

## Literatursammlung Fachbereich NT und NMG

### Outdoor chemistry in teacher education – a case study about finding carbohydrates in nature

Höper, J., & Köller, H.-G. (2018). Outdoor chemistry in teacher education – a case study about finding carbohydrates in nature. *LUMAT: International Journal on Math, Science and Technology Education*, 6(2), 27–45. <https://doi.org/10.31129/LUMAT.6.2.314>.

#### Abstract

In this case study, we describe an inquiry-based approach to enhancing tuition in chemistry by taking student teachers out of the lab and into nature. We used video observation and interviews to gain insight into student teachers' expectations and experiences of such fieldwork. Through thematic analysis, we found that the participants perceived the approach as individually relevant and worthy of integrating as a teaching method in future practice. Further, we discussed challenges presented by outdoor chemistry and ways to overcome these. Overall, we show that fieldwork in chemistry contributed to a better understanding of chemistry as an integral part of nature.

[Zum Artikel](#)

### Barriers To Biological Fieldwork: What Really Prevents Teaching Out of Doors?

Scott, G. W., Boyd, M., Scott, L., & Colquhoun, D. (2015) Barriers To Biological Fieldwork: What Really Prevents Teaching Out of Doors?, *Journal of Biological Education*, 49:2, 165-178, DOI: 10.1080/00219266.2014.914556

#### Abstract

This paper considers a range of factors that may contribute to an unwillingness or inability of teachers to participate in the teaching of biology through fieldwork. Through a synthesis of the views of both pre-service teachers in training and primary school teachers in practice we explore the relative importance of a wide range of potential barriers and potential responses to them in the context of the wider literature. We conclude that although fieldwork may be impeded by the interaction of a wide range of individual barriers, including an individual's predisposition towards the outdoors, it is possible to group interacting barriers into two main areas: school culture and teacher confidence. It is also apparent that barriers may assume different levels of significance when considered in general terms rather than when applied to a particular context and that the significance of barriers may change through time. Encouragingly, we have also shown that in-service teachers have a willingness to overcome these barriers.

[Zum Artikel](#)

### An exploratory study of student teachers' conceptions of teaching life science outdoors

Subramaniam, K. (2019) An exploratory study of student teachers' conceptions of teaching life science outdoors, *Journal of Biological Education*, 53:4, 399-411, DOI: 10.1080/00219266.2018.1472133

**Abstract**

The purpose of this exploratory qualitative study was to investigate elementary student teachers' conceptions of teaching life science outdoors. The study involved 99 student teachers who were enrolled in an elementary science methods course at a large public university in the United States of America. The study utilised drawings, and narratives to investigate the nature of these teachers' conceptions. Data analysis revealed that three conceptions of teaching life science were common among the participants: (1) teaching life science is predominantly conceptualised as being situated in the schoolyard, (2) teaching life science outdoors is teacher-directed, and (3) teaching life science outdoors is disconnected from in-class science instruction. Implications include the need for (1) teacher education programmes to provide reflective supports that explicate student teachers' conceptualisation of teaching life science and thus exposing prior frameworks; and (2) teacher educators to examine student teachers' prior frameworks for teaching life science outdoors and provide knowledgeable theory and practice platforms that will serve as frameworks for student teachers to adopt, connect and routinize outdoor life science teaching with in-school teaching of life science.

[Zum Artikel](#)

**Opinions of Prospective Biology Teachers about “Outdoor Learning Environments”: The Case of Museum Visit and Scientific Field Trip**

Uzel, N. (2020). Opinions of Prospective Biology Teachers about “Outdoor Learning Environments”: The Case of Museum Visit and Scientific Field Trip . *Participatory Educational Research* , 7 (2) , 115-134 . DOI: 10.17275/per.20.23.7.2

**Abstract**

This study aims to determine the opinions of prospective biology teachers about outdoor learning environments by drawing on the cases of museum visit and scientific field trip. In line with this aim, phenomenology research design was utilized. Criterion sampling, which is one of the purposeful sampling methods used in qualitative research studies, was resorted to with a view to determining the participants. In accordance with the phenomenology of the research, 17 prospective biology teachers in their first year of their studies during 2018-2019 academic year in a public university constituted the participants of the research. In order to determine the opinions of prospective biology teachers about outdoor learning environments, an opinion form and an observation form were made use of as data collection tools. Content analysis was referred to in the analysis of research data. In their views on the contributions of the outdoor learning environments, prospective teachers seemed to concentrate on the issues of gaining new information, concretizing the knowledge, learning in the natural environment, and learning by doing and living. It was understood that the codes of “following the guide/teacher”, “acting in a planned manner” and “practice” came to the fore in the opinions of the prospective biology teachers regarding the things to be done during the implementation phase of the outdoor learning environments. While the codes of “getting opinion” and “question-answer method” came into prominence in the prospective teachers' views on the things to be done in the evaluation of outdoor learning environments; especially due to its content, after the scientific field trip, prospective teachers expressed opinions about “the examination of the notes taken, pictures, samples, and so on.” It was also observed that codes emerged from the suggestions of prospective biology teachers regarding the use of outdoor learning environments focused more on these aspects of the process: “should be a well-planned trip”, “should be informative”, “time management” and “participant/ teacher characteristics”.

