



Alameda County Waste Management Authority
Alameda County Source Reduction and Recycling Board
www.stopwaste.org

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Our Agency is pleased to make available this report on Environmental Education in Alameda County. The purpose of the report was to provide the Source Reduction and Recycling Board with qualitative research on opportunities for strengthening environmental education in K-12 schools in Alameda County. We share the report findings in the hope that they can provide others with an understanding of the need to link environmental education outcomes with student academic achievement and offer ideas for building environmental education capacity.

About Our Agency

The Waste Management Authority and the Source Reduction and Recycling Board form an integrated Agency dedicated to achieving the most environmentally sound solid waste management and resource conservation program for the people of Alameda County. Within this context, the Agency is committed to achieving beyond a 75% waste reduction goal and promoting sustainable consumption and disposal patterns.

Schools Program

The program links waste reduction education with the opportunity to practice recycling behavior at school. Public schools generate 4% of the county's waste stream. If all schools reduce their waste by 30%, the total reduction annually would be 18,000 tons of garbage. More importantly, the Schools Program provides access to environmental education for youth in the county to increase awareness and knowledge about waste reduction issues and develop the skills necessary to make informed decisions and motivation to take responsible actions.

Schools Program - Recycling Infrastructure

The Schools Program works with schools at the district level that commit to implement district-wide recycling. As of the 03-04 fiscal year, the Schools Program is working with Berkeley, Castro Valley, Emery, and Oakland Unified School Districts on implementing and institutionalizing recycling systems. The first step of district-wide recycling is defined as a bin in every classroom and a written description that documents the system. Success of this task is measured not only in the reduction of waste, but also in the change in the organizational culture; where if the students, teachers, support staff, or administrators are asked what their recycling program is, they can describe how it works and what their role is in the system. School districts that commit to district-wide recycling receive all of the Agency's 4Rs education programs.

4Rs Education

The 4Rs -reduce-reuse-recycling-and rot (composting) education program provides six types of 4Rs environmental education services in Alameda. They are: school assemblies, classroom presentations, service learning, teacher training, after school activities, and field trips. In the 2003-04 school year, it is expected that 37,000 students will have a 4Rs learning experience linked to the state content standards.

Environmental Education Leadership Action Project

Recommendations presented to the Alameda County Source Reduction and Recycling Board

June 18, 2004

A Research Report by
Community Resources for Science

About Community Resources for Science

Community Resources for Science (CRS) is a nonprofit organization located in Berkeley, CA. Our mission is to build a community of educators dedicated to getting kids excited about learning through science. Our programs provide practical support for both teachers and informal educators – helping teachers integrate science into their teaching and helping the many programs in our community be stronger partners for the classroom teacher.

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Acknowledgements

We are proud to serve the many teachers and environmental educators working in our community to educate our children so they may build an informed society making thoughtful decisions about our future. We thank these educators for their daily inspiration and patience, and for helping us understand the teaching needs and educational opportunities for Alameda County students.

Many dedicated and busy people participating in environmental educations, including classroom teachers, program providers, administrators, and students, generously shared their time and insight with us to support these recommendations. Skillful support for study design, data collection, and analysis was provided by Evans/McDonough Company, Inc., Dr. Deborah Pruitt, Nicole Cheslock, and Bill Baker. We thank all these community members, research collaborators, and the Alameda County Source Reduction and Recycling Board for making this study possible and hope that these recommendations will help all of us continue our work to improve environmental education for Alameda County students.

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Executive Summary

The ultimate goal of strengthened EE is to build a base of knowledge and practice that helps students understand and sustain environmentally responsible behavior.

Project Design

The Environmental Education Leadership Action Project summarizes research undertaken by Community Resources for Science (CRS) on behalf of the Alameda County Waste Source Reduction and Recycling Board (the Agency) in spring, 2004. The goals were to identify opportunities for strengthening environmental education (EE) in K-12 schools in the county, and to make recommendations for possible Agency actions towards this effort.

CRS worked with consulting researchers to design and implement a qualitative research approach that would provide insight into the factors that support or deter effective EE. Research drew on a broad range of voices, gathering information from administrators, educators, and students across the K-12 grade levels, representing schools selected to capture the diversity of EE background, environmental surroundings and economic resources in the County. Focus groups and site interviews were conducted using protocols designed to elicit input on research questions reviewed by the Authority staff and Board members. Data was collected over a two-month period and combined with a body of national and local research to develop a final report.

Report Background and Structure

Prior research shows convincing support for several general understandings about school-based environmental education:

- Classroom teachers need EE to be supportive of academic achievement, specifically in the context of academic standards
- Teachers need EE to be *relevant*, i.e. age appropriate and locally/culturally appropriate
- Teachers feel they lack time to incorporate EE
- Teachers report that access to, and awareness of, EE materials and programs are significant issues

These results suggest the importance of a deeper understanding of local issues to discover both specific issues and broader generalizations about ways to improve environmental education for K-12 education in Alameda County.

Our research looked at EE from the perspectives of all the participants in the complex interactions between and among schools, teachers, program providers, students, and the community that work together to provide EE in Alameda County, revealing an EE “system” made up of interdependent parts:

- Available Resources
- Access to Resources
- Teaching Practice
- Administrative and Infrastructure Support
- Student Understanding and Sustained Behavior

This structure is used in the report to analyze commonalities, differences, and leverage points for change.

Observations: Commonalities

There is a broad array of resources available for K-12 education in Alameda County, including enrichments (field trips, in-class programs, and materials), teacher training, curriculum, and community support. There was also strong agreement among participants in this study that only a limited portion of

the student population – primarily elementary students, and students with teachers who are personally motivated to teach EE – regularly accesses these resources.

Participating teachers at all grade levels were aware of the importance of EE for their students, particularly in terms of teaching important conservation behaviors and a sense of personal pride and responsibility about their surroundings and nature. However all teachers reported time constraints, particularly due to standards and testing, that limit their ability to teach EE. Most EE happens in elementary schools, and is fueled by the interests of individual teachers. Few teachers perceived natural connections between standards (and standardized curriculum) and EE, but all participating teachers believed in the power of modeling behaviors. Participating teachers at all grade levels and socio-economic settings identified funding as a critical need in order to do more EE, particularly to cover field trip transportation costs.

While participating principals reported teachers having a lot of freedom in *how* they accomplish their curriculum goals, their leadership also tends to reinforce time pressure and accountability issues. Where administrative support—and infrastructure such as active recycling programs—encourages teachers to approach EE as an integrating context, teachers and students were more likely to describe EE as “a way of life” at the school. Principals also reported that community support and partnerships make possible the school-wide efforts that provide visibility and focus for successful EE.

Students participating in this study referred to a wide range of environmental topics and behaviors, many gleaned from school experiences particularly in the early grades. Waste reduction and the 4Rs were mentioned most frequently by teachers and students across grades and types of schools. When early experiences lead to an expectation of recycling infrastructure that is unfulfilled in upper grades, some students can become discouraged.

Observations: Differences

In addition to common EE observations, the research also revealed important distinctions between different groups: between formal and informal educators, between grades, and between socio-economic groups. The difference in the educational goals of informal environmental educators and the formal education system is a critical consideration in efforts to strengthen EE. In general, the goal of environmental program providers is to produce improved environmental behaviors, while K-12 public schools are focused on academic and “whole child” outcomes. In order to improve environmental education within K-12 schools it is important for environmental education program providers to understand and support the academic achievement goals of formal educators.

The research also showed there are important distinctions between different grade levels. The differing classroom structures and developmental capacities of elementary, middle, and high schools lead to EE being integrated in very different ways. There are significantly more environmental field trips and in-class programs available to—and used by—elementary grades in the Bay Area. The contained classrooms and relatively integrated/interdisciplinary approach of elementary schools make it more possible for teachers to develop EE projects that use local resources to engage kids in foundational experiences, and to model positive behaviors. Elementary teachers are interested in field trips, assemblies, and grade level appropriate materials and programs.

In middle school, students are increasingly able to learn about concepts and systems, particularly in the context of current events/personal choices, while some teachers still have the capacity to develop

integrated, project-based approaches. Participating elementary and middle schools were more likely to report school-wide environmental projects such as recycling or gardening/nature area studies that required administrative support and parent/community partnerships. Students in elementary and middle schools were more likely to feel positive about their environmental behaviors. Middle school teachers are interested in lessons connected to curriculum, practical action, and larger issues and outcomes.

High schools have the least infrastructure for supporting behaviors initiated in earlier grades and the least flexibility for integrating EE. The specific curriculum, single-subject approach, and short class periods make it more difficult to integrate EE content both in the classroom and through field trips. Classroom EE in high school is largely confined to particular classes in science departments, placing more emphasis on student clubs and school-wide modeling of environmentally responsible behaviors. High school students have a growing capacity to understand the causes and complex interactions in the science behind EE and global issues. Some students question the lack of support for recycling in upper grades and some become discouraged by the lack of participation by staff and peers. In general, high school students need more reinforcement for individual action, examples of positive EE role models for more complex issues, and support for extra-curricular activities. High school teachers ask for “push-in” approaches to EE, such as speakers, individual lessons for specific subjects, and support for 4R infrastructure development.

