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Environmental action projects involving middle school students

Mark Toney

ENVIRONMENTAL ACTION PROJECTS INVOLVING MIDDLE SCHOOL STUDENTS

A Project

Presented to the

Faculty of

California State University,

San Bernardino

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts

in

Education: Environmental Option

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by

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Approved by:

[redacted]

Dr. Darleen Stoner, First Reader

6/15/95

Date

[redacted]

Dr. Joseph Jesunathadas, Second Reader

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ABSTRACT

This paper reports on the development of environmental action projects for middle school students. Although many of the participating students have been exposed to environmental education, few have actually had the opportunity to take action with a hands-on approach. The purpose of this report is to explain the results of the four action projects that took place at Frisbie Middle School. In an after school environmental club, students were introduced to a variety of environmental problems at their school. The four action projects undertaken included: paper recycling, aluminum can recycling, school improvement projects, and lunch time waste reduction. Each action project problem was identified and the action to be taken was decided upon by the students. The apparent success of this program for these middle school students provides a basis for the future implementation of an environmental elective at this school site.

ACKNOWLEDGEMENTS

During the course of this project, it was necessary to ask for assistance. This assistance came in two forms. My advisor, Dr. Darleen Stoner, gave invaluable advice and her everlasting patience made this project much easier. The second form involves the students and staff at Frisbie Middle School who helped by participating and field testing these activities and action projects.

DEDICATION

This project is dedicated to my loving wife, Anne, without whose understanding and support this project would have never come to be. Also, to my family who always understood that I frequently had to ignore them when they visited.

INTRODUCTION

With much emphasis being placed on recycle, reuse and reduce, it has been surprising to me to see many middle school students do no more than throw their soda cans in a recycling container, if one is near. Although many of my students can explain why it is important to recycle, few have been able to see the total impact of their actions.

As a result, I decided to establish an after school environmental club for students. This club was developed because, as a teacher, I could not fit as many environmental projects into my science classes as I felt the students required to develop the necessary skills they would need to take action. Although I have found that environmental concepts and issues can be infused into almost every lesson, there was little time to do actual hands-on projects within the regular school day. The after school club allowed the students to participate in and complete projects that were not happening in the classroom due to time constraints.

The environmental action projects enabled the students to learn about environmental issues and the actions necessary for their solution. The students identified problems and took steps toward solving them. The students did not understand the entire depth of

the problem before the environmental action was started. However, there were opportunities for the students to take newly acquired knowledge, apply it to the problem and then make necessary modifications to their actions.

Involving students in environmental action projects was aimed at meeting an important link to environmental issues that is often left out, that being action. According to Stapp and Wals (1989, p.133), "The students should have the opportunity to take responsible action. Through that effort, students learn about the problem, the action and the process of problem solving." Stapp and Wals (1989) also maintained that participants do not have to understand the problem thoroughly before implementing the plan of action, as long as there were opportunities in the plan to assess the outcome and make necessary changes. They referred to this problem solving process as the "planning-observing-action-reflection spiral." This process was used with my students.

REVIEW OF THE RELATED LITERATURE

In preparation for this project, literature was reviewed that define environmental education and elucidated potential outcomes for students involved in action projects.

Definition and Goals of Environmental Education

Environmental education can have different meanings. The term, environmental education, might trigger concepts of ecology, recycling, or outdoor education. Each of these terms fits under the environmental education umbrella, but only offers a partial contribution to environmental literacy. In order to be complete, teachers of environmental education need to prepare students to understand current environmental issues and to develop the skills necessary to effectively take action toward the improvement and maintenance of the environment (Ramsey, Hungerford & Volk, 1992, p.35).

The following is the definition of environmental education used for this project. Environmental education must prepare individuals to be responsive to a rapidly changing world, to understand world problems, and to provide the skills needed to play an effective role in the improvement and maintenance of the environment (Ramsey, Hungerford & Volk, 1992, p.35).

