could become a reality. How would you start? Who would you need to join you? What else would you need to do?
5. Was the Earth Charter a useful tool for envisioning how your school community could support sustainable choices? Why, or why not?
6. Which, if any, of the parts of the Earth Charter are most applicable to your school right now?

Civics Extension

Use this activity to generate a School Sustainability Plan, which provides a vision of how your school might look if it were dedicated to supporting sustainability and a roadmap for achieving that vision. How would the campus look? What would students and teachers be doing? How would the surrounding community be involved? What policies would enforce this vision? Transform the vision into reality by crafting a School Sustainability Plan outlining specific goals for the school and ways to achieve them. Include a mission statement summarizing your school's commitment to sustainability.

Additional Resources

- **Website:** *The Earth Charter Initiative*
<http://www.earthcharterinaction.org>
The Earth Charter Initiative website includes the full text of the Earth Charter in dozens of languages, a list of endorsers of the Earth Charter, and information about Earth Charter activities happening all over the world, including youth-driven projects, youth online courses, and a youth toolkit.
- **Website:** *UNESCO*
<http://www.unesco.org/new/en/education/>
Read more about the United Nations' Education for Sustainable Development efforts around the world.
- **Website:** *Earth Charter US*
www.earthcharterus.org
This website houses the official organization for mainstreaming the Earth Charter in the United States, which is now an Affiliate of Earth Charter International.

From Earth Charter to School Community, page 1

The Earth Charter	How Your School Community Could Support This Idea
I. Respect And Care For The Community Of Life	
1. Respect Earth and life in all its diversity.	
2. Care for the community of life with understanding, compassion, and love.	
3. Build democratic societies that are just, participatory, sustainable, and peaceful.	
4. Secure Earth's bounty and beauty for present and future generations.	
II. Ecological Integrity	
5. Protect and restore the integrity of Earth's ecological systems, with special concern for biological diversity and the natural processes that sustain life.	
6. Prevent harm as the best method of environmental protection and, when knowledge is limited, apply a precautionary approach.	
7. Adopt patterns of production, consumption, and reproduction that safeguard Earth's regenerative capacities, human rights, and community well-being.	
8. Advance the study of ecological sustainability and promote the open exchange and wide application of the knowledge acquired.	

From Earth Charter to School Community, page 2

The Earth Charter	How Your School Community Could Support This Idea
III. Social And Economic Justice	
9. Eradicate poverty as an ethical, social, and environmental imperative.	
10. Ensure that economic activities and institutions at all levels promote human development in an equitable and sustainable manner.	
11. Affirm gender equality and equity as prerequisites to sustainable development and ensure universal access to education, health care, and economic opportunity.	
12. Uphold the right of all, without discrimination, to a natural and social environment supportive of human dignity, bodily health, and spiritual well-being, with special attention to the rights of indigenous peoples and minorities.	
IV. Democracy, Nonviolence, And Peace	
13. Strengthen democratic institutions at all levels, and provide transparency and accountability in governance, inclusive participation in decision making, and access to justice.	
14. Integrate into formal education and life-long learning the knowledge, values, and skills needed for a sustainable way of life.	
15. Treat all living beings with respect and consideration.	
16. Promote a culture of tolerance, nonviolence, and peace.	

Activity 4: Is It Sustainable?

Overview

Students use a common sustainability framework to analyze the sustainability of a variety of actions taken by individuals, businesses, and governments. Student groups determine ways to increase the sustainability of these actions.

Objectives

Students will:

- define sustainability and its three key components: the economy, the environment, and society
- identify and describe a range of activities undertaken by individuals, businesses, and governments (e.g., foods eaten, transportation used, products bought, services provided, laws passed)
- determine the sustainability of these activities based on a set of criteria that includes impacts on the economy, the environment, and society
- present their findings using a Venn diagram
- analyze if and how an unsustainable activity can be altered to adhere to the three components of sustainability

Inquiry/Critical Thinking Questions

- What does “sustainability” mean and how does it apply to human activity?
- How is the sustainability of an individual, business, or government activity determined?
- How can we balance the needs of people, protect the environment, and have a vibrant and equitable economy?
- How can an activity be made more sustainable?