There are also differences in the needs of schools with student populations from different socioeconomic sectors. Urban schools in Alameda County tend to have lower socioeconomic profiles, and are more likely to be confronting severe accountability constraints in terms of achievement goals. Participating teachers felt strongly that EE for students in city environments is contingent on having access to outdoor nature experiences, while teachers in more affluent/non-urban surroundings were more concerned with imparting understanding of human impacts on the environment. Since schools in this study from lower socioeconomic sectors also were more likely to be under pressure in terms of achievement accountability, those administrators also tended to think of EE as too difficult for teachers to add. Participating students from urban schools were more likely to define the environment as “away from pollution,” and were more tuned into the environmental concerns of their immediate neighborhood, while students from more affluent suburban communities tended to describe their own surroundings as the environment, and showed higher awareness of the issues around more generalized “natural” environments.

Leverage Points for Change: Issues and Opportunities

Teachers, program providers, principals and students had important suggestions about ways to improve EE in Alameda County. Analyzing these suggestions in the context of opportunities revealed by the commonalities and differences between groups in the EE system illuminated some powerful leverage points for change in our community.

The issues for strengthening the EE resources available to local K-12 teachers and students have to do with improving communication and connections between teachers and resources and between the more than 140 different organizations providing EE programs for Alameda County students. Opportunities include:

- developing and disseminating insight into teacher and student needs
- EE program providers refining existing resources with a focus on developmental appropriateness, connections with grade-level academic goals, and being responsive to needs for specific content, inclusive language, and preferred formats

- EE providers collaborating and coordinating in order to share techniques and build stronger experiences that reach a broader range of students.

Issues for improving access to EE resources have to do with broadening teachers' knowledge of existing resources and improving equity among schools and teachers. While all participating teachers wanted to provide field trips for their students, it is essential to provide access to natural environments for students attending school in urban settings. Community opportunities include:

- Improving access to information through broader teacher outreach and education, and possible new information tools such as a website or local resources fair
- Making funding or other support available, especially for transportation, to ensure experiences with natural environments for all students

Issues around strengthening teaching practice have to do with teacher professional development — particularly in connecting EE with standards-based curriculum—and support for practices that sustain EE behaviors. Opportunities for the community focus on providing professional development that helps teachers to:

- connect EE with academic standards and use the range of available resources
- link age-appropriate content with behaviors and projects
- model positive behaviors: by participation in school site EE programs, through encouraging student peer teaching, and by use of environmental career role models

Issues for strengthening administrative and infrastructure support have to do with leadership and support for school-wide attitudes, practices, and projects. Opportunities include:

- Researching and sharing effective models and achievement-linked results among schools and districts
- Providing support for school-wide environmental practices and learning resources through development of community collaborations, funding, model programs, and training.

Recommendations for Action

Based on the community opportunities revealed through the research, the Agency can consider some specific ways to improve EE in Alameda County. The recommendations specify short-term and long-term actions relative to the Authority's own programs, as well as short- and long-term routes for promoting community EE and ongoing growth in environmentally responsible behaviors through leadership and advocacy.

Immediate, short-term actions the Agency could consider for strengthening its own programs and materials:

- Review existing 4Rs programs and materials to respond to the specific teaching challenges of different grade levels, cultural needs and best EE teaching practices
- Develop outreach materials that clearly inform teachers about how the Agency programs support classroom goals
- Continue to assess and support recycling infrastructure in schools, with particular focus on how to support recycling behavior in upper grades

Longer term projects to improve Agency programs:

- Keep program fees down and subsidize transportation
- Engage teachers to assist with the development of new materials
- Offer training for teachers and administrators on EE programs and outcomes
- Expand programs to support extracurricular organizations, especially for upper grades
- Document and disseminate information on “model EE schools” to assist 4R practices

Immediate, short term actions the Agency can also consider in order to stimulate broader EE change in the community:

- Disseminate recommendations on strengthening EE resources and programs for K-12 education to EE providers and formal educators, funders, and community organizations
- Convene an EE Providers Network in the East Bay to pursue collaborative strategies for strengthening EE for K-12 schools

Longer term projects to strengthen community EE include working with the newly-convened EE Providers Network to:

- Promote collaboration and coordination among EE resource organizations to: address gaps, create powerful linked experiences, disseminate best practices, and provide a range of experiences to all students
- Support the organization of an East Bay EE resource fair
- Support development of school site EE resources such as gardens, natural areas, materials
- Develop and disseminate a guide to simple school EE practices and infrastructure
- Convene transportation and funding resources to improve access to varied outdoor experiences by examining issues and developing new solutions
- Explore opportunities to design and run an EE resource website for students and teachers targeted at upper grades
- Assist in regional efforts to diversify participation in EE by: Agency example, participation in regional groups, and dissemination of ideas.

Purpose and Methods of the EE Leadership Action Project

Purpose

The purpose of the Environmental Education Leadership Action Project (EELAP) is to develop recommendations for actions the Alameda County Source Reduction and Recycling Board (the Agency) could take to strengthen environmental education in Alameda County. The ultimate goal of strengthened EE is to build a base of knowledge and practice that helps students understand and sustain environmentally responsible behavior. This report brings together the voices of the many individuals and groups participating in environmental education (EE) to look at the general state of EE in Alameda County, and find leverage points for change in the EE system. These observations were analyzed along with the specific suggestions of research participants to identify opportunities for strengthening EE and possible roles for the Agency.

Overview of Research Methods

EELAP research methods were designed to gain insight from environmental education practitioners, classroom teachers, students, and administrators about the current state of K-12 environmental education in Alameda County. A qualitative research approach, using interviews and focus groups with a broadly representative sample, was chosen in order to provide in-depth insight into specific experiences.

This research program was undertaken specifically to hear from a wide range of participants in K-12 EE in Alameda County about the factors that support or deter environmental education. For this reason, the methods for collecting data focused on constructing ways to get deep, considered opinions from targeted groups and individuals rather than the quantitative results that could be expected from a broad survey approach. This qualitative approach illuminates opportunities for change, rather than measuring the status quo.

Community Resources for Science (CRS) developed a research plan that included several different data-collection approaches:

- Formal focus groups with teachers – conducted by Evans/McDonough Company, Inc.
- Site visits at schools to talk with small groups of students, their classroom teachers, and the principal – conducted by independent research consultants
- Informal focus group with environmental education program providers – conducted by CRS staff

Each approach was carefully designed to create the broadest possible representation from participants across a variety of demographic criteria, including grade-level, socioeconomic group, geographic location, and school size (for teacher and school groups); program size and type, and program audience and scope (for program providers). (A description of the methodology is included in Appendix I, and the instruments used and demographic quota systems of each approach are included in Appendix V.) In total, we spoke directly with 37 teachers, nine principals, and 95 students, representing voices from 30 schools across Alameda County, as well as eight EE program providers representing a range of types of EE programs serving K-12 teachers and students across the County.

While our methods were developed to get input from sources with a range of experience with environmental education, in any voluntary interview process there is an inherent tendency towards self-selection by participants who are interested in and support the topic being discussed. This means that while there are certainly members of the education community who do not agree that EE is a valuable element of K-12 education, few of those opinions are represented in the data collected. While this bias might color the overall reaction to EE as a subject, all the teachers participating knew teachers who did not teach EE, some found it too difficult to teach themselves, and all were able to speak authoritatively on the factors that both support and weaken EE outcomes.

The challenge of qualitative research on a subject as broad as county-wide K-12 environmental education is to represent both the common themes and trends discovered as well as the particularities and differences among specific groups, without privileging louder voices or discounting singular ideas. Our approach looked for commonalities, distinctions between different groups, and unique perceptions and suggestions that illuminated the opportunities for change. Wher

community into developing a cooperative approach to EE with defined common outcomes (*Bay Area Environmental Education Evaluation Collaborative, 2004*). This local group has reaffirmed that effective EE can be defined as experiences and knowledge that motivate responsible environmental behaviors, and acknowledges the importance of practices that tie EE to academic goals as well as local issues.

What We Want to Know

These findings indicate that in order to improve EE in Alameda County it is time to develop a new picture of the role of environmental education in local K-12 classrooms that seeks to understand the complex interaction of drivers and constraints that makes effective EE more or less possible. The research and findings in this report are a step towards that understanding.

Observations of EE in Alameda County: Commonalities and Distinctions

Alameda County is diverse in many ways, including geography, environmental and economic resources, and its population. (Alameda County public school demographics are shown Appendix II.) Despite this diversity, many aspects of environmental education are identified in common by all kinds of participants in this study, regardless of their role in the system, grade-level, or particular demographics. In addition to the strong common experiences of environmental education for K-12 students, teachers, and administrators, other observations pointed at important differences between formal and informal educators, between grade levels, and between schools in different socio-economic settings. These differences reveal some interesting opportunities for targeting specific needs.