[Zum Artikel](#)

## Science teacher education for sustainable development: a case study of a residential field course in a Norwegian pre-service teacher education programme

Jegstad, K. M., Gjøtterud, S. M., & Sinnes, A. T. (2018) Science teacher education for sustainable development: a case study of a residential field course in a Norwegian pre-service teacher education programme, *Journal of Adventure Education and Outdoor Learning*, 18:2, 99-114, DOI: 10.1080/14729679.2017.1374192

### Abstract

In this paper, we explore how a Norwegian teacher education institution promotes education for sustainable development (ESD) through a residential field course. The residential field course was located in a mountain area and data were collected through participant observation. The data included—together with instructional artefacts—evaluation schemes and assignments written by the student teachers, and the analysis was based on categories for science ESD. Through exemplary teaching experiences in an outdoor environment and pupil-active teaching methods, such as inquiry learning and phenomenon-based teaching, the student teachers gained experience in outdoor education and of stepping into the unknown in a safe learning environment. This was further connected to ESD pedagogy.

[Zum Artikel](#)

## Cultivating environmental connections in science teacher education: learning through conversation

Howes, E. V., Jones, K. M., & Rosenthal, B. (2004) Cultivating environmental connections in science teacher education: learning through conversation, *Teachers and Teaching*, 10:5, 553-571, DOI: 10.1080/1354060042000243042

### Abstract

The inspiration for this paper was a retreat in which education students and professors spent a weekend at a forest preserve, conducting biodiversity studies. Our writing describes the power of our retreat as a scientific, social and pedagogical learning experience. The three authors present our written reflections individually, prefaced by a description of the retreat setting. We place our reflections in an exploration of conversation in science teacher education as a way to help our students and ourselves connect more deeply and educatively to each other and to other living things.

[Zum Artikel](#)

## Assessing Psychosocial Outdoor Learning Environment of Pre-service Science Teachers through The Field Trip Experiences

Rahmawati, R. F. , Imaduddin, M. , Haqiqi, A. K. , Fikri, A. A. , Fawaida, U. , Prasetyo, D. R. & Faikhamta, C. (2020). Assessing Psychosocial Outdoor Learning Environment of Pre-service Science Teachers through The Field Trip Experiences . *Participatory Educational Research* , 7 (2) , 135-150 . DOI: 10.17275/per.20.24.7.2

### Abstract

Field trip activities are often considered additional activities and are considered recreational activities rather than ones that teach science effectively to students. Field trip activities are one form of effective experience-based learning to train pre-service teachers in the outdoor environment. This study attempted to describe the design of outdoor science learning in the form of the field trip for pre-service science teachers (PSTs) and the condition of psychosocial learning environments in outdoor activities. This research is a case study carried out in a pre-service science teacher training program at Institut Agama Islam Negeri Kudus, Indonesia. The field trip was designed with field visits on six objects for three days in Bandung, West Java, Indonesia. The field trip activity was attended by 70 PSTs. Qualitative data is captured through the documentation of activities at each outdoor learning location. Quantitative data collection instruments included seven psychosocial scales, namely (1) Environmental Interaction; (2) Integration; (3) Students cohesiveness; (4) Teacher supportiveness; (5) Open-endedness; (6) Preparation and organization; (7) Material environment. The field trip design for PSTs recommends activities that lead to observation and exploration of visiting objects relating not only to the content of the science but also to the pedagogical aspects of the science. The psychosocial aspects of PSTs indicate that field trip activities show a positive meaning in all aspects, although there are significant differences in the conditions of expectations and reality experienced by PSTs. The integration aspect is not significantly different. The decline in perception is still at the medium level, and the condition of the perception is still at a positive level. Research and development studies that emphasize the process of integrating classroom learning with outdoor activities can be carried out further to be able to give meaning to science learning, which is not limited by classrooms or laboratories.