Time Required

One 45-minute class

Key Concepts

- sustainability
- economy
- environment
- society

National Standards Addressed

National Council for the Social Studies

3. People, Places, and Environments

7. Production, Distribution, and Consumption

National EFS Standards

2.1 Interconnectedness: Systems thinking

2.2 Ecological Systems: Respect for limits

2.3 Economic Systems: True cost accounting

Materials/Preparation

Overhead: *Components of Sustainability*

Three different colored 2”x2” sticky notes, enough for each student to have 1 sticky note of each color

Draw a Venn diagram, like the one in the *Components of Sustainability* overhead, on a large sheet of butcher paper (or project the overhead onto a whiteboard)

(Optional) Handout: *Investigating Sustainability*, 1 per group of 3 students

Activity 4: Is It Sustainable? *continued*

Activity

Introduction

1. Review the three components of sustainability using the overhead, *Components of Sustainability*. Explain that in determining whether an action or product/service is sustainable, many people who study sustainability take into account three key elements: the environment, the economy, and society/equity. In order to determine whether or not something is sustainable, the activity being evaluated would be assessed in relation to each of these principles, or “standards of sustainability.” This assessment reveals how the action or item impacts the economy, the environment, and society in either negative, positive, or neutral ways. You may need to review the definitions of “economy,” “environment,” and “society.”
2. Using the Venn diagram (on the butcher paper or projected on the whiteboard), explain that a Venn diagram’s purpose is to demonstrate that issues overlap and share common traits. Explain that this tool can be used to evaluate the sustainability of activities, products, and actions.

Steps

1. Explain that they will list and analyze the sustainability of several different activities, products, and actions from the following categories: individual activities (*e.g., eating breakfast, driving to school, attending school, playing guitar*), business products and services (*e.g., clothes, housing, computers, restaurants*), or government actions (*e.g., passing laws and regulations such as speed limits and burn bans, provision of services such as utilities and trash*).
2. Before breaking the class into groups, choose one activity/item (*such as riding the bus to school*) and walk through an analysis of the activity with the whole class, asking if it is sustainable using the three components of sustainability

(*economy, environment, and society*) as a guide. Alternatively, you may want to walk through this analysis with one of the apples from the prior activity.

Option: Use questions from the handout, *Investigating Sustainability*, to ask about the activity.

3. Arrange students in groups of 3 and assign each group one category: individual activities, business products and services, or government actions.
4. Have them create a brainstorm list of activities/items that fall within their assigned category. Be as specific and descriptive as possible during the brainstorm. For example, rather than list a cup of coffee, think about what kind of coffee you want to analyze—is it sun-grown coffee or Fair Trade certified?
5. From their brainstorm list, have students choose 2 items from their list and transfer these to individual color-coded sticky notes (use different colored sticky notes for each category, such as blue for individual activities, yellow for business activities, and green for government activities).
6. Have students place their sticky notes on the Venn diagram in the area they think the activity best fits, depending on whether the activity is economically, environmentally, and/or socially sustainable. If an activity is both environmentally and economically sustainable, place the sticky note in the area of overlap between the environment and economy circles. If an activity is not sustainable in any of the three categories, place the sticky note outside the Venn diagram. Many actions are not inherently sustainable or unsustainable. For example, harvesting timber does not have to be an unsustainable action; it can be done in a manner that promotes ecosystem health and continued forest production.

