DOCUMENT RESUME

ED 125 857 SE 019 314

TITLE	Student Impact in the Cognitive and Affective Domains: Report of the Field Evaluation of the Environmental Curriculum Materials.
INSTITUTION	Willoughby-Eastlake School District, Willoughby, Ohio.
SPONS AGENCY	Bureau of Elementary and Secondary Education (DHEW/OE), Washington, D.C.
BUREAU NO	SO-464-SW
PUB DATE	[75]
NOTE	226p.; Not available in hard copy due to marginal legibility throughout
EDRS PRICE	MF-$0.83 Plus Postage. HC Not Available from EDRS.
DESCRIPTORS	Affective Behavior; Cognitive Measurement; *Curriculum Evaluation; Educational Assessment; Educational Research; *Elementary Secondary Education; *Environmental Education; *Evaluation; Measurement
IDENTIFIERS	Elementary Secondary Education Act Title III; ESEA Title III; *Ohio; Research Reports

ABSTRACT

This publication reports the results of an evaluation program to determine the effect of an interdisciplinary, K-12 environmental curriculum. The objectives of the evaluation program were twofold. First, to develop and validate evaluative instruments which would measure the impact of the environmental curriculum materials on students. Both cognitive and affective instruments were developed corresponding to the levels of the curriculum design. Second, to measure the degree of impact the environmental curriculum materials had on students from the twelve school districts involved in the program. This report discusses the degree to which these objectives were successfully attained. The evaluative instruments, data, and data analysis are presented for each level. The evaluation results indicate that the total curriculum package for grades K-12 does provide the educator with a program with the potential of having a significant impact. (BT)

STUDENT IMPACT IN THE COGNITIVE AND AFFECTIVE DOMAINS:

REPORT OF THE FIELD EVALUATION

OF THE ENVIRONMENTAL CURRICULUM MATERIALS

CONDUCTED BY THE PROJECT ENTITLED:

ENVIRONMENTAL EDUCATION: CURRICULUM, INFORMATION, AND TRAINING

WILLOUGHBY-EASTLAKE CITY SCHOOLS
37047 RIDGE ROAD
WILLOUGHBY, OHIO 44094

PROJECT NO. SO 464 SW

FUNDED BY THE:

ESEA TITLE III OFFICE, U. S. OFFICE OF EDUCATION
WASHINGTON, D. C.

WILLOUGHBY-EASTLAKE CITY SCHOOLS
37047 Ridge Road
Willoughby, Ohio 44094

Mr. Arthur S. Holloway, Superintendent

BOARD OF EDUCATION

Mr. Charles W. Fetheroff, President
Mr. John N. Nelson, Vice-President
Mr. C. Richard Henderson
Mr. John W. Reinhardt
Mr. Michael C. Weist

ENVIRONMENTAL EDUCATION: CURRICULUM, INFORMATION, AND TRAINING

%Longfellow Elementary School
35200 Stevens Boulevard
Eastlake, Ohio 44094

Project No. SO 464 SW

Dennis M. Wint, Consultant

Funded by the U.S. Office of Education

ESEA Title III Office

TABLE OF CONTENTS

APPENDICES

APPENDICES (cont'd)

Student Impact in the Cognitive and Affective Domains:

Report of the Field Evaluation of the Environmental Curriculum Materials

I INTRODUCTION:

This publication reports the results of the evaluation program sponsored by a grant from the U.S. Office of Education, ESEA Title III, Section 306, to determine the effect of an environmental curriculum on students.

The Center for the Development of Environmental Curriculum was funded by Ohio ESEA Title III between August 15, 1971 and August 14, 1974, for the purpose of developing an interdisciplinary environmental curriculum for grades K-12 which would assist in the development of the environmentally literate citizen.

During the three years of the project, thirty four units for elementary teachers and thirty four units for secondary teachers were prepared. The elementary units were written by members of the project staff between May, 1972, and November, 1972. The secondary units were prepared by classroom teachers, environmental experts, and content specialists between October, 1973, and January, 1974.

All curriculum materials were field tested in classroom situations in urban, suburban, and rural communities, in school systems located primarily in northeastern Ohio. During the elementary pilot program, 69 teachers from nine school systems participated. The secondary pilot program involved 123 teachers representing sixteen school systems. The purpose of the pilot program was to obtain evaluative data on the applicability and potential success of the curriculum materials in actual classroom situations.

Juries of experts were also contracted to review elementary and secondary materials. The first jury, composed of school administrators, curriculum and instruction experts, and environmental experts, reviewed the first draft materials for content validity and curriculum appropriateness. The second jury, composed of classroom teachers as well as members of the first jury, reviewed the final draft materials for potential success.

The results of the final jury evaluation indicated that 31 of the 34 elementary units and all 34 of the secondary environmental units met the minimum level of acceptance.

Of the 34 elementary units, 27 were published by the Ohio Department of Education. All 34 of the secondary units were published.

Based upon the initial evaluation results provided by the jury of reviewers, the Willoughby-Eastlake City Schools submitted an application to the U.S. Office of Education (USOE) in April, 1974 for the purpose of gathering evaluative data of the impact of the environmental curriculum materials on students. Prior to this time, all evaluation had been conducted using adults as reviewers.

The project entitled "Environmental Education: Curriculum, Information, and Training" was funded by USOE for the period of July 1, 1974 to June 30, 1975, and was concerned with implementing the curriculum and evaluating the impact of the curriculum on students.

A second and related project entitled "Environmental Curriculum" was sponsored by the Ohio ESEA Title III Office with the purpose of implementing the program into selected Ohio schools. A total of twelve schools received monies through

the "Adaptation Grants" to implement the environmental curriculum materials. Because the Ohio ESEA, Title III projects were concerned primarily with implementation and the USOE project was concerned primarily with evaluation, the grants complemented one another.

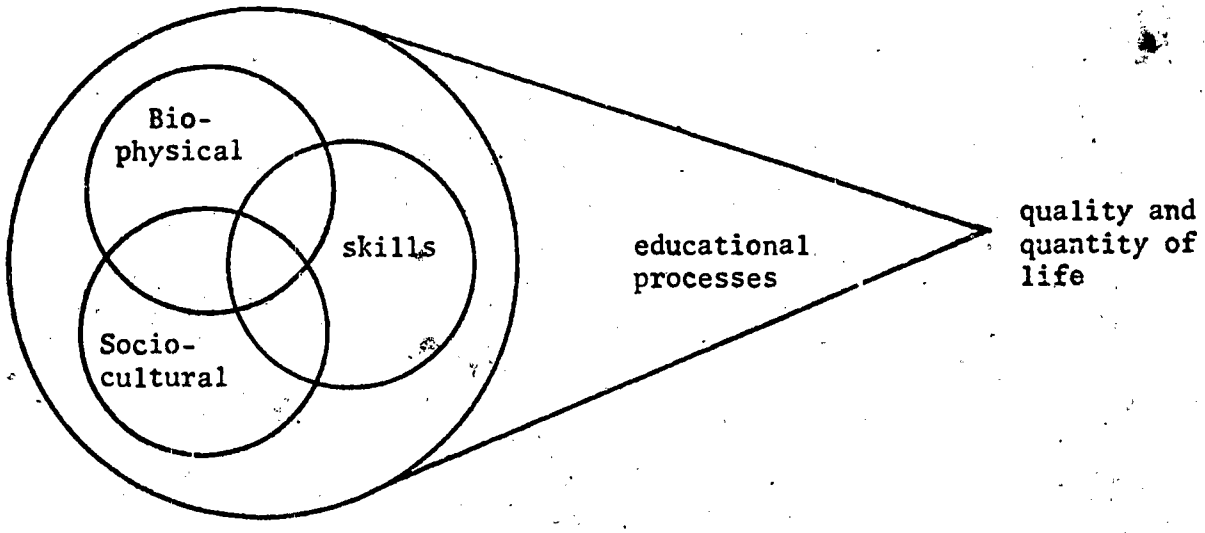
The objectives related to this report were stated in the project "Environmental Education: Curriculum, Information, and Training" are:

> To develop and validate evaluative instruments which will measure the impact of the environmental curriculum materials on students. Both cognitive and affective instruments will be developed corresponding to the levels of the curriculum design.
>
> To measure, using the cognitive and affective instruments at the various levels, the degree of impact the environmental curriculum materials has on students from the twelve school districts involved in the program.

This report will discuss the degree to which these objectives were successfully attained.

II CURRICULUM ORGANIZATION

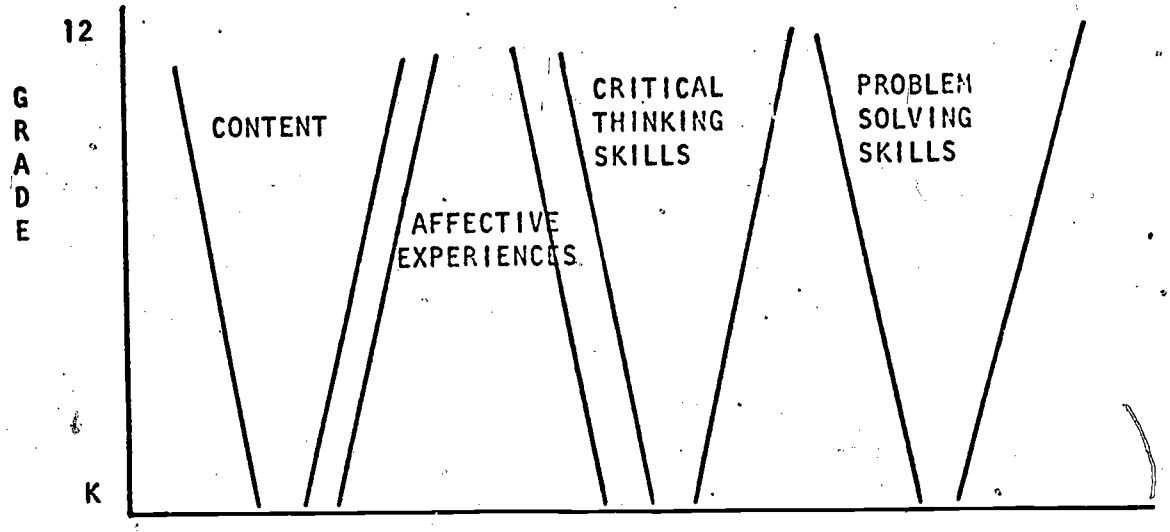
The components of the environmental curriculum developed by CDEC are interrelated as follows:



(Adapted from Dr. Mary Lynn Bowman, Ohio State University)

The skills are primarily in the area of critical thinking and problem solving, both of which are important for the environmentally literate citizen. The bio-physical component is concerned with the ecological, physical, and chemical reactions that occur in a community, which includes man as a component organism. The socio-cultural component relates to the processes by which people relate to their environment, as their values and philosophies, and decisions. It is an ethical component by which man interacts with his environment.