[Zum Artikel](#)

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Höper, J., & Köller, H.-G. (2018). Outdoor chemistry in teacher education – a case study about finding carbohydrates in nature. *LUMAT: International Journal on Math, Science and Technology Education*, 6(2), 27–45. <https://doi.org/10.31129/LUMAT.6.2.314>

### Abstract

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[Zum Artikel](#)

## Psychosocial Achievements of Social Studies Teacher Candidates in Out door Geography Courses

Çırak Karadağ, S. (2019). Psychosocial Achievements of Social Studies Teacher Candidates in Out door Geography Courses. *Review of International Geographical Education Online*, 9 (3), 663-677. DOI: 10.33403/rigeo.580824

### Abstract

The academic outcomes of courses are evaluated by teacher grades or achievement tests; however, their psychological and interpersonal benefits are usually unknown. Therefore, the purpose of this study was to investigate the views of social studies teacher candidates on the psychological and interpersonal outcomes of the outdoor education courses they took, namely Geography Teaching and Museum Education. A descriptive qualitative research methodology was employed with a homogeneous sampling technique. The participants, who were voluntarily recruited, included 24 social studies teacher candidates who took the Geography Teaching and Museum Education classes as part of the Social Studies Teacher Education Program. Data were collected through focus group interviews. Recorded interviews were transcribed and then analyzed thematically. The results showed that participation in outdoor courses improved students' relationships with their peers and lecturers, increased their motivation for class attendance, and helped them manage their stress.

[Zum Artikel](#)

## Laying down a path in walking: student teachers' emerging ecological identities

Gray, D.S. & Colucci-Gray, L. (2019) Laying down a path in walking: student teachers' emerging ecological identities, *Environmental Education Research*, 25:3, 341-364, DOI: 10.1080/13504622.2018.1499014

### Abstract

There is growing global awareness of the importance of what are often labelled as 'natural environments' for human health, well-being and cognitive development. However, fostering learning in such 'natural environments', as they may be differently experienced and understood, requires a review of theoretical and practical approaches in teacher education, foregrounding the sensorial, experiential, embodied and relational dimensions of learning processes. This paper presents the results of an exploratory study on the experiences of a group of first year undergraduate student teachers enrolled in a newly introduced course on outdoor learning. Adopting a pragmatic and enactivist mixed methods approach, the study provides evidence of impact of the course on the students. Specifically, the study contributes a qualitative description of student teachers' learning trajectories, featuring what students deemed to be significant moments of an emerging ecological awareness. Findings point to important implications for curriculum and pedagogy, promoting environmental consciousness in formal teacher education contexts.

[Zum Artikel](#)

## Nordic Student Teachers' Views on the Importance of Species and Species Identification

Palmberg, I., Hermans, M., Jeronen, E., Kärkkäinen, S., Persson, C., & Yli-Panula, E. (2018) Nordic Student Teachers' Views on the Importance of Species and Species Identification, *Journal of Science Teacher Education*, 29:5, 397-419, DOI: 10.1080/1046560X.2018.1468167

### Abstract

People's knowledge about nature, their interest in nature, their nature experiences, and their values and emotions regarding nature are factors that promote people's positive views on environmental issues and sustainability. Knowing the variation and patterns in teachers' and student teachers' views is an essential step in considering the ways in which sustainability might be interpreted and enacted in schools and in teacher education. The aim of this study is to analyze student teachers' views on the importance of species and species identification in general and as a part of their professional development regarding their understanding of biodiversity and sustainability. A total of 426 student teachers in Finland, Norway, and Sweden answered a questionnaire consisting of fixed and open-ended questions. Mixed methods were used: t test and analysis of variance for quantitative data and inductive and deductive, model-based content analysis for qualitative data. According to the majority of student teachers (85%), both species identification and biodiversity are important for sustainability; species identification in general was important to 58% of them. Their statements about importance contained mostly ecological views (46%), followed by emotional (17%), educational (16%), and utilitarian (11%) views. The remainder of the student teachers' statements (10%) contained negativistic or indifferent views. The reasons for the low percentage of educational views are discussed. The implications of the results for teacher education worldwide are emphasized, especially the importance of those teaching methods that have the potential to increase student teachers' understanding of sustainability.

[Zum Artikel](#)

## Determining the Factors That Affect the Objectives of Pre-Service Science Teachers to Perform Outdoor Science Activities

Karademir, E. & Erten, S. (2013). Determining the factors that affect the objectives of preservice science teachers to perform outdoor science activities. *International Journal of Education in Mathematics, Science and Technology*, 1(4), 270-293.

### Abstract

The purpose of this study is to determine whether pre-service teachers have an aim to perform outdoor education activities within the scope of science and technology course; by which factors this aim is affected, through The Theory of Planned Behaviour and the opinions of pre-service teachers. Accordingly, the study was designed as mixed research method. With the aim of defining the factors that affect the objectives of pre-service teachers to perform outdoor education activities within the scope of science courses, 'Outdoor Science Activities Performing Scale', improved by Karademir (2013) was used. The eventual scale was applied to 1513 pre-service teachers studying at science teaching department. Additionally, qualitative data obtained from pre-service teachers through structured interview forms were evaluated together with quantitative data. Providing diversity in method, this enhanced the explanatory features of the data.

