Developing Key Concepts in Environmental Health Ethics

Purpose
To develop key concepts in environmental health ethics, multiple scenarios are provided to use with your students. We suggest an inductive approach to developing them in which students study the different examples to develop an understanding of the key concept. You may wish to have students keep a journal specifically for developing their understanding of these key concepts over time.

Overview
The inductive concept development process begins with students studying examples of the concept, then identifying commonalities and developing a definition. Students then reflect on the concept and how they see it in their lives.

For example, for the concept of acceptable compromise, you:

1. Provide students with scenarios and the “decision endpoints” (opposing positions), and an acceptable compromise.
2. Ask them to read through the scenarios, underlining important points, and then listing what they have in common.
3. In pairs, have them discuss what they think “acceptable compromise” means.
4. Have pairs meet together and compare definitions, developing one that incorporates all their ideas.
5. Each group of four posts their definition, walk around to review each other’s, then meet again to refine their definition.
6. Finally, each group posts a final definition for the whole group, and you lead a discussion about any key differences you note, and come up with a definition that incorporates the best thinking from each group.
7. Ask students to reflect on their own lives and when they have, or could, use the concept of acceptable compromise.
8. Ask students to write down a definition of acceptable compromise along with their application of it to their own lives.

Time
1 period for each concept

Key Concepts
Acceptable compromise
Sustainable development
Environmental justice
Risk communication
Cost/benefit analysis

Skills
• Analyze a case for key ideas
• Use inductive reasoning to help develop a definition

Materials
Inductive reasoning worksheet
Key concept scenarios
Background
It is good to use this same inductive concept development process with students each time you do it. The routine will become part of their tool kit for reasoned discourse. A worksheet is provided for each concept using the same process described above.

Procedure
Guide students in using inductive reasoning:
1. Study the scenarios. Underline important points in each. Write a definition in your journal that will fit all three scenarios.
2. Compare and discuss the scenarios with a partner and develop one definition together.
3. Compare your team’s definition with another pair and develop one among you.
4. Share your foursome’s definition with the whole class.
5. Return to your definition and revise it. Make it better. Write it in your journal.
6. Think about an example from your own life. Write it in your journal.

Student Assessment
Ask students to submit their definitions with a sample case from their own lives or current events.
Guide to Inductive Reasoning to Develop Key Concepts

Powerful ideas have come out of our struggle to understand our moral duties to ourselves and to each other. They have come to define how we make ethical decisions.

To help you understand these ideas, you can use what is called "inductive reasoning," or the mental process of moving from a series of individual events or concepts to a general rule or concept. In this case, that means studying different scenarios to develop a clear sense of the general concept. This is partly what philosophers mean when they say they are conducting a "conceptual analysis."

Key Concept: ___________________________________________________

1. Study the scenarios. Underline important points in each. Develop a definition that will fit all three scenarios. Write it here:

2. Compare and discuss the scenarios with a partner and develop one definition together. Write it here:

3. Compare your team’s definition with another pair and develop one among you. Develop one definition for the four of you. Write it here. Share your foursome’s definition with the whole class.

4. Return to your definition and revise it. Make it better. Write it here.

5. Think about an example from your own life. Write it here.
Acceptable Compromise

What is it? Study these scenarios to develop a definition of this important idea in Ethics.

**Scenario 1: Acceptable Compromise**

Context/facts: Small particles of smoke - particulate air pollution - kills 60,000 people a year in the United States. Fossil fuels are burned to generate electricity, which is needed for social, economic and other reasons. The burning generates smoke, which pollutes the air.

Decision endpoints

| Halt all burning of fossil fuels | Allow all burning |

Compromise

Require "scrubbers" and other ways to reduce smoke emissions.

**Scenario 2: Acceptable Compromise**

Context/facts: A motorcycle emits about 20 times more pollution per mile than a new car, according to the U.S. Environmental Protection Agency.

