

Early concepts in ecology

Exploring early years children's understanding of some key ecological concepts¹

Michael Allen

Background and rationale. Despite the importance of an ecologically-literate populace, the environmental understandings of children have been shown to be limited or incorrect (e.g. Shepardson, Wee, Priddy & Harbor, 2007). However, the recent publication of a new Primary Science National Curriculum (Department for Education, 2013), which was implemented in schools in September 2014, may go some way toward addressing these problems. Ecology topics that were previously taught to older children during Key Stage 2 (ages 7-11 years) will in future appear in the Key Stage 1 curriculum (ages 5-7 years). This will ensure, in state maintained schools at least, that key ecological concepts will be accessed by much younger children than is presently the case. One likely outcome is that young children will become more environmentally aware than was previously the case.

With the new curriculum in mind it will be necessary to elicit key ecological concepts of preschool children in order to determine their knowledge and understanding upon arrival at Key Stage 1, which is the intention of the current study. Previous research with Key Stage 1 and 2 children has revealed misconceptions that hinder proper understanding of key ecological ideas (Allen, 2014), so there is a clear need to ascertain whether these or any other misconceptions are held by younger, preschool children. No survey that has explored the ecological ideas of children in the early years presently exists in the literature. The research is underpinned by the tenets of constructivist child development theory (e.g. Eimas, 1994) which holds that infants and adults alike access precisely the same processes with differences in performance being solely attributed to the amount of source information that is currently available to each individual.

Aim of the research. Determine the ideas of a sample of early years children pertaining to selected ecological concepts.

Research questions: Which misconceptions do early years children hold about key ecological concepts? How does the nature of these misconceptions change during the ages 3-5 years? What might be the origins of these misconceptions?

Methodology. The study relies on both quantitative and qualitative methods to survey the ideas of early years children relating to key ecological concepts. The key ecological concepts that will form the foci of the study relate to the way species are dependent upon each other as food sources. These particular areas of study were selected because they are new to Key Stage 1 in September 2014, and specifically include,

- the concepts *carnivore, herbivore, omnivore, predator, prey, and producer*;
- the ability to correctly construct simple food chains and food webs;

¹ This study has been funded by a Faculty Small Grants award, FHSCE, 2014.

Early concepts in ecology

- understanding the effect of changing numbers of species within a food chain, and the influence of these changes on other organisms within the same food chain.

A structured interview method will be used to collect data from children based on an innovative approach that has successfully been utilised by the Principal Investigator and his research team with children from the same age group (Allen, in press; Allen & Choudhary, 2012). Briefly, the method involves the presentation of scale models of different animal and plant species to children who are then required to categorise the models into named sets as instructed by the researchers by making a binary choice. After children have allocated the models into sets, children are asked to provide reasons for their choices. Fifty-one children will be surveyed from a variety of playgroups, nurseries and schools. Analyses will largely take the form of statistical operations.

Results. Data collection is currently ongoing and it is expected that early findings will begin to emerge around the end of December.

Impact of the project. The inclusion by central government of key ecological concepts into the Key Stage 1 curriculum provides a golden opportunity for teachers to enable young children to correctly learn these often difficult ideas, so laying firm foundations for the later study of ecology, and ultimately helping them to become more scientifically literate and environmentally-aware citizens. The study would play a vital part in this process, providing a starting point for Key Stage 1 teachers in light of the introduction of the new primary curriculum in September 2014.

(Word count 720 excluding references).

References

Allen, M. (In press). Preschool children's taxonomic knowledge of animal species. *Journal of Research in Science Teaching*.

Allen, M. (2014). *Misconceptions in Primary Science*. Maidenhead: Open University Press.

Allen, M. & Choudhary A. (2012). *Animal classification by early years children*. United Kingdom Science Education Research Conference. NSLC, University of York.

Department for Education (2012). *National Curriculum for Science: Key Stages 1 and 2 – Draft*. London: Crown Copyright.

Eimas, P. D. (1994). Categorisation in early infancy and the continuity of development. *Cognition*, 50, 83-93.

Shepardson, D. P., Wee, B., Priddy, M. & Harbor, J. (2007). Students' mental models of the environment. *Journal of Research in Science Teaching*, 44, 327–348.