

Environmental Education in Selected Berkeley Schools: Its Importance and Effectiveness

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There is one ocean, with coves having many names;
a single sea of atmosphere, with no coves at all;
a thin miracle of soil, alive and giving life;
a last planet and there is no spare.

--David R. Brower

Introduction

Perhaps the fact that "no spare" planet exists and that all life is dependent on a healthy environment should provide enough incentive for concern about the state of the earth. However, concern can develop only through awareness of the natural environment and understanding of how people rely on and affect it. Education provides the tool to heighten the public's awareness; it is the foundation for future efforts aimed at preserving and protecting our biosphere. An International Conference on Environmental Education noted that "world educators and environmental specialists have repeatedly pointed out that any solution to the environmental crisis will require environmental awareness and understanding to be deeply rooted in the educational system at all levels" (National Council of Educational Research and Training, 1981).

The destruction of many delicate balances of earth's ecosystems are seen in the frequent and varied reports of environmental degradation. The possible calamities these symptoms represent are cause for action. Education about the environmental crisis and human's role in it is imperative. Since every person interacts with his surroundings on a daily basis, education is important at all levels, but perhaps especially so in the early years of schooling. Studies have shown that environmental education (EE) programs "appear to have their greatest influence in childhood" (Pomerantz, 1986). Perhaps this is because habits and ideas are not yet rigidly fixed and children are still widely receptive to new ideas. Only then can teachers seek to influence a child's growth and actions, and stimulate an on-going concern about issues.

Because of its importance, I sought to evaluate both the extent and effectiveness of EE in the public classroom setting. By using a series of surveys prior to and following classroom

teaching, I tested for the effect teaching has in raising interest and awareness of the natural environment and for an increased understanding of people's interdependence and influences on the earth.

Past Studies

Few studies concerned with EE have been conducted in the past. In 1970, the National Education Association (NEA) conducted a nationwide survey of schools to obtain information regarding the current status of EE. Since this was the first such study, no established criteria were available to determine which curricula comprised environmental education. Thus courses in conservation and outdoor education were included in the study, as were subjects like botany, biology, and weather studies. The NEA report also provides information on curricula types, funding issues, time spent on EE, and the aims of such programs. In lower grades, NEA found that programs tended to focus on developing attitudes and general awareness about nature, while higher grades focused on technical and scientific issues of specific problems. At that time, few programs included information about the use and preservation of resources or about such issues as pollution and pollution control (NEA, 1970).

More recently, Joiner (1980) assessed weeklong camping trips as one form of EE. He found enthusiasm for such trips by students, teachers, parents, and administrators, and felt the experience increased students' understanding about the environment. As was found with the NEA study, education focused on the scientific aspects: geology, botany, biology, weather. Joiner gave no indication whether the experience of camping increased awareness of man's use and dependence on resources. Since outdoor education is difficult if not impossible for many schools, and limits the number of students able to attend, Joiner also explored some of the available EE activities for use on school grounds. Though activities for biology and natural history are common, few are geared toward the environment specifically. However, Joiner feels that they generally provide an introduction to the physical environment, and again found a very positive response.

Background

Early Efforts: As Joiner (1980) notes, education about the environment began as early as the 1920s; forestry camps run by schools in Los Angeles, California provided sample programs for other schools to follow, though on a purely voluntary basis decided by each district. Only in 1951 did school districts recognize the importance of EE; the earlier closure of LA's camps led to legislation authorizing such programs to continue.

Concern about the environment in the 1960s led to the 1968 Miller Bill; the Bill required California schools to "provide instruction in the wise use of natural resources and protection of the environment in all appropriate grade levels and subject areas, grades one through twelve" (California Department of Education, 1973). Shortly after, in response to a growing concern about increasingly important environmental issues, the federal government passed the Environmental Quality Education Act of 1970. The act's aims are to encourage and support environmental curricula in public schools, provide funding for outdoor study areas and teacher training, and assure that materials are made available to schools and the mass media (US House Education and Labor Hearings, 1972).