For a program to be effective, there must also be an organizational strategy, which is illustrated as follows:

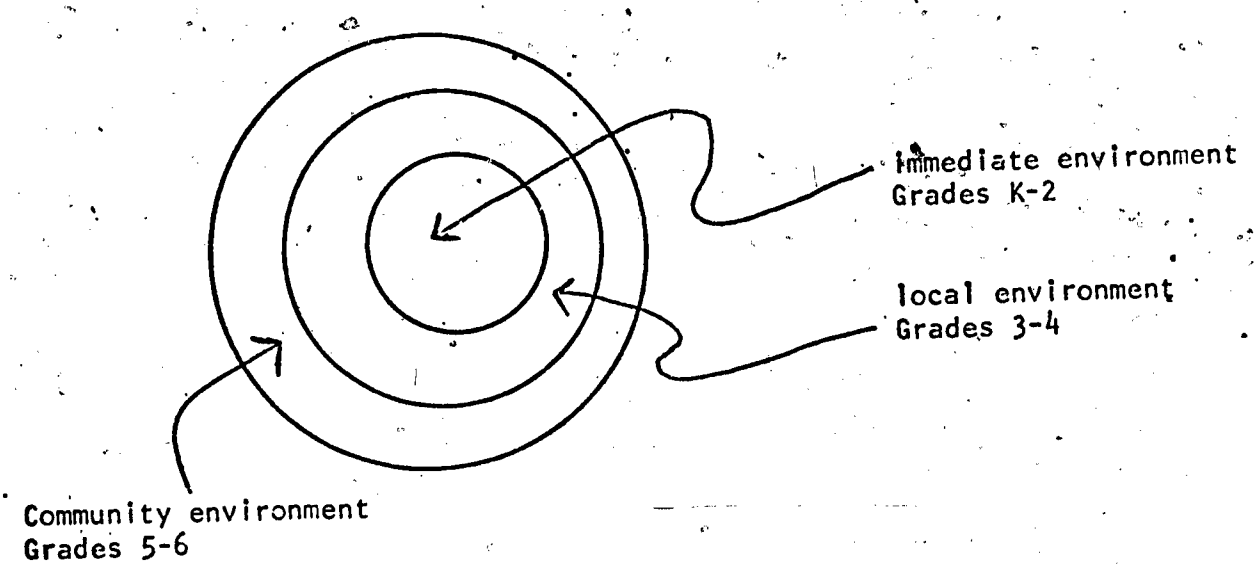


(Adapted from: Dr. William Stapp, University of Michigan)

The major consideration at the Kindergarten level is providing direct and affective experiences with the environment. The child relates to the real world at his level and deals with one concept at a time.

By the time the student has reached grade 12, the units are concerned primarily with skills development and content.

The 34 elementary environmental units are organized into three packages for grades K-2, grades 3-4, and grades 5-6. The basis for this decision was made on the concept that expanding environments become more complicated, and that the complexity and abstraction of the materials must be closely related to the developmental level of the child. On the following page is an illustration of the concept as viewed by CDEC.



The first level, for grades K-2, is identified as the immediate environment. It is the environment that a student directly experiences in his immediate vicinity; e.g., one tree, one kitten, one terrarium. The materials are concerned with affective and direct experience.

The second level is for grades 3-4, and is concerned with the local environment which included that which the student can directly experience by moving from one location to another; e.g., the classroom to the cafeteria; the school building to the school yard; the forest to the meadow. Students consider both individual members of the community as well as the total community organization.

Level three includes grades 5-6, and deals with the community environment. This environment may be a woodlot, a pond, a city block, or a town or city. Students directly experience portions of the material but they also have vicarious experiences through films or readings. The emphasis on the socio-cultural and bio-physical concepts increases. The skills of problem solving and critical thinking are also receiving additional attention in the materials.

The 27 titles of the elementary curriculum published by the Ohio Department of Education are:

Grades K-2

Preparing for Seasonal Change: Fall
The Terrarium
Food Chains
Food Web
Birds in Our Lives
Trees
Trash
Dirt and Stuff
Kittens

Grades 3-4

The School Lawn
The Vacant Lot
Giants on the Land: Trees in Our Environment
Wild Ideas with Wild Plants
The Endangered Predator
The Cemetery
An Environmental Quality Index for the School and Neighborhood
Poetry in the Environment
Water
The Breath of Life - or Death: Air Pollution

Grades 5-6

Problem Solving
How to Plan a Clean-up Campaign in the Local Community
Scars upon the Land
Water: Life Blood of the Earth
Noise Pollution
Succession and the Pond Community
Animals and Their Habitat
Our Native Lands: Conserve and Preserve

The scope of the elementary program is organized around the PACID concepts originally developed by the Need Program of the National Park Service, Department of Interior. These PACID standards are applicable in any environment and are Patterns, Adaptation, Change, Interdependency and Diversity.

The design of the secondary curriculum is as follows:

Socio-Cultural Discipline	Bio-Physical Discipline
Earth Thoughts	Earth Thoughts
Quality of Life	Quality of Life
Environmental Inventory	Environmental Inventory
Environmental Management	Environmental Management
Politics and Economics	
Community Problems	Community Problems
Futurism	Futurism

This design is for both the junior high school and the senior high school. The senior high school units are not repetitions of the junior high school units, but rather built upon the concepts in a more complex and sophisticated approach.

Although the environmental units in the Bio-physical and Socio-cultural Disciplines are designed to be sequencial, they also have the capabilities to stand alone. Thus, the curriculum can be used as separate curriculums, supplementary materials, or as a complete mini course. They are to be designed for use in interdisciplinary programs or within a single discipline.

Many schools are not in a financial position to hire consultants, purchase expensive equipment, or schedule numerous field trips from the school site in order to implement an environmental curriculum. The grades K-12 environmental curriculum materials were developed for the classroom teacher who will have the major responsibility of providing an environmental experience to the student in the class. For this reason, all materials received considerable input from classroom teachers.

Only a minimum amount of equipment is required and most of that should be available in any school. Field experiences outside of the classroom are usually within the vicinity of the school and its immediate neighborhood. Whenever expensive equipment or long distance field trips are required, the activities are classified as optional.

III EXPERIMENTAL DESIGN:

The original experimental design specified that from the twelve school districts implementing the project, four school systems would be involved in the testing. The rationale for this decision was based upon the anticipated number of teachers involved at the level for which the curriculum materials were developed. Based upon the original information, approximately one-half of the teachers in the program were represented by these four school districts. Appendix 1.0 presents the number of teachers by school district thought to be in the program as of September 10, 1974.

The information was based upon the application procedure used by the Ohio ESEA Title III Office for awarding of Adaptation grants. Instead of each school district indicating the number of teachers to be involved, the districts specified the number of curriculum guides they wished to purchase. In many cases, school districts purchased several guides per teacher. It was not until November, 1974 that the school districts were able to provide an accurate number of teachers involved. These results are presented in Appendix 2.0. From this second appendix, it is seen that the number of participating teachers was 341, far less than the 604 originally identified.

The erroneous information as to the large number of teachers involved in implementation was the basis for preparation of the original design. If the more accurate number of teachers had been known prior to development of the design, the evaluative approach would have undoubtly been different from that presented in the letter of September 10, 1974 to USOE.

The original evaluation specified that 16 teachers would be randomly selected from the total number of teachers at each grade level. In addition, 16 closely matched control teachers were to be selected. Using an average class size of 25 students per class, and randomly selecting 50 percent of the answer sheets for analysis, the number of students involved in the testing was estimated at 200 experimental and 200 control students per level.

Due to unforseen complications, to be discussed later, the number of environmental teachers participating in the actual evaluation phase was less than anticipated. Appendix 3.0 indicates the number of experimental and control teachers and students who participated in the evaluation phase. Rather than the 112 experimental and 112 control teachers anticipated, the evaluation phase had 44 experimental and 36 control teachers. The number of students tested was approximately the same as the number desired. Instead of 1,400 experimental and 1,400 control students, there were 1,483 experimental and 1,358 control students. Two main reasons were responsible for the large number of students. First, rather than analyzing 50 percent of the answer sheets as originally intended, all of the answer sheets were analyzed. Second, even though the number of teachers at the secondary level was far less than desired, the teachers often taught several sections. This is, of course, not as desirable as the original design.

After completion of the testing, which occurred between March 10-13, school coordinators provided standarized scores for each student for which such information was available. Tests and answer sheets were returned to the project office between March 15-19.

Project staff reviewed each answer sheet and coded the appropriate information in the area designated at "Identification." Information coded included: sex, grade, instructor's code number, name of standarized test, standarized test score, and experimental or control. Answer sheets were then scored on an IBM 370 - Model 115 computer with an IBM 3881 scanner.

IV EVALUATION INSTRUMENTS:

The instruments used in conjunction with this evaluation phase were:

Cognitive and Affective Instruments for students in grades K-2

Cognitive and Affective Instruments for students in grades 3-4

Cognitive and Affective Instruments for students in grades 5-6

Cognitive Instrument for Junior High and Senior High School, Bio-physical students

Cognitive Instrument for Junior High and Senior High School, Socio-cultural students

Affective Instrument for Junior and Senior High School students

During 1972, the Center for the Development of Environmental Curriculum (CDEC) developed draft copies of cognitive and affective instruments for grades K-2, 3-4, and 5-6. Approximately 1000 students were involved in the test validation program. The subsequent results, in the form of item analysis, proved to be very valuable in the revision of these instruments. Two consultants from the Department of Education, Case Western Reserve University were contracted to revise these three instruments.

A survey of testing instruments conducted by CDEC in 1972 and 1973 indicated a noticeable lack of appropriate instruments for the secondary level. Another literature survey was conducted in October and November, 1974, and several recently developed instruments were identified. Their authors were contacted and copies acquired and reviewed. In every case, the content of CDEC's secondary curriculum was not related to the cognitive questions of the tests. Some of the affective questions were consistent with the affective objectives of CDEC's secondary curriculum and were therefore, of value.

Development of the secondary instruments began with the contacting of individuals who had either written or revised CDEC's secondary environmental curriculum. This method was used because of the thorough and comprehensive knowledge these individuals had of both the purposes and content of the curriculum. A total of thirteen consultants were contracted each to prepare 30 cognitive and 20 affective questions. In addition to these consultants, project staff prepared additional questions from the teaching guides. The approximately 400 cognitive and 250 affective questions served as a question pool from which the final test questions were selected.

Consultants were generally able to meet the deadline identified for instrument development. On a limited number of occasions, consultants did not follow the format guidelines, and thus, their questions required extensive revision or deletion.

Upon completion of the field draft instruments, tests were field tested in classrooms in the Willoughby-Eastlake City Schools. The number of students involved in this field testing is as follows:

Grade and/or Level	No. Students
3 and 4 - cognitive and affective	120
5 and 6 - cognitive and affective	153
Junior High, Bio-physical - cognitive	44
Senior High, Bio-physical - cognitive	145
Junior High, Socio-cultural - cognitive	65
Senior High, Socio-cultural - cognitive	40
Junior High - affective	45
Senior High - affective	163

The K-2 cognitive and affective tests were not repiloted after revision because of the time required for printing and collation.

After field testing of the other instruments, an item analysis was run. Questions which were overly easy or difficult were either discarded or revised. In all cases, more questions were field tested than were incorporated into the final instruments.

Because validation of the three elementary instruments by content experts had been conducted by CDEC, and because the instruments had not been altered to any extent, review of the instruments was restricted to the consultants from the Department of Education, Case Western Reserve University (CWRU). The secondary units were reviewed, not only by the consultants from CWRU, but also by the secondary teachers administering the field test. Many valuable comments were provided by these consultants and teachers which helped increase the quality of the instruments.

The final printed instruments were delivered to coordinators of the Adaptation Schools on March 8, 1975. Coordinators distributed the tests to their teachers for administration.

Copies of all tests and instructions for both coordinators and teachers are provided in Appendix 4.0. The number of questions for each test are as follows:

	Cognitive	Affective	Total
K-2	55	20	75
3-4	50	40	90
5-6	50	40	90
Bio-physical, JHS & SHS	50	50*	100
Socio-cultural, JHS & SHS	50	50*	100

With the exception for the K-2 tests, students recorded their answers on an IBM answer sheet to facilitate machine scoring. Students taking the K-2 test marked directly in their test booklets. Answers were then transferred to IBM answer sheets and also machine scored. A copy of the answer sheet is also included in Appendix 4.0.

* The same affective questions were administered to both bio-physical and socio-cultural students.

V DATA ANALYSIS

There were three main analyses. T-Tests were run between experimental and control groups on the appropriate dependent variables for a) every student who took the tests and b) for those students who had an ability score reported by the school district. A partial correlation analysis was also conducted on those students who had ability scores. The partial correlation analysis was conducted by correlating a group membership vector (1 or 2 for experimental and control) with the dependent variables. Since there were only two groups, the null hypothesis of H_o: B=0 is an equivalent test for $H_o : {}^{M}_{1} = {}^{M}_{2}$. Thus, the correlations between the group membership vector and the cognitive and affective dependent variables had the effects of the ability scores partialed out. If the partial correlation coefficients were significant, it indicated that the adjusted group means were also significantly different.