Although many goals for environmental education have been developed, the following goal statement represents my personal views:

> The goal of environmental education is to help students become environmentally knowledgeable, skilled, and dedicated citizens who are willing to work, individually and collectively, toward achieving and maintaining a dynamic equilibrium between the quality of life and the quality of the environment (Hungerford & Peyton, 1976, p.2)

This goal is supported by the following objectives, originally established in the Tbilisi Declaration (UNESCO, 1978, p. 43):

> Awareness: Helping students acquire an awareness and sensitivity to the total environment and its problems; develop the ability to perceive and discriminate among stimuli; process, refine, and extend these perceptions.
>
> Knowledge: Helping students acquire the basic understanding of how the environment functions, how people interact with the environment, and how issues and problems dealing with the environment can be solved.
>
> Attitudes: Helping students acquire a set of values and feeling of concern for the environment and the motivation to participate in environmental improvement.

> Skills: Helping students acquire the skills needed to identify, investigate and contribute to the resolution of environmental issues and problems.
>
> Participation: Helping students acquire experience in using their acquired knowledge and skills in taking positive action toward the solution of environmental issues and problems.

Thus, in order to achieve this goal of environmental education students need to acquire an environmental ethic that promotes responsible citizenship (Hungerford & Volk, 1990, p.8). Developing this ethic requires a multifaceted approach in which students develop awareness, knowledge, attitudes, internal locus of control, sensitivity and skills that will enable them to take thoughtful, positive action toward environmental issues. An individual has an internal locus of control when self-motivation, not external rewards, motivates action. Developing environmental sensitivity means that a person has an empathic view of the environment.

In order to successfully use environmental action strategies, students must develop knowledge of and ability to use citizenship action skills to influence decision making at a local level (Ramsey & Hungerford, 1989). Developing environmental citizenship skills is supportive of active classroom learning. Thus students should be

actively engaged in classroom learning tasks such as experimentation, investigation, observation and discussion. Students should be able to choose their own methods for solving problems and request the resources and materials they need to arrive at solutions (Klein & Merritt, 1994, p.16).

Environmental Action Learning

The action approach to environmental education is based on the belief that students should play a role in planning their educational activities and in taking responsible action toward environmental problems. Through that effort, students learn about the problem, the action and the process of problem solving. Learning through action research is an effective way of developing desirable environmental behaviors as an outcome of learning.

Action research is best conducted in a series of steps. The process begins when participants such as a teacher and group of students decide to address local problems that affect them. By exploring, discussing and negotiating with one another, action research participants isolate one environmental problem for study.

Before beginning the actual project, the students work to understand the problem, to recognize the possibilities for resolving it, to explore the opportunities for taking action and to identify the potential constraints that may impede their efforts (Wals, Beringer

& Stapp, 1990, p.14). In order for students to find success in environmental action projects, they must feel that what they are doing is useful or valid in the real world. According to Wals, Beringer and Stapp (1990), there is a three-parted rationale which supports action learning. First, society must solve critical issues with the full participation of its younger members. Second, students need to know that they can be forces for constructive change and that their involvement is needed in the world. Third, giving students a chance to investigate and act upon a problem of their choosing will increase their motivation to learn.

The role of the teachers is to facilitate the action research activities of the students. They explore a problem or issue along with their students, guide them in locating resources, help them apply critical thinking skills and in carrying out a project. They encourage their students to become responsible for their own learning, emphasizing "how to learn," rather than "what to learn" (Stoner, 1995).

PROJECT DESIGN

The environmental action projects described here were conducted by 16 students from Frisbie Middle School in Rialto, California from January 10, 1995 to June 1, 1995.

The after school environmental club was formed to introduce

students to some local environmental problems in which they could be involved in providing solutions. This club allowed the students to participate in and complete projects that were not happening in the classroom due to time restrictions. Most of the students participating were enrolled in my regular science classes.

The club met on most Tuesdays and Thursdays after school from 2:45pm to 3:45pm to define problems and participate in activities that were environmentally focused. Olga Pesantes, David Culberhouse and myself, all science teachers at the school, acted as facilitators to guide and assist students in taking steps to solve the problems at hand.

The goal of the after school environmental club was to help students become environmentally knowledgeable, skilled and responsible citizens who are willing to work alone or as a group to try to improve the quality of life and also to improve the quality of the environment.

As the school year came to a close, the students completed a final student survey (Appendix B). This survey was simplified and contained only five questions. This was done in order to get a sample of their newly gained knowledge, attitudes and motivation toward the resolution of environmental issues.

Procedure Followed in Establishing an After School Environmental Club.