State Guides: Even before this legislation, the California Department of Education's (CDE) Guidelines in science and social science included some environmental aspects. These guidelines provide examples of subject areas that should be understood at each grade level. According to CDE, the earliest years of education should provide an introduction to the physical world--plants, animals, soils, water-- and should focus primarily on observation and comparisons. Lessons in grades 3-6 should concentrate on ideas of interactions and interdependence of systems and parts of systems; understanding relationships is the main goal. Grades 6-9 should involve students with the theoretical: explaining and predicting phenomena through changes (CDE, 1984). (For more information and examples of curricula, see also CDE, 1964, 1985, and 1988).

Defining EE: Though much has been written concerning the nature and goals of EE, all proposals state a need for an interdisciplinary approach and on-going effort as well as teaching the *skills* needed to understand and work towards solutions of environmental problems. The Environmental Quality Education Act defines EE as the study of "man's relationship with his natural and man-made environments" (US House Education and Labor Hearings, 1972). It includes the relationships among pollution, resource use, technology, conservation, transportation, and planning. Brennan (1986) states that EE should provide "a knowledge of *how* people manipulate, transform, control, preserve, or destroy their environment *and* the possible consequences of their actions". He also calls for an understanding of the global environment, social and natural, and a recognition of an individual's responsibilities in both local and global contexts. (For an in-depth discussion of EE and its goals, see above discussions and National Council of Educational Research and Training, 1981.) Thus EE should not be a discipline that only focuses on causes of specific problems, but rather should be designed to develop analytical and creative skills needed to

solve and prevent environmental problems, to assess and predict changes to the environment and how it is used, and to understand impacts of daily activities on resources and ecosystems.

Methodology

To gain an overview of EE and its effectiveness, I used a series of presurveys, lessons about the environment, and postsurveys. Since each grade builds a foundation for understanding more complex relationships, I worked with four classes: Peter Weinstein's second-third grade class at Jefferson Elementary School, Bob Irish's third grade class at LeConte Elementary School, Phoebe Tanner's sixth grade class at Columbus Elementary School, and Vanna James' eighth grade class at Willard Junior High School.

The initial survey was designed to determine students' interest in the natural environment, their understanding of basic ideas, and their perceptions of environmental issues. (See Appendix A for sample questions). Though Fink and Kosecoff (1985) state that forced choice questions are more reliable than open ended ones, the majority of my survey questions were designed to avoid a forced choice; I felt students' own answers, without any initial ideas from me, would give a better indication of student's awareness and attitudes while minimizing my biases.

The presurvey was given prior to any environmental education either by myself or the instructor, although Ms. Tanner had completed one day of EE before the survey was given. As several classes were beginning a recycling program, surveys were given prior to any discussion of recycling. To minimize difficulty in answering a question because of limited reading skills, questions to the second and third grade classes were read aloud.

Lessons were structured around responses to the initial survey, and emphasized relationships and issues students had not been aware of. Though designed to emphasize human impacts and their consequences, lessons were not designed to be "anti-development" or to pressure students into becoming "environmental." Rather, they were used to show examples of how and why people alter the environment, leaving the question of concern and importance to the individual student.

In sixth and eighth grades, I chose to give a lesson about global warming. I felt this subject provided an excellent example of human influences over the earth and ultimate consequences from our actions. Because it gave me an opportunity to show students a solution to a growing problem, I also introduced a discussion on recycling to the sixth grade class; the eighth grade class was involved in starting a school wide recycling program.

The initial survey revealed that few second and third grade students understood what an environment is. As a result, the lesson for these classes focused on explaining the concept of environment and how it changes, both through nature and by people. In addition, I had an opportunity to give a second lesson to Mr. Weinstein's class, illustrating concepts of food webs and biomagnification. Like Ms. James' class, Mr. Weinstein's was also involved in a school recycling project.

Based on ideas presented in my lessons and from classroom discussions with students, the postsurvey questions were designed to test whether a student understood the relationships presented, and to evaluate for any change in a student's interest about the environment. (For sample questions and answers see Appendix B) To minimize responses based on short term memory, the postsurvey was administered several weeks after the last lesson to that class. An exception was Ms. James' class; due to scheduling conflicts, the survey was given one week after the lecture.