[Zum Artikel](#)

## Learning biology and mathematics outdoors: effects and attitudes in a Swedish high school context

Fägerstam, E., Blom, J. (2013) Learning biology and mathematics outdoors: effects and attitudes in a Swedish high school context, *Journal of Adventure Education and Outdoor Learning*, 13:1, 56-75, DOI: 10.1080/14729679.2011.647432

### Abstract

This research suggests that learning biology in an outdoor environment has a positive cognitive and affective impact on 13–15-year-old, Swedish high school pupils. Eighty-five pupils in four classes participated in a quasi-experimental design. Half the pupils, taking a biology course in ecology or diversity of life, had several lessons outdoors and the other half were taught indoors. All of the classes, but one, also had mathematics lessons outdoors once a week. Twenty-one pupils were interviewed five months after the course and all were positive towards the new learning environment they had experienced outdoors in biology and/or mathematics. They also valued the higher degree of interaction among the pupils. Other findings from the interviews were that the pupils from the outdoor classes showed a higher degree of long-term knowledge retention. They remembered both activities and contents better than the pupils in the indoor classes. An essay-type question assessing their biological understanding qualitatively according to the Structure of Observed Learning Outcome taxonomy revealed no differences between the groups. The results are discussed in the light of neurocognitive models of long-term memory.

[Zum Artikel](#)

## Student-Teachers' Ability to Read Nature: Reflections on their own learning in ecology

Magntorn, O. & Helldén, G. (2005) Student-Teachers' Ability to Read Nature: Reflections on their own learning in ecology, *International Journal of Science Education*, 27:10, 1229-1254, DOI: 10.1080/09500690500102706

### Abstract

This paper addresses student-teachers' ability to read nature in a woodland habitat before and after a 10-week ecology course. Reading nature is our definition of the ability to observe, describe and explain basic ecology in the field. Data consists of field-based pre-course and post-course interviews followed up by metacognitive interviews where students analyse their own learning. A bi-dimensional coding scheme is adopted to examine the range and development of students' ability to read nature. Students find it important to know the ecology of a few key species and they recognize the importance of having learned the language of ecology — ecologish — helping them to describe and discuss ecology. Students generally recognize the excursions as key learning situations in ecology education but they give different reasons for finding excursions so important. This variation will be elaborated in the paper together with the implications for teaching ecology.

[Zum Artikel](#)

## Use of the Outdoor Classroom and Nature-Study to Support Science and Literacy Learning: A Narrative Case Study of a Third-Grade Classroom

Eick, C. (2012) Use of the Outdoor Classroom and Nature-Study to Support Science and Literacy Learning: A Narrative Case Study of a Third-Grade Classroom, *Journal of Science Teacher Education*, 23:7, 789-803, DOI: 10.1007/s10972-011-9236-1

### Abstract

A case study of an exemplary third grade teacher's use of the outdoor classroom for meeting both state science and language arts standards is described. Data from the researcher's field journal, teacher lesson plans, and teacher interviews document how this teacher used nature-study to bridge outdoor classroom experiences with the state science and language arts curriculum. This teacher's early life experiences supported her strong interest in science and nature in the outdoors and experiencing it with her children. Children interacted with the outdoor classroom throughout the day as a context for science and literacy learning. All but one child successfully met Annual Yearly Progress (AYP) goals in reading at the end of the school year.

[Zum Artikel](#)

## Colorado's Millennial Generation: Youth Perceptions and Experiences of Nature

Barton, K.S. (2012) Colorado's Millennial Generation: Youth Perceptions and Experiences of Nature, *Journal of Geography*, 111:6, 213-223, DOI: 10.1080/00221341.2011.652648

### Abstract

This study uses survey and focus group methods to explore attitudes toward and experiences of nature among millennial-aged students in northern Colorado. First, results confirm that young people possess a strong interest in the outdoors yet time, transportation, and new technologies hamper their ability to visit public lands and outdoor spaces. Second, respondents experience nature in ways more mediated by new technologies such as cell phones and nature DVDs. Third, citizen science and active learning show promise as techniques for returning young people to the outdoors. The challenge lies in teaching young people to reimagine the outdoors not as elsewhere or out there but as a backyard geographic space.

[Zum Artikel](#)

## Science beyond the Classroom Boundaries

Feasey, R. & Bianchi, L. (2011) Science beyond the Classroom Boundaries

### Abstract

There have been many years of innovation in primary science education. Surprisingly, however, most of this has taken place within the confines of the classroom. What primary science has not yet done with universal success is step outside the classroom boundaries to use the school grounds for teaching and learning across all



aspects of the science curriculum. In this article, the authors share some of the ways in which teachers around the country are taking science learning outdoors.

[Zum Artikel](#)

## **An Activity Based on Inquiry Driven Science In Nature: Biodiversity is Under Threat At National Park!**

Vekli, G.S. (2019). An Activity Based on Inquiry Driven Science In Nature: Biodiversity is Under Threat At National Park!