Facts: Motorcycle emissions increase ozone, carbon dioxide and soot levels, which contribute to a variety of respiratory and related health problems. Source: http://www.planetark.org/dailynewsstory.cfm?newsid=17085&newsdate=31-Jul-2002

Decision endpoints

| Environmentalists call for 90% emission reduction requirements | Do nothing |

Compromise

Government calls for 50% reduction in motorcycle emissions
Scenario 3: Acceptable compromise

Context/facts: "Arsenic occurs naturally in rocks and soil, water, air, and plants and animals. It can be further released into the environment through natural activities such as volcanic action, erosion of rocks, and forest fires, or through human actions. Approximately 90 percent of industrial arsenic in the U.S. is currently used as a wood preservative, but arsenic is also used in paints, dyes, metals, drugs, soaps, and semiconductors. Agricultural applications, mining, and smelting also contribute to arsenic releases in the environment. Studies have linked long-term exposure to arsenic in drinking water to cancer of the bladder, lungs, skin, kidney, nasal passages, liver, and prostate. Non-cancer effects of ingesting arsenic include cardiovascular, pulmonary, immunological, neurological, and endocrine (e.g., diabetes) effects. Short-term exposure to high doses of arsenic can cause other adverse health effects, but such effects are unlikely to occur from U.S. public water supplies that are in compliance with the existing arsenic standard of 50 ppb. The current standard of 50 ppb was set by EPA in 1975, based on a Public Health Service standard originally established in 1942."

Decision endpoints

Retain current standard (50 ppb) ⇐⇒ Reduce standard (5ppb)*

Compromise

EPA sets arsenic standard for drinking water at 10 ppb.

*On June 22, 2000, EPA proposed a new drinking water standard of 5 ppb for arsenic and requested comment on options of 3 ppb, 10 ppb and 20 ppb. EPA evaluated over 6,500 pages of comments from 1,100 people commenting.
Sustainable Development

What is it? Study these scenarios to develop a definition of this important idea in Ethics.

**Scenario 1: Development on the edge of the Everglades**

**Facts**
A developer wanted to build a community on the edge of the Everglades. Indeed, the South Golden Gate Estates was a 173-square-mile project planned a half century ago. It would have created a community about 10 miles east of Naples. Developers dug canals to drain the land, but the canals diverted water from the Everglades National Park. They also built roads that were never used — the development was never completed … indeed, the developers could not sustain their own project, a fact not discovered until they had damaged part of the park. Nearly 50 years later, in 1997, the U.S. Department of the Interior provided $25 million to a state matching fund for the acquisition of 31,000 acres of privately owned — and environmentally sensitive — land, including South Golden Gate Estates.

**Issues and Questions about Sustainable Development**

- South Golden Gate Estates would have provided jobs and houses. Everyone rightly believes these are good things.

- What sorts of rules and laws should be considered to achieve a balance between economic stability/growth and environmental protection?

- "How do you propose to balance the jobs and homes against the damage to the Everglades, the state’s water supply, and the needs of other nearby communities?"

- What does it mean that many projects are started, lead to environmental damage … and are never completed (hence never even realizing the economic benefits sought in the first place)?
Scenario 2: Farmer’s Markets
Facts
In the United States, farmers’ markets have emerged on a huge scale in recent years. Under the Federal 1976 Farmer-to-Consumer Direct Marketing Act, state extension services have a mandate to promote the development and expansion of direct marketing. Held on a weekly or twice weekly basis, farmers and consumer groups have established new market sites to foster direct selling to the local public. There are at least 2,400 farmers’ markets in the U.S.A., involving more than 20,000 farmers as vendors, one third of whom use them as their only outlet. Each is unique, offering a variety of farm-fresh and organic vegetables, fruits and herbs, as well as flowers, cheese, baked goods and sometimes seafood. Each week, about one million people visit these farmers’ markets, 90% of whom live within 11 km of the market. The annual national turnover is about $1 billion. One farmers’ market in Madison, Wisconsin, contributes $5 million to the local economy each year; another in Santa Fe, New Mexico, brings an added 3/4 million to the nearby farming and food system. Farmers’ markets also recycle resources into other important community functions, contributing particularly to social programs. In Los Angeles, for example, the Encino market is sponsored by an organization that provides for the elderly, and part of the revenue from the market goes back into health care. Markets run by the Georgia Hunger Coalition bring black farmers from rural southern Georgia into black housing estates of Atlanta to sell their produce to 300 households. And in New Orleans, the Vietnamese market features a wide range of Asian vegetables and ducks raised on 16 hectares of former wasteland.