Data

Because the presurvey served mainly as an orientation tool, results of only selected questions are presented below; selected questions are also presented for the post surveys. Answers irrelevant to the question asked were categorized as no answer. Unless noted, results from the second-third grade and the third grade classes are combined.

Presurvey, 2nd and 3rd grade: From questions seeking to determine interests, well over half the second and third grade students chose Disneyland over visiting a park, and video games over a desert; however, the vast majority chose camping with friends to having friends over at home. Of a list of five activities, sports was the favorite choice while hiking was the least popular (Q1). Only seven students of 48 gave an indication that they knew what "environment" means (Q2), but almost all felt caring about nature is important. Given a list of current environmental issues, the majority of students rated all as a "big problem", with litter and air pollution seen as the most severe. Students also understood the effects of polluted water on plants and animals (Q5), and most students were aware of recycling (Q7). Thirty-eight of the 48 students said their families currently recycle, while 44 knew of at least one recyclable item and a reason why people recycle. The most common answer was to get money. Finally, most students felt their knowledge of the environment came mainly from teachers and textbooks.

Postsurvey, 2-3rd grade: In the postsurvey, most students could define the word environment or give an example of one, and could state how different environments can change (Q1-2).

Twenty-four of 41 students said that learning about nature and changes to it are important (Q11). A substantial number (25) of students stated that they wanted additional lessons about the environment, especially about birds, trees, and animals.

The postsurvey for Mr. Weinstein's class contained additional questions. Though most students could not define what a food web is, only eight did not have an understanding of what happens if one level dies; twenty stated one way for a level to die, with pollution being the most frequent answer. Many understood the effects of toxic chemicals, and several explained biomagnification. Seven students said they would begin recycling although they had not recycled before .

Presurvey, 6th and 8th grade: For both classes, most students preferred an amusement park, video games, and camping to the alternatives. Sports and hiking remain the most and least popular activities respectively from the given list (Q1). Most students gave an indication they knew what "environment" means (Q2), and most eighth graders gave a reason why nature is important to care about (Q3). Given a list of environmental issues, most were considered very serious (Q8), with air and water pollution considered the most serious by both grades. The effects of polluted water on plants and animals were also understood (Q5). As with third graders, students could identify at least one object that was recyclable, and a reason to recycle; for the sixth grade, the most common reason was not to get money, but to lower waste and spend less money on new products (Q7). For eighth graders, the reasons were divided almost equally between saving money and protecting the environment. Over half the families in each class recycled. Finally, most students stated that their knowledge about the environment came from TV and radio.

Postsurvey, 6-8th grade: While few students could explain the causes of the greenhouse effect (6 out of 19 eighth graders; 6 out of 25 sixth graders), the majority of sixth grade students could cite changes in the environment due to it and a plausible action to reduce the further development of global warming (Q6-8). Less than half of the eighth grade class cited impacts or solutions. Of the sixth grade students, 20 noted that the greenhouse effect is very important as it can drastically alter our life (Q9). In addition, 17 of 19 eighth grade students felt changes in attitudes and lifestyle were important to solving the environmental problems of the future. Needed changes included conservation, fewer "comforts", carpooling and recycling, and the need for a concern about the future (Q13).

In both classes, students noted the importance of recycling (Q10,12). Four students in eighth grade said they would recycle at home although prior to the school project they had not;

six sixth grade students also said they would start recycling. Twenty-two students (sixth grade) noted that much of our garbage is placed in the San Francisco Bay or landfills. Thirteen of the eighth grade students stated that they felt they were more aware of the need for recycling after the school project. Most students (34 out of 44) in both classes also felt that learning about the environment and how it changes is important (Q11).

Discussion

In developing my study, I hoped to provide a general survey of the amount of EE done in Berkeley and Oakland schools, as well as an evaluation of its effectiveness. However, the time constraint and difficulty in finding teachers to work with did not allow for this. Thus, my study represents only an example of the effectiveness and importance of EE. Because teachers I worked with were those already interested in EE, students in their classes probably receive more instruction in EE than students in most classes. Therefore, my study does not necessarily represent the true emphasis of EE in the school district.

