

The 4DEE framework seeks to:

- Describe a set of concepts and practices central to ecology as requested by the membership
- Inform students of the scope of ecology for future study and career goals
- Describe core ideas (concepts) for practitioners seeking certification as ecologists
- Inform and support instructors and education researchers seeking to incorporate ecology into their STEM education initiatives
- Identify ecology practices and skills necessary for careers in today's and tomorrow's environmental workforce
- Establish ESA as the leader in ecology education



ECOLOGICAL SOCIETY OF AMERICA

esa

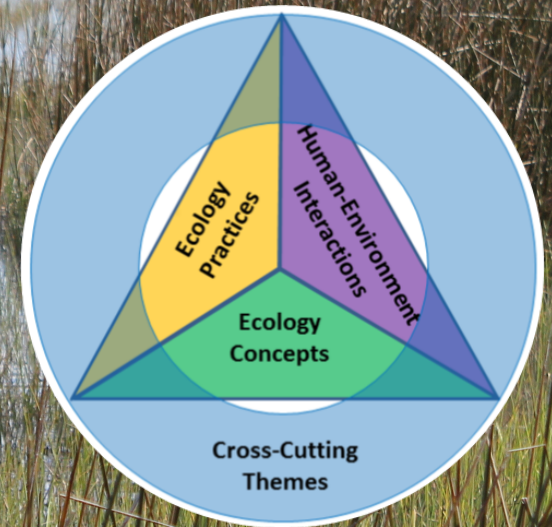
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Ecology Education is now 4D

Four Dimensional Ecology Education Framework



For more info on the framework please visit the 4DEE website or scan the barcode



<https://www.esa.org/4DEE/>

Core Ecology Concepts

Classical Ecological Hierarchy



Ecology Practices

Approaches and Methods



Four Dimensional Ecology Education Framework

- **Core Ecological Concepts** follows the widely recognized hierarchy of ecology presented in most ecology textbooks, including individuals, populations, communities, ecosystems, landscapes, biomes and biosphere.
- **Ecology Practices** include approaches and methods used in doing ecology, e.g. natural history, fieldwork, quantitative reasoning, computational thinking, designing and critiquing investigations, and collaboration.
- **Human-Environment Interactions** include dependence on the environment, human-accelerated environmental change, how humans can use ecological systems to shape and manage resources/ecosystems/the environment, ethical dimensions and communicating and applying ecology.
- **Cross-Cutting Themes** include structure & function, pathways & transformations of matter and energy, systems, and spatial & temporal scales and processes (including evolution). Integration across the dimensions is a hallmark of the framework. The ultimate goal is for the four dimensions to be taught as integrated units, courses, and curricula.

GET INVOLVED:

- Redesign curriculum and support ecology educators
- Reframe student advising and mentoring
- Develop research agenda on teaching and learning
- Inform professional development programs

Human-Environment Interactions

Human Dependencies, Impacts, Ethics



Cross-cutting Themes

Ways of thinking, Unifying Ideas