The T-Tests and partial correlation analyses were conducted using the Statistical Package for the Social Sciences (SPSS). A drawback to the partial correlation analysis was that the adjusted group means were not computed or printed out. It was concluded that the adjusted means were not necessary for evaluating the program. If the experimental and control means were found to be significant on the T-Test analysis and the corresponding partial correlation analysis was significant, it can safely be concluded that the observed significant differences in the T-Test analysis were "real" and not the result of ability differences between the groups. On the other hand, if the partial correlation analysis was nonsignificant, it indicated that the T-Test significance was quite possibly the result of ability differences between the two groups and not a "real" difference. A third possibility was a nonsignificant T-Test with a significant partial correlation. This indicated

that when ability was accounted for, the groups were significantly different on the dependent variable.

The Behrens-Fisher T-Test (SPSS calls this a separate variance estimate) was utilized in testing for significant differences between the two group means. This resulted in a computed degree of freedom that was frequently not $n_1 - n_2 - 2$. Due to the unequal n and, in a few instances unequal variances, it was concluded that the Behrens-Fisher solution was the appropriate test.

The ability scores were handled in two different ways - grade equivalent scores and stanine conversions. The grade equivalent scores were not changed and analyses were run on grade levels and across all grades for the K-6 students. There were no grade equivalent scores for the 7-12 students.

The ability scores that were not grade equivalent scores were of four kinds: percentiles, T scores, IQ scores, and stanine scores. The first three were transformed into stanine scores.

stanine = 2((T score - 50)/10) + 5

stanine = 2((IQ score - 100)15) + 5

normalized stanine =	Percentile	to	Percentile
1 =	1	to	4
2 =	5	to	11
3 =	12	to	23
4 =	24	to	40
5 =	41	to	60
6 =	61	to	77
7 =	78	to	89
8 =	90	to	96
9 =	97	to	100

The computed stanines were truncated at 1 or 9 and rounded off to the nearest whole stanine. This conversion was performed to allow comparisons and groupings across the different ability scores.

VI RESULTS:

Data sheets summarizing the results are organized into Score, Cognitive Total (CogTot), and Affective Results (Affect.). Cognitive subconcepts are also reported, and are identified on the appendix cover sheet. These subconcepts were used as indications of strength and weaknesses in the cognitive component of the program.

Results will be presented and discussed for each level of testing. For each section, the order of discussing the data will be as follows:

1. T-Test for all students involved in the testing.
2. T-Test for students with ability scores only.
3. Partial Correlation Analysis for students with ability scores.

A. Data for Grades K-2:

Five schools were involved in the testing at this level, and there was good representation of both teachers and students. Four of the schools provided ability scores which were either stanine or which could be converted into stanine, and one school reported grade equivalent scores. The results for students with stanine or stanine conversion scores will be discussed first, followed by the results of students with grade equivalent scores.

Controlling for Ability - Stanine

Analyzing the mean results of all experimental students versus all control students, the data indicates no significant differences between the groups. Experimental students performed better on the subconcepts Dependency, Adaptation, and Diversity, and on the Affective Test. Only the Affective Test indicated a trend towards significance. For the Cognitive Total and the subconcept Change, the control group performed slightly better than the experimental group, and for the subconcept Patterns, the control group

performed significantly better than the experimental. Considering only students with ability scores, the subconcept Diversity was significant in a positive direction, and the experimental students performed better for the subconcepts Change, Adaptation, and Diversity, but not significantly better.

Only a slight difference was noted between the abilities of the experimental students and control students. With the partial correlation analysis, the subconcept Dependency was still significant, and for the three subconcepts mentioned above, the experimental students performed better than the control students. For the Cognitive Total, the subconcept Patterns, and the Affective Test, control students performed slightly better than experimental students. Refer to Table 5.1 for the detailed results.

School #1: All students had ability scores, thus making the results of the overall T-Test the same as the results for the T-Test of stanine conversion scores.

Performance of the experimental students from this school was not very positive in comparison to the control students. For the Cognitive Total, three of the subconcepts (Dependency, Patterns, and Adaptation), and the Affective Test, the control students performed better than the experimental students, and for the subconcept Patterns and the Affective Test, they performed significantly better. These results are discouraging, especially since the experimental group has slightly higher ability scores than the control group, though the difference is not significant.

Further analysis by partial correlation reinforces the above results with the exception that the subconcept Adaptation which was not previously significant, is nearly so. The results are presented in Appendix 5.2.

School #3: All students tested from this school had ability scores, thus making the overall T-Test the same as the stanine conversion score T-Test.

The experimental students from this school also did not perform well when compared to the control students. Although the two groups were nearly the same in ability, the control performed better on the Cognitive Total, and the subconcepts Dependency and Change. On the Affective Test and for the subconcept Diversity, they performed significantly better. For only two subconcepts, Patterns and Adaptation, did the experimental students perform slightly better.

The results of the partial correlation analysis reflected the results of the T-Test because of the slight difference between the abilities of the students. For this school, the curriculum failed to measure any positive achievement in performance, and in fact, the testing indicated reverse impact. Appendix 5.3 reports the results.

School #5: Again, all students taking the test had ability scores. The results of the T-Test indicated a positive impact was achieved in this school system. Significance was found for the Cognitive Total, and the subconcepts Dependency, Change, and Diversity, and reverse significance was found again for the subconcept Patterns.

Part of the impact caused by the experimental group was due to their significantly higher abilities as compared to the control students. The partial correlation analysis supported the significance for the three subconcepts, but significance for the Cognitive Total was lost. Comparing attitudes, the experimental students had only slightly more positive attitudes than the control students. The results for this school can be found in Appendix 5.4.

School #6: Over all students taking the test, the experimental group did perform significantly better on the subconcepts Dependency, Change, Adaptation, and Diversity. They also performed better for all of the other components, although not significantly better.

A large number of students did not have ability scores, thus lowering the number of students in the T-Test analysis. Nevertheless, significance was determined in all five of the subconcepts, but was unfortunately not found in the Cognitive Total. It was also not found on the Affective Test. Results for the school are reported in Appendix 5.5.

Since the control students were of somewhat higher abilities than the experimental students, the significance was still further improved for all five subconcepts. No significance was found though for the Cognitive Total. A possible reason for this is as follows:

> One of the assumptions of the T-Test is homogeneous variances. While the Behrens-Fisher statistics attempts to control for this on the subscale analyses, it created an oddity for the total cognitive test score. The assumption of equal variances was violated on each of the subtests at the 0.001 level of significance. However, this assumption was retained on the total test analysis. There is a strong suspicion that the non-significant T-Test for the total cognitive test score is the result of the distributions of the subscale data.

Controlling for Abilities - Grade Equivalent Scores

Only school #2 had grade equivalent scores, and the results will be discussed here. For grade 1, the experimental students performed very poorly, so poorly

in fact, that only one experimental and one control class from school #1 performed worse on the Cognitive Total score. Only for the Affective subconcept of the test did the experimental students perform better than the control students. It must be noted that the control students performed significantly better for the Cognitive Total and for four of the five subconcepts. The only exception was the subconcept Adaptation for which the control group still performed better, but not significantly so. These results are derived from the partial correlation analysis and can be found in Appendix 5.6.

The results for grade 2 were even more disappointing. Even though experimental students had significantly higher abilities than did the control students, the control students scored higher on the Cognitive Total, and on the subconcepts Dependency, Patterns, Change, and Adaptation. Although the attitude scores of the experimental students were significantly higher, the significance was lost after the partial correlation analysis.

The reader is directed to the Cognitive score for the control students, Appendix 5.7. The mean score of 50.83 is higher than all scores from all schools. with the exception of the experimental group from school #5 who had a mean score of 51.26. The exceptionally high Cognitive Total score from a control group of students who have a relatively low ability score poses an interesting question for further discussion.

Summary:

Considering all of the data provided from the testing program at this level, the curriculum did not provide a measurable impact on either student attitudes or cognition. Two of the schools (#5, and #6) had positive, and in some cases, significant impact in the Cognitive areas. In one school (#3) the

experimental and control students performed about equally well. For two schools (#1 and #2) the control students outperformed, sometimes significantly, the experimental students.

Evaluation in either the Cognitive or Affective domains at this level is difficult at best. A researcher is never sure that his instrument is measuring what it was intended to measure.

Further analysis must discuss the teacher effort as distinguished from the impact of the materials. How can the students of teachers using the same materials score so widely? Certainly teacher effort must be considered. A case in point is with the control teacher, school #2, grade 2, whose class outperformed all but one other group of students, be they experimental or control. Was this "control" teacher actually very environmentally oriented and through "contamination" from other teachers in the program, provide similar experiences for her students as did experimental teachers? One can speculate on this situation, but unfortunately, the answer will probably never be known.

B. Data for Grades 3-4:

The results of the analyses across all students who took the 3-4 grade test is listed in Appendix 6.1. There were no significant differences for any of the cognitive tests. There was, however, a significant difference between experimental and control groups on the attitude questionnaire, with the experimental group demonstrating more positive attitudes towards environmental concerns than the control group. Looking at the students who had an ability score (stanine or transformed to a stanine), not a grade equivalent score, this significant difference is retained on the T-Test results and is supported by the partial correlation analysis.

Controlling for Ability - Stanines

Five schools had ability scores that were already recorded as stainines or had ability scores that were able to be transformed into stanine scores.

School #1: There were significant differences between the experimental and control groups over all students taking the test. However, the control group performed better than the experimental group on all of the dependent variables. Appendix 6.2 depicts this analysis. Turning to only those students who had ability scores, it was found that the experimental and control groups were not significantly different on the ability measures.

The control group was significantly higher than the experimental group on the total cognitive score and the subconcepts of Patterns and Diversity. The partial correlation analysis supported the T-Test analysis. Furthermore, the correlational analysis showed that the control group was also superior on the subconcepts for Change and Adaptation. The experimental group was higher on the Affective measure, but not significantly higher. Results are reported in Appendix 6.2.

School #2: The third grade from this school had grade equivalent scores and therefore, was not included in the stanine analyses. This school did not demonstrate any significant differences on either the cognitive or affective variables.

This was the case for the analysis over all students and for the analyses conducted on those students who had ability scores. Appendix 6.7 depicts these results. The experimental and control groups were not

different on the ability measures. The experimental group had a more positive attitude towards environmental concerns than did the control group, but this was not a significant difference.

School #3: Over all of the students from this school, the experimental group had a significantly larger mean on the subconcept Dependency. Appendix 6.3 shows these analyses. Turning to only those students who had an ability score, there were significant differences for the Cognitive Total and the subconcept Change. In both cases, the experimental group was higher than the control group. The significant difference on Dependency was lost, however. The experimental group was of superior ability than the control group, but not significantly so. The partial correlation analysis indicates that the Cognitive Total significance dissipated, along with the significant difference for Change. However, the correlational analysis demonstrated that a significant difference existed for Dependency, which supported the analysis conducted over all students. There were no significant difference on the Affective instrument.

School #5: There were significant differences between the experimental and control groups, over all of the students from this school, on the Cognitive Total, and on the subconcepts Dependency and Adaptation. On these three variables, the experimental group was superior to the control group. The experimental group was also superior to the controls on the other dependent variables but these differences only approached significance. Appendix 6.4 depicts these analyses. Considering only those students who had ability scores, it was found that the experimental and control group were equivalent in ability. The analyses on these

students replicated the results of the analyses based on all of the students with the exception of the Adaptation subtest. This significant difference was lost and the partial correlation analysis indicated that the difference between the two groups approached significance. There was no significant difference on the affective instrument, but the experimental group was higher than the control group.

School #6: There were significant differences, albeit in the wrong direction, between the experimental and control groups over all of the students in the school. The control group was significantly higher than the experimental group on the Cognitive Total and the subconcepts of Dependency and Diversity. The analyses conducted over those students who had ability scores supported the above results. The analyses for this school were clouded by the distressingly large amounts of missing data. Appendix 6.5 shows these results.