Though I tried to minimize biases in the surveys, some do exist. Questions were modified slightly, especially in the presurveys. This was due in part because of varying vocabulary skills in different grades, and in part because in giving the first presurvey, I found several questions difficult for students to understand or not helpful in assessing their interests and knowledge. Secondly, different lists of activities given to students to rank may have altered their preferences of environmental versus non-environmental activities.

Finally, one area of concern in assessing the surveys is the honesty of answers. Though I tried to phrase opinion questions without "right" or "wrong" responses a chance always exists that a student will answer a question to "fit in"; Ms. Tanner noted this could be especially true for the questions on recycling, although the concern probably applies only to a small fraction of students (pers. comm.).

In spite of the flaws, the study shows some interesting trends. The presurveys for all four classes indicate a generally low interest in activities centered around nature. As one student in Ms. James' class noted, interest may have been low because of a lack of exposure to certain activities. This indicates the need for students to be exposed to activities connected with nature. All sets of surveys also show an extensive awareness of current environmental issues although this awareness does not necessarily mean a thorough understanding of the issues. Concern about the health of our planet is apparent, as is some understanding of people's role in

affecting the health of nature. Pollution is consistently noted as a problem and student's answers often referred to the need for a solution.

Assessment of 2nd and 3rd grades: Analysis of second and third grade post-surveys show that students developed an increased understanding of the word "environment". Perhaps of more significance is the ability of students to predict changes to different areas. Though the ability to anticipate that a tree will be cut down or a house will be built may seem insignificant, it is important for students to be able to predict and/or observe how places can change. Without an early introduction to ideas of change and human influence over that change, further understanding of complex relationships between humans and the environment, and the ability to curtail human impacts will be minimal. After a lesson on food webs, students in Mr. Weinstein's class began to understand the interdependence of organisms, including such complex issues as bioaccumulation. Understanding of food webs heightens understanding of why fish and other organisms can die, and the importance of even "small" distortions to an ecosystem. Students seem to understand the impact of such changes to the natural environment: pollution was the most frequent answer given for the cause of fish dying.

Assessment of 6th and 8th grades: Though students could not define global warming, many understood the possible outcomes of the greenhouse effect. The emphasis on energy concerns in the eighth grade survey indicates an understanding of how we influence the earth on a daily basis. In the sixth grade postsurvey, when asked about the greenhouse effect's importance, students indicated they understood the great impact our actions will have in the future. Students understood how temperature changes can alter life drastically: examples included effects on food supplies, extinction of animals, and possibly destruction of ourselves. The last statement may be a bit severe, but it does show an understanding of the seriousness of the issue.

Perhaps the concept of recycling provides an even clearer illustration of how knowledge can stimulate concern. In the three classes in which recycling was introduced, seventeen students who had not recycled before said they would begin after being introduced to the idea. Although the number may not be completely accurate, as discussed earlier, it does show that students are concerned enough to act on a problem when they are informed about it. From responses to why people recycle, a change of attitudes, at least for the second and third grade classes, is clear. In the initial survey, money was stated as the primary reason for recycling; in the second survey, while money may still be important, the primary reason stated was to reduce waste and protect the environment. Students in the sixth grade class said recycling was important because landfills and San Francisco Bay were reaching capacity. While their reasons may not be significantly different from their reasons on the earlier survey, reducing

waste, students' responses show concern for a changing environment. It should be noted that factors other than education may also influence students recycling: for some families the extra income may be very important, as well as the fact that in general, awareness of recycling in Berkeley is high. However, for whatever reason, students will not recycle unless they know about it and why it is important.

Although students may still prefer video games to deserts, and hiking or birdwatching may not become their favorite hobbies, students from all classes showed some interest in learning about nature and how it is affected by our use of it. However, interesting differences occur among the different grade levels. Even though interests are difficult to assess as they develop over time, the postsurveys show that most second and third grade students want additional lessons about nature, and felt that learning about how people interact with the environment is important. An area that seems to be of particular concern is the negative effects of pollution and a desire to minimize that problem. The postsurveys for the upper grades show less interest in lessons than in lower grades, but students still feel such education is important. Many students noted people's current and future dependence on the earth and felt that "if we don't know about issues we can't help" but learning about them "makes kids want to help" (quotes taken from sixth grade postsurveys).