In order to start the after school environmental club, the following procedure was used:

1. I discussed the planned program with the principal and obtain approval.
2. I recruited two other teachers (Olga Pesantes and David Culberhouse) to assist with supervising and preparation of activities.
3. I met with the school's Advisor for Associated Student Body and develop a constitution that explained the function and objectives of the club. This, along with student behavioral requirements, and names of supervising teachers was submitted to the Associated Student Body for approval.
4. I sent home a permission slip with those students interested in attending the after school club (See Appendix A.)
5. I submitted a facilities use form in order to use a classroom after school.
6. I discussed with two other teachers the

parameters of other possible projects. These included a multidisciplinary approach, developing a recycling program, working on school improvement and displaying projects in

Description of Environmental Club and Teaching Methods

The environmental club concentrated on activities and issues to prepare the students to be responsible citizens who are environmentally aware, knowledgeable and have the skills to take positive actions in resolving problems. The teachers presented a hands-on, group oriented approach which encourages direct involvement by students.

A variety of projects and activities were used during the club's meetings to prepare students for deciding on future environmental actions. Many of these activities were from Project WILD (1986) and Earth's Natural Resources for seventh and eighth grade students (Prentice Hall, 1993).

Project WILDis an interdisciplinary, supplementary environmental and conservation education program. Project WILD is based on the belief that young people and their teachers have an interest in learning about the earth as a home for people and wildlife. The program emphasizes wildlife because of its intrinsic,

ecological and other values, as well as its importance as a basis for understanding the fragile grounds upon which all life rests.

The Prentice Hall science texts were used because the textbook included real-world problems that required critical thinking processes and strategies. These real life problems can be used to supplement instruction in the curricular areas of math, science, English, social studies and reading. These problems are also flexible in terms of how teachers choose to use them in their plans and in terms of topic focus.

The activities that were used related to pollution, land use, basic habitat needs, carrying capacity and conservation.
The following activities from Project WILD were the most adaptable for this project. These activities were used mostly as preparatory activities to get students to begin thinking about environmental issues they were going to address in greater depth.

Ants On a Twig: This activity stresses the basic needs that ants have and how similar their needs are to human needs. It allows students the opportunity to go outside and experience nature on a small scale.

Micro Scavenger Hunt: In this activity, students find evidence to show that humans and wildlife share common environments. Also, it was expanded so students would conclude that humans and

wildlife experience some of the same problems.

Habitat Lap Sit: This is a fun activity that allows students to see the importance of each component (food, water, shelter and space) in a habitat. This is an easy activity to set up as it requires no materials.

Litter We Know: The purpose of this activity is to alert students to the dangers of litter pollution and to consideration of responsible actions people can take to minimize pollution.

Urban Nature Search: Students go outside and observe the school environment. They sketch and describe different kinds of plants and animals in a this environment.

Quick Frozen Critter: This is like a game of "freeze tag." During the game, the students take the roles of predators or prey. Once they understand the concept of the game, it is much easier to discuss the predator/prey relationship and how it affects populations.

Classroom Carrying Capacity: This activity allows students to experience carrying capacity while in the classroom. They have the opportunity to discuss the earth and its carrying capacity related to current population.

Deadly Links: Students get to participate in an activity where they collect food in a food chain. They discuss how pesticides can

spread throughout a food chain.

Shrinking Habitat: Students play a role of herbivores, carnivores or developers. After the activity, the students summarize some of the possible impacts on wildlife from human activities like development of land areas.

Too Close for Comfort: Students learn about the amount of space an animal needs to remain healthy. A healthy animal is able to find enough food and reproduce. The students discuss what happens when animals are not given the natural amount of space they require.

Here Today Gone Tomorrow: The students learn how to use the classification system that indicates the level of threat an animal is experiencing. Students learn the difference between animals that are endangered, threatened, rare and extinct.

These activities are directed at building students' interest. Once the students understand the concepts of each lesson, it is easier to apply those concepts to other areas in environmental education.

DESCRIPTION OF PROJECTS

The following projects were agreed upon by myself and the students as areas that are of concern at Frisbie Middle School. Once a project was started, it was our goal to continue the action to the end of the school year. The paper and the aluminum can recycling projects were the only projects continued to the end of the school year.

