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Environmental Education Teacher and Student Needs: A Teacher Survey Identifies Problems, Motivational Factors and Desired Topics for Teacher Workshops and Student Groups: Part One

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ENVIRONMENTAL EDUCATION TEACHER AND STUDENT NEEDS

A Teacher Survey Identifies Problems, Motivational Factors and Desired Topics for Teacher Workshops and Student Groups

PART ONE

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In order to identify teaching problems and student motivational factors, and to determine which environmental topics of study are perceived to be of greatest importance for grades 4-12, the Iowa Conservation Education Center (CEC) conducted a survey of Iowa science teachers. The results of this survey should be helpful to teachers planning environmental activities or field trips. The information will also aid various organizations in their efforts to improve services for student groups and teacher workshops.

The CEC is a residential environmental education facility operated by the Iowa Conservation Commission at Springbrook State Park in west central Iowa. The center is interested in increasing the number of teacher workshops and school groups using the facility, and improving the quality of programs offered to them.

This article will explain the background of the teachers who responded to the survey and the needs they perceived for student groups. The needs for teacher workshops, also assessed by the survey, will be presented in Part 2 of this article which will appear in a future issue of the *Iowa Science Teachers Journal.*

The survey targeted 500 teachers of grades 4-12 in Area Education Agency (AEA) 11 comprising an eleven county area which also includes the city of Des Moines. It was a random sample of 356 fourth to sixth grade teachers (from both self-contained classrooms and departmentalized science teaching situations), and 144 secondary teachers of biology, life science and earth science. This was about 25 percent of the secondary science teachers and 5 percent of the fourth to sixth grade teachers in AEA 11. Figure 1 shows the survey area (AEA 11) which included both urban and rural areas, and schools up to 100 miles from the CEC. The survey was conducted during the autumn of 1985.

General Description of Teachers

A total of 278 teachers (55.6 percent) responded to the survey. Respondents were 60 percent female and 40 percent male. Public schools employed 87 percent of the respondents; 13 percent were from parochial schools. Results showed 68 percent were elementary teachers and 32 percent secondary teachers. They averaged 15.1 years teaching experience. Of the total, 88 percent of the respondents were familiar with the Conservation Education Center (CEC). A total of 33 percent had attended a workshop for teachers at the CEC, and 21 percent had brought a group of students to the CEC. Non-users composed 58 percent of the respondents.

The relationship between the teachers' general involvement in environmental

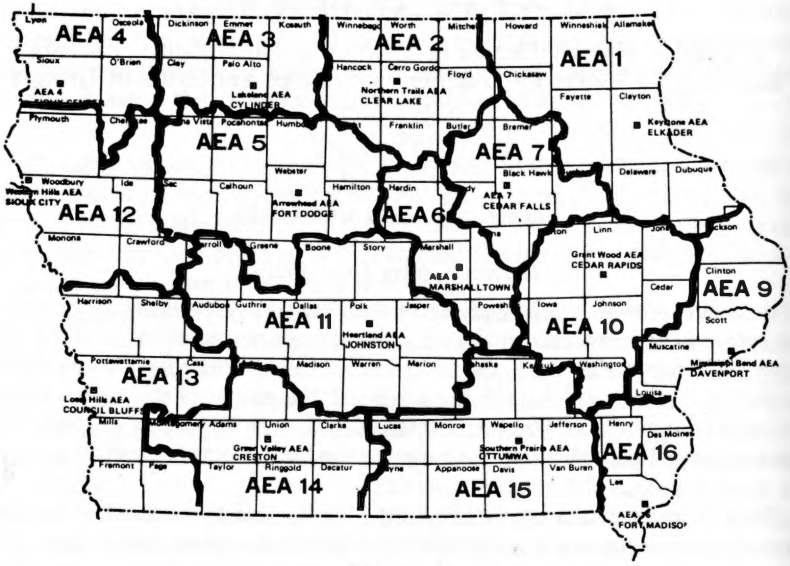

Figure 1
MAP OF TARGET AREA (AEA 11)

education and their degree of use of the CEC was considered to be helpful information in understanding why teachers use the CEC. Teacher involvement in environmental education (EE) was determined from the frequency of their actions for the following: EE classroom discussions, EE classroom activities/experiments, EE activities on the school grounds, EE activities in local nature areas and overnight EE field trips. The following values were assigned to each frequency: None = 0, Once/Yr. = 1, Few times/Yr. = 2, Once/Mo. = 3, Once/Wk. = 4. The five values were then added together to obtain the total EE involvement (Table 1).