EE is a system with many participants: teachers, students, school administrators and staff, resource providers, and the larger community. In order to identify opportunities for improving positive outcomes, it is important to note how commonalities and distinctions surface in each part of the system. The observations collected by the research are organized around the various parts of the local EE system:

- Available Resources
- Access to Resources
- Teaching Practice
- Administrative and Infrastructure Support
- Student Understanding

Common Observations of EE in Alameda County

Available Resources

Resources available for K-12 environmental education in Alameda County include student programs, teacher training, materials for students and teachers, professional development organizations, government agencies, and environmental and science groups.

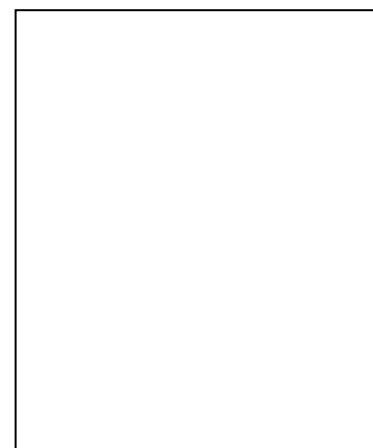
More than 140 different organizations offer nearly 800 EE-related student programs to the K-5 population in Alameda County, including field trips, classroom programs, and assemblies. Of these, more than 500 also serve some or all of grades 6-12 and there are a few programs that focus only on the older age group. The topics presented to teachers cover a wide range, addressing different habitats, animal groups, environmental issues, and concepts. According to participating teachers, and evidenced by repeated use of programs, these existing resources seem to meet the needs of the teachers they reach. However, despite the rich resources, environmental education groups are generally aware that they are reaching only a part of the student population. This implies a need for continued improvement and evaluation of EE programs to attract a broader population of teachers and students.

The local people are tremendously helpful – Bay Savers, Alameda Water, Waste Management – their programs are excellent.

We tend to get the same teachers interested in EE activities. How do you get to all the teachers and kids?

In addition to student programs, Alameda County teachers also have access to a broad range of EE resources in the form of curriculum materials, training, and support. Significant work has been done both locally and nationally to catalog and review EE curriculum. The North American Association of Environmental Education (NAAEE) has recently published several important tools, including *EE Materials: Guidelines for Excellence*, *Excellence in Environmental Education: Guidelines for Learning (K-12)*, and three *Reviews of Resources* volumes, all available to download on their website at www.naaee.org. These new resources add to the well-known *Compendia* of reviews of environmental education curricula published by the CA Department of Education and various other state environmental organizations. Regionally, the California Regional Environmental Education Community (CREEC) network collects and connects information about available curriculum materials and programs for environmental education in the region on their website at <http://www.creec.org/region4/>. Teachers can get trained locally on a wide range of existing curriculum as well as general teaching approaches through many distinguished local organizations. Community Resources for Science also offers support for planning and implementing standards-based EE classroom teaching and enrichment, and acts as a clearinghouse for information about training and other resources for elementary teachers in Alameda County.

Access to Resources



Teaching Practice

EE is primarily happening in elementary classrooms, upper grade science classes and after-school clubs. Environmental education experiences in elementary grades are delivering the most powerful impacts on the broadest range of students. Middle and high school teachers report doing some EE, primarily within science classes, and more reliance on student clubs and extracurricular activities. Across our sample, the extent to which EE happens in classrooms was dependent on the interest and initiative of individual teachers, and was often undertaken in the face of many challenges.

It's amazing how much we are all teaching different parts of environmental education, as part of our school programs, it's really quite interesting because we obviously sneak it in, because we think it's so important.

Teachers at all grade levels spoke about the importance of environmental education for their students, citing a variety of goals including:

- teaching important conservation behaviors
- teaching a sense of personal pride and responsibility
- providing fundamental experiences that connect children to nature.

Environmental content cited by teachers and students covered a wide range of subjects from water pollution, to habitat loss, global warming, and waste reduction. Waste reduction and the 4Rs were the most commonly cited examples of environmentally responsible behaviors. Elementary teachers were more familiar with the 4Rs than high school teachers, although many teachers, and some students, were confused by the addition of “rot” to the 3 “Rs” they were familiar with.

Despite their interest in EE, most participating teachers had trouble connecting EE to the already challenging academic curriculum requirements. Some “sneak it in” anyway, while others were actively trying to identify connections or ways to use EE as a vehicle to accomplish other curriculum goals. All teachers tended to choose particular enrichment programs and materials based on how well they met their primary needs, which are engaging students in learning standards-based content and required skills.

We had so many things that we wanted to do -- just not the time.

Creative and useful support is always welcome...while keeping in mind there is specific curriculum I must cover.

Teachers and students at all grade levels indicated that hands-on projects, widely practiced behaviors (such as litter reduction, water conservation, or recycling) and field trips created the most memorable learning experiences. Many students remembered specific experiences from field trips, assemblies, and classroom projects from several years before.

When I see these students, now that they're older, that's the stuff they remember. (talking about field trips and hands-on experiences)

Administrative and Infrastructure Support

Administrative and school infrastructure support are important for teaching EE, using EE programs, going on field trips, and developing and maintaining site-based resources. While principals tend to allow teachers to make their own decisions about the place of EE in the curriculum, and are proud of the environmental projects at their schools, as a group principals were clear that environmental education must support and not distract from “basic” curriculum goals. The most

The place [of EE] in the curriculum depends on the teacher.

Our focus is on basics, the fundamentals to get students literate, any EE would have to be something that teaches basic skills

enthusiastic principals were from schools where several teachers had found ways to use EE experiences as a vehicle to get to the standards, often using on-site experiences in gardens or other natural areas.

Outside support for teachers is an important part of the development and maintenance of these on-site EE resources and programs. At some schools, community organizations or parents have provided the support necessary to build a garden or remove concrete. Continuing involvement by these groups is often critical to sustaining the on-site resource for educational use. Other on-site projects like recycling programs are also dependent on ongoing cooperation from the site maintenance staff as well as faculty. Participants in this study confirmed the conclusion of an earlier study by the Blue-Ribbon Commission that effective recycling infrastructure is a critical part of school environmental practice.

The community bought in and now they take care of the garden on the weekends.

The kids at my school really want to recycle, but we don't have a recycling program on our campus.

Student Understanding and Sustained Behavior

Students interviewed in this study had a wide perception of environmental issues collected from a range of experiences in classrooms, from EE programs, at home, and from TV and books. Waste reduction was identified as a common component of most elementary EE programs and what many students think of when asked about EE. Students from schools receiving Agency programming were all aware of recycling – many do it at home and most do it in some form at school and at the very least are aware of recycling bins in their classroom.

Environmental education is changing the behavior of kids and sometimes families and communities. Most of the behavior cited is related to recycling. Participating teachers noted the fact that their students with a history of EE saw environmentally-responsible behavior as the norm and students chided teachers and schools when infrastructure and support for environmentally-responsible behavior was not available.

I'm trying to be a good consumer and be a good citizen--at home we put cans in real big bins.

Parents react and come to me saying 'I didn't know that.'

A few students in schools without widespread participation in recycling or other indications of environmental awareness felt discouraged about the behavior of their fellow students and teachers. Several teachers and principals identified the importance of linking environmental concerns with practical actions, real-world role models, and consistent modeling from the adult community, in order to sustain environmentally responsible behavior.

It's not good to hook kids into concerns about the environment without practical actions. It's important that kids know 'there are many people working on solving these problems and you can be a part of this.'

Distinctions between Classroom and Informal Educators

In addition to the common observations across groups, participants identified some important differences that reveal opportunities for targeting specific needs. An overarching difference was noted between the educational goals of informal environmental educators and the formal education system. While the goals of EE programs are to improve environmental behaviors by learning about and appreciating the interrelatedness of humans and the many aspects of our environment, classroom educators are focused on broader academic and “whole child” outcomes. Environmental educators

working successfully with and within public schools noted the importance of understanding school culture and local needs, as well as fitting in with the academic program.

Distinctions between Grade Levels

There were differences between elementary, middle, and high school within each of the different areas of the EE system.

Grade Level Differences in Availability of and Access to Resources

As mentioned earlier, there are more EE programs in the Bay Area available to Alameda County elementary student than those targeting older grades. Field trips are among the most memorable EE experiences for all students; however field trips also become more difficult to organize in older grades. In-class visitors and programs are appreciated at different grade levels for the different ways in which they bring outside expertise into the classroom. While elementary teachers expressed the power of the expert visitor’s “nametag” to make an impression on their students, high school teachers speak of “real people really doing [the science] we are talking about.”

*If [students] get to see the Bay, the animals that live in the Bay...then maybe they will think twice about tossing that can.
(Elementary teacher)*

You’re not going to be able to go on a field trip in high school. There’s just no time.

Grade Level Differences in Teaching Practice

There is a sharp contrast between EE teaching practice in elementary, middle, and high school, reflecting a combination of school structure and developmental appropriateness. The largest amount of teacher-led, school-day EE observed in this study is happening in the younger grades, where contained classrooms, multidisciplinary structure, and small school size provide a more flexible context for integrating EE and pursuing school-wide projects. As the grades go up, opportunities to integrate EE diminish as classes become more subject-focused, time pressure increases, and EE content gets more complex. In elementary grades all classroom teachers have the potential to teach some EE—and all in this study were doing so. In high school EE was most often reported within some science classes, in special environmental academies, or as a focus for an after school club.