Paper Recycling

While doing a "trash peek" (students looking into the school's dumpsters to see what kind of material is being thrown away), the students discovered that the majority of waste in the school dumpsters was paper. Most of this paper was white paper from notebooks and handouts. The students collected the trash cans from three surrounding classrooms, they separated the white paper from the rest of the material. Then they attempted to calculate by weight, how much white paper was being thrown away in the entire school.

The students discussed the problem of reducing the amount of paper waste and potential solutions. They decided that recycling the paper was the best idea, but they had no idea who to contact. They asked the school's principal which company picked up the school's trash. They found that the company, EDCO, picked up the school's trash.

When students asked personnel at EDCO about recycling, EDCO personnel volunteered to deliver recycling boxes for each classroom. These boxes were for white paper only. The boxes had to be dumped into a special recycling dumpster provided by EDCO. The recycling boxes and the recycling dumpster were free to the school. When the dumpster was full, EDCO was called and then picked up the recyclable paper. The students decided to pick up the boxes from each class participating every Friday and deposit the white paper in the recycling dumpster.

This pickup procedure was deemed to be unsuccessful after three weeks, as I received notes from four teachers in my mail box that asked for their classes not be interrupted by students collecting the paper from the recycling boxes. That problem was addressed during a staff meeting and the conclusion was that each teacher would take responsibility for emptying their classroom box. The recycling dumpster was unlocked every Friday during the last period of the day for any teacher that needed to empty the recyclable white paper box. Unfortunately, the amount of paper regularly going into the recycling dumpster was not as much as expected. This project actually started in November 1994. As of April 14, 1995 the total amount of money raised from the recycled white paper was $22.00.

Although the group was discouraged about the lack participation from teachers and administration as well as the loss of potential revenue, the students continued to stress the importance of their action toward reducing the amount of waste going to the local landfill. This was determined by asking the students if the recycling of white paper should continue despite the problems encountered and disappointing amounts of revenue. A common statement voiced by the students was, "We are just throwing the paper away, so if we can recycle the paper and reduce the amount going to the landfill, then it is worthwhile."

Concern has remained high regarding correct paper to put into the recycle box. Project students often tell their peers that only white paper can go into the recycling boxes. So when someone puts white paper in the trash, a club member is likely to tell him/her that white paper goes in the recycle box.

A follow-up plan was discussed among the project staff. When the new year starts, it will be the responsibility of each teacher to collect and transport his/her own white paper to the recycling dumpster. This may be done by the teacher or by sending students to the recycling dumpster.

Recycling Aluminum Cans

The school has soda available at two machines and in the snack-bar at lunchtime. This produces a tremendous amount of aluminum cans that was being thrown in the trash. Some cans were being recycled due to the efforts of the night custodian. The students goal was to collect every can on campus and recycle them. The students' plan received approval from the Associated Student Body to buy four recycling bins that have a can crusher built into the lid.

These recycling cans were successfully purchased at a cost of approximately $70.00 each and placed in the physical education area as well as in the lunch areas. While the initial program was found to be successful, many aluminum cans were still going into the regular trash cans. To solve this problem, the students approached the staff and Associated Student Body to propose a team competition.

After a given number of days, the team with the most aluminum cans in its recycling bin, would win team points. The teams are made up of the students core classes: math, science, English and social studies. There are eight teams on campus with each team containing about 120 students. The team with the most points at the end of the year, would win a free trip to a waterpark,

paid for by the Associated Student Body fund.

It was determined that one point per aluminum can would be given. Leadership students were given the task to monitor and count how many aluminum cans went into each team's recycling bin at each lunch. The students decided that the cans did not need to be purchased at lunch to go in the recycling can; it could be an aluminum can brought from home. The competition increased the amount of cans being placed into the recycling bins as the students did not want a can that they threw into the trash to be picked out and placed into another team's recycling bin.

The number of cans collected out numbered the total student body population almost two to one every day of the contest. The students from Mr. Marshall's student government class (The Leadership students) took responsibility for collecting the aluminum cans. Mr. Marshall then loaded the aluminum cans and took them to a recycling center. The money from the cans went into the Associated Student Body fund to help defer the cost of school activities such as dances. The amount of money collected as of April 14, 1995 was $495.65.

The students found creative ways to use aluminum cans. Some of these ways included making bird feeders, aluminum can neck-ties, pencil holders and other creative objects that allowed the students to find ways to reuse objects that are typically thrown away.

