

Water Curricula & Multi-Perspective Tools

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The Big Picture of ESD

- ▶ Emphasis on integration of science, society, and economics
- ▶ Sustainability is an important goal for local, regional, and global spheres
- ▶ Civic responsibility of individuals and groups is integral to environmental decision-making

Two Curricular Tools

- ▶ **Freshwater Curriculum Template ESD**
 - A guide to designing integrated, place-based, action-oriented teaching approaches

- ▶ **Multi-Perspective Tool**
 - Presents seven unique, but overlapping, perspectives on the relationships **within** natural systems and **between** natural systems and human society

Core Elements of Teaching for ESD

- ▶ Build scientific knowledge and conceptual, multidimensional thinking
- ▶ Integrate social and intercultural perspectives
- ▶ Develop local action competence
- ▶ Develop of a sense of connectivity with natural freshwater systems

Nine Strands of Freshwater Curriculum Template

- ▶ 1 – Water Ethics
- ▶ 2 & 3 – Natural Sciences water-related topics
 - E.g. water cycle, ecosystems, watershed
- ▶ 4, 5, & 6 – Societal water-related topics
 - E.g. supply, usage, culture, economics
- ▶ 7 – Risk management
- ▶ 8 & 9 – Procedural skills, Critical thinking skills, and Action strategies

Template guides educators to:

- ▶ Begin with focusing on a local water issue
- ▶ Identify relevant scientific and societal knowledge
- ▶ Identify and address ethical considerations
- ▶ Design a place-based action plan to enhance sustainability of local community

Focus Questions of Pre-Service Teachers

- ▶ How can agricultural pollution be prevented?
- ▶ What are the processes that a local water supply goes through before it becomes safe drinking water?
- ▶ What kinds of benefits do wetlands provide to people and the environment?
- ▶ Why is it important to maintain unpolluted water in a lake ecosystem

Pre-Service Teachers' Comments

- ▶ "In my unit I try to get my students to realize that everything they do on their farms has some type of outcome... an action that is careless will affect the health of their water source on their farms."
- ▶ "When people fertilize their lawns... do not dispose of pet waste properly, oil leaks on their driveways and when they choose not to recycle, they only think about what is good for them. ... Many people do not think of the idea of run-off and how the chemicals from the fertilizer can run off and get into their local watershed."

Systems Thinking

- ▶ "Land is changed by the formation of dams. ...One major function of the integrated unit is to convey the message that alterations, although in many ways positive, will almost always lead to repercussions. In order to improve a standard of living or appearance in one area, there are going to be opportunity costs elsewhere."

Multi-Perspective Tool

- ▶ Emphasis on Ways of Knowing
- ▶ Can be used in analysis of actual issues or case studies
- ▶ Perspective-focused questions can be the basis for discussions and action strategies

Values Perspective

- ▶ How would you describe your values in regard to use of natural resources?
- ▶ What diverse values are evident among the local community?
- ▶ What actions or events might cause someone to reconsider their values about ESD?
- ▶ Is it necessary to change the value system of a group or groups in order to achieve a consensus position?

Historical Perspective

- ▶ What are the main historical causes of the issue?
- ▶ How is this issue interrelated with other issues?
- ▶ What solutions are currently being implemented?
- ▶ What recent changes have either worsened or mitigated the sustainability issue?

Cultural Diversity Perspective

- ▶ What are the cultural assumptions, practices, and values that relate to the issue?
- ▶ How can local forms of knowledge contribute to the proposed solution of the issue?
- ▶ What existing and potential conflicts between community groups could affect the decision-making process?
- ▶ What are the positive aspects of diversity that can impact the sustainability issue?

Human Rights Perspective

- ▶ Do all people have equitable access to natural, economic, and social resources?
- ▶ Do all community members have equitable opportunities for benefitting from the proposed solutions?
- ▶ Does the sustainability issue differentially limit the expression of cultural practices or values by members of the community?
- ▶ Does the sustainability issue differentially threaten tangible or intangible aspects of cultural heritage of members of the community?

Gender Perspective

- ▶ Are there opportunities for men and women to feel equally empowered to make decisions?
- ▶ Do women and men have equal opportunity to influence provincial, state, or national policies?
- ▶ Do boys and girls experience the same levels of access to education, retention, and success in literacy, giving them equal opportunities for full participation in decision-making?
- ▶ Do men and women have equal access to and control over the natural resources?

Scientific Perspective

- ▶ What are the major risks and consequences to the natural environment?
- ▶ What data exists or could be collected to support the assertion of risk?
- ▶ What other assertions could be supported by the same data?
- ▶ Why does the issue exist where it does? What biotic or abiotic factors contribute to the issue?

Sustainability Perspective

- ▶ What major social values (e.g., economic, ecological, political, aesthetic) are involved in decision-making processes regarding sustainability issues?
- ▶ What are possible economic implications of restricting immediate use of natural resources in exchange for the expectation of long-term availability of resources?
- ▶ How can individuals make personal changes to create more sustainable lifestyles?
- ▶ How can groups of people make changes to create more sustainable societies?

Case Studies

- ▶ Tunisia – traditional irrigation and modern demands
- ▶ Thailand – urbanization and water quality
- ▶ Lake Peipsi – transboundary development near protected wetlands
- ▶ Lake Titicaca – climate and social change
- ▶ Zambia – water quality and health

Thank you!