Controlling for Ability - Grade Equivalent Scores

School #2 reported grade equivalent scores for their third graders and one class from School #3 grade equivalent scores reported.

The class (School 3) that had scores was a control group. The matched experimental group did not have scores reported, thus no analyses could be performed to test for and control for ability. There was a significant difference favoring the experimental group on the subconcept Dependency; no other significant differences were found. Appendix 6.8 shows these results.

Looking at School #2, grade 3, there was a significant difference on the cognitive subconcept Dependency for those students who had ability scores.

The experimental group was higher. The partial correlation analysis did not support this signiticant finding, even though the experimental and control group were of equal ability. Appendix 6.7 depicts these results.

Summary: Generally, it was concluded that the affective instrument did measure a significant difference, albeit slight, between the experimental and control groups with the experimental group having a slightly more positive attitude towards environmental concerns. Throughout all school districts, the experimental group was usually more positive, but not necessarily significantly more positive than the control groups. With all of the schools grouped together, perhaps the n was large enough to create significance. It must be stated, however, that the superiority of the experimental groups was not impressive.

The overall stanine analysis (Appendix 6.1) also indicated nearly a significant difference for Patterns in the wrong direction. As with the affective scale, it was concluded that the sample size was creating this difference. The partial correlation coefficient was only 0.099, somewhat less than substanial.

While some schools demonstrated significant differences favoring the experimental groups on the total cognitive test score and the subconcepts Dependency (Schools #3 and #5), their modest gains were offset by the unexpected significant differences in the opposite direction in other schools. These results were heavily confounded by a teacher effect. In all five of the schools, there were analyses with one teacher in either the experimental or control group classrooms or both. Rather than testing program results, it is possible that teacher effectiveness has been measured.

Based upon the data, the 3-4 unit was successful in raising student attitudes about the environment demonstrating success in the affective domain. There was not a corresponding success in the cognitive domain.

C. Data for Grades 5-6:

All scores presented at this level are either stanine or stanine conversion scores. Only school #6 reported grade equivalent scores, and since the number of students totalled less than one class, no analysis was conducted.

Referring to the overall analysis of all students who took the test (Appendix 7.1), significance was found in the Cognitive Total, Affective, and two of the subconcepts, Dependency and Change.

The ability scores between experimental and control students indicated that the experimental students were of significantly higher ability than the control students. The T-Test for students with stanine or stanine conversion scores was the same as all students, except those mentioned above, had scores.

In the partial correlation analysis, significance for the two subconcepts and the Affective results was retained. Significance for the cognitive total was lost, although a positive trend was present.

School #1: For all students, significant differences was found in all areas except the subconcepts Diversity, thus indicating the experimental students of this school did perform significantly better than the control students. When referring to students with ability scores, the same results were found. It must be mentioned though, that the experimental students were of significantly higher ability than the

control students. Further analysis using partial correlation supported the previous analysis with the exception that significance for the subconcept Adaptation was lost. Thus, significance was found for the Cognitive Total, three of the subconcepts, and for the attitudinal test. Appendix 7.2 presents the summary for school #1.

School #3: Because all of the students had either stanine or stanine conversion scores, the T-Test for all students was the same as the T-Test for stanine scores. In this analysis, no significance for any concept or subconcepts was found. The control students tended to be of higher ability than the experimental students, although not significantly so. In the partial correlation analysis, none of the concepts or subconcepts were significant. The experimental group performed better on the Cognitive Total, two of the subconcepts, and the Affective Test, whereas the control students performed better on three of the subconcepts. Results are presented in Appendix 7.3.

School #5: Among all students, the experimental group had significantly larger means for the Cogntive Total, and three of the subconcepts (Dependency, Patterns, and Change). They were not significantly better in the Affective Test. The T-Test for stanine conversion scores was the same as all students that had ability scores.

When comparing ability scores, the experimental group was significantly higher ability than the control group. The partial correlation analysis indicates that the significance for the Cognitive Total, and the subconcepts Dependency and Change remain, while the significance for the subconcept Patterns was lost. After the partial correlation analysis, the experimental and control students performed equally well on the Affective Test. Results are presented in Appendix 7.4.

School #6: All students taking the test also had ability scores. When analyzing the abilities of the group of students, it was found that the experimental students were significantly of higher ability than the control students.

The T-Test indicates that none of the concepts or subconcepts were significant and that in the Cognitive Total and the subconcepts of Patterns and Diversity, the experimental students were out-performed by the control students. When using the partial correlation analysis, it was found that the control students also performed better on the subconcepts Dependency, Change, and Adaptation. Experimental students did not perform well in this school. Appendix 7.5 summarizes the results for this school.

D. Data for Bio-physical, Junior High School Disciplines:

For all students from the three schools taking this test, the experimental students performed significantly better on the Cognitive Total, the six subconcepts, and on the Affective Test. When the analysis was conducted for only students with ability scores, the results were significant for each area previously stated.

Because the ability scores of the experimental students were significantly higher than the control students, the partial correlation analysis was required. For this analysis, significance was maintained for the Cognitive Total, and for the subconcepts Quality of Life, Inventory, and Management. Significance was lost for the three subconcepts Earth Thoughts, Problems, and Futurism, and for the Affective Test. It should be mentioned, though, that there were very definite trends towards significance for two of the subconcepts, Earth Thoughts and Problems. Scores are presented in Appendix 8.1.

School #3: For this school, the results for all students taking the test indicated that the experimental student significantly outperformed the control students for each area. For all students with ability scores, the same results were noted.

Partial Correlation analysis, required because of the significant differences in ability scores, indicated that the significance was maintained for the Cognitive Total, the subconcepts Earth Thoughts, Quality of Life, Inventory, and Management, and the Affective Test. A very definite trend towards significance was indicated for the subconcept Problems, and significance was lost for the subconcept Futurism. The results are represented in Appendix.

School #4: When the results of every student taking the test were analyzed, significance was found at the Cognitive Total, and the subconcept Quality of Life. Definite trends were also noted for the subconcepts Earth Thoughts, and Inventory. For students with ability scores, only the Cognitive Total score was significant, with trends towards significance for the subconcepts Earth Thoughts, Quality of Life, Inventory, and Futurism.

The ability scores of the experimental students were significantly higher than the control students. The difference was nearly 1.2 points based on the stanine conversion score. Because of this wide difference in abilities, significance and the trends towards significance was lost for each area mentioned above. Thus, in this school, the curriculum had no measurable impact in the students involved in the program.

Analysis for this school is difficult, both because of the small number of control students taking the test, and because of the large amount of missing data. Refer to Appendix 8.3 for detailed results.

School #5: Considering all students taking the test, significance was found for the Cognitive Total, and for the subconcepts Quality of Life and Problems. The same results were noted when only students with ability scores were analyzed. Only a few students were without ability scores.

Because the abilities of the experimental and control students were nearly the same, the analysis by partial correlation reinforced the significance previously mentioned.

For the remaining subconcepts, Components, and Affective Total, the experimental students performed better than the control students, but the difference in means were not significant. Detailed results are presented in Appendix 8.4.

E. Data for Bio-physical, Senior High School Disciplines:

The results at this level indicated the curriculum materials were extremely successful. For all students taking the test, the mean of the experimental students was significantly higher than the control students for Cognitive Total, all six of the subconcepts, and the Affective Test.

Considering only students with stanine or stanine conversion scores, the experimental students performed significantly better than the control students for every test. The ability scores differed, as the experimental students were of significantly higher ability than the control students. For the

partial correlation analysis, significance was found for the Cognitive Total, three of the six subconcepts, (Earth Thoughts, Quality of Life, Environmental Problems), and Affective Test. There was also a trend towards significance for the subconcepts Inventory and Management. Overall results are presented in Appendix 9.1.

School #2: For all students, the experimental group had significantly higher results for each part of the test than the control group. The analysis for students with either stanine or nine conversion scores duplicated, almost exactly, the results for all students. Although the ability scores were significant for experimental students, analysis by partial correlation indicated that the Cognitive Total, and three of the six subconcepts (Earth Thoughts, Quality of Life, Environmental Problems) were still significant. Significance for the Affective Test was lost, as was significance for the subconcepts Inventory, Management, and Futurism. A trend towards significance was noted for subconcepts Management and Futurism. Appendix 9.2 reports the results.

School #3: Only two teachers and two classes of students were involved in the testing in this school. As both classes were classified as experimental, no analysis could be conducted. Test scores are presented in Appendix 9.3.

School #5: Throughout the entire analysis, no significance was found. For all students taking the test, the experimental students performed better in all but one area (Earth Thoughts), but not significantly better. The control group was of somewhat higher ability than the experimental, but not significantly so. For both the T-Test for

students with ability scores and the partial correlation analysis, none of the results approached significance. The curriculum had no measurable impact in this school. Refer to Appendix 9.4 for the results.

School #6: For all students taking the test, significance was found in the subconcepts Inventory and Problems. Trends were also noted for the Cognitive Total, and the subconcepts Earth Thoughts, Management, and Futurism. Analysis involving only students with ability scores indicated no significance for any of the tests. There was still a trend, though, in the subconcept Inventory.

When analyzing for differences in ability scores, it was determined that the control students were significantly higher in abilities than the experimental and that this difference partially accounted for the results. In the partial correlation analysis, significance was found in the Cognitive Total, and the subconcepts Earth Thoughts, Inventory, Management, Problems, and Futurism. A trend was also noted for the subconcept Quality of Life. Although the experimental students had a more positive environmental attitude than the control students, the results were not significantly higher. Appendix 9.5 reports the results.

F. Data for Socio-cultural, Junior High School Disciplines:

Because only one experimental teacher and one control teacher were involved in the testing at this level, a true analysis of the impact of the materials on students is nearly impossible as the sample is too small. Only school #5 had teachers represented.

For all students taking the test, the subconcept Earth Thoughts was significant. Trends towards significance were also noted for the subconcepts Quality of Life and Management. The experimental students performed better than the control students on Cognitive Total, four of the seven subconcepts, and on the Affective Test. Analysis using students with ability scores provided similar results.

Although the experimental students were of slightly hi[illegible] ability than the control students, the differences did not approach sig[illegible]ance. In the partial correlation analysis, significance was still f[illegible]r the subconcepts Earth Thoughts and the experimental students performed [illegible] on the Cognitive Total, four of the seven subconcepts, and on the Affe[illegible]st. Appendix 10.1 summarizes the results for this level.

G. Data for Socio-cultural, Senior High School Disc[illegible]ines:

As with the previous level, only one school, #4, with one experimental teacher and one control teacher were involved in the testing. Because the teachers tested several sections of students, the sample included 142 experimental and 133 control students.

Comparing the means of all of the experimental and control students taking the test, positive significance was found for the Cognitive Total, and the subconcepts Earth Thoughts and Politics. The experimental performed better, but not significantly better in five of the six remaining subconcepts, and the Affective score. When considering only students with ability scores, the results were nearly the same.

The ability score of experimental students indicated a trend towards significance over the control students. With partial correlation analysis, the two subconcepts Earth Thoughts and Politics remained significant while the Cognitive Total significance was lost. There was little difference in attitudes between the environmental and control students.

Because only one matched set of teachers were involved in the testing, it is impossible to suggest any impact of the curriculum on students. Further testing of a larger number of teachers and students is necessary.

VII DISCUSSION:

For the K-2 and 3-4 level, the number of teachers involved in the testing approached the number projected in the original design. Although only half the number of desired teachers were involved at the 5-6 level, by using all of the students, the number approximated that which was desired.

The number of teachers involved in testing at the secondary level was far less than desired, and only through the fact that teachers had several sections of students did the number of students approach the desired number.

In order for a teacher to be considered as an experimental teacher, they were required to teach at least two units for the curriculum package. In addition, a control teacher was needed to match the experimental teacher at the same grade level and subject area.