### **Abstract**

The purpose of this study is to present an activity designed according to inquiry-based science approach and its implementation. The activity set up towards guided inquiry and was performed with participating 12 preservice science teachers and 24 eighth grade students. The activity started with a daily-life problem related to Yozgat Camlik National Park. First, envelopes, presented as hidden documents signed by park chief, and a research kit were provided to learners. Then a nature trip was organized to identify species of plants listed in the distributed inventory. Learners expressed the problem (the national park's bio-diversity is decreasing) as a result of interpreting the data collected in a nature trip. Learners were asked to form hypotheses about factors effecting bio-diversity and determine investigation methods to test their hypotheses. At final, learners reported the results and research processes. The activity can be used both in science and biology courses.

[Zum Artikel](#)

## **MUBEM & SAC: STEM Based Science and Nature Camp**

Okulu, H.Z., Oguz-Unver A., & Arabacioglu, S. (2019). MUBEM & SAC: STEM based science and nature camp. Journal of Education in Science, Environment and Health (JESEH), 5(2), 266-282. DOI:10.21891/jeseh.586326

### **Abstract**

The idea behind the MUBEM & SAC: STEM based science and nature camp was a transformation of scientific knowledge into artifacts using the engineering design process and scientific inquiry. The goals of the camp were developing an integrative science perspective in accordance with the nature of STEM education, supporting career choices of participants for STEM fields, experiencing outdoor learning environments and researches with real scientists, internalizing engineering design process by creating artifacts, and comprehending interaction with nature and science. The participants were sixth and seventh grades gifted students (Male: 14 and Female: 15). STEM attitude scale, researcher notes, artifact, camp, and activity evaluation forms were used as data collection tools. The several disciplines such as astronomy, archeology, music, and mathematics involved the camp. The participants found the opportunity to use telescopes, experience an extensive archaeological excavation, observe the near-nano size object with electron microscopes, construct a bridge like an engineer, and design artifacts like rockets and holograms during the camp. According to results, the science and nature camp supported participants' STEM attitudes and participants' views on the science and nature camp were positive. In addition, participants' artifacts were also qualified as STEM artifacts.

[Zum Artikel](#)

## Teaching Children Science: Hands-On Nature Study in North America, 1890-1930

Kohlstedt, S.G. (2010) Teaching Children Science: Hands-On Nature Study in North America, 1890-1930. University of Chicago Press

### Abstract

In the early twentieth century, a curriculum known as nature study flourished in major city school systems, streetcar suburbs, small towns, and even rural one-room schools. This object-based approach to learning about the natural world marked the first systematic attempt to introduce science into elementary education, and it came at a time when institutions such as zoos, botanical gardens, natural history museums, and national parks were promoting the idea that direct knowledge of nature would benefit an increasingly urban and industrial nation. This book emphasizes the scientific, pedagogical, and social incentives that encouraged (primarily women) teachers to explore nature in and beyond their classrooms. It brings to life the instructors and reformers who advanced nature study through on-campus schools, summer programs, textbooks, and public speaking. Within a generation, this highly successful hands-on approach migrated beyond public schools into summer camps, afterschool activities, and the scouting movement. Although the rich diversity of nature study classes eventually lost ground to increasingly standardized curricula, the book locates its legacy in the living plants and animals in classrooms and environmental field trips that remain central parts of science education today.

[Zum Artikel](#)

## Outdoor Natural Science Learning with an RFID-Supported Immersive Ubiquitous Learning Environment

Liu, T.Y., Tan, T.H. & Chu, Y.L. (2009). Outdoor Natural Science Learning with an RFID-Supported Immersive Ubiquitous Learning Environment. *Educational Technology & Society*. 12. 161-175.

### Abstract

Despite their successful use in many conscientious studies involving outdoor learning applications, mobile learning systems still have certain limitations. For instance, because students cannot obtain real-time, context-aware content in outdoor locations such as historical sites, endangered animal habitats, and geological landscapes, they are unable to search, collect, share, and edit information by using information technology. To address such concerns, this work proposes an environment of ubiquitous learning with educational resources (EULER) based on radio frequency identification (RFID), augmented reality (AR), the Internet, ubiquitous computing, embedded systems, and database technologies. EULER helps teachers deliver lessons on site and cultivate student competency in adopting information technology to improve learning. To evaluate its effectiveness, we used the proposed EULER for natural science learning at the Guandu Nature Park in Taiwan. The participants were elementary school teachers and students. The analytical results revealed that the proposed EULER improves student learning. Moreover, the largely positive feedback from a post-study survey confirms the effectiveness of EULER in supporting outdoor learning and its ability to attract the interest of students.

[Zum Artikel](#)

## Developing a Mobile Learning Management System for Outdoors Nature Science Activities Based on 5E Learning Cycle

Lai, A.F., Lai, H.Y., Chuang, W.H. & Wu, Z.H. (2015). Developing a Mobile Learning Management System for Outdoors Nature Science Activities Based on 5E Learning Cycle

### Abstract

Traditional outdoor learning activities such as inquiry-based learning in nature science encounter many dilemmas. Due to prompt development of mobile computing and widespread of mobile devices, mobile learning becomes a big trend on education. The main purpose of this study is to develop a mobile-learning management system for overcoming the difficulties of outdoor learning activities. In addition, this study conducted a learning experiment on marine education in an elementary school for investigating its impact on the learners' learning achievement and attitudes, and evaluating the suitability of this system. The results show that the mobile learning model with the system developed by this study has positive and significant effect on learners' cognitive achievement. Nevertheless, the learners' attitudes toward marine education is not enhanced after experiment. In addition, the result of system evaluation reveals that the experts show high appraisal toward this system including system usefulness, suitability and operational easiness.