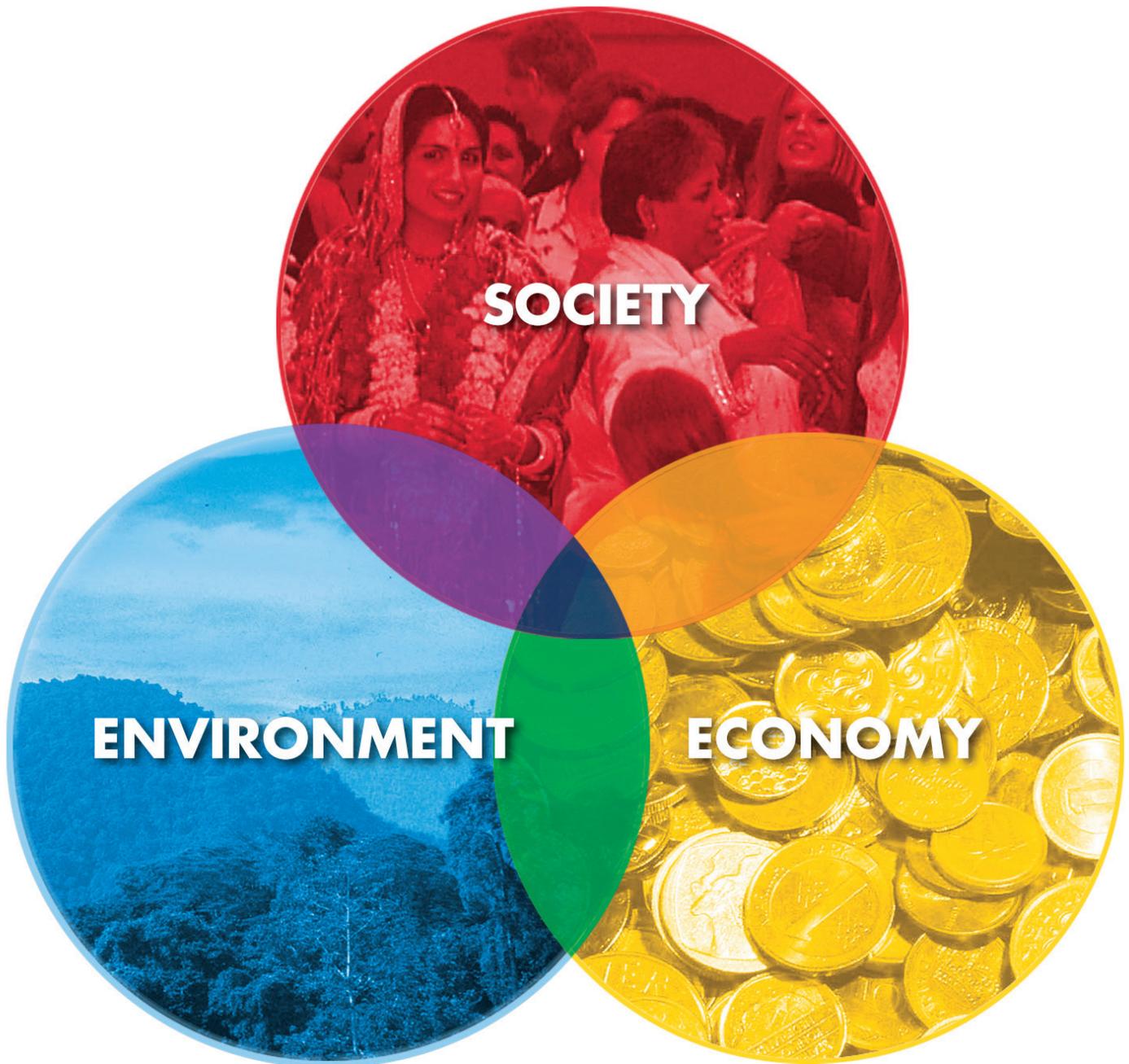
Activity 4: Is It Sustainable? *continued*

7. Have each group explain to the class how they decided on the placement, giving concrete examples and evidence to support their decision. Encourage each member of the group to participate in the discussion, and answer questions from the class.
8. Conclude with the following discussion questions.

Discussion Questions

1. If someone asked you what sustainability meant, how would you respond?
2. Can everything we do be measured against the standards of sustainability? What are some examples of activities that would be especially difficult to measure and especially easy to measure?
3. Why do you think people use the standards of sustainability to assess human activities? How and where could this process be useful?
4. Whose needs should be met when there are trade-offs involved (e.g., between economic and environmental priorities)? How can these contradictions be resolved?
5. Choose an unsustainable activity from the Venn diagram and explain how it could be made more sustainable.

Components of Sustainability



Investigating Sustainability

Environment:

- Does the activity/item use a minimal amount of resources? Are the resources renewable?
- Can the activity be done without damaging plants or animals?
- Does it improve air, water, and soil quality, rather than leading to pollution or erosion?
- Does it use resources at a rate that allows the resource to be renewed or regenerated?
- Is the waste created by the activity recycled or recyclable?
- Does the activity generate a limited amount of waste?
- Does this activity contribute to the conservation of natural resources?

Society:

- Does the activity/item contribute to people's quality of life?
- Does it positively affect culture(s)?
- Are individuals and communities involved in making decisions about the activity, and is the decision-making process fair and democratic?
- Is it an equitable activity (i.e., does it offer more options and opportunities to certain groups of people than others)?

Economy:

- Does the activity/item have a positive impact on either local or global economies?
- Does it create meaningful and satisfying work for individuals?
- Does it contribute to a community's economic development?
- Do all people receive equal economic benefits from the activity, rather than some people benefiting at the expense of others?

Overall Sustainability:

- Can the activity be done without causing damage in the three areas: economy, environment, and society?
- Can this activity be done so that people in the future will have the same opportunities to do this activity as people today?