As mentioned, the September, 1974 evaluation design was developed based upon records from the Ohio ESEA Title III office. The application procedure did not require the schools to specify the number of teachers participating at each level, and the number of teachers was approximated from the number of curriculum guides being ordered. Because schools often ordered multiple booklets for teachers, especially at the secondary level, the number of participating teachers was greatly inflated.

Four school systems were originally identified to participate in the evaluation phase. The other eight school systems were informed they would not be involved, and that their teachers could implement the curriculum at their own rate.

It was determined in November, 1974, that the original estimate of teachers was nearly twice the number actually involved, and thus the evaluation design was not applicable. The four school systems originally identified for evaluation had far fewer teachers than needed.

Other school systems were contacted to also be involved, but many of their teachers had already not scheduled to teach two units until after the testing phase in March, 1975. To further reduce the number of available teachers, several school districts were implementing the materials into each class, and thus, no control teachers were available. Some of these schools were overwhelmingly positive, as indicated by their successful implementation.

Lastly, as in any project, there are always some teachers who are neither interested or committed, and are unable to meet the responsibilities of the project. Although this did occur among some elementary teachers, it was far more pronounced at the secondary level. Although the teachers attended the two workshops in October or November, and were aware of their commitment, many secondary teachers preferred to postpone any use of the program until the last two months of the school year.

A major impact on the results is based on the designated use of the materials. In all cases, the curriculum guides were developed as teacher materials, not student materials. Had the materials been developed as the latter, the evaluation would have been a more realistic determination of the impact of the curriculum on students because the message would have been consistent and known. Because the materials were for teachers use, the evaluator had no real knowledge of the message delivered by the teacher to the students. Teacher

values, interest, and competency could either support or contradict the impact of the materials. Thus, it is almost impossible to analyze the impact of the materials without consideration of teachers effort, and with the limited monies and time available to this project, it was equally impossible to analyze the impact of the teacher.

The necessity to obtain standarized scores on students abilities caused some problems because of the lack of consistency of testing procedures either among school systems, or even within a school itself. Scores from 16 different tests were reported by the six schools involved in the project. Only one school had a testing procedure that was consistent from grades.

In another school, four different scores were reported on one class of 25 students, making it almost impossible to standarize scores of the students.

Should another testing project be conducted, it is strongly recommended that a standarized test be administered simultaneous with the cognitive and affective tests so as to provide consistent data for use in the partial correlation analysis.

Although significance was not found at the K-2 level, one could question whether a program at that level can indicate impact. Students are not yet developing attitudes of their own, but rather reflect the attitudes of both their home and classroom. It is not until the later grades that attitudinal measures be more representative of the child's values. As seen for both the 3-4 and 5-6 level, there was significant impact in the attitudinal areas.

At the secondary level, there was significance in the cognitive domain at both the Junior High and Senior High levels of the test. But only the Bio-physical, Senior High level demonstrated significant impact in attitudes. This may have been the result of exceptionally high environmental attitudes for both the experimental and control students which were very positive.

All attitudinal scores were to be rated between 1 (indicating strong disagreement) and 5 (indicating strong agreement). For each question, preferences were indicated. For questions in which the desired response was on the 1 side of the scale, the question values were reversed during the computer analysis. Therefore, total scores could be . The highest possible score was 250 points. The scores for the second levels are reported in Appendix 12.0.

As can be seen from the table, the maximum difference between experimental and control students is only 3.46 points, with 1.67 points being the minimum difference.

The highest point value of 172.33, when divided by fifty questions, gives an average rating of 3.45 per question which is a positive response. The lowest response of 162.01 gives an average response of 3.24 per question which is also positive. The average rating of every group of students taking the affective test is positive. No group scored negatively.

A possible reason for this positive attitude is due to the considerable attention the mass media has given to environmental problems. Everyone is positive in their outlooks.

VIII CONCLUSIONS:

The following chart summarizes the results of the elementary evaluation:

	Grade Level		
	K/2	3/4	5/6
Cognitive Total	No	No	Trend
Dependency	Yes	No	Yes
Patterns	No	No	No
Change	No	Trend	Yes
Adaptation	No	No	No
Diversity	No	No	No
Affective Total	No	Yes	Yes

"Yes" indicates that significance was found at the .05 level for the 2-tailed test. "Trend" reports that although significance was not found, there was a positive impact by the experimental students. Results reported as "trends" are between .051 and .250. Where "no" is reported, there was neither significance nor trend towards significance.

Except for the subconcept Dependency, there does not appear to be any appreciable impact of the curriculum at the K-2 level. As previously mentioned, testing at this level is difficult, and a reader can readily note the range of scores among the different groups of students. Teacher effort also appeared to play a major role at this level. One control group of students with low ability performed not only better than their higher ability experimental matched class, but also better than all other experimental classrooms except one.

Experimental students at grades 3-4 did have a significantly better attitude towards the environment after involvement in the program. A similar impact was not found for either the Cognitive Total or for any of the five subconcepts. For the subconcept Change, there was a trend towards significance.

At grades 5-6, the curriculum proved to have a more positive impact. Significance was found on the Affective Test, and the Cognitive subconcepts Dependency and Change. In addition, there was a trend towards significance for the Cognitive Total. Thus, the Affective Test, the Cognitive Total, and two of the five subconcepts were either significant or indicated a trend towards significance.

In Section II, "Curriculum Design," one of the major purposes of the elementary curriculum was to provide positive environmental attitudes. Cognitive experiences were also present, but the emphasis was in the Affective Domain. The organization strategy design on page 5 reflects the intention of the curriculum and provides a schematic illustration of the relative percentage of curriculum content at various grade levels.

Towards that stated design, the elementary curriculum, with the exception of the K-2 level, did accomplish the objectives of providing a significant impact on student attitudes towards the environment. Experimental students for both grades 3-4 and grades 5-6 performed significantly better than their control counterpart.

A second chart is provided below which summarizes the results of the evaluation at the secondary level:

	Bio-physical		Socio-cultural	
	Junior High	Senior High	Junior High	Senior High
Cognitive Total	Yes	Yes	No	No
Earth Thoughts	Trend	Yes	Yes	Yes
Quality of Life	Yes	Yes	Trend	Trend
Inventory	Yes	Trend	No	No
Management	Yes	Trend	Trend	Trend
Problems	Trend	Yes	No	No
Politics	—	—	Trend	Trend
Futurism	No	Trend	No	No
Affective Total	Trend	Yes	No	No

For the Bio-physical discipline, the curriculum had significant impact in the cognitive domain for both Junior High and Senior High levels. At the Junior High level, significance was found at three subconcepts, and a trend was found at two additional subconcepts. For the subconcept Futurism, the experimental students did not outperform the control students. Senior High experimental students performed significantly better on three subconcepts and indicated a trend towards significance on the three remaining subconcepts.

On the Affective Test, the High School experimental students had significantly better environmental attitudes than the control students. Although the Junior High experimental classes performed better on the Affective Test, their performance was not significantly better.

Only moderate impact of the curriculum materials was noted at the Junior High and Senior High level for the Socio-cultural area. The testing indicated significance or a trend towards significance for four of the seven subconcepts. The small number of teachers in this testing population undoubtly effected the outcome. Rather than rejecting the curriculum package for this discipline, one can only say that the population of teachers and students involved in the testing was too small to indicate success or failure.

In summary, significance or positive trends for significance was found in grades 3-4 and 5-6, and for both the Junior High and Senior High levels of the Bio-physical Discipline. Impact was not noted at the K-2 grades or the Socio-cultural Discipline.

Most of the teachers involved in the testing taught only two units between November, 1974, and March, 1975. If teachers had the entire school year to implement the program, the students would have more extensive contact with environmental concepts. One would assume that the curriculum materials would have an even greater impact on students cognition and attitudes towards the environment.

It should also be mentioned that the impact of the curriculum would be accumulation if it were properly implemented into an existing curriculum. Since the program is sequencial, the impact would be carried from year to year.

The indication of the evaluation results is that the total curriculum package for grades K-12 does provide the educator with a program with the potential of having a significant impact in both the cognitive and affective areas for a large portion of the students.

APPENDICES

1.0 Original Estimate of the Number of Teachers Involved in the Implementation Program (Dated September, 1974)

2.0 Revised Estimate of the Number of Teachers Involved in the Implementation Program (Revised November 12, 1974)

3.0 Number of Teachers and Students, both Experimental and Control Participating in the Evaluation Phase

4.0 Copies of the Cognitive and Affective Instruments
Instructions for Test Administration - Coordinators and Teachers
IBM Answer Sheet

5.0 Summary of the Evaluative Data for Experimental and Control Students in Grades Kindergarten through Grade Two

- 5.1 All Schools and All Students
- 5.2 School #1
- 5.3 School #3
- 5.4 School #5
- 5.5 School #6
- 5.6 School #2, Grade 1 only
- 5.7 School #2, Grade 2 only

6.0 Summary of the Evaluative Data for Experimental and Control Students in Grades Three and Four

- 6.1 All Schools and All Students
- 6.2 School #1
- 6.3 School #3
- 6.4 School #5
- 6.5 School #6
- 6.6 School #2, 3 - Grade 3 only
- 6.7 School #2 - Grade 3 only
- 6.8 School #3 - Grade 3 only
- 6.9 School #2 - Grade 4 only

APPENDICES (cont'd)

APPENDIX 1.0

Original Estimate of the Number of Teachers in the Twelve Adaptation Schools Involved in the Implementation of the Environmental Education Curriculum Materials Excluding the Topic "Other Curriculum Areas" (Dated September, 1974)

Name of School System	Grades K-2	Grades 3-4	Grades 5-6	Socio-cultural Junior H.S.	Bio-physical Junior H.S.	Socio-cultural Senior H.S.	Bio-physical Senior H.S.	Total
Local Schools in Northwest Ohio								
Bath Local	15	14	10	3	1	1	3	47
Columbus Grove Local	9	8	8	11	11	14	14	75
Holgate Local	2	1	1	4	2	2	2	14
Riverside Local	5	4	3	2	2	4	4	24
Local Schools in Southwest Ohio								
Beavercreek Local	10	9	9	8	4	4	4	48
Blanchester Local	14	12	4	4	4	7	7	52
Miami Trace Local	9	6	7	3	3	5	3	36
City Schools in Northwest Ohio								
Napoleon City	36	23	26	7	7	10	10	119
City Schools in Northeast Ohio								
Cambridge City	9	8	8	6	6	6	7	50
East Liverpool City	11	9	9	6	6	3	3	47
Toronto City	6	5	5	4	4	4	4	32
Vocational Schools								
Penta County Joint Vocational	-	-	-	-	-	30	30	60
TOTAL	126	99	90	58	50	90	91	604

APPENDIX 2.0

Revised Estimate of the Number of Teachers in the Twelve Adaptation Schools Involved in the Implementation of the Environmental Education Curriculum Materials Excluding the Topic "Other Curriculum Areas" (Revised 11/12/74)

Name of School System	Grades K-2	Grades 3-4	Grades 5-6	Socio-cultural Junior H.S.	Bio-physical Junior H.S.	Socio-cultural Senior H.S.	Bio-physical Senior H.S.	Total
Local Schools in Northwest Ohio								
Bath Local	15	13	8	1	-	1	2	40
Columbus Grove Local	7	7	7	2	2	-	2	27
Holgate Local	2	1	1	-	-	1	1	6
Riverside Local	4	5	2	1	2	2	-	16
Local Schools in Southwest Ohio								
Beavercreek Local	13	8	8	8	4	3	4	48
Blanchester Local	14	11	4	2	2	4	2	39
Miami Trace Local	6	5	5	2	1	1	3	23
City Schools in Northwest Ohio								
Napoleon City	8	10	13	1	2	1	3	38
City Schools in Northeast Ohio								
Cambridge City	9	7	8	3		4	4	42
East Liverpool City	11	8	10	2	3	1	2	37
Toronto City	4	5	7	2	1	1	1	21
Vocational Schools								
Penta County Joint Vocational	-	-	-	-	-	1	3	4
TOTAL	93	80	73	24	24	20	27	341