	Elementary	Middle School	High School
<i>Structure</i>	Contained classrooms	Some subject groupings	Single-subject classes
<i>EE approach</i>	Integrated, often project based	Interdisciplinary, sometimes project-based	Curriculum-based and subject specific
<i>EE teaching goals</i>	Foundation of knowledge; modeling positive behaviors	“How does EE fit into a 6 th grader’s life?”	Make students aware of science behind EE and global issues
<i>Teaching approach</i>	Local (school/ community), hands-on experiences	Focus on current events and personal choices	Complex, real life examples and applications

Grade Level Differences in Administrative & Infrastructure Support

Across grade levels, participating principals assigned teachers responsibility for decisions about curriculum content but point to standards and structured curriculum requirements as obstacles to EE. As the grade level goes up, increased departmentalization and larger school size tend to result in

greater administrative obstacles and make school-wide infrastructure support more difficult. Several of the middle and high schools included in the study did not have effective recycling programs or other environmental sustainability programs, compounding the reduced opportunities for students to learn environmental science and behaviors.

In addition, in elementary and middle schools, administrators cited support systems for EE that were not mentioned by high school principals:

- Parent involvement
- Community grants and partnerships
- Recycling “part of the culture”
- Garden-cafeteria link important for making EE connections

Grade Level Differences in Student Understanding and Sustained Behavior

Teachers may feel frustrated about their limited capacity to teach EE, however their students respond to and remember environmental lessons. Students in all grades reported a broad range of environmental knowledge; as they mature, students become both increasingly sophisticated and decreasingly hopeful about the significance of their responsible environmental behaviors.

Elementary teachers are right on target in thinking that they’re providing students with a “foundation,” in fact students most often refer back to their elementary school experiences when they talk about where they learned about the environment. As students grow older, their understanding of EE is gained increasingly from out-of-school experiences.

Elementary	Middle School	High School
Observe natural world	Observe systems and concepts	Understand systems and details
EE includes recycling, garden, pollution, rot, compost, saving water, planting trees, picking up litter	In addition to “nature and stuff,” EE includes habitat preservation, endangered species	In addition, “now we go more in depth” to explore issues like point source pollution, CFCs...
Experiences related to what teachers have described teaching	In addition to memories of elementary experiences, students recall after-school programs, and family/recreational experiences	In addition to elementary and middle school memories, students cite clubs, camping, jobs, and science fairs.
I can “make the world more beautiful”	I can “not litter,” “save land,” “not waste energy,” “not waste water,” “raise \$ to help animals”	“I’m more aware of global problems” “I’m trying to be a good consumer and be a good citizen.”
	Frustration with limited access to recycling (at school)	Frustration with lack of participation and larger problems “People don’t care”

Distinctions between Socio-Economic Groups

In addition to comparisons of EE practice at schools of differing grade levels, the research also revealed some important differences between schools from different socioeconomic profiles (see Appendix I, Research Methods, for definitions). Overall, teachers and principals were more deeply concerned with student achievement and accountability at schools in the low socioeconomic sector,

which in Alameda County tends to correlate with more urban environments. Schools in suburban areas also have slightly different issues relative to EE than those in highly urban areas.

Socio-Economic Differences in Access to Resources

A recent local study of inner city communities of color showed that funding, especially for transportation, is the most significant barrier to program access; and that unequal access to programs, especially programs inclusive of the whole family, is a significant issue in program effectiveness (Mayeno). Many schools with lower socio-economic profiles are also in urban settings with fewer natural resources in the neighborhood and school site. Although teachers and students unanimously agreed about the importance and impact of field trips for environmental education, urban teachers expressed concerns about baseline access and exposure, while colleagues in more affluent, non-urban schools described field trips as added enrichment. Program providers were also aware of these differences, citing the need to develop EE experiences based on the needs of the specific community and teachers, particularly in regard to cultural differences and based in the desire to reach teachers and students who otherwise do not participate in their programs.

Bring the environment to the teachers. More and more teachers don't have connection to the environment.

Urban/Lower \$	Suburban/Higher \$ Profile
“Kids who would really benefit from EE camps are the ones who won’t be exposed to it”	“Field trips make children feel connected and build global awareness”
Kids living in the city: don’t have opportunities to go outside, “asphalt jungle mentality”	
“They just need a pleasant, safe place to experience the outdoors”	“Specialist teaches kids beyond what I know – my job is to get them there.”

Socio-Economic Differences in Teaching Practice

While participating teachers tended to teach a broad variety of EE topics using age-appropriate approaches, there are interesting differences in teachers’ understanding about why EE is important. There was strong agreement that learning to be aware of one’s impact on the environment requires experiential learning. However, reasons cited by teachers for doing this learning varied relative to the school’s socioeconomic profile:

Some things you have to go outside to see; you can't write about trees sitting in a classroom.

Urban/Lower \$	Suburban/Higher \$
“We are going to keep the school clean because this is where we have to live, it’s our responsibility.”	“Important for kids from higher socioeconomic groups to see that their purchases and actions have an effect on the rest of the world”
EE “helps kids to take ownership of the earth”	“There are things they can do: shut off lights, stop pollution.”

Socio-Economic Differences in Administrative and Infrastructure Support

Several teachers from schools with lower socioeconomic profiles reported struggling with more stringent mandates for improving student achievement, especially in literacy and math. With school

funding tied to test scores, teachers find it harder to get administrative support for “extras” like EE. This compounds the difficulty of adding EE to an already-crowded curriculum, and makes integrating enrichments more challenging.

Lower \$	Higher \$
Mandated curriculum often dominates available time	Many different types of classes/extracurricular options
“EE would have to be something that teaches basic skills”	“amount of EE depends on teacher interest”

Socio-Economic Differences in Student Understanding and Sustained Behavior

While most students expressed common interpretations of the environment as “where people and animals live” and composed of “things that are not man-made,” there were clear differences in impressions between kids going to school in lower socioeconomic urban settings and those in more affluent suburbs. Urban students tended to focus on the negative impacts observed in their immediate environment, while suburban students felt less immediate concern or were more interested in improving the environment somewhere else, removed from their lives.

	Urban/Lower \$	Suburban/Higher \$
<i>What is the environment?</i>	“hometown” or somewhere else “away from pollution”	“We have such pretty natural surroundings”
<i>Environmental concerns?</i>	“You see people throwing trash;” own environment is “dirty” “polluted”	“People don’t care, we have a good life and are not seeing the bad”
<i>What can kids do?</i>	fix up things, get money for recycling, not litter	Raise money to clean up, save the rainforest, help animals

Leverage Points for Change: Issues and Opportunities

Observations of the different parts of EE system in Alameda County reveal many leverage points for strengthening student understanding and environmental behaviors. These opportunities for change are revealed by examining the structure of each part, identifying the issues, and exploring opportunities for addressing those issues.

Opportunities for change may be identified both through internal views that can see specific solutions to familiar problems, and external views that look for commonalities between individual voices, local context, and research, to reveal opportunities to leverage change for larger groups. Both of these viewpoints provided important guidance for this analysis.

Principals, teachers, students, and environmental education program providers made a wide variety of specific suggestions about how to expand or improve environmental education for K-12 students. (The complete list of suggestions is attached as Appendix IV.) Specific suggestions that offer insight into the area or point to particularly powerful opportunities are included in the appropriate sections below.

Strengthening Available Resources

While there is a wealth of existing EE resources, participants in this study revealed several types of disconnects:

- between the academic objectives of teachers and the EE resources
- between different EE programs resulting in gaps and overlaps
- between program design and outreach and teachers' situations and needs
- between available programs and student and cultural needs

Addressing these disconnects involves improving communications and connections between teachers and resources and between the more than 140 different organizations providing EE programs. EE organizations can take in strengthening this part of the EE system, focusing on three discrete initiatives:

Build Better Understanding of Teacher and Student Needs

There is a large pool of professional knowledge and local educational research that can be collected and disseminated to improve the non-formal EE community's understanding of teachers' and students' needs at different grade levels and in different cultural settings. Convening a group of local EE providers to share information and determine possible responses would set the stage for both informed development and possible coordination between programs.

Refine and Target Resources to Meet Needs of Different Educational Levels

Programs and materials need to connect clearly with academic goals, student profiles, and structural constraints at different grade levels. While all materials should connect content with the value of age-appropriate individual action, the depth of information and response should increase with the students' ages. Teachers were adamant, and program providers were aware, that material must be representative of culturally diverse and current characters and community issues.

In addition to these overarching guidelines, some specific content needs for resource development and refinement have also been identified. Earlier research identified specific gaps in currently-available programs including: missing standards, high interest areas, service-learning projects, hands-on activities, and school site programs. The same study noted that all field trip programs should consider school schedules, need for pre- and post- materials, and difficulties of navigating new sites with groups of children (CRS, 2003). Teachers in the current study identified specific needs for materials on a range of subjects, including endangered species, hygiene, and soil. Upper grade-level teachers saw integration possibilities around EE materials designed for use in English, foreign language, and math classes. Teachers at all levels were interested in age-appropriate and culturally-inclusive books, particularly non-fiction.