[Zum Artikel](#)

## "You don't wanna teach little kids about climate change": Beliefs and Barriers to Sustainability Education in Early Childhood

Ginsburg, J.L. & Audley, S. (2020). "You don't wanna teach little kids about climate change": Beliefs and Barriers to Sustainability Education in Early Childhood

### Abstract

To support a sustainable planet, preschools need to engage young children with sustainability education. In the United States of America (USA), nature-based preschool programs are likely to promote environmental science and nature education, given their outdoor curricula, but very little is known about how these programs might also cultivate sustainability education. The purpose of the present study was to investigate nature-based preschool teachers' craft knowledge (Grimmett & MacKinnon, 1992) about sustainability education within curricula as they presently exist. We interviewed 22 early childhood educators and administrators across nine early childhood naturebased education centers in the Northeastern United States. Following Davis' (2010) differentiation of education in, about, and for the environment, we found that most participants promoted activities in the environment, such as children spending time outdoors in the woods. Educators reasoned that they focused on promoting "in-nature" based activities because they believed that caring for and loving nature were foundational to promoting sustainability practices. Also, the educators promoted simple everyday pro-environmental behaviors, such as reusing containers, as they believed such acts lead to lifelong sustainable behaviors. Ultimately, we found that almost all of the teachers who participated in our study wanted to include sustainability education within their pedagogical approaches, and they did so by

focusing on “every-day sustainability practices,” but felt they could not engage in more ethically-driven sustainability practices due to curricular and parental barriers.

[Zum Artikel](#)

## The Evaluation of Nature Education Training

Akbash, S. (2018). The Evaluation of Nature Education Training

### Abstract

Within the scope of “Nature Education” project by TUBITAK Science Department, which aims to provide a wide ecology vision and teach the language of nature to young research assistants from different departments, master and doctorate students and scoutleader teachers; in July, five years time the Project of “Ecology-Based Nature Education around Göksu Valley and Delta” was carried out. 149 people participated in this program. In the research, qualitative and quantitative research methods are used together. A form consisting of 20 questionnaires and 3 open-ended questions was used and the obtained data were analyzed. Codes were created in the direction of the answers given to the open-ended questions, and the opinions of the participants were interpreted by associating the generated codes. As a result of this research, the participants’ expectations of the nature education projects were met and achieved the result of leaving it with a vision of a wide ecology.

[Zum Artikel](#)

## Increasing Motivation and Science Learning Achievement Through the Implementation of Outdoor Cooperative Learning Model in Class VIII SMP 2 Banguntapan Academic Year 2015/2016

Cahyono, A., Haryanto, S. & Sudarsono. (2016) Increasing Motivation and Science Learning Achievement Through the Implementation of Outdoor Cooperative Learning Model in Class VIII SMP 2 Banguntapan Academic Year 2015/2016

### Abstract

Science can be a tool for studying the human and the natural surroundings, both directly and indirectly. The learning process can directly develop the competence to be able to study nature scientifically. Science education is hoped to be more inquiry that helps students gain experience and understand the natural surroundings. This study aims to reveal whether the implementation of outdoor cooperative learning model can improve the learning motivation and science achievement of students of SMP 2 Banguntapan academic year 2015/2016. This study is also used to determine the appropriate action patterns in implementing outdoor cooperative learning model on science lesson. This research is a classroom action research, which puts emphasis on efforts to change the real conditions that exist now towards the expected conditions by four stages: (1) planning, (2) implementation, (3) observation, and (4) reflection. Data were collected through four techniques, namely: test, questionnaires, interviews and classroom observation. The result of the research revealed that the achievement improves from 62.5 on the pre-cycle into 71.56 in cycle 1 and increased to 90.31 in cycle 2. Based on t-test, the achievement between pre cycle to cycle 1 got significance of 0.012, between

cycle 1 to cycle 2 got significance of 0.000, between the pre cycle to cycle 2 got significance of 0.000. All show less than 0.05, a significant improvement. Motivation questionnaire result shows that no student has low motivation, 15.625% of the students have medium motivation and 84.375% of students have high motivation, so this study is considered successful in improving students' motivation. Based on data from the achievement in the first cycle to the second cycle that is very significant and the students' satisfaction on learning activities outside the classroom, it can be taken a precise time ratio for the lesson period: preliminary learning : learning outside the classroom in groups (7-8 children at a different place for each group) : a group discussion in the class : closing = 1: 4: 2: 1

[Zum Artikel](#)

## Nature Experience and Education

Rathunde, K. (2013) Nature Experience and Education

### Abstract

Kevin Rathunde turns his research lens to the task of finding out the relevance of the natural world, its impact on adolescent motivation, and its positive sustaining of concentration and focus. He cites "disembodiment and denaturing" as needing to be countered by contact with nature, leading to higher creativity, less drudgery, and more positive social interaction for an adolescent community. [This talk was presented at the NAMTA conference titled "Science, History, and the Arts Through Nature's Keyhole," Atlanta, GA, January 26-29, 2006. Reprinted from "The NAMTA Journal" 31, 1 (2006, Winter): 117-127.]