School Improvement Project

It was discovered that one of the physical education teachers was going to spend a week repainting the numbers and outlines in the physical education area. This has been an annual task that is very time consuming. There was also one outside wall that was regularly painted with graffiti and that needed repainting. The students from the Environmental Club volunteered to come to school on a Saturday and do all of the painting. Nine students showed up to paint. The materials were supplied by the school and with minimal supervision, the students went to work. When finished, the area looked bright and sharp. The students that participated were asked at the completion how they felt about people vandalizing the school. Their answers could best be summed up as: "they were tired it."

The wall that received graffiti on a regular basis was once again hit less than one week after the students had repainted it. The physical education teacher that takes care of the area said, "That wall gets it every time new paint is put on; it's like a game to the vandals." One of the students that participated in the painting project, told me how angry she was "after working so hard to make the school look nice, only to have it trashed less than one week later."

Lunch Time Waste Reduction Project

The idea behind this project was initiated by my desire to reduce the enormous amount of waste that comes from the school's lunch program. When I proposed this project to the students, they were excited and quickly began to develop solutions to solve this waste problem. The first step taken was to go out after lunch and before the trash cans were emptied into the dumpster to do a survey of how many of each item was found in the trash can.

The students were supplied with rubber dishwashing gloves. They began separating the trash into the following groups: milk cartons, cardboard boxes, plastic fruit cups, straws, napkins, plastic sporks (a plastic spoon/fork combination) and plastic wrappers. There were other objects found in the trash, but the focus area was on the material from the free and reduced lunch program.

The students' first response to the task of separating the trash was that it was a nasty job and the trash needed to be separated before it was thrown away.

While counting the individual materials, the lunch supervisor came and questioned our actions and assisted us with a tremendous shortcut. She informed us that if a total number of lunches was needed to complete the count, all we had to do was ask and she

would give us the number of lunches served that day.

Each student then developed a series of questions to be made into a survey. The students then selected the best questions from the group and typed the survey that was presented to teachers, students, custodians and the lunch area workers. The questions in most of the surveys designed for students, asked if they would be willing to separate their own lunch material into specific recycling containers. Many replied "yes" and that they would place the material in the specific container. Other questions for students asked what materials they seldom used from the lunch program. Many answered they rarely used the package that contains the plastic spork, straw and napkin.

Questions directed at custodians and the lunch area workers asked if having students separate these materials would make their job easier. The reply from these surveys was a shock to the students as those workers said they have a system that works and that they didn't want that system changed. Several thought that a recycling program was a good idea, but they wanted very little to do with the student's ideas. One custodian said, "This is a bad idea; all it will do is make more work for me."

The students developed a plan and called EDCO (the company that picks up the school's trash dumpsters and recycled white paper

dumpster) and asked if any of the lunch material were recyclable. In response, EDCO sent someone to pick up a sample and determine what if any of the material was recyclable.

The results were that the cardboard box, milk carton and napkin would be easiest to recycle because we could use a dumpster similar to the white paper dumpster currently at school.

The students then developed plans and maps for what they thought would be the best recycling system. The plans explained how students would pick up their lunch, eat it, and dispose of the left over materials into the proper containers. The maps displayed the location of new recycle containers.

Not wanting the students to be to disappointed with the response they obtained from the staff, I had them participate in some fun activities using some material from the lunch program. The students had to make vehicles that would roll the furthest distance after starting down a ramp in the classroom. The only materials that could be used were from the lunch material.

I see this project requiring the cooperation of the entire district in order to achieve the maximum level of success. My students have developed ideas that have potential, yet there are many areas where the students do not understand the complexity effecting change.

RESULTS

After each activity or project, the students were involved in a reflection period. This reflection was allowed as much time as necessary for the students to discuss their acquired knowledge, feelings or attitudes pertaining to the completed issue. Often times, as a result of their reflections, students were able to better define why problems occur and the need to be involved in solving them. It was apparent that many of the students became more active participants in the discussions than before the action projects.

The students responses to the final survey (Appendix B) are summarized in the following paragraphs.

When describing their environmental awareness, students felt more aware of problems that face the environment and yet many still felt the solutions to environmental problems was up to adults. Results from the survey showed that 50% said they were more knowledgeable about environmental issue; 40% listed areas that they were more aware of, with the most listings being recycling and pollution.

