

The environment - living and non-living things

Critical teaching ideas - Science Continuum F to 10

Level: Moving towards level 6

Student everyday experiences

Students tend to think of organisms only interacting with the physical environment and plants, without appreciating the complex interdependence between members of and across species (See Tytler & Hubber, 2004).

Students tend to regard only natural and wilderness areas as fully functioning ecosystems.

Students tend to equate human impact with the destruction or collapse of ecosystems (See Novak & Gowin, 1984).



The scientific view

- The world contains a wide diversity of physical conditions, which creates a wide variety of environments where living things can be found. In all these environments, organisms interact and use available resources, e.g. food, space, light, heat, water, air, and shelter. Each population of organisms, and the individuals within it, interact in specific ways that are limited by and can benefit other organisms.
- Interactions between different organisms are numerous and are usually described according to their positive (benefit), negative or neutral effect on others.
- The interactions between living things and their non living environment makes up a total ecosystem; understanding any one part of it requires knowledge of how that part interacts with the others.
- Ecosystems do not 'collapse' but do change in function, structure and composition over time due to natural or human disturbance (drought, flooding, mowing, herbicides). (See Novak & Gowin, 1984)

Critical teaching ideas

- Living things have various structures that enable them to survive: for example, transport structures in plants allow water & trace elements to move, digestive structures & respiratory structures in animals, reproductive structures in plants and animals.
- Each organism has particular forms of these structures that assist their survival (See Skamp, 2004).
- In all environments, organisms with similar needs may compete with one another for limited resources, including food, space, water, air and shelter. (See AAAS Maps)

- Students need to experience evidence of a functioning ecosystem with abundant plant-animal interaction.

Time is a factor that influences the type of interactions and changes that take place in an ecosystem. This is problematic for science planning that does not allow students to observe changes over an extended period of time. Allowing ongoing investigations to run throughout the year is an important consideration (or alternatively use video footage that captures changes over time).

Teaching activities

Collect evidence/data for analysis.

Identify a project within your local community where student involvement can have an impact. Some examples are

Some examples are:

- [Whale Dept. of Environment and Water Resources - Coasts and oceans](#)
- [Marine Coastal Projects](#)
- [Adopt a Dolphin - Whale and Dolphin Conservation Society](#)
- [Dolphin Research Institute](#)
- [Environment and Resource Efficiency Plans \(EREP\)](#)
- [Environmental Indicators for Metropolitan Melbourne](#)

(See Baker, 2005).

Challenge some existing ideas.

Encourage students to undertake activities which allow them to investigate living things in a natural local environment e.g. schoolyard, local pond, wetland or a constructed environment e.g. classroom pond, etc. (See Skamp, 2004).

Collect evidence/data for analysis.

Studying pond animals over a period of weeks gives a sense of the changes that occur in populations as they interact or in changes of form as animals go through their lifecycles (See Skamp, 2004). Students can link this with study with a longer study to provide insights to seasonal changes and animal adaptations related to seasonal cycles.

Focus student attention on overlooked detail

Encourage students to record observations and descriptions of phenomena using science journals, labelled diagrams, timelines and PowerPoint presentations. Use digital microscopes and hand held lenses to assist observations of structure and function

<http://www.sciencefirst.com/pctr/78-510.jpg>



Clarify and consolidate ideas for/by communication to others.

Students could create a news report on their project (or develop a project like Creating a new Playground) or an issue for the media (or their school newsletter) from differing perspectives such as a politician, a greenie, a farmer, a mum, a local elder or other teachers. This involves

ethical decision-making on behalf of the students as to what to include and what not to include.



Further resources

Science related interactive learning objects can be found on the [FUSE Teacher Resources](#) page.

To access the interactive learning object below, teachers must login to FUSE and search by Learning Resource ID:

- [Environmental evaluation project: frog pond habitat](#) –students answer a short quiz about how organisms are adapted to their environment, then explore a pond environment. They choose sampling tools suited to avoid hurting the animals or damaging the study area, then collect animals from a pond, grassy bank, rocky bank, trees and shrubs. They look at a species description and video for each animal and describe how the animal meets its basic needs for food, water, shelter and protection. Learning Resource ID: R9QN9M
- [Environmental evaluation project: frog pond habitat \(2\)](#) – students explore why a frog population is declining by look at changes in the pond over time (specifically, water quality, habitat loss and predation by introduced species). Students build a food web for the pond and model population interactions. They identify which species have the greatest impact on the frog and finally build a report using evidence collected to support their conclusions. Learning Resource ID: FTE6CS