The types of resources offered by local providers, especially to different grade levels, could also be reviewed. All teachers were clear in their preference for individual lesson plans with connections to their specific curriculum requirements that they could use and adapt, rather than new curriculum. Several teachers were interested in kits, pictures, and software that illustrated different EE issues with interactive materials. The teachers at different grade levels differed in the types of enrichments they wanted. Elementary teachers participating in the study were most interested in grade-level specific

field trips and assemblies, while upper grade teachers were more interested in on-site infrastructure assistance, videos, and speakers, a “push-in” rather than “pull out” approach to enrichments.

Coordinate Resources to Offer Broader Experiences to More Students

Coordination among the many resources available to Alameda County teachers and students could improve offerings or increase their attractiveness. While it is important to maintain a broad spread of available resources, both in terms of content and geographic distribution, better coordination would also allow programs, training, and material resources to deepen their impact by sharing techniques for outreach, design, and evaluation of program effectiveness. Collaboration can help programs identify both similarities and differences; similarities can help organizations link programs and share techniques, while identifying differences makes it easier for programs to communicate their unique contributions to teachers.

Improving Access to Resources

Teachers reported a variety of issues around access to EE resources. In particular, teachers felt they need more:

- knowledge about existing resources
- funding for materials and programs
- field trip transportation

Although program brochures swamp teachers’ inboxes, and there are several different website and other informational resources in the County, some teachers feel uninformed about the resources and all teachers are pressed for time to research and choose among such a vast array. While program providers are eager to use email and website options to connect with teachers, schools are in a transitional time between paper-based and electronic information systems, and so programs must acknowledge and respond to needs for multiple forms of communication.

Participating teachers at all grade levels and socioeconomic settings identified funding as a critical need in order to do more EE. Because EE is perceived as an “extra,” teachers need funding to add curriculum and/or classroom materials, develop projects, pursue professional development and training options, and take field trips. Transportation is the costliest part of many field trips, and while all teachers want to provide field trips for their students, it is *essential* to provide access to natural environments for students attending schools in urban settings.

Increase Teacher Awareness of EE Teaching Resources

Improving access to information about site, neighborhood, and community resources involves training teachers on how to use existing information sources that can continue to help them make up-to-date and informed choices.

Some new information tools might also be helpful. Information on how to find EE opportunities on school sites and in neighborhoods would be useful. Middle and high school teachers are excited by the idea of a website that would act as a kind of resource guide/clearinghouse for students and teachers for interesting EE projects, actions, and resources. Other teachers and resource providers suggested a local resource fair, similar to the Bay Area EE Resources Fair in Marin, sponsored by individual

school Districts or county-wide, which would show case different kinds of programs, training, and materials for teacher use.

Provide Funding/Transportation to Ensure Varied EE Experiences for All Students

Funding for EE materials and programs continues to be an issue for most teachers. In order for all students to have fundamental experiences in nature, as well as in-class EE lessons, the EE community must:

- Assess the relative access to and costs of various options for providing these fundamental experiences, (e.g. traveling to local parks v. developing on-site natural resources such as gardens and nature areas, exploring diverse ecosystems v. visiting museums, etc.)
- Mobilize transportation and financial resources in the schools' communities to identify existing solutions and develop new ones, and
- Disseminate information to teachers about transportation and funding opportunities in the community.

Addressing the issue of limited funding for EE materials and programs could involve drawing together the financial resources in the community to create an EE fund, or working with resources to find ways to reduce costs to teachers through some other subsidy or cost savings.

Transportation costs are a critical barrier to broad natural experiences for urban students, and a specific sub-set of the funding issue. Both teachers and program providers pointed at the need for access to low-cost buses. One participant suggested bio-diesel fueled "green buses" that could take classes from schools to various EE sites not easily accessible by public transportation.

Strengthening Teaching Practices

Teachers have difficulty finding time to teach EE, difficulty that increases with the educational level. In addition, while a number of teachers participating in this study had personal background and training in EE, most teachers lack information on best practices for this subject and resources that help them connect EE to their other academic goals. In addition, the existing structure of the EE system does not always support students in sustaining environmentally responsible behavior as they mature. Educators noted that students can become overwhelmed by environmental issues if they aren't linked to age-appropriate responses and that the failure of upper grade levels to model environmentally responsible behavior further undermined EE outcomes. The focus for addressing these issues is on professional development for teachers.

Help Teachers Connect to Standards and Use Available Resources

Many voices echoed the idea that "educating teachers is the biggest key" to developing effective environmental education at schools. Helping teachers learn how to integrate EE into other curriculum goals is probably the most important need. There was broad agreement that EE professional development needs to support standards-based teaching, particularly in science. Elementary schools that were successfully using EE as a vehicle for teaching across the curriculum could see connections to different standards, and found or developed units to support this approach. Even teachers in non-science upper grades were open to the idea of incorporating EE as a subject or example if it could be clearly connected to their other goals.

Teachers who are already skilled at EE have powerful ideas about best practices including: student-centered, site-based, interactive, interdisciplinary, hands-on, using real-life examples, and immersion experiences. One teacher summed up these practices by describing “experiments and activities that answer the question “Why is this important?” Other teachers commented on the effectiveness of having real examples (animals, plants) and powerful visuals in their classrooms, and environments on site (planter boxes, gardens) and in the community in which to explore connections and applications of their studies. Several teachers reinforced the importance of connecting EE approaches and action to local community issues. These insights would help teachers trying to build EE into their programs.

Other suggestions for professional development related to lesson planning include: building knowledge about how to use of specific curriculum, specific approaches like gardening, and available kits and materials. One teacher suggested a district-supported day that would include training and information about EE resources.

Help Teachers Link Age Appropriate Content and Behaviors

All participating teachers felt that EE should start early. Elementary teachers spoke to the ability and enthusiasm of their students for these subjects, while high school teachers noted that they were more constrained than their elementary colleagues, and that earlier experiences and behaviors had huge impacts on the older students. The greater structural capacity of elementary and middle schools to design and implement school-wide projects and engage community support provides reinforcement for teacher-initiated EE projects.

I think it should start at the younger ages. When you start something young, you start with a basis.

Selecting age-appropriate content that is linked with action initiates and supports sustained environmentally responsible behavior. Elementary teachers tend to do this naturally, emphasizing hands-on projects and building habits such as personal hygiene and responsibility. As students get older, their understanding of the complexity of environmental issues deepens and they become more aware of wider social practice, and students’ choices and actions expand appropriately into transportation choices, consumption choices, and conservation. Schools can provide assistance and not just directives around these behaviors whenever possible; emphasizing individual action while providing infrastructure support for broad participation in responsible behavior, can help sustain EE behaviors.

Help Teachers Model Positive Behaviors

All teachers felt that modeling environmental behaviors was crucial at all grades. Some high school teachers felt that modeling behaviors might be the easiest, or in some case the only, way they could contribute. Modeling environmentally responsible behaviors can take several forms that all reinforce desired EE outcomes:

- Faculty and administrative participation in school-wide practices
- Broad peer participation in 4Rs and other practices to reduce pollution and consumption on the school site
- Role models for different kinds of environmentally-related career choices, including scientists, policy makers, and EE educators

Increased participation by faculty and administrative staff in environmentally responsible behavior depends on administrative support and easily accessible infrastructure.

Modeling establishes behavior expectations for younger children and helps sustain those behaviors for older students. Peer participation is particularly important. Students and teachers talked about the need for support and incentives for student leadership and clubs, including access to exciting field trips as encouragement for club participation, as well the need to give teens a voice. These observations underline the social nature of student organizations, as well as the value of field trip experiences for older students.

It's got to be cool to work for 7th and 8th graders!

Experience with a variety of career models in EE can help students feel that these issues are taken seriously by the larger community, while providing diverse career options and possible education goals for some students. Career role models must be recruited, trained in age-appropriate hands-on techniques, and placed with interested teachers.

Strengthening Administrative and Infrastructure Support

While lack of administration and infrastructure support rarely stops the motivated teacher, this support is critical to involving a broader teaching community and supporting continuing environmentally-responsible behavior. Currently, administrative support varies across the county, but only a few principals in this study pointed to the potential of EE as a vehicle to engage kids in standards-based content and skills. This means there is less recognition of efforts of individual teachers and less support for faculty EE training and responsible site practices. While many elementary schools do some sort of recycling, there is significantly less infrastructure support for environmentally responsible practices on middle school and high school sites. Teachers report that their students question them about recycling support in particular, and that the absence of physical support and adult modeling undermines sustainable behaviors. In addition to the uneven support for EE practices, the variations between the physical sites of schools, particularly between urban and suburban campuses, results in inequities of access to on-site learning resources such as natural areas, gardens, or even trees.

Disseminate Information on EE Support for Academic Achievement

Administrators generally give responsibility for curriculum choices to their teachers, but their openness to “extras” like EE depends on the level of pressure to improve their students’ performance, their experience with teachers successfully using EE as a vehicle to reach standards, and other mandated programs that restrict class schedules. Creating more administrative support for integration of EE relies on educating principals about the role EE can play in supporting academic achievement, local success stories at schools with similar pressures, and information about techniques and available training for faculty. Collecting and disseminating this information among schools and districts would improve administrative support for EE teaching, faculty training, field trips, site-based resource development, and school site environmental practice.