[Zum Artikel](#)

## "I Have a Hippopotamus!": Preparing Effective Early Childhood Environmental Educators

Torquati, J., Leeper-Miller, J., Hamel, E., Hong, S.Y., Sarver, S. & Rupiper, M. (2017) "I Have a Hippopotamus!": Preparing Effective Early Childhood Environmental Educators, *The New Educator*, 13:3, 207-233, DOI: 10.1080/1547688X.2017.1331095

### Abstract

This article describes an early childhood teacher-preparation program that infuses environmental education and nature experiences into courses, practicum, and student-teaching experiences. Program philosophy, pedagogy, materials, and methods are described and linked to the Early Childhood Environmental Education Programs: Guidelines for Excellence, the Guidelines for the Preparation and Professional Development of Environmental Educators, and state-level early learning guidelines that focus on connecting young children with nature. Preservice teachers build knowledge, skills, and dispositions for effective environmental education beginning from an awareness level and progressing to application and refinement. The value of nature is communicated explicitly and implicitly throughout the program. Preliminary analysis of student outcomes indicated that, over the course of the program, students' ratings of the importance of nature and science experiences and outcomes increased, along with their confidence implementing environmental-education activities.

[Zum Artikel](#)

## **Creative by Nature: Integrating the Arts into Environmental Science Education.**

Holmes, S.A. (2002) Creative by Nature: Integrating the Arts into Environmental Science Education.

### **Abstract**

Incorporates environmental education into the arts to enhance student learning, imagination, and ability to invent solutions. Provides lesson ideas such as a river walk, bird adaptation sculptures, and a tree scavenger hunt.

[Zum Artikel](#)

## **Exploring the Wild World of Wiggly Worms**

Dominguez, L., McDonald, J., Kalajian, K. & Stafford, K. (2013) Exploring the Wild World of Wiggly Worms

### **Abstract**

Young children are naturally curious and constantly exploring the world around them. Combining this curiosity with the outdoors and nature for science skill development has many advantages for young learners. As children develop an enhanced understanding of the natural world, they are also developing explanations of how things work. Allowing children to explore is consistent with the "Next Generation Science Standards" (NGSS). Learning about the worms living in their local area allows children to experience a world that is hidden from view. Worms can usually be found in the school yard or at local parks within walking distance. These relatively accessible and safe outdoor places give children numerous chances to practice appropriate outdoor behaviors. Easy outdoor trips allow children to become familiar with science tasks such as mapping, sampling, observing, and identifying, while still allowing time for exploration and discovery. This article presents an activity for students to get their hands dirty while investigating earthworm habitats and behaviors.

[Zum Artikel](#)

## **Indoor-Outdoor Science**

Gopal, J. & Pastor, E. (2013) Indoor-Outdoor Science

### **Abstract**

This article describes a hands-on science curriculum used to teach kindergarten students about decomposition at the Riverdale Country School in the Bronx, New York. The goal was to get students to spend more time in the natural world and to have the opportunity to literally "get their hands dirty." This was premised on the idea that the more time students spent with nature, developing an understanding of its science, the more they would appreciate, respect, and nurture it. Information is provided on the development of an indoor-outdoor classroom that featured access to a vegetable garden and promoted nature walks. Particular attention is given

to activity programs that included monitoring the decomposition rate of a pumpkin, studying vermicomposting, and studying seeds. Tips are also presented on teaching this curriculum even if there is no backyard. The activities are appropriate for K-3 but can be adapted for older grades as well.

[Zum Artikel](#)

## Outdoor Integration

Tatarchuk, S. & Eick, C. (2011) Outdoor Integration

### Abstract

An outdoor classroom is an exciting way to connect the learning of science to nature and the environment. Many school grounds include gardens, grassy areas, courtyards, and wooded areas. Some even have nearby streams or creeks. These are built-in laboratories for inquiry! In the authors' third-grade classroom, they align and integrate language-arts process skills with science-process skills through a curriculum based on nature study in their outdoor classroom. This article takes the reader through their basic format in a science unit from skill-based reading about nature to conducting outdoor inquiries to writing about nature learning. They provide three examples of units that they have completed following this model in their outdoor classroom: seeds, butterflies, and stream health.