NUMBER OF TEACHERS AND STUDENTS, BOTH EXPERIMENTAL AND CONTROL, PARTICIPATING IN THE EVALUATIVE PHASE

School Code		K/2	3/4	5/6	B/P JHS	B/P SHS	S/C JHS	S/C SHS	TOTAL
#1	Teachers - Experimental vs. Control	1/1	1/1	1/1					3/3
	Students - Experimental vs. Control	23/25	25/44	30/23					78/92
#2	Teachers - Experimental vs. Control	5/2	7/3			1/1			13/6
	Students - Experimental vs. Control	46/44*	177/71			90/87			313/202
#3	Teachers - Experimental vs. Control	3/3	2/2	1/1	2/2	2/0			10/8
	Students - Experimental vs. Control	70/59	46/45	29/29	168/177	45/0			358/310
#4	Teachers - Experimental vs. Control				1/1			1/1	2/2
	Students - Experimental vs. Control				108/26			143/141	251/167
#5	Teachers - Experimental vs. Control	1/2	1/1	3/3	1/1	1/1	1/1		8/9
	Students - Experimental vs. Control	23/45	24/25	85/82	59/48	26/59	87/78		304/337
#6	Teachers - Experimental vs. Control	3/3	1/1	2/2		2/2			8/8
	Students - Experimental vs. Control	55/64	27/29	48/41		49/116			179/250
		13/11	12/8	7/7	4/4	6/4	1/1	1/1	44/36
		217/237	299/214	192/175	335/251	210/262	87/78	143/141	1483/1358

* BECAUSE THERE WERE MORE EXPERIMENTAL TEACHERS AND STUDENTS, ANSWER SHEETS WERE RANDOMLY SELECTED TO APPROXIMATE AN EQUAL NUMBER OF EXPERIMENTAL AND CONTROL STUDENTS.

APPENDIX 4.0

Copies of the Cognitive and Affective Evaluation Instruments

Grades K-2

Grades 3-4 Bio-physical, Junior and Senior High School

Grades 5-6 Socio-cultural, Junior and Senior High School

Instructions for Test Administration

Coordinator

Teacher

IBM Answer Sheet

ENVIRONMENTAL EDUCATION: CURRICULUM, INFORMATION, AND TRAINING

% Longfellow Elementary School
35200 Stevens Boulevard
Eastlake, Ohio 44094
Ph: 216-946-5000, ext. 358

Sponsored by a Grant from the U.S. Office of Education

through the

Willoughby-Eastlake City Schools, Willoughby, Ohio

Field Study of the Cognitive and Affective Evaluation

Grades K-2

NAME OF STUDENT

AGE

GRADE

NAME OF TEACHER

SCHOOL BUILDING

SCHOOL DISTRICT

DATE

OFFICIAL USE ONLY
STANDARIZED SCORE
NAME OF TEST
DATE OF MOST RECENT TESTING

INSTRUCTIONS FOR TEACHERS

The materials in this booklet contain all of the components of the tests to be administered to your students. Students are to mark directly in the test booklets, using pencils, pens, or crayons. Be sure the students have adequate marking instruments prior to administration of the tests.

There are two main sections to the tests, a cognitive and an affective section. The cognitive section has five subsections, each related to one of the PACID concepts: Patterns, Adaptation, Change, Interdependence, and Diversity. At the beginning of each section, you will find the directions for the section, an example for the students, and labels for each question. Be sure the students understand both the marking system and the directions before you proceed to the test questions.

The affective section has several parts, all of which are concerned with assessing the feelings of the students about the environment. Please allow the students free choice in this test.

Directions to be read to students are CAPITALIZED.

There is no time limit on any part of this test. You are to read the directions or explanations, and have the students proceed together through the test. You may administer this test in several sittings to avoid fatigue.

Please familiarize yourself with this test booklet before you administer the test to your students. Questions should be referred to your school's program coordinator.

When reading the labels of the questions to the students, particularly in the affective section, read the labels as unemotionally as possible. Inflections in your voice or emphasis on particular words can influence the student's choice of answers.

DIRECTIONS

I. PATTERNS I

THE BOOKLET THAT YOU HAVE ON YOUR DESKS HAVE PICTURES IN THEM. WE ARE GOING TO DO SOMETHING WITH THESE PICTURES. ON THIS PAGE YOU SEE TWO PAIRS OF PICTURES. ONE PICTURE SHOWS THREE CHILDREN WATCHING A LITTLE PLANT. THE OTHER PICTURE SHOWS THREE CHILDREN WATCHING A BIG PLANT. WHICH PICTURE WOULD HAPPEN FIRST. PUT YOUR FINGER ON THE PICTURE OF WHICH WOULD HAPPEN FIRST.

Check to make sure the students have their finger on the correct picture. Point out that the children in the pictures are watching the same plant. Then say,

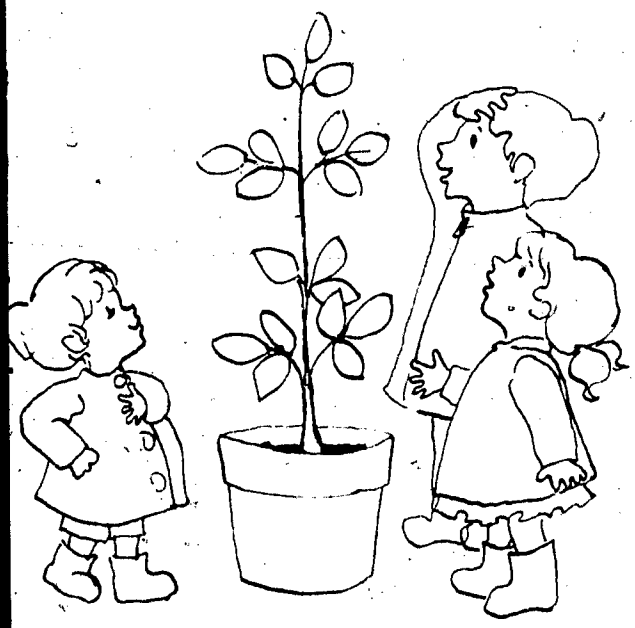
TAKE YOUR PENCILS (OR PENS). LOOK AT THE PICTURES AGAIN. MAKE AN "X" ON THE PICTURE THAT SHOWS WHICH SHOULD COME FIRST.

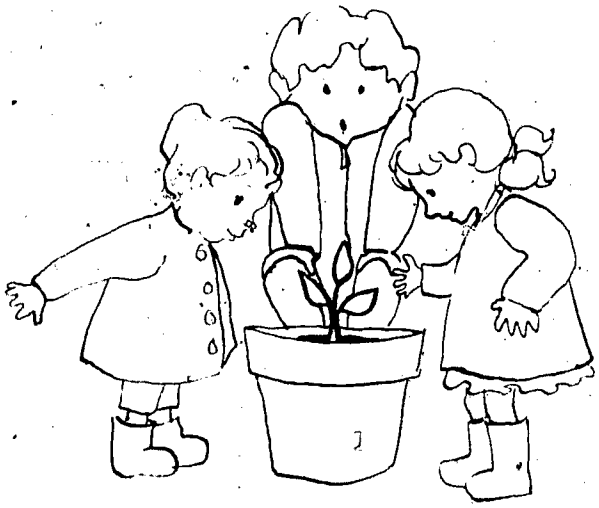
Illustrate on your test booklet, and check to make sure all of the children know what to do. If the children understand the directions, say,

NOW, WE WILL MARK THE PICTURES TOGETHER. I WILL READ WHAT THE PICTURES ARE ABOUT, AND YOU ARE TO MARK AN "X" ON THE PICTURE THAT WOULD COME FIRST.

TURN TO THE NEXT PAGE.

I. EXAMPLE





EXPLANATIONS OF QUESTIONS: PATTERNS I

TO BE READ BY TEACHER TO STUDENTS.

1. THESE ARE PICTURES OF SPIDERS SPINNING WEBS. MARK AN "X" ON THE PICTURE THAT WOULD COME FIRST.

2. THIS IS A PICTURE OF A LADY MEASURING A BOY, AND A PICTURE OF A BABY PLAYING. MARK AN "X" ON THE PICTURE THAT WOULD COME FIRST.

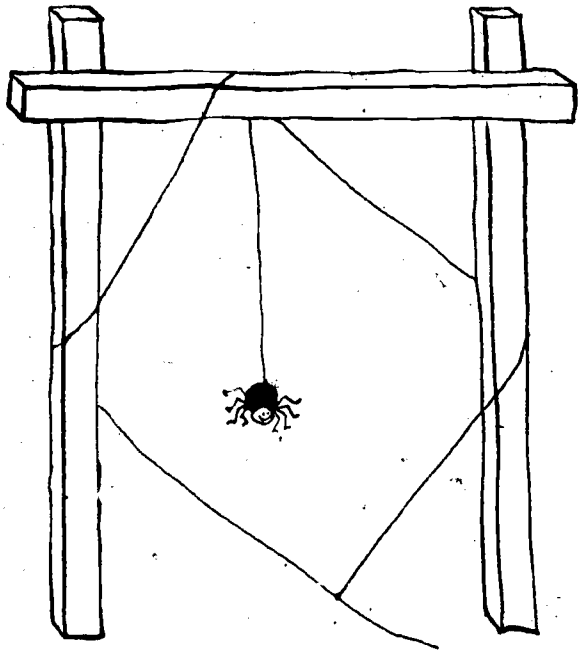
3. THIS IS A PICTURE OF A FARMER PICKING APPLES, AND A PICTURE OF A FARMER SELLING FRUIT AND VEGETABLES. MARK AN "X" ON THE PICTURE THAT WOULD COME FIRST.

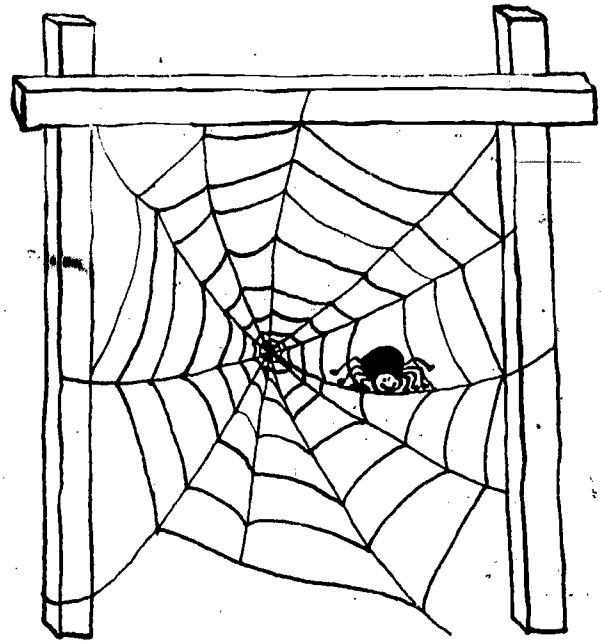
4. THIS IS A PICTURE OF BOY WATCHING A PLANT GROW, AND A PICTURE OF A BOY PLANTING A SEED. MARK AN "X" ON THE PICTURE THAT WOULD COME FIRST.

5. THIS IS A PICTURE OF THINGS MADE OF WOOD, AND A PICTURE OF A STUMP AND A TREE. MARK AN "X" ON THE PICTURE THAT WOULD COME FIRST.