The lack of interest in additional lessons may be due more to how the subject is presented than to the material itself. The third grade lessons were structured around activities students participated in. Though lessons in the upper grades were not activity oriented, I did try to engage the students in the discussion by asking them questions on how the subject could affect their lives. While even at this level lessons should be oriented towards student involvement (Halversen, pers. comm.), the lack of it does not explain the difference between sixth and eighth grade interest in more classes. It does, however, bring up another fundamental issue of teaching: the effectiveness of the teacher in introducing material and in stimulating further interest is very much a part of the overall effectiveness of education.

Teaching EE: While factual understanding of ecosystems is still crucial, both Ms. Tanner and Ms. Halversen of the Oceanic Society in San Francisco stated that the real need is to move beyond the "old EE" (Tanner, pers. comm.), and to show students that everyone effects changes and that we all need to be responsible for the health of the environment (Halversen, pers. comm.). A basic part of EE is to help students develop a respect for the environment and values that enable students to help protect it. Questions on the first surveys indicate that while many students have had lessons about the environment, the focus, especially in lower grades, appears to be on ecology and what we rely on from nature. No student said he or she learned

any thing about human influences on nature. Without this knowledge little can be done to solve the existing and future problems.

Ms. Tanner feels strongly that EE is an important part of a student's education, but that the goal must be to "educate people to take care of the earth or there is no point to [environmental] education" (pers. comm.). She feels that much of what students are taught stays with them, though it may not show in a survey. This point is particularly important to realize when the subject being studied centers to a large degree around values and not strictly factual material. Perhaps the most important aspect of education is the one that is most difficult to assess with surveys: that of long term values and responses. An example of this is evident in the artwork of one of her students, a picture of a shrinking bay. This student may or may not have been able to explain the underlying causes for the change in the bay, but he probably understood the connection between filling the bay, development, and the amount of waste generated. At this grade level, such an awareness seems sufficient.

In teaching EE Ms. Tanner tries to inspire her students, to show them that people *are* concerned about the issues, and that things *can* be done. One compelling reason to teach about our actions on the environment, at least for sixth graders, is because it is "a time when they develop outrage... [they see] the incongruities of what should be and what is" (Tanner, pers. comm.). The goal of teaching about environmental degradation is not to foster outrage per se, but to foster awareness and develop real concern through that outrage. Perhaps this is one reason Ms. Tanner emphasizes the vulnerability of the earth and the need for humans not to dominate it.

The Oceanic Society in San Francisco has begun a program to combine basic knowledge of ecosystems with education about the immense potential, positive and negative, humans have over the environment. The program, called OCEANS Week, centers around a theme of the marine environment that runs through all subjects from spelling and math to music and art. The program is designed so each grade level focuses on a different habitat. The Oceanic Society has also developed curricula and trained teachers to integrate education around physical and biological aspects of the area, as well as aspects of human involvement.

Though classroom education is vital, outdoor education cannot be overlooked. Perhaps more than for most subjects, field trips can provide an integral part of a student's instruction about ecosystems and the consequences when areas are altered. Not only can outdoor experience make the study more interesting, but as Ms. Tanner notes, field trips make ideas more real for students, it "opens them up" (pers. comm). Since awareness is an important

initial part of the struggle in environmental education, field trips are important not only to solidify ideas discussed in the classroom, but also as an instrument to further general awareness of the many natural areas existing. Even if exposure to nature does not lead to a deep attraction for a student, it can at least encourage respect for nature, especially as many students seldom have the opportunity to visit different places (Tanner, pers. comm.). This respect in itself provides an important part of education and an important start to future environmental protection. A generation of people who do not know about, or who fear, different animals, and who do not understand the interdependence of species within the biosphere, including human interdependence, will have little concern for the destruction of ecosystems. Field trips need not be far from the school; frequently trips to local areas allow students to more fully understand something that is close to them. This closeness helps them understand the connection *they* have, whether to a stream ecosystem and its pollution or to a landfill. A local example can then be used to raise bigger questions about more abstract ideas and places (Tanner, pers. comm.). Such field trips, or activities in the classroom, can also serve to stimulate more interest in students for learning about environmental issues.