The average total EE involvement score was 5.56. The average respondent to this survey has EE classroom discussions several times per year (2.13), does EE classroom activities/experiments a few times per year (1.53), and does an EE activity on the school grounds about once per year (1.04). About three-fourths of the respondents (72 percent) conduct EE activities in a local nature area once per year, and about one-seventh (15 percent) go on an overnight EE field trip once per year.

Teachers who had visited the CEC both with students and at workshops had nearly twice the total score for EE involvement (8.33) as nonusers (4.48). Secondary teachers in this sample had a higher average for EE involvement (6.15) than elementary teachers (5.29).

The EE totals offer information to be examined further. For example, the fifth grade teachers had the lowest total score, as well as the lowest scores for classroom discussion and activities in the classroom or on the school grounds. However, they were the third highest for overnight field trips. These facts raise

the following question: Is there something about the fifth grade curriculum that encourages a "major" field trip, but less EE involvement back at the school?

The ninth grade teachers had the lowest score for both types of trips away from the school, as well as the second lowest total score. However, the eighth grade teachers had the highest total score, as well as the highest scores for classroom discussions and activities. This information poses several unanswered questions, the answers to which could prove to be important in curriculum planning: Why is there such a distinct difference in involvement between eighth and ninth grade? Are ninth graders considered a greater discipline problem away from school? Are ninth graders the youngest in the high school who thus haven't "earned" the right to a field trip? Do ninth grade teachers have more teaching or extra-curricular activities that make it hard to take on the additional responsibility of organizing a field trip?

Table 1
AVERAGE EE INVOLVEMENT BY GRADE

Grade Taught*	# of Surveys	Classroom Discussion	Class Activity	School Grounds	Local Areas	Overnight Field Trip	Total
4	103	2.20	1.51	1.01	.75	.11	5.59
5	100	1.97	1.35	.95	.73	.17	5.17
6	89	2.08	1.52	1.07	.74	.19	5.60
7	44	2.43	1.86	1.34	.77	.18	6.59
8	46	2.57	1.96	1.24	.80	.15	6.72
9	38	2.11	1.63	1.03	.45	.08	5.29
10	59	2.25	1.63	1.24	.76	.10	5.98
11	51	2.39	1.76	1.29	.78	.10	6.33
12	51	2.45	1.80	1.39	.84	.10	6.59
Average	65	2.13	1.53	1.04	.72	.15	5.56

*Many teachers wrote down several grades. Some may have interpreted the question as asking for all the grades they'd taught throughout their careers.

Student Field Trips to the Conservation Education Center (CEC)

Problems in Bringing Students to the CEC

Teachers rated problems which would prevent them from bringing school students to the CEC. The average scores for all elementary teachers and all nonusers showed three principle problems (in order of importance):

1. Distance
2. Cost of food and lodging
3. Cost of transportation

The average score for all secondary teachers showed four problems for them (in order of importance).

1. Conflicts with extracurricular activities
2. Not enough time to coordinate the trip
3. Cost of transportation
4. Distance

These problems could be approached in two ways. One is to try to reduce the conflicts, cost and distance. The other is to acknowledge these problems, and then show that a visit to the CEC is worth the cost of travel, money, time, or energy.

For example, many teachers consider the CEC to be too far away. When comparing this factor by county, one would expect the farthest counties to have a higher percentage of teachers who consider this factor problematic. However, one exception is Jasper County which is among the farthest from the CEC, but has a relatively low percentage of teachers that think the CEC is too far away. Jasper County also has one of the highest percentages of teachers who have taken students to the CEC. A look at actual experiences at the CEC, shows, for example, that several Newton schools bring their students to the CEC year after year. They are willing to travel the distance, because the field trip is worthwhile for them.