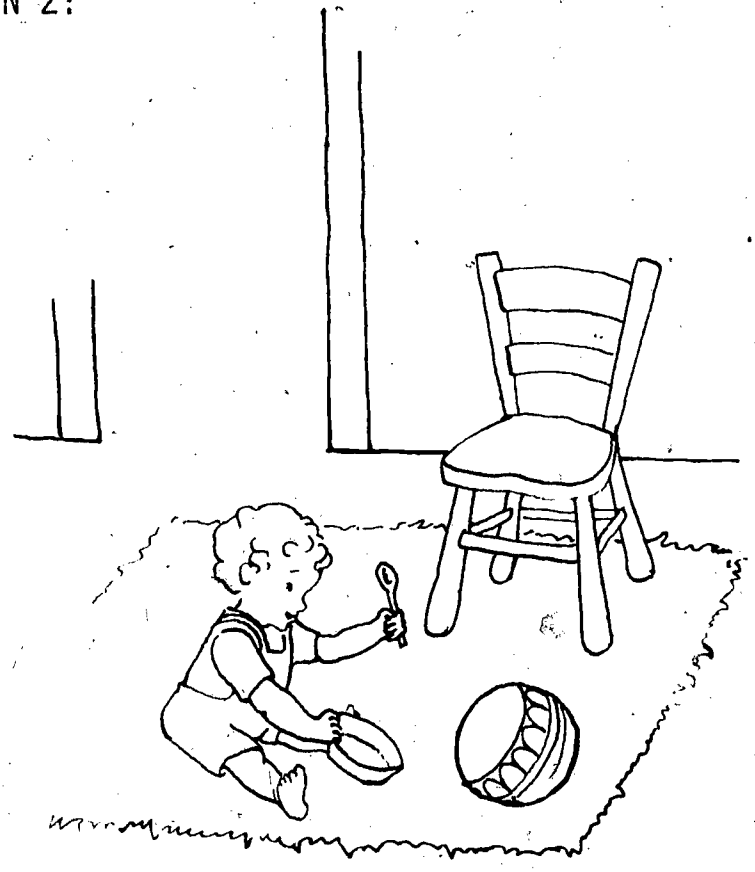
6. THIS IS A PICTURE OF A CATERPILLAR, AND A PICTURE OF A BUTTERFLY. MARK AN "X ON THE PICTURE THAT WOULD COME FIRST.

QUESTION 1:

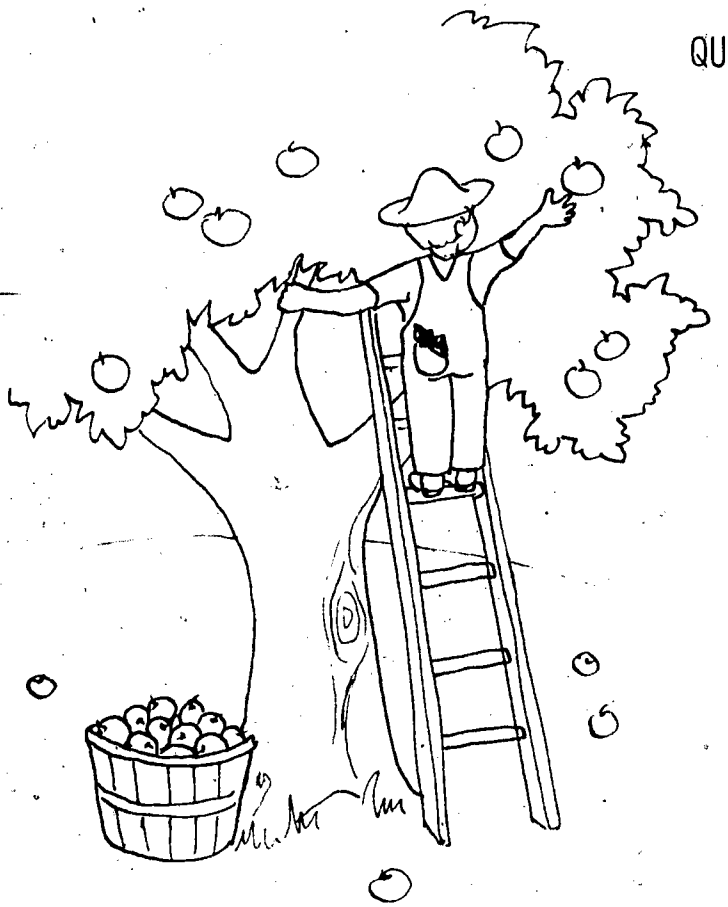




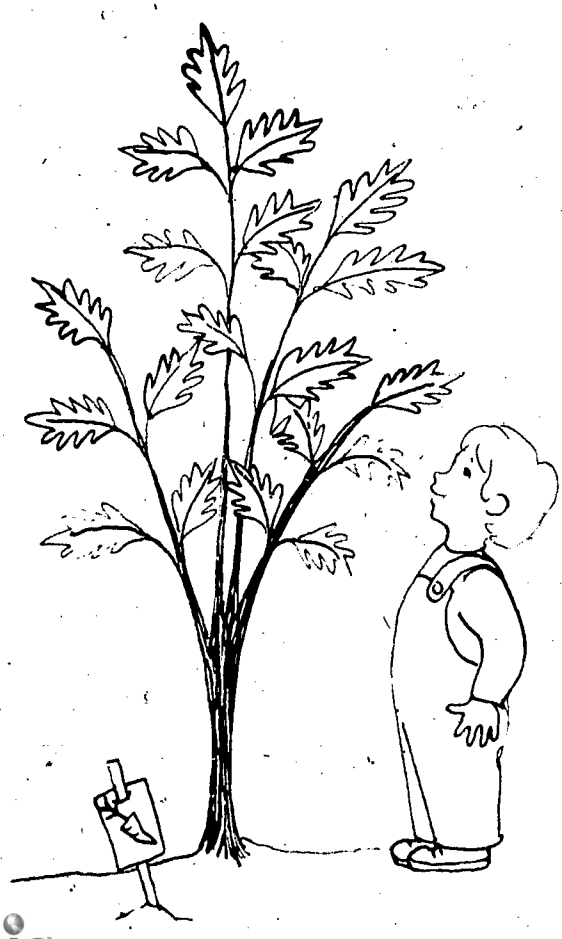
QUESTION 2:



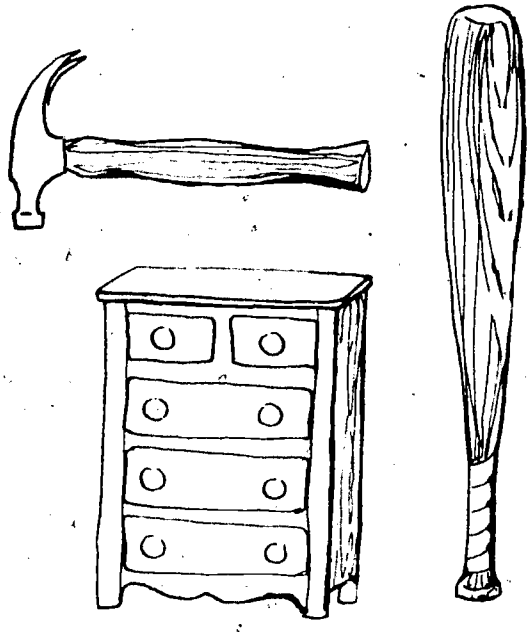
QUESTION 3:

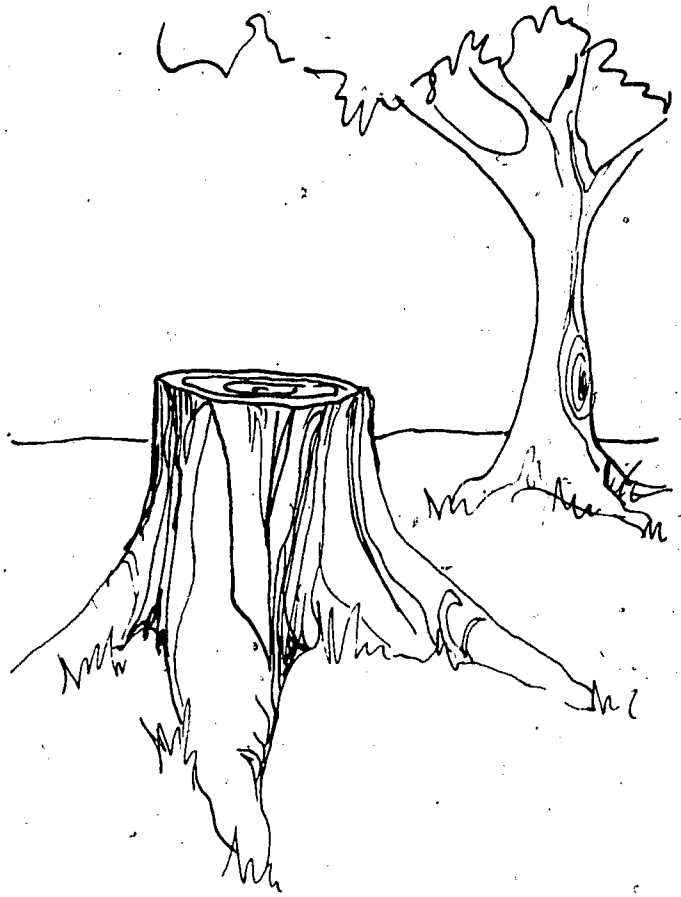


QUESTION 4:

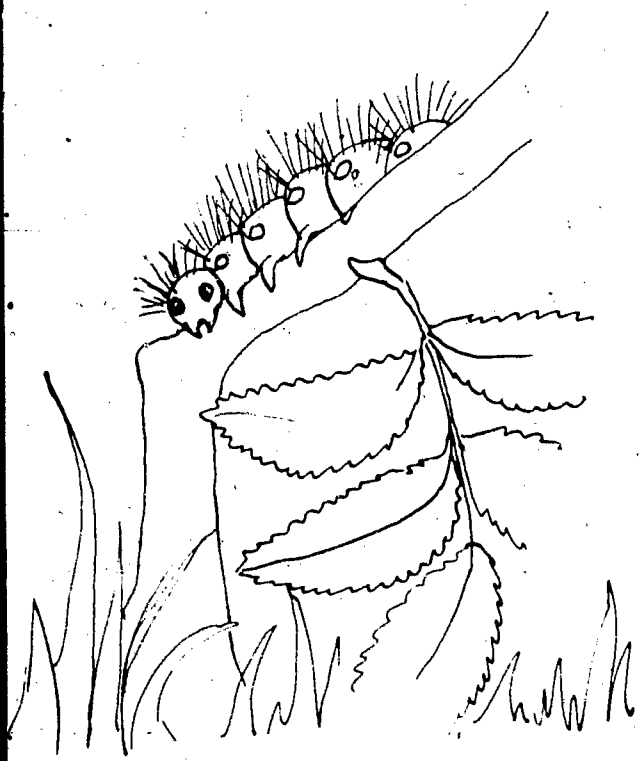


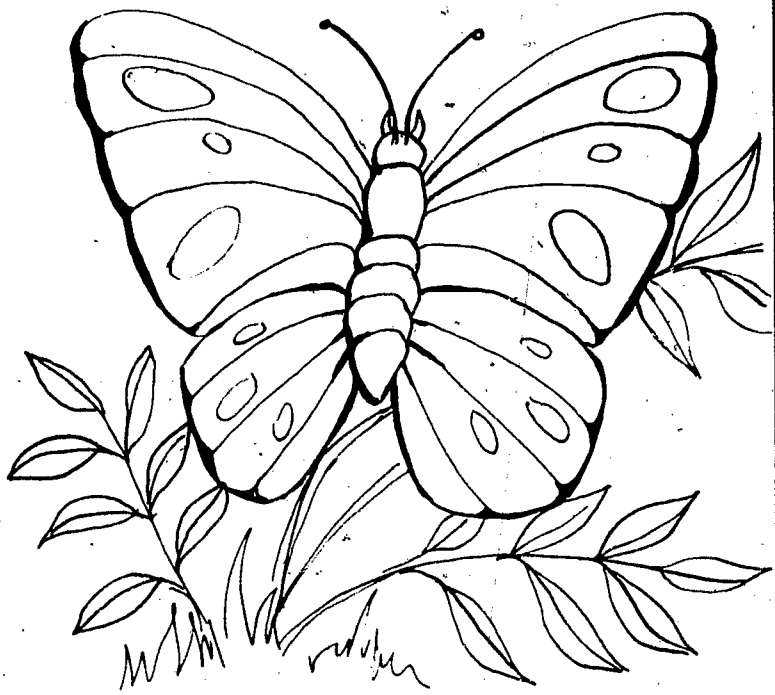
QUESTION 5:





QUESTION 6:





DIRECTIONS

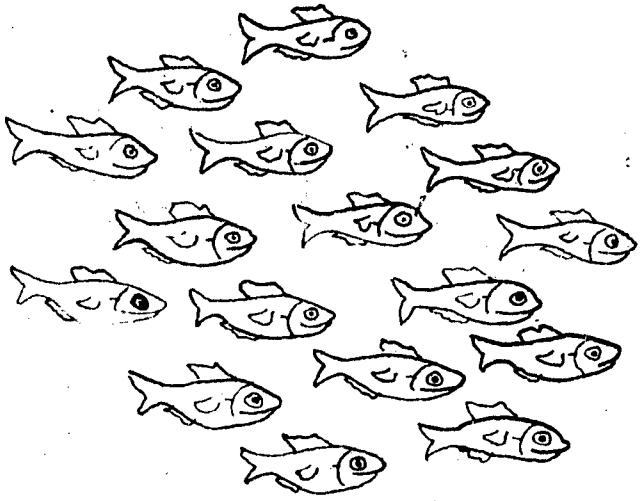
II. PATTERNS II

IN THE NEXT THREE PAGES OF YOUR BOOKS YOU WILL BE LOOKING FOR PICTURES OF THINGS THAT MAKE A PATTERN. LET'S DO THE EXAMPLE BELOW.