Support School-Site Environmental Practices and Resource Development

There are a wide range of environmental practices that school sites can use to both minimize their environmental impact and support individual environmentally-responsible behavior. These practices could be packaged in a “20 Simple Things” format to include everything from recycling program design, to tips for water conservation and protection, to reducing paper use. In addition to these practices, students also learn through access to on-site teaching resources like trees, gardens, or natural

areas that can be used for hands-on activities and exploration. These on-site practices and resources can be supported in several ways, including:

- collection and dissemination of information about practices and infrastructure requirements
- training, materials, and information for development of gardens and other on-site learning areas
- funding for infrastructure development
- development of model programs and on-site resources that teachers can visit and observe
- development of community support for developing and maintaining resources like gardens that require year-round care

Recommendations for Agency Action

These recommendations were drawn from the analysis presented in the section above, Leverage Points for Change. Recommendations for Agency action fall into two groups:

- 1) recommendations to strengthen Agency programs and
- 2) recommendations for specific actions to provide leadership for the development of EE and the ongoing growth of environmentally responsible behavior in Alameda County.

Some of the action recommendations can happen now, while others would take place over a longer time scale. Research findings underline the importance of involving the community in the practical implementation of these recommendations, bringing in smaller, targeted working groups to support the Agency in developing practical plans and products.

Strengthening Agency Programs and Materials

Immediate Actions

- ❖ Review agency programs and materials to:
 - * help teachers accomplish classroom achievement goals, particularly in the context of science standards
 - * make sure offerings are developmentally and culturally appropriate
 - * provide specific types of support appropriate at different grade levels
 - * support best teaching practices (using NAAEE guidelines)
 - * help students understand relevance and connect with age-appropriate actions
 - * provide short, specific lessons, with attention to adding science content for high school
 - * provide interdisciplinary links and content extensions.
- ❖ Develop new outreach materials emphasizing connections to academic goals, cultural diversity, and range of teacher assistance available from the Agency.
- ❖ Continue to assess and support school recycling infrastructure and faculty education, and reassess infrastructure support approaches to support recycling behaviors in upper grades.

Longer Term Projects

- ❖ Keep program fees down and explore opportunities to provide subsidized transportation to dump and recycling facilities.
- ❖ Use teacher focus groups to assist in development of new materials such as:
 - * grade-level specific kits that could be loaned for classroom use including pictures, short activities, vocabulary, current fiction and non-fiction books, videos and software materials related to specific grade-level appropriate content and practical behaviors
 - * Curriculum-specific materials for high school students that can be used to integrate EE ideas into subject-specific classes, such as articles in Spanish or worksheets that apply math tools to waste reduction or other EE situations.
- ❖ Offer both pre-service and in-service training, as well as professional development for administrators, in conjunction with student programs, lesson plans, or materials, to develop EE background knowledge and familiarity with Agency assistance.
- ❖ Expand programs to support extracurricular organizations, especially in the upper grades.
- ❖ Document and disseminate “model EE schools” to assist 4R practices.

Providing Leadership for Strengthening EE in Alameda County

Immediate Actions

- ❖ Disseminate research-based recommendations for strengthening EE resources and programs to EE providers and formal educators, funders, and community organizations
- ❖ Convene East Bay EE Providers Network, with both formal and informal educators, to work with the Agency in pursuing collaborative strategies for strengthening EE for K-12 schools

Longer Term Projects

Working with the newly convened East Bay EE Providers Network, the Agency can explore a variety of longer term projects:

- ❖ Promote collaboration and coordination of EE resources to address gaps, create powerful linked experiences, disseminate best practices for teaching and evaluation, and provide a broad range of experiences to all students in the County
- ❖ Organize local EE resource fair as a vehicle to train teachers in EE best practices and disseminate information on range of EE resources; or investigate possibility of replication or relocation of the BAEER Fair to Alameda County
- ❖ Support development of school site EE resources, such as classroom materials, gardens, or natural areas, by coordinating available resources and examining new methods to address challenges.

- ❖ Develop and disseminate guide to simple school practices and infrastructure that promotes environmentally responsible behaviors.
- ❖ Convene community, including transportation and funders, to examine: accessibility of EE resources, easing use of public transportation, as well as potential imaginative transportation/funding solutions (e.g. free bio-diesel/alternative fueled buses for EE field trips), with an emphasis on giving urban students more varied outdoor experiences.
- ❖ Explore opportunities to design and run an EE website for teachers and students, targeted at upper grades, including resources, activity ideas, and student and teacher reviews of materials.
- ❖ Assist in regional efforts to diversify participation in EE by: example, participation in regional groups, and dissemination of ideas.

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Appendix I: Research Methods Summary

Overview

The goal of the research methods for the Environmental Education Leadership Action Project was to gain access to insight from environmental education practitioners, classroom teachers, students, and administrators, about the current state of K-12 environmental education in Alameda County. A qualitative research approach, using interviews and focus groups with a broadly representative sample, was chosen in order to provide in-depth insight into specific experiences.

1. Evans/McDonough Focus Groups

Community Resources for Science and Evans/McDonough Company worked together to design recruiting and interview approaches for focus groups with teachers representing a broad range of teaching experiences across Alameda County.

Sample Development

The sample was drawn using data from the Alameda County Office of Education and the California Department of Education to develop broad representation based on the following criteria: school type (elementary, middle, high); school size (number of students); school district location (north, central, or southern Alameda County). Socio-economic level (low, medium, high) was determined according to a formula based on an average of the percent of students enrolled in Free/Reduced Meals and percent enrolled in CalWORKS: “low” > 50%; “medium” = 7% - 50%; “high” < 7%.

Recruitment

The groups were recruited by Insight Research using a screening script and process designed by CRS/EMC. Principals were contacted for recommendations of specific teachers to contact, and were asked to identify their school in terms of level of environmental education and active recycling program.

15 respondent teachers were recruited for each group fulfilling specific quotas for all the above criteria to ensure representation from a diversity of school and teacher types.

Conducting the Groups

Two focus groups—one with eleven elementary teachers and one with ten middle and high school teachers—were held the evening of March 23, 2004. The 21 teachers represented 21 different schools with an even distribution over the selection criteria listed above. Participants were paid \$100 for their participation. The focus group moderator followed an interview guide developed by CRS and EMC

2. School Site Interviews

CRS worked with three professional researchers to develop a process for learning about existing environmental education knowledge and experience from students, teachers and principals at schools from across Alameda County.

Sample Development

The sample was drawn using data from the Alameda County Office of Education and the California Department of Education to develop broad representation based on the following criteria: school type (elementary, middle, high); school size (number of students); socio-economic level (# of students

enrolled in Free/Reduced Meals and/or CalWORKS); school district location (north, central, or southern Alameda County).

Recruitment

Schools were selected through a process that entailed District notification/permission followed by Principal agreement and recommendations for participant teachers. Teachers were informed by memo from CRS (through the Principal) about the project; CRS also provided parent permission slips for student participation in the student interviews. A researcher contacted teachers directly to schedule interview dates for teachers and their students.

Interview Protocols and Process

CRS worked with the researcher team to develop interview protocols for students, teachers, and principals. A researcher conducted group interviews with two groups of 3 - 5 students from each participating school and interviewed one or two teachers at each site. A researcher then contacted the Principal for an interview.

Results

A total of nine schools from eight districts representing broad diversity over the selection criteria participated in school site interviews between February and April 2004. A total of 16 teachers and 95 students participated in interviews as well as nine principals.

3. Environmental Education Program Providers Focus Group

CRS conducted a focus group of environmental education program providers to learn about issues and opportunities experienced by people serving K-12 educators and students.

Sample Development

The group was drawn from environmental education programs serving Alameda County K-12 schools identified through the CRS database as well as the CREEC Resource Directory. Selection criteria were established to provide breadth across the variety of environmental education experiences available locally, including: audience(s) served, type(s) of program(s) offered; and environmental issue(s) addressed. Participant selection was also based on depth of experience, i.e. educators with significant experience, and program/staff management as well as field teaching responsibilities.

Recruitment and Discussion Guide Development

A discussion guide was developed by CRS Directors. Potential participants were contacted by phone followed by mailed invitations with potential discussion questions to think about in advance.

Conducting the Group

A total of eight educators participated in a two-hour informal focus group discussion held on March 30, 2004.

4. Background Research

A variety of journals, books, and internet sites were perused to identify past research whose results might inform the current project. Selections were made among sources that provided background on local issues, environmental education program development, environmental education program evaluation, and teacher/student environmental knowledge and use of resources.

Appendix II: Alameda County School Population Demographics

Data taken from CBEDs for school year 2002-2003.

