

Integrating Sustainability into the Science Classroom



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What is Sustainability?

With your neighbor, discuss the following:

- How would you describe or explain the concept of sustainability?
- What ideas about sustainability might students bring from their everyday lives?



Common Sustainability Issues

- **Resource and energy use:** How can a home be made more energy efficient?
- **Water:** How should wastewater be treated before it is released into the environment?
- **Health:** How should research funding be allocated to address global health issues?
- **Biodiversity:** Where should conservation efforts be focused?
- **Food and nutrition:** Should foods be genetically modified?



Contaminants and the Water Cycle

In this activity, students simulate the travels of a water molecule in a water droplet through the water cycle.

- Use the cards to complete the activity.



Contaminants and the Water Cycle

- Identify potential content and processes that could be taught using this sustainability issue



Activity: Contaminants and the Water Cycle

Content-based approach

Content: Water cycle

Process: Modeling

Issue-based approach

Content: Water cycle plus potential for:
Water pollution,
Water quality,
Water treatment,
Health effects associated with contaminated water

Process: Modeling



3 Pillars of Sustainability

■ Economic

- People desire the highest standard of living that they can achieve. The generation of economic wealth supports adequate access to health care, jobs, education, etc.

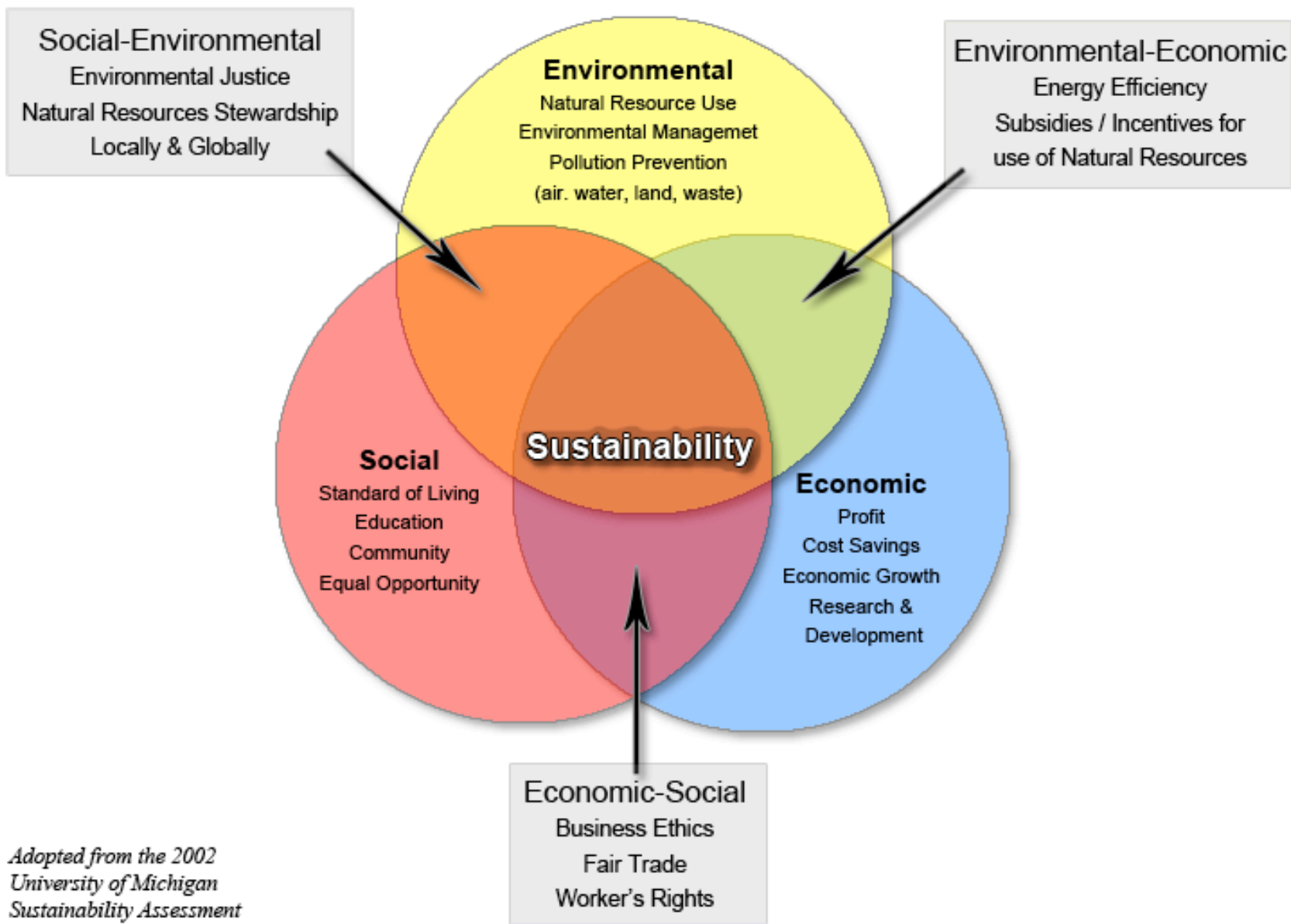
■ Social

- To have a sustainable future, peoples' needs for clean air, water, resources, access to health care, etc must be met equally.

■ Environmental

- The Earth has limited resources which organisms need for survival and healthy life.

The Three Spheres of Sustainability



*Adopted from the 2002
University of Michigan
Sustainability Assessment*



Sustainability and the issue of water pollution and clean water

- Think about the issue of water pollution and clean water in the context of the three pillars of sustainability.
 - Write down elements of the issue that fit into each of the three pillars.
 - Example: water treatment is part of the “Economic” pillar.



Water Pollution and Clean Water

Economic

- Water treatment
- Importing/exporting water
- Treatment of sick people

Environmental

- Water pollution

Social

- Equal access to health care/medical treatments



Using the Three Pillars

- Brainstorm sustainability connections for the following subject areas
- For each one determine connections to issues related to each of the three pillars

Ecology

Cell Biology

Evolution

Electricity

Waves

Atomic Structure

Chemical Reactions



Sustainability can be viewed on three levels

- Personal
- Community
- Global

Discuss and record whether the factors you listed in each of the three pillars are at the personal, community, or global level.



Why Sustainability?

- Sustainability opens up more avenues to relevance for students.
- Sustainable issues relate to science.
- Sustainable living is where our society is going and will likely continue in the future.
- Sustainability decisions and scientific literacy are closely related - one has the potential to develop and inform the other.



Activity: Who Infected Whom?

- In this activity students take on the role of epidemiologists to investigate who is (or are) the carriers of the disease.
- Students make and test a hypothesis.



Activity: Who Infected Whom?

- Use the Cards to make a hypothesis in Part A.
- Use the dropper bottles to collect evidence and test the hypothesis in Part B.



Examine the following for the activity.

Record your ideas on chart paper:

- Content addressed
- Process skills taught
- Ties to the issue of sustainability
 - Three pillars
 - Personal, community, global levels



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SEPUP website

(for this presentation and other information)

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