Issues and Questions about Sustainable Development

Farmers’ markets offer direct selling to the local public.

Why are farmers’ markets an example of sustainable development?

Which of the following are most affected by the growth of farmers’ markets: water, air, soil, food?

Are such markets adequate to the needs of entire communities? If not, why are they worth supporting or encouraging anyway?
Scenario 3
Facts
Next time you are on road that runs alongside a South Florida beach, note the relative locations of the beach, the road and the hotels/motels. In Miami Beach, for instance, the hotels and motels are right on the beach … meaning that over the years, occasional storms would cause waves to wash over the pool decks and into swimming pools (it is a nasty job to have to remove lots of beach sand from a swimming pool!). Indeed, when those storms would come and waves would hit the hotels’ seawalls, it caused extensive beach erosion, requiring a number of “beach renourishing” projects in which seafloor sand was pumped up onto the eroded beaches to restore them. (Next time you are on a South Florida beach and the sand seems coarse and with lots of little shell fragments, it is likely you are on a beach that has been renourished in the past; before that, the sands were much finer.)

In Fort Lauderdale beach, on the other hand, the hotels and motels are across the street from the beach.

Issues and Questions about Sustainable Development

People like to stay right on the beach. It is better for the beach if they stay across the road.

How should an individual’s rights to private property be balanced against social or community needs – and who should decide this question?

Which beach would you rather sit on, and why?

There are miles of Florida beaches with no hotels, condominiums or motels at all – but which are prime sites for development. What rules should govern that development?
Environmental Justice

What is it? Study these scenarios to develop a definition of this important idea in Ethics.

Scenario 1: Ammunition Storage and Disposal

Facts

The Anniston (Alabama) Army Depot (ANAD) started as an ammunition storage facility in 1941 under the command of the United States Army. Regular ammunition was stored in the depot until 1963, when the Army started storing excess chemical weapons at the site. Since then, the residents of Anniston have been subjected to adverse conditions that have brought about health problems due to chemical releases. ANAD is second in the nation for toxic releases. The total toxic releases equaled 548,073 pounds in 1996, and contained zinc compounds, hexachoroethane, 1,1,1-Trichloroethane, chlorine and others (DOD, 1996). Years after the weapons were stored and had already released toxic material, the military decided to dispose of the chemical weapons through on-site incineration. The military says this is the safest way to dispose of the chemicals and that in any event the toxic release source has never been conclusively identified. According to Executive Order 12898, signed by President Bill Clinton in 1994, this incinerator deserves the attention of certain Federal agencies because there is a “disproportionately high and adverse health and environmental” effect of this policy decision upon “minority populations and low-income populations” (Executive Order 12898, 1994) considering the city of Anniston has an African-American population which is 267% higher than the national average (Census data 1990).

Source: http://www.umich.edu/~snre492/Jones/maxbayrum.htm#Background

Issues and Questions about Environmental Justice in this Scenario

We need to dispose of toxic materials somewhere.

Who should be involved in the decision-making?

How clear a connection should be shown between a waste site and damage to a community before the site is relocated, closed or made to conduct its business elsewhere?

How should disagreements be handled?
Scenario 2: Firing Range off Puerto Rico

Facts

“For more than 60 years, the Navy used a 900-acre firing range on the eastern tip of the tiny island [of Viéques, off Puerto Rico,] for bombing exercises. For decades it insisted that the exercises could not take place elsewhere, because the area offered a unique opportunity to conduct ship-to-shore gunnery practice and aerial bombings. The people of Viéques and the Puerto Rican commonwealth bitterly complained that the drills were dangerous. The practice generated international criticism in 1999, when two errant bombs killed a civilian Puerto Rican security guard.” Others protested that so many bombs were dropped that their chemicals damaged the health of some island residents, and that the stress of living near a bombing range caused still other health problems. After years of protest, the bombing officially ended on May 1, 2003.