In the presurvey, most students indicated that they learn primarily about nature either from teachers and textbooks, or from TV and radio (46 and 31 respectively out of 90 students). Thus, the need for environmental education in school is apparent on two levels: one because school is the primary source of environmental knowledge for many students, and two, because the flaws of TV and radio necessitate that teachers educate students, if the goals of EE are to be met. While TV can pique a student's interest, the mass media

is much less suited to present the facts behind the usually complex situations and to educate students to analyze situations, identify the factors which contribute to the problem, clarify values, weigh alternatives, and suggest feasible solutions. These goals can be reached only through education (Blum, 1987).

Because students in the classes I worked in probably receive more classroom EE than most students do, the media may actually be an even greater means of disseminating information regarding the environmental crisis to students. While these students are at least introduced to ideas, they are not receiving education about the skills needed to understand and work with complex issues. In a discussion on the role of mass media in education, Ms. Halversen was concerned that many students get much of their knowledge from T.V. Feeling the media to be too passive, she noted T.V. is "space-out time for kids...they don't get much out of it" (pers. comm.). However, she noted the value media could have in schools if properly used; videos

should not simply be turned on, but must be used to engage the students in dialogue and analysis.

Ms. Halversen as well as other sources have noted several constraints to encouraging EE in the classroom. Although the Science Framework Addendum for 1990 has begun to stress the need for education about human influences (Halversen, pers. comm.), both Ms. Halversen and Ms. Tanner noted the lack of material that is actually available for teachers to use. Along with a lack of material is a lack of awareness among teachers of resources that are available, and insufficient planning time for teachers to incorporate EE activities into the classroom. Without the material and time to prepare classes, few teachers will change their teaching patterns to include EE.

Perhaps it is because EE is not a priority in our schools that these constraints occur. Though some schools do take advantage of outdoor camps and programs such as OCEANS Week, it is far from a universal priority. Traditionally, EE and ecology have been left for the end of the year--if there is time (Halversen, pers. comm.). To change this attitude, teachers must be shown the value of EE, something the Oceanic Society has been instrumental in. Once teachers realize the value and importance of EE they frequently become active proponents of the program, even in lower grades (Halversen, pers. comm.).

Conclusion

While environmental education has come a long way from its early beginning in the 1920s, the content and format are no longer sufficient to meet today's needs. Environmental awareness and issues of concern change rapidly with new technologies and with increased knowledge of ecosystems and impacts people have on them. Environmental education must continually keep pace with these changes if it is to be effective in providing students the skills needed to help manage the earth's resources. Since lifestyles critically affect how environments are used, and thus their health, EE must also center on attitudes towards the environment.

Robottom (1985) has pointed out the difficulties to teaching EE:

It [EE] continues to represent a challenge to existing patterns of schooling. Its inquiry orientation is a challenge to habitual patterns of teaching; its interdisciplinary character is a threat to conventional, disciplinary curricular structures; its emphasis on outdoor education presents problems for existing organizational patterns (Robottom, 1985).

Like any institution, schools are slow to change methods that have been used and developed over time. However, the structure and condition of the world has changed so dramatically in recent years, that perhaps it is time to re-evaluate how students are taught. Clearly, the problems Robottom points out have been overcome by teachers already involved in EE.

Although this study has been limited by time and location, I hope it has proven that education can serve a formative role in stirring and expanding students' concerns about the health of our planet. While many teachers may think students in second and third grade are too young to learn about the impacts from the use of resources, I feel it is clear that people are never too young to learn about how their behavior affects their environment. This education is especially important at the *lower* grades where true concern can be developed from ideas and values learned early on. In spite of their limitations, I feel the results presented here justify more extensive studies and an intensified effort to create and implement EE curricula in Berkeley and other school districts. Such an approach must be integrated and coordinated among all levels, much like the Oceanic Society's project, but must remain flexible enough to evolve to meet future needs.