Alameda County Public Schools

- # of Students: 218,041
- # of Schools: 356
- # of Teachers: 11,141
- % English Language Learners: 21.6%
- % qualifying for free/reduced meals: 34.8%
- Ethnicity: 28.8% White, 18.6% African American, 25.6% Latino, 19.7% Asian/Pacific Islander

Oakland Unified School District

(approximately 25% of school population in the County)

- # of Students: 52,501
- # of Schools: 110
- # of Teachers: 2,888
- % English Language Learners: 33.4%
- % qualifying for free/reduced meals: 66.2%
- Ethnicity: 5.8% White, 44.3% African American, 32.2% Latino, 16.5% Asian/Pacific Islander

of Title 1 Schools Participating in the II/USP Program: 64

- Alameda City Unified: 3
- Berkeley Unified: 1
- Emery Unified: 2
- Fremont Unified: 1
- Hayward Unified: 4
- Livermore Valley Joint Unified: 1
- Newark Unified: 3
- Oakland Unified: 46
- San Leandro Unified: 1
- San Lorenzo Unified: 2

Appendix III: Specific Enrichments Named in Interviews and Focus Groups

Field Trips

Parks
Oakland Museum
Exploratorium
Monterey Bay Aquarium
California Academy of Sciences
Junior Center (for Art and Science)
Sulphur Springs
Oakland Zoo
Chabot Space and Science Center
Crab Cove
Tilden Park
Moss Beach
“The Bay”
“anywhere in nature”
East Bay Regional Parks
Lake Chabot
“Waste Management”
Canyon Ranch
Headlands Institute
Davis Street
TriCed (local recycler)
Coyote Hills
“Estuary Project” (Estuary Action Challenge?)
“Science Camp” in Santa Cruz
“Tide Pools”
“Outdoor School” in Pescadero
Emeryville Recycling Center
Hyde Street Incinerator
Kayak in Sloughs
Moss Landing
“Geology Lab”
“Fossil Bed”

In-Class Programs

BaySavers
“4Rs”
Living Laboratory
“Authority Visitors”
Forest Ranger
“Water Use Assembly”
Project YES
“EBMUD People”
“People from solar labs”
Lawrence Livermore speakers

Curriculum

Closing the Loop
SEPUP

Training

Integrated Waste Management Board
Closing the Loop

Appendix IV: Teacher Suggestions for Improved EE

Principals, teachers, students, and environmental education program providers made a wide variety of specific suggestions about how to expand or improve environmental education for K-12 students. This is a complete list of individual suggestions, sorted into their places in the EE “system.”

■

Suggestions for Improving Availability of Resources

- Lesson Plans/Teaching Materials
 - Not curriculum: lesson plans. “I’d rather do it myself than have a curriculum – pick and choose”
 - Simple lessons very useful
 - “Easily modifiable to meet my needs”
 - “interesting and interactive” materials
 - Material that helps build curriculum around the state standards: use EE to teach toward standards
 - Something that could incorporate with what we already have to do
 - Build EE curriculum into existing textbooks
 - Experiments and activities that answer the question “Why is this important?”
 - Non-fiction reading is where it could be put in the English curriculum
 - Materials about EE issues to use in Spanish language classes
 - Tied to standards
- Books
 - Trade books
 - List of books [that support EE concepts]
 - Non-fiction about the environment and preservation
 - Written at kid-friendly level
 - Great pictures (up to date, reflecting cultural diversity)
 - Grade specific/grade-appropriate
- Kits
 - Free, easy to make
 - w>BD-ionmdatprils foro sud(enks)TjETEMC /P <</MCID326 >>BDC BT/TT4 1 Tf0 Tc 0 Tw 12 0

Suggestions for Improving Access to Resources

- Transportation (in addition to funding)
 - Program for alternative-fueled (bio-diesel) buses to provide transportation to EE field trip programs – bonus: provide education about alternative fuels
- Website
 - Website for EE club with a monthly topic, facts and resources, ways to connect with other clubs
 - Website for teachers with places they can go, resources they need, teacher reviews and suggestions
 - Website by and for kids (empowerment)
 - Website for teachers too!
 - Website would have lesson plans, cross-curricular with specific worksheets, readings, math problems
 - Website would link themes to disciplines, have projects for students, at-home links, “quick-write” ideas, etc.
 - Website would be a place for teachers to share ideas
- Resource fairs – Revitalize BAEER Fair, provide teachers with stipend to attend, relocate to Alameda County.
- Resource Guide
 - List of organizations providing classroom speakers
 - Local guide of available resources, organized by item, lesson plan, area, cost, grade level
 - Developed/reviewed by cross-discipline teacher group to maximize usefulness
- Out-of-School Opportunities/Reinforcements
 - Home/school mutual reinforcement of recycling
 - “do it through boy scouts/girl scouts”
 - Student clubs
 - Summer program expands reach of EE programs
 - Community service projects
 - Career Day with environmental scientists
 - After school programs – fun, open environment; powerful with kids; more flexible; need content! (“politics wouldn’t interfere”!)
 - Alameda County Fair – create a playground out of recycled materials with hands-on experiences

Suggestions for Improving Teaching Practice

- Classroom Teaching/Modeling
 - Art projects with recycled materials
 - Use school grounds/landscaping projects as a learning lab
 - For high school, integrate more science into EE, make it detailed, science questions, actions, problem-based
 - Connect with other (3rd world) countries around social justice/ environmental issues
 - Endangered species
 - Connect urban kids with EE issues through common thread of hygiene
 - Animals in the classroom

- “In EE we really fail to address soil”
- “I’m constantly pointing out good [environmental] behaviors.”
- “I think the most important thing we can do is model behavior”
- Teacher Professional Development
 - “Educating teachers [is] the biggest key”
 - “how to” information for inexperienced teacher
 - Team or school-wide training in standards-based EE lessons and topics (e.g. Closing the Loop)
 - District-supported teacher professional development day (include something a trade show with organizations to talk to teachers)
 - Teacher training should include skills on managing children outdoors
 - Training on how to maximize gardening effectiveness
 - Showcase EE programs for pre-service teachers
 - Related to how to teach EE in a regular ed classroom

Suggestions for Improving Administrative/Infrastructure Support

- School-wide Approaches (requiring administrative leadership)
 - School-wide service learning projects on recycling/reducing
 - Students volunteer to recycle – 2 per week
 - Science fair projects in high school
 - Student projects with community/government groups
 - Many recycling programs being run by groups of students
 - Use school as a community – develop a whole-school model
 - A lot of junior high and high school teaching would be more powerful if it was easier to collaborate with teachers in other subjects
 - Each grade takes on responsibility for one thing (e.g. ecology) on campus
 - “Push in” is good (i.e. as opposed to “pull out”)
- School Infrastructure and Grounds
 - Make sure there are recycling bins – for cans and bottles as well as paper – throughout campus
 - Planter boxes
 - Gardens
 - Need pick-up service for recycling
 - Outdoor space at school where students can read (“Pleasant, safe place to experience the outdoors”)

Suggestions for Improving Student Understanding

- Environmental education “with the garden...works really well with problem kids”
- “you could have the toughest kid in the world...and he’ll pick up the bird and he’ll chirp and change and just be like...in a happy zone.”
- For high school, integrate more science into [EE], make it detailed, science questions and actions, problem-based), more questioning and measuring
- Students teaching students [about recycling/environmental issues]
- Give teens a voice
- “Sit alone in nature” – moving experience, can motivate kids

- “Chemistry in the Community” model – “students are much more aware of what they learned, the chemical impact on the environment” because curriculum focuses on applications

Appendix V: Interview Guides and Focus Group Protocols

Teacher interview protocol

1. *What does environmental education mean to you?*
2. What do you think are the most important environmental ideas that students should be taught?
3. Would you tell me more about some of the particular EE experiences *your students have had this year?*
4. **How and to what extent** do you include environmental education in your classroom plan?
5. Approximately **what percentage** of classroom time is devoted to environmental education? Under 10% 10 - 30% 30-50% > 50%
6. *What, if any, EE field trips or school site (visiting? Guest?) programs have you used in your classes over the years? Please describe and comment on the programs' content and effectiveness.*
7. Are you familiar with programs or material from the Alameda County Waste Management Authority (worm classroom presentation, Davis Street field trip?) have you used them? If so, how were they useful/how are you continuing to use what you learned?
8. Authority is considering making a free classroom kit on the 4Rs. Are you familiar with the 4Rs? What advice - general recommendations -do you have for them to make a good kit for you, for teachers?
9. Would you go to a training on the kit?
10. Overall, how would you describe the environmental education learning experience at this school?
11. What **obstacles or challenges** keep you from addressing environmental topics with students? Please comment with respect to EE both within the classroom and external programming.
12. *Have you had any formal or informal training in environmental education?*

Wrap up: Thank you and additional comments?

Student focus group protocols

Duration: 20-30 minutes

Elementary School

School:

Grade:

Number of Students:

13. We use the term “environment” a lot when we talk about where we live and what we do. So, when you hear this term “environment”, what thoughts come to mind?

(Prompts to elaborate on above if students are confused) There seem to be some different parts of the “environment.” Can you tell me some more about them? Some things are living... Are there any non-living things in the environment? Can you describe any relationships between us humans and our environment?

14. What do you remember about any classroom visitors or field trips about the environment or taking care of the environment? Tell me about them.

15. What about experiences in school when you learned about the environment – could be this year or when you were younger?

16. What kinds of things might you do to protect the environment?

Of these things, what have you done? What kinds of things do you see other people like you or your parents doing?