Issues and Questions about Environmental Justice in this Scenario

Why is this a case about environmental justice?

What group was allegedly being unjustly exposed to costs/damages/harms?

Assuming the truth of the military’s claims, what are some ways to resolve the conflict?
Scenario 3: Restoring the Everglades

Facts
For half a century, the Everglades has been damaged by development and faulty land and water use. Most everyone agrees the Everglades should be restored, but such restoration itself raises environmental justice issues. For instance, the Miccosukee Tribe of Florida had accused the Southern Everglades Restoration Alliance (“SERA”), a federally funded organization, with giving advice that “caused continuing damage to tribal lands in the Everglades.” The details of the case are complicated, but broad questions can be asked about how such disputes generally should be approached.


Issues and Questions about Environmental Justice in this Scenario

Sometimes, two worthy goals or values come into conflict.

Everglades restoration – or at least some approaches to it – conflicts with Native American land use and rights.

When such disputes arise, how should they be addressed?

Who should be at the table to help resolve them?

What should be done when, as is so often the case, there are disagreements about the facts of the case?
Risk Communication

What is it? Study these scenarios to develop a definition of this important idea in Ethics.

Scenario 1: Oprah Talks about Mad Cow Disease

Facts
On national television, Oprah Winfrey interviews guests who talk vividly about the dangers of bovine spongiform encephalopathy (mad cow disease), and express fears that some of the beef in the country might be contaminated by the agent that causes BSE. Oprah says, “It has just stopped me cold from eating another burger!” The cattle industry later sued Oprah, saying her remarks had cost the industry $11 million. The industry lost the suit.

Issues and Questions about Risk Communication

People want to know how to protect themselves.

Is this an example of a premature risk disclosure?

That is, has the public been told about the risk of BSE in the best possible way?

It might be that Oprah and her guests over sensationalized the issue.

Does acquiring additional scientific evidence help with risk communication?

What can be done to communicate risk calmly and appropriately?
Scenario 2: Is it safe to swim in Florida’s freshwater lakes?

Facts

A 12-year-old boy dies of “primary amebic meningoencephalitis” after swimming in a lake near Orlando. The disease is caused by an amoeba that might or might not be related to pollution, but is thought to proliferate during hot, summer months. As the next summer approaches, authorities need to decide whether to warn people against swimming in Florida’s freshwater lakes. (April 15, 1996)

Issues and Questions about Risk Communication

What if it were Florida’s beaches?

People want to be able to protect themselves from disease.

What is known about this amoeba? Since decisions are based on reasons and evidence supports or informs reasons, it makes sense to ask if the state has conducted any research on the problem.

Compare this case to Oprah and mad cow disease – where an industry claimed that a premature or false warning cost a lot of money … here, what is the worst that would happen if health authorities “over-warned” about the safety of Florida’s lakes?
Scenario 3: Bug Killer Toxic

Facts
Some pollution is quite local. Methyl bromide is a gas used to kill bugs on tomatoes, strawberries and peppers. While it is injected into the soil, it also propagates through the air, sometimes spreading to nearby houses and communities. The chemical also damages the Earth’s stratospheric ozone layer. The U.S. Environmental Protection Agency classifies methyl bromide as a “Class I acute toxin.” In Florida and other states, the farm workers who come in contact with the gas are mostly poor people from Mexico, Central America and Haiti. Health risks range from nausea and headaches to cancer and memory loss … though there is not much research on the question.

Issues and Questions about Risk Communication

Bug killer may have health risks for workers.

How much information should farm workers be given about the health risks of exposure to methyl bromide?

Does it matter that they need to work to support their families and might therefore agree to be exposed to risks that better-off people would disdain?

Might it be OK not to disclose any risks to them to prevent them from worrying too much?