EE will not be implemented on a broad scale until its need is seen as a priority. Just as students need to appreciate the value of the environment, it is vital that teachers, administrators, and parents see the value of EE and work to promote it in schools. Teaching materials and general information about the environment and its destruction must be made available, perhaps through a committee of interested teachers in each school district. The National Teacher's Association should also be involved in assessing approaches to EE and developing teaching material. Workshops need to be held for teachers without a background in EE, and future teachers should be trained in EE as they are in other fields. Most importantly, teachers should be encouraged to break from traditional forms of education, which limit the effectiveness of EE, and promote discussions about values and alternative uses of our environment, based on respect for the balances of nature.

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Appendix B. Post-Survey Sample Questions and Answers

Second-third grade survey given 2/23/89; 23 students; Mr. Weinstein

Third grade survey given 2/10/89; 18 students; Mr. Irish Unless stated, results from 2-3 & 3rd grade classes are combined.

Sixth grade survey given 2/10/89; 25 students; Ms. Tanner

Eighth grade Survey given 1/20/89; 19 students; Ms. James

- What does the word "environment" mean to you?
3rd: no answer/no idea: 13 examples of environments: 14 a place/what's around you: 5 where things live: 6
something that can change: 3 things you see: 1
- For each of the environments you listed, what is a change that happens because of humans?
Below are example answers only.
3rd: forest: fire; pollutions; cut down; kill animals; new plants
buildings: pollution; new buildings; kill plants/animals
park/playground: dead animals; pollution; change structures; burn; build
ocean/lake: pollution, build over, erosion, drain water
- A food web has plankton, fish, seals, and sharks. What happens if all the fish die? (Weinstein only)
no answer: 8 other animals die: 11 people die (no food): 4
- A factory puts a small amount of toxic chemicals into a lake every day. What can happen to the birds feeding on the fish in the lake? EXPLAIN. (Mr. Weinstein only)
no answer: 5 get sick/die: 8 idea of biomagnification: 10
- Why is recycling so important today? (Mr. Weinstein only)
no answer: 8 save trees: 3 litter: 2 too much garbage: 6 reduce waste: 4
- Explain briefly the causes of current global warming, also called the greenhouse effect.
6th: no answer: 11 ozone layer less: 7 deforest: 1 polluting air/burning gases, coal: 6 (One noted heat trapped in)
8th: don't know: 9 ideas of warming/carbon trapping heat: 6
- What are two changes to our environment that will happen due to the greenhouse effect?
6th: change in temp: 11 sea level rise: 7 droughts/floods: 1 can't grow what want: 2 plants can die: 2
other: 2 no answer: 6
8th: temperature change; sea level rise; animals may die: 6
- What are two solutions you think will help lessen the changes you stated above?
6th: no answer: 9 recycle: 2 education: 1 burn less gas/alt E: 11 less harmful chemicals: 3 ban styrofoam: 2
8th: conserve E/ alternate E; educate not to pollute; use care less: 7
- How important do you think the greenhouse effect is? Explain.
6th: no answer: 5 very important: 20 explanations included changes can alter life drastically; affect food, plants, animals; we could die.
- Why is recycling so important to consider today?
6th: no answer: 3 not enough room for garbage/bay, fills filled: 12 running out of resources: 2
won't waste as much: 4 less litter: 4
- Do you think it is important to learn about the natural environment and environmental issues in school? Why or why not?
3rd: no/no answer: 17 yes: 24 reasons included pollution, etc is harming animals, we may need to know later, its fun, you may be able to stop it.
6th: yes: 21 examples: if don't know about issues can't help ie recycle; makes kids want to help;
8th: yes: 15 no: 3 examples: many commented on future generations and human's dependence
- Besides recycling, what could people do in their daily lives to help protect the environment?
6th: no answer: 9 don't litter: 5 don't waste stuff: 3 drive less/carpool: 6 other: 4
- In dealing with the many environmental issues, do you think some changes in lifestyle and attitudes towards the environment is needed? Explain your answer, and what changes are needed.
8th: no answer: 2 yes: 17 explanations included lessen natural resource use; conserve; recycle;
carpool/drive less; prepare for changes in future; need concern for future; less "comforts"