How did you learn about these things?

17. Why do you think it’s important for people to protect the environment? Tell me some of your reasons why (or why not).

18. What do you know about the **4Rs**?

students nod/yes: /

What are the 4Rs?

appear to know what they are:

How did you learn about the 4Rs (where/ who?)

school visitor, teacher, field

trip, parents, friend

Have you ever done any of the 4Rs or seen any of them done at home or school?

Middle School

School:

Grade:

Number of Students:

When you hear or see the word “environment,” what thoughts, ideas, concepts come to mind?

What are the basic components of the environment

How would you describe the environment

What makes up the environment

What experiences have you had in school that have helped you learn about the environment? Tell me about them.

What do students (people like you) do to protect the environment? How did you learn about this?

Take a moment to think about what you eat, where you live, what you do in your free time. How do your actions affect or impact the environment? [do they see connections between specific actions/needs and environmental resources]

How much environmental teaching happens at this school? There’s a lot of it/There’s some/ Not much/none. In what class? How many students are involved? Follow-Up comments?

Individual challenge – A new student is moving to <town> and coming to <school>. What should they know about protecting the environment OR they are going to be starting an environment club – what suggestions do you have for what they should do?

High School

School:

Grade:

Number of Students:

Above questions.

EELAP: Principal Interview Protocol

Our objective: Identify the typical learning process and points of possible impact in Alameda County. We are not analyzing or reporting on particular individuals or schools.

Questions:

1. How would you describe Environmental Education?

2. Describe the EE you see happening at your school.

(If there is any) What factors contribute to this?

3. Where does EE fit in your school's curriculum?

Check categories:

Not at all; Enrichment; Specific Units; Skill Building/Commun Service;
Integrated

4. How does EE fit in your practice (how your school operates)?

Specifics on programs, partners, support, etc.

5. Are there any partnerships for EE with outside organizations active in your school?

Do you know of specific enrichment your teachers use?

6. Is there any extramural support for EE?

Parents? Money, time
Community/civic orgs?

7. What are the barriers you face in providing EE?

8. What would most help your school provide more EE?

Listenings: follow-ups and things to listen for

What specific support exists? How does enthusiasm translate into support? Teacher release time, money, etc.

Focus Groups Moderators' Guide

I. Introduction (15 minutes *length of time for section*/15 minutes length of time elapsed in group)

- A. Explanation of focus group and focus group rules
- B. Introduction of EMC
- C. Introduction of participants
 - 1. Name
 - 2. Length of time teaching
 - 3. Grade level
 - 4. Subject taught (middle/high school)
 - 5. Interesting hobbies?

II. Environmental Awareness (XX minutes/XX minutes)

- A. When I say the words “environmental education,” what do you think of?

PROBES:

What specific skills or behaviors do you think of?

What content or ideas do you think of?

- B. Tell me about some of the environmental activities happening in your, school or classroom that you're aware of.

PROBE FOR:

- 1. Composting
- 2. Water conservation
- 3. Reuse/recycling programs
- 4. School garden
- 5. School/park cleanup programs
- 6. Earth Day events
- 7. What else?

- C. Let's talk a little about some of the basic scientific ideas behind environmental education. What are some of the concepts in environmental education that you think are important as an adult?

- 1. Write on white board

- D. What do you think your students should learn about these concepts?

- 1. **PROBE:** We talked about a lot of different ideas here. What level of information feels right for **your** students?
- 2. How important is it that environmental education be taught in schools?

III. Environmental education experience (XX minutes/XX minutes)

- A. What types of teachers at your school teach environmental education?

PROBE FOR:

- 1. Grade level or levels?
- 2. Subject or subjects?

3. What types of teachers do you think would be the right ones to teach environmental education at your school?

B. I'd like to go around the room and have each of you tell the group about an environmental education experience you may have had or heard about. If you don't have a favorite from your classroom, talk about something you'd like to do, or you've seen another teacher do. If you can, tell us what you think the lesson was trying to teach and why it was successful.

C. By a show of hands, who here knows what the "4 Rs" are?

1. (*choose someone*) Can you tell me what they are?

a) Can anyone help him/her out?

2. Summarize: The 4 Rs are:

a) Recycling

b) Reuse

c) Reduce consumption

d) Rot-composting

3. Now that I've told you, do those concepts sound familiar?

4. By another show of hands, does anyone teach all of these concepts in your classroom?

a) And who teaches some of them, but not all?

b) Who knows other teachers at your school who teach the 4R's?

IV. Building Environmental Education (XX minutes/XX minutes)

Let's talk about the process of bringing environmental education into the classroom.

A. What would you say are the challenges you face in teaching environmental education?

Listen, and PROBE AS NEEDED for subjects not mentioned or specificity:

1. Do you feel there's a...

a) Lack of teaching resources

(1) What specifically?(materials, curriculum, preplanned lessons)

b) Not enough time

(1) Do you mean not enough class time, or not enough time to plan the lessons?

c) Lack of access to training

d) Lack of support from principal or administration

e) Lack of support from other teachers

f) Lack of support from parents

g) Lack of funds or other access issues

- h) Lack of interest by students
- 2. Is it a challenge for anyone because environmental education...
 - a) Is not on standardized tests or benchmark requirements
 - b) is too political
 - (1) Don't want to be labeled an "environmentalist" or "tree hugger"
- 3. What else?

B. What might help address these challenges? [open discussion, attitudes, things, or policy changes]

C. If you feel you do have support for teaching environmental education...

- 1. What are the significant sources of support?
 - a) Students
 - b) Fellow teachers
 - c) Administration
 - d) Parents
 - e) Community groups
 - f) Community programs
- 2. What types of support do they give you?

D. What kinds of available resources do you know about that can help teachers bring more environmental education into the classroom?

Write kinds of resources up on paper on easel. Once they are out of suggestions, probe for:

- Field trip resources
- In-class visitor programs or guest speakers
- Training
- Kits or supplies
- Curriculum or lesson plans
- Funding
- Videos
- School assembly programs
- Logistical materials, such as classroom recycling bins
- Grade-specific programs

E. Are there any other kinds of resources you can think of that might be useful to you if they were available?

1. Add to paper on easel

F. Let's think about which of these kinds of resources are most useful. I'd like you to each take four dots and put a dot next to the four resources you think are most useful.

- 1. Tear paper off easel & place in center of table. Allow each participant time to place their dots.*
- 2. There are lot's of dots by [...].

- a) Tell me more about what would be most useful within this category.
- b) Are there particular kinds of [...example: Kits & supplies]
- c) Any particular content or format?

G. What's your general impression about the quality of teacher and student resources that are currently available to you for teaching environmental education?

1. What factors do you think about when you're considering the quality of environmental education materials, programs, or training?
 - a) What makes a resource "high" or "low" quality?

H. Where would you expect to find out about resources for teachers or students?

PROBE FOR:

1. Private website
2. District website
3. Printed media delivered to your mailbox
4. Poster in teachers lounge or office
5. In-person presentation
6. Word of mouth/other teachers
7. Where else?

I. Have you ever used programs or materials offered by the Alameda County Waste Management Authority?

1. Were they useful to you?
2. Have you continued to use the programs or materials?

Possibly include a handout of available resources from ACWMA?

Thank you for your participation!!

EE Providers Focus Group – Discussion Guide

Welcome everyone! Thank you for contributing this time to help improve environmental education in the Bay Area. Our purpose today is to gather information about your interactions with schools, teachers, and students and explore ways to strengthen connections between environmental educators and public school students.

Let's start by introducing ourselves. Could you each tell the group ...

- your name and the organization you're with,
- the focus of your programs and the student age-range you work with?
- [start with CRS and our role facilitating ACWMA's research]

Great – you'll probably notice there's a wide variety of programs represented around the table – we're hoping that you'll have lots of differences of perspective on the topics we discuss today. While you are here to represent your organization, we will not identify you personally in our report, and to encourage your candid participation we'd like to suggest that we agree to a standard of "anonymity," meaning that while you may learn interesting things about each other's work in this meeting you should not quote any individual without getting permission outside the meeting.

Success Stories – Now let's go around and give examples of a success story - what's really working for your organization/program relative to environmental education in K-12 public schools.

Probe: What do you think are the **key factors** that made your example successful?

[length of relationship –short & easy, long & intense; outreach; top down; lots of teacher training... write different factors down on pad titled success factors]

Observations about School Issues - What cultural, logistical, or pedagogical norms in public schools do you see affecting EE?

Outreach Methods – What kinds of outreach have you used to reach teachers and schools?

Follow-on: Which methods do you find most effective?

Program Design Practice – What kinds of external or internal standards or guides do you use to design your programs?

Follow-on: Are there other standards that you know about?

Outcome Measures - How do you understand the outcomes of your programs?

Probe: Are you thinking about student learning? Behavior change? Numbers of students/teachers? Etc.

Support & Barriers – Is there particular local/regional support that helps your organization work with K-12 education? (grants, community initiatives, school district structures...)

Follow-on: Are there barriers make your work more difficult or less effective than you'd like it to be? (funding, community issues, school system structures...)

Suggestions – Do you have any ideas for addressing these barriers or strengthening EE in the County?