When asked what areas of environmental issues they felt most knowledgeable, 56% responded that recycling was the area that they were most knowledgeable. The environmental issue that concerned

them the most was the ozone layer which received a response from 43% of the students surveyed.

When asked what has motivated them to take action toward solving an environmental problem, 62% responded that the environmental club gave them the idea to start taking action at home.

When asked how they could identify an environmental problem, 25% responded that it was something that they could see (visually) which damages the earth. Although this was not as in depth of an answer as I had expected, at least the students can look to see that something damaging the earth is an environmental problem.

The success of this project is evident in two forms. The first is the continued support from the students for the two recycling programs. The students are placing aluminum cans in the recycling bins, and the white paper collection boxes in the classrooms are always filling up. The second form of success is the response from the students who say they are increasing their recycling at home.

This project will hopefully be continued next year as a 6 week elective. This will allow more students to experience hands-on action projects.

Appendix: A

Student Permission Slip

CONSENT TO PARTICIPATE IN SCHOOL STUDY TRIP/ACTIVITY

Frisbie Middle School

TO BE COMPLETED BY SCHOOL PERSONNEL:

Description of study trip or activity: After school environmental club.

Date(s) of the trip: Tuesday & Thursday after school

Transportation will be provided by:

- ☐ School bus
- ☐ Other N/A

Participants will leave from (location) _____ at (leave time) 2:45 and return at approximately (return time) 3:45. If participants return after the normal school dismissal time, parents must arrange for transportation home.

SPECIAL INSTRUCTIONS: (sack lunch, special clothing, etc.) Students must bring a notebook.

TO BE COMPLETED BY PARENT/LEGAL GUARDIAN:

I hereby give my permission for (student's name)_____ (hereinafter, "dependent") to participate in the above described study trip/activity. I fully understand that he/she is to abide by all rules and regulations governing conduct during the study trip. It is understood that anyone determined to be in violation of these behavior standards may be sent home at the parent or guardians' expense and may be subject to further disciplinary action.

I understand and acknowledge that, as provided in Education Code Section 35330, by consenting to allow my dependent to participate in this study trip, I shall, by law, be deemed to have waived all claims against the Rialto Unified School District, each of its officers, employees and agents (hereinafter, "District") for any injury, accident, illness or death occurring during or by reason of the study trip. I also agree to relieve the District of any responsibility for damage to or loss of my dependent's property occurring during or by reason of the study trip.

In the event of any illness or injury, I hereby consent to whatever x-ray, examination, anesthetic, medical, dental or surgical diagnosis or treatment and hospital care from a licensed physician and/or surgeon as deemed necessary for the safety and welfare of my dependent. It is understood that the District has no insurance covering such medical costs and therefore, resulting expenses will be the responsibility of the parent(s), or participant. (Whenever possible, attempts will be made to contact the parent/guardian prior to taking any medical action.)

Signature of Parent/Legal Guardian	Home Phone
Date / Mother's Work Phone	Father's Work Phone
Health Insurance/Student Accident Insurance*	Policy Number
Emergency Contact Person (If unable to reach above)	Phone Number

SPECIAL NOTE TO PARENTS/GUARDIANS:

- All medications must be pre-registered with the school following the District's Health Services procedures. Contact your school office for specific procedures.
  - ☐ Check here if your dependent has a special medical problem or requires medication during the trip. Describe any special problems or medications, along with the reason to be taken, on the reverse.
  - ☐ Check here if there are no special problems that the staff should be aware of and no medications are required on the trip.
- Free, reduced, and full price sack lunches are available to participants. ☐ Check here if you would like a lunch provided to your dependent. *(Contact school for prices.)*

* If you do not have health insurance, the District provides forms for you to obtain a low-cost student accident insurance plan. The forms are available at your school office.

Appendix B:

FINAL STUDENT SURVEY

Please answer the following questions to the best of your ability. Please give explanations and examples where necessary.

1. How would you describe your awareness of environmental issues?
2. In what areas of environmental issues do you feel more knowledgeable?
3. What environmental issue concerns you the most?
4. What has motivated you to take action toward solving an environmental problem?
5. Describe how you could identify an environmental problem.

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