Why should we worry about foreign farm workers when their labor helps keep fruits and vegetables cheap?
Cost/Benefit Analysis

What is it? Study these scenarios to develop a definition of this important idea in Ethics.

Scenario 1: Leaded Gasoline – The Great Debate
Facts
The following table shows the costs and benefits of a pair of decisions in one of the great environmental policy debates of modern times – whether to change from leaded gasolines to low-lead fuels or to eliminate lead altogether. Here are steps in the cost-benefit analysis:

Step 1: The definition of a baseline: what will happen if there is no new regulation? The baseline must take into account the impacts of changing market conditions and other current and pending regulations.
Step 2: Identification of policy alternatives. These include different standards, different methods of regulation—such as incentive-based policies like pollution taxes or tradable permits versus technology standards—and alternatives to regulation altogether (such as public information campaigns).
Step 3: Identification of potential changes in outcomes and risks
Step 4: Assessment of economic costs and benefits.

Benefits and Costs of Lead Reduction in Gasoline

<table>
<thead>
<tr>
<th>Category</th>
<th>1988 Costs/Benefits (millions $1983)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low-lead policy option</td>
</tr>
<tr>
<td>Costs</td>
<td></td>
</tr>
<tr>
<td>Increased refinery costs</td>
<td>$503</td>
</tr>
<tr>
<td>Valve damage $^1$</td>
<td>$0</td>
</tr>
<tr>
<td>Total costs</td>
<td>$503</td>
</tr>
<tr>
<td>Benefits</td>
<td></td>
</tr>
<tr>
<td>Reduced vehicle maintenance</td>
<td>$669</td>
</tr>
<tr>
<td>Reduced HC, NOX, and CO emissions from misfueling</td>
<td></td>
</tr>
<tr>
<td>Monetized benefits</td>
<td>$404</td>
</tr>
<tr>
<td>Unmonetized benefits $^2$</td>
<td>$B_1$</td>
</tr>
<tr>
<td>Reduced lead-related health damages</td>
<td>$41</td>
</tr>
<tr>
<td>Avoided medical costs</td>
<td>$184</td>
</tr>
<tr>
<td>Avoided remedial education costs</td>
<td>$B_2$</td>
</tr>
<tr>
<td>Total benefits</td>
<td>$1,289 + B_1 + B_2</td>
</tr>
<tr>
<td>Net benefits</td>
<td>$785 + B_1 + B_2</td>
</tr>
</tbody>
</table>

Issues and Questions about Cost/Benefit Analysis

Lead poses a health risk. Complete lead phaseout would increase refinery costs.

Can you decide the question “low lead or lead phaseout” on the basis of money alone?

As in risk communication, the question of uncertainty looms large. What can be done in the face of imperfect information?

What values need to be included in a cost-benefit decision?
Scenario 2: Walk, Bicycle or Drive?

Facts
You live two kilometers from the store. You need a quart of milk and a loaf of bread. You can walk, ride a bicycle or drive the family SUV. If you walk it will take a half hour. If you bicycle, it will take 15 minutes. If you drive, it will take 7 minutes. You need the food to prepare meals so you won’t be hungry for the exam the next day (for which you are studying quite hard). When you are hired to work at the mall, you can make $10 an hour. Gas costs $1.75 per gallon. It might rain.

Issues and Questions about Cost/Benefit Analysis

You have a limited amount of time. Your decision about transportation will have consequences for you and others.

Why are these facts important? How should they be laid out?

What values are to be identified?

What is meant by saying “cost-benefit analysis informs the decision making process, but it does not by itself make decisions.”
Scenario 3: Wash before Recycling

Facts
Some cities, businesses, and institutions provide for glass, paper, plastic and metal to be recycled. Recycling itself uses resources, some of them nonrenewable. Many people who recycle containers wash them first, often in hot water.

Issues and Questions about Cost/Benefit Analysis

- Recycling reuses resources but it also uses resources.
- Are recycling programs effective means for reducing waste and increasing sustainability?
- Should containers be carefully washed before being deposited into recycling bins?
- What information do you need to perform cost/benefit analyses on these micro-environmental and macro-environmental questions?