Costs are not likely to decline in the present economic climate. Some solutions schools have used include class fund raisers, students paying costs individually, the school picking up the tab, or a combination of these. Some schools save transportation costs by "piggy-backing" classes: The bus which brings the second class takes the first class home.

To offset the secondary teachers' worries about having enough time for coordinating the trip, the planning aids provided by the CEC staff could be promoted.

Motivation for Bringing Students to the CEC

Teachers thought all four motivations listed were important reasons for exposing students to the CEC. They were ranked as follows:

1. A teacher's guide of environmental education activities is provided by the Conservaton Education Center staff.
2. Assistance from the Conservation Education Center staff is given in teaching classes.
3. Assistance from the Conservation Education Center staff is offered in planning the field trip schedule.
4. Training in leading environmental education activities is provided by the Conservation Education Center.

The CEC presently provides the first three items, and provides EE training (#4) in a general format.

Topics for Students

From a list of topics, teachers checked those they would like to include for a student field trip to the Conservation Education Center. In Tables 3-5, the number after each grade refers to the total number of teachers reporting in that grade. The number in front of each topic is the percent of those teachers who checked the topic.

Table 2
TOPICS FOR STUDENT FIELD TRIPS — ALL GRADE LEVELS

Rank	Percent*	Topic
1	63	Plants
2	61	Mammals
3	58	Birds
4	56	Environmental sensitivity
5	53	Soil conservation
6	52	Wildlife management
6	52	Ecology
8	51	Reptiles/Amphibians
9	50	Rocks/Landforms
9	50	Problem-solving skills
11	47	Fish
12	44	How people interact with the environment culturally, politically or economically
13	43	Forestry
14	40	Water/Air
15	39	Invertebrates
16	31	Hunting/Trapping/Fishing

* Percent of 478 teachers who listed the topic

Table 3 shows that the choices for fourth and sixth grades are more like each other than like fifth grade. Soil conservation is ranked first for fifth grade, higher than any other grade. However, most of the topics that are "living" are rated

Table 3
TOPICS FOR STUDENT FIELD TRIPS — GRADES 4-6

Rank	Percent Grade 4 (103)	Percent Grade 5 (100)	Percent Grade 6 (89)
1	67 Plants	65 Soil cons.	64 Plants
2	67 Mammals	61 Rock/Landform	63 Env. sensitive
3	64 Birds	60 Plants	60 Birds
4	62 Rock/Landform	59 Env. sensitive	60 Mammals
5	56 Rept/Amph	58 Birds	57 Wildlife man.
6	50 Soil cons.	56 Mammals	56 Prob. skills
7	47 Wildlife man.	55 Prob. skills	55 Rock/Landform
8	46 Env. sensitive	52 Ecology	54 Soil cons.
9	46 Prob. skills	50 Wildlife man.	53 Ecology
10	46 Fish	48 Cult/Polt/Econ	51 Rept/Amph
11	43 Ecology	44 Rept/Amph	48 Forestry
12	41 Forestry	42 Water/Air	47 Cult/Polt/Econ
13	39 Cult/Polt/Econ	40 Fish	47 Fish
14	39 Water/Air	36 Forestry	43 Water/Air
15	35 Invertebrates	35 Invertebrates	42 Invertebrates
16	22 Hunt/Trap/Fish	23 Hunt/Trap/Fish	33 Hunt/Trap/Fish

lower for fifth grade than for fourth or sixth grade, including Plants, Birds, Mammals, Wildlife management, Reptiles/Amphibians, Fish and Forestry. Rocks/Landforms shows a decrease in popularity from fourth to sixth grade, whereas some topics show an increase in popularity in this progression, such as Environmental sensitivity, Problem-solving skills and Ecology. Invertebrates and Hunting/Trapping/Fishing are both rated at the bottom for all three grades.