[Zum Artikel](#)

## Being outside learning about science is amazing: A mixed methods study

Weibel, M.L. (2011) Being outside learning about science is amazing: A mixed methods study

### Abstract

This study used a convergent parallel mixed methods design to examine teachers' environmental attitudes and concerns about an outdoor educational field trip. Converging both quantitative data (Environmental Attitudes Scale and teacher demographics) and qualitative data (Open-Ended Statements of Concern and interviews) facilitated interpretation. Research has shown that adults' attitudes toward the environment strongly influence children's attitudes regarding the environment. Science teachers' attitudes toward nature and attitudes toward children's field experiences influence the number and types of field trips teachers take. Measuring teacher attitudes is a way to assess teacher beliefs.

The one day outdoor field trip had significant outcomes for teachers. Quantitative results showed that practicing teachers' environmental attitudes changed following the Forever Earth outdoor field trip intervention. Teacher demographics showed no significance. Interviews provided a more in-depth understanding of teachers' perspectives relating to the field trip and environmental education. Four major themes emerged from the interviews: 1) environmental attitudes, 2) field trip program, 3) integrating environmental education, and 4) concerns. Teachers' major concern, addressed prior to the field trip through the Open-Ended Statements of Concern, was focused on students (i.e., behavior, safety, content knowledge) and was alleviated following the field trip. Interpretation of the results from integrating the quantitative and qualitative results shows that teachers' personal and professional attitudes toward the environment influence their decision to integrate environmental education in classroom instruction. Since the Forever Earth field trip

had a positive influence on teachers' environmental attitudes, further research is suggested to observe if teachers integrate environmental education in the classroom to reach the overall goal of increasing environmental literacy.

[Zum Artikel](#)

## The Future of Bioscience Fieldwork in UK Higher Education

Mauchline, A.L., Peacock, J. & Park, J.R. (2013) The Future of Bioscience Fieldwork in UK Higher Education, *Bioscience Education*, 21:1, 7-19, DOI: 10.11120/beej.2013.00014

### Abstract

Fieldwork is an important and often enjoyable part of learning in Bioscience degree courses, however it is unclear how the recent reforms to Higher Education (HE) may impact the future funding of outdoor learning. This paper reports on the findings from a recent survey of 30 HE Bioscience practitioners from across the UK. Their current level of fieldwork provision and factors affecting this provision in the future were explored. The data showed that the level of fieldwork had remained similar over the past five years and this was set to remain so over the next academic year and also into the next five years (when it may even increase). Funding of fieldwork was under review in most institutions due to the increase in student tuition fees and it was found that in some cases the cost of compulsory fieldwork will be subsumed within the overall course fee. Many influencing factors were discussed, but the most frequently raised topics were that of the development of employability skills during fieldwork and its importance in attracting and retaining students. Both topics are high on the agenda of HE institutions going forward into the new funding model, suggesting that fieldwork will remain a central part of the Bioscience curriculum.

[Zum Artikel](#)

## The field course effect: gains in cognitive learning in undergraduate biology students following a field course

Easton, E. & Gilburn, A. (2012) The field course effect: gains in cognitive learning in undergraduate biology students following a field course, *Journal of Biological Education*, 46:1, 29-35, DOI: 10.1080/00219266.2011.568063

### Abstract

Field work and field courses within undergraduate biology degrees have been under threat in recent years for multiple reasons and while there has been widespread support from learned societies, academic staff and students for the retention of field study, there has been little research to support the perceived value of field teaching within this context. This paper reports on research that addresses this issue. Undergraduate attainment data from final-year biology undergraduates were compared with similar attainment data from their penultimate year of study. Those students who attended a 10-day residential field course in Portugal between their penultimate and final years of study were found to perform about a grade better on a 20-point scale compared with non-attending students in their final-year honours module. This research provides



quantitative evidence that field courses can increase attainment and improve cognitive learning in undergraduate biology students.

[Zum Artikel](#)

## **Introduce Science to Students Using the Environment: A Guide for Teachers of Native American Students.**

Richau, D. (1981) Introduce Science to Students Using the Environment: A Guide for Teachers of Native American Students.

### **Abstract**

Written for science teachers of elementary and secondary Native American students, the guide offers 18 science-related activities that integrate science with Indian culture and life. A teacher preparation exercise is presented first to allow the teacher to look at him/herself and use the information as a tool to understanding the students' learning processes. Each activity provides the following information: grade level, time it takes for activity, notes to the teacher, equipment (if any), objectives, sample discussion topics and questions, illustrations, and instructions on conducting the activity. Activities include sensory walk, the life box, for lichen-likers, an earth cake, the earth as an apple, have you thanked a green plant today, the village house, mini-climates, and the story of water. Other lessons presented are the web of life, the animal world, animal house, from the ground up, ecosystem, strands walk, and for urban studies. Suggestions for leading students in the field, a bibliography, and further reading and enrichment sections are also provided for the teacher.

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