Activity 5: Visioning Sustainability

Overview

Students envision what a sustainable community looks like by determining what economic, environmental, and cultural elements should and should not be included.

Objectives

Students will:

- envision the economic, environmental, and social characteristics that support a sustainable community
- develop their own definitions of a sustainable community
- consider how their community could benefit from working toward sustainability

Inquiry/Critical Thinking Questions

- How can we design a community to ensure the economic, environmental, and social well-being of its citizens?
- What steps would move our community toward a more sustainable future?

Time Required

One 45-minute class

Key Concepts

- sustainable development
- community planning
- infrastructure
- economy
- governance

National Standards Addressed

National Council for the Social Studies

- 6. Power, Authority, and Governance
- 10. Civic Ideals and Practices

National Science Education Standards

F. Science in Personal and Social Perspectives

National EfS Standards

- 2.1 Interconnectedness: Systems thinking
- 2.2 Ecological Systems: Urban design/land management
- 3.2 Collective Action: Community-based and societal decision-making
- 3.2 Collective Action: Organizational and societal change skills and strategies

Materials and Preparation

Handout: *Designing a Sustainable Community*, 1 per student

Activity

Introduction

1. Ask students to close their eyes and picture what they think their community is likely to be like in 50 years (*when they may be grandparents*). Will people in 50 years be better off or worse off? Will economic systems be vibrant, so that everyone has meaningful employment; or will the gap between the richest and the poorest grow? Will environmental systems be healthy, so that the water, air, and soil are clean; or will environmental systems be polluted? Will social systems be strong, so that people work and live together peacefully; or will social divisions plague your community?
2. Ask them to reopen their eyes and to share words or phrases that describe how they think their community will be in another 50 years.
3. Now ask students to close their eyes again. This time, ask them to visualize what they want their community to look like in 50 years. How will people treat each other? What opportunities will be available? What will the state of the environment be?

Activity 5: Visioning Sustainability *continued*

4. Have students open their eyes again. Ask them to describe how their vision for the future changed when you asked them to think about what they *want* to happen, instead of asking what they *think* will happen.
5. Before moving on, make sure students understand why it is important to envision an outcome. If we cannot visualize what we want the future to look like, it will be difficult to make that future happen.

Steps

1. Pass out a copy of the handout, *Designing a Sustainable Community*, to each student.
2. Group students into design teams of 2 to 3 students each.
3. Provide students with the majority of the remaining class time to work through the handout with their group members.
4. Ask one member of each group to share their “Guiding Vision Statement” from the handout. Have another group member write the group’s statement on the board.
5. Ask students to read through all of the Guiding Vision Statements on the board and identify commonalities. What concepts seem to be central to designing a sustainable community?

Option: Have students give a short presentation to a relevant audience, explaining their ideas for how to develop a sustainable community. This could involve attending a City Council meeting or inviting a local government representative into your classroom.

Discussion Questions

1. If your community does not look like the one you designed on the handout, what are possible reasons?
2. Consider one of your answers on the handout. How could you transform it into reality? What steps would you take? What resources would you need? Who would you need to work with?
3. What is a potential obstacle to making your goal a reality? How might you overcome that obstacle?
4. Who in your community would benefit from working toward making your community more sustainable?

Art Extension

Have students draw a representation of their sustainable communities, either by doing freehand drawings or with graphic design software. A key could be included that explains how certain items in the drawing are elements of a sustainable community.

Additional Resources

- **Film:** *Ecological Design: Inventing the Future*
<http://www.filmwest.com/Catalogue/itemdetail/8/>
What do flying bicycles, Rocky Mountain jungles, “living machines,” and recyclable homes with their own “metabolism” all have in common? They are unique, inexpensive solutions to the design dilemma of sustainable living and are all featured in this 60-minute film by Brian Danitz and Chris Zelov.
- **Videos:** *Green Living Project*
<http://www.greenlivingproject.com/projects/>
Watch short films featuring various efforts around the world to live sustainability and to build sustainable communities.

Designing a Sustainable Community

1. What would a sustainable community look like?

2. What services, opportunities, and forms of assistance would be available to citizens?

3. How would neighborhoods be structured?

4. What elements of infrastructure (physical structures like roads and buildings) would be essential?

5. What kinds of infrastructure would not be present?

6. What activities and events would be encouraged?

7. What activities would not be encouraged?

8. What would government look like? How would citizens be involved?

9. What rules or laws would govern the community?

10. What types of economic activity or employment opportunities would be available?

Guiding Vision Statement:

A sustainable community is one in which...