Ratings of topics by seventh and eighth grade teachers, shown in Table 4, are very similar, except that eighth grade teachers ranked Wildlife management and Soil conservation higher and Reptiles/Amphibians lower. The ninth grade list is the exception for this table. Ninth grade teachers' first choice was "How people interact with the environment culturally, politically or economically," which was ranked in the middle or bottom of all other lists. Several of the "living" topics were lower on the ninth grade list than either the eighth or tenth grade lists, including Plants, Wildlife management, Mammals, Birds, Reptiles/Amphibians, and Invertebrates. For some topics, however, ninth grade was a transition from eighth to tenth grade where Ecology increased in popularity, and Soil conservation, Forestry, Water/Air, and Rocks/Landforms decreased in popularity.

Table 4
TOPICS FOR STUDENTS — GRADES 7-9

Rank	Percent Grade 7 (44)	Percent Grade 8 (46)	Percent Grade 9 (38)
1	68 Plants	67 Wildlife man.	68 Cult/Polt/Econ
2	67 Mammals	65 Plants	61 Ecology
3	64 Ecology	63 Mammals	61 Env. sensitive
4	64 Rept/Amph	63 Soil cons.	55 Plants
5	61 Wildlife man.	61 Ecology	55 Wildlife man.
6	61 Env. sensitive	61 Env. sensitive	50 Mammals
7	61 Birds	59 Birds	50 Soil cons.
8	59 Forestry	57 Rept/Amph	50 Forestry
9	59 Fish	54 Forestry	47 Fish
10	57 Soil cons.	54 Fish	47 Prob. skills
11	57 Prob. skills	54 Prob. skills	45 Birds
12	52 Cult/Polt/Econ	50 Cult/Polt/Econ	45 Hunt/Trap/Fish
13	50 Invertebrates	48 Invertebrates	42 Rept/Amph
14	48 Hunt/Trap/Fish	46 Hunt/Trap/Fish	39 Water/Air
15	41 Water/Air	46 Water/Air	34 Invertebrates
16	39 Rock/Landform	43 Rock/Landform	29 Rock/Landform

Table 5 shows that the rankings of topics for tenth through twelfth grades were very similar, and the top three topics were the same for each grade: Ecology, Wildlife management and Plants.

Table 5
TOPICS FOR STUDENTS — GRADES 10-12

Rank	Percent Grade 10 (59)	Percent Grade 11 (51)	Percent Grade 12 (51)
1	66 Ecology	65 Ecology	67 Ecology
2	61 Wildlife man.	61 Wildlife man.	63 Wildlife man.
3	59 Plants	59 Plants	61 Plants
4	58 Mammals	55 Mammals	59 Env. sensitive
5	56 Env. sensitive	55 Env. sensitive	57 Mammals
6	53 Birds	53 Cult/Polt/Econ	55 Prob. skills
7	51 Fish	53 Prob. skills	53 Birds
8	49 Cult/Polt/Econ	51 Birds	51 Cult/Polt/Econ
9	47 Invertebrates	49 Fish	51 Fish
10	47 Prob. skills	45 Invertebrates	47 Invertebrates
11	46 Rept/Amph	43 Rept/Amph	45 Rept/Amph
12	42 Forestry	41 Hunt/Trap/Fish	41 Hunt/Trap/Fish
13	41 Hunt/Trap/Fish	39 Forestry	39 Forestry
14	34 Soil cons.	37 Soil cons.	35 Soil cons.
15	32 Water/Air	33 Water/Air	31 Water/Air
16	15 Rock/Landform	16 Rock/Landform	16 Rock/Landform

In comparing topic choices by grades, it is interesting to note that the two grades which interrupted the trend, fifth and ninth, had the lowest EE involvement scores, with 5.17 and 5.29 respectively (Table 1).

This survey was the first step in the Conservation Education Center's efforts to improve services for students in environmental education. Creative solutions are being sought to solve the identified problems, to increase motivational factors and to design programs appropriate to the needs of each level.