HERE ARE TWO PICTURES. ONE IS A PICTURE OF FISH, THE OTHER IS A PICTURE OF PETS. WHICH IS A PICTURE OF SOMETHING THAT MAKES A PATTERN? MAKE AN X ON THE PICTURE THAT IS A PATTERN.

THERE ARE THREE MORE PAGES IN THIS PART OF THE BOOKLET. EACH PAGE HAS TWO PAIRS OF PICTURES ON IT. ONE OF THE PAIR OF PICTURES SHOWS SOMETHING THAT MAKES A PATTERN. MAKE AN X ON THE PICTURE THAT SHOWS A PATTERN.

II. EXAMPLE



EXPLANATION OF QUESTIONS: PATTERNS II

TO BE READ BY THE TEACHER TO THE STUDENTS.

7. THIS IS A PICTURE OF LEAVES, AND A PICTURE OF A BOY PUSHING A WHEELBARREL. MARK AN "X" ON THE THINGS THAT MAKE A PATTERN.

8. THIS IS A PICTURE OF CUPBOARDS IN A KITCHEN, AND A PICTURE OF SOME FURNITURE IN A KITCHEN. MARK AN "X" ON THE THINGS THAT MAKE A PATTERN.

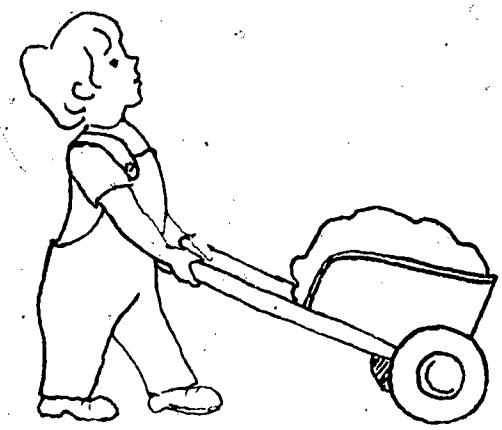
9. THIS IS A PICTURE OF ANIMALS FALLING, AND A PICTURE OF TIGERS IN A CAGE. MARK AN "X" ON THE THINGS THAT MAKE A PATTERN.

10. THIS IS A PICTURE OF A FIELD OF FLOWERS, AND A PICTURE OF LEAVES AND FLOWERS. MARK AN "X" ON THE THINGS THAT MAKE A PATTERN.

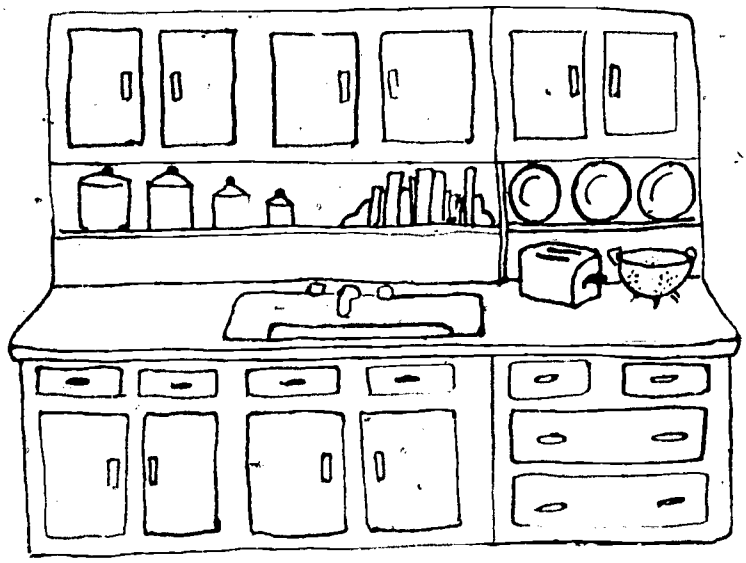
11. THIS IS A PICTURE OF A CALENDAR, AND A PICTURE OF NEWSPAPERS AND MAGAZINES. MARK AN "X" ON THE THINGS THAT MAKE A PATTERN.

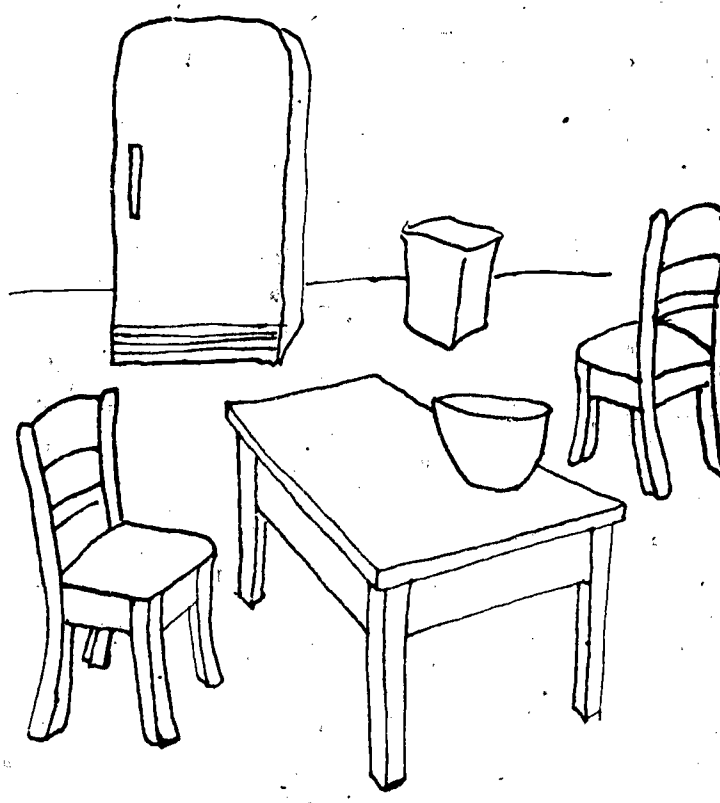
12. THIS IS A PICTURE OF SOME TOOLS, AND A PICTURE OF SOME STUMPS. MARK AN "X" ON THE THINGS THAT MAKE A PATTERN.

QUESTION 7:



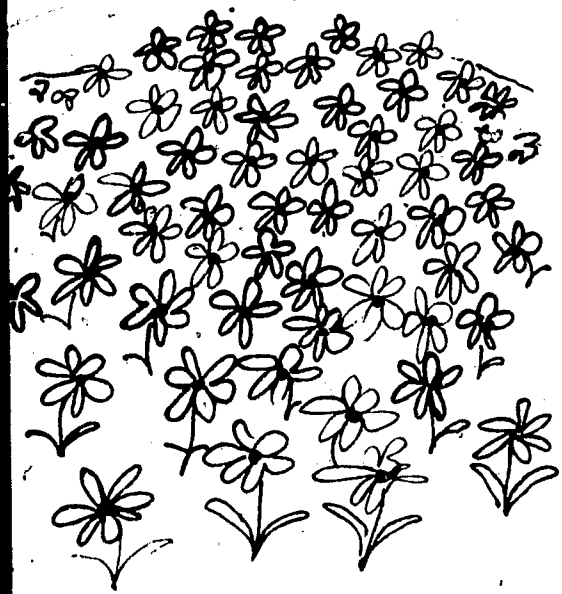
QUESTION 8:





QUESTION 9:

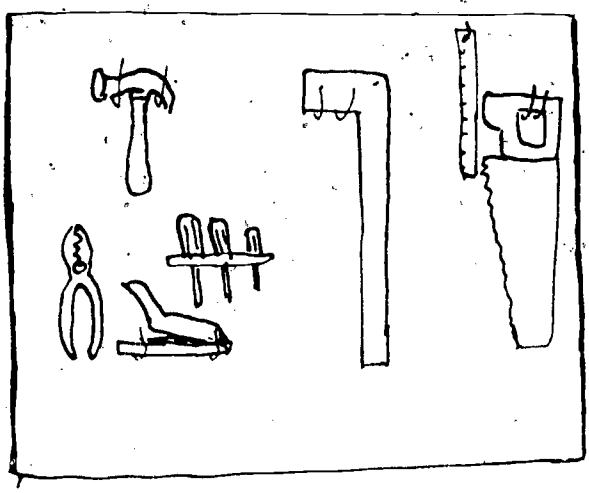
QUESTION 10:

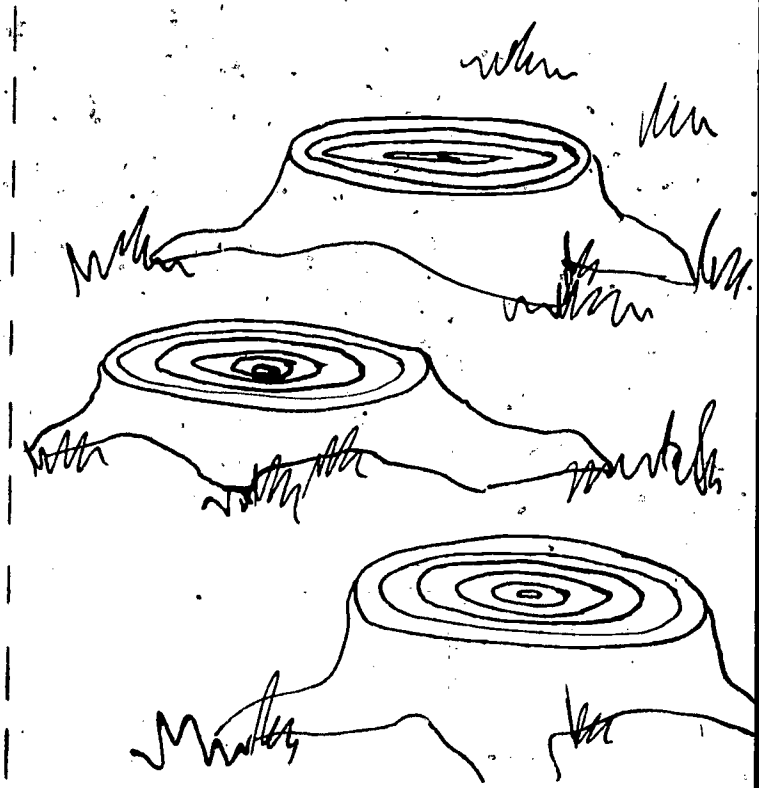


QUESTION 11:

1975 MARCH 1975						
SUN	MON	TUE	WED	THU	FRI	SAT
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23/30	24/31	25	26	27	28	29

QUESTION 12:





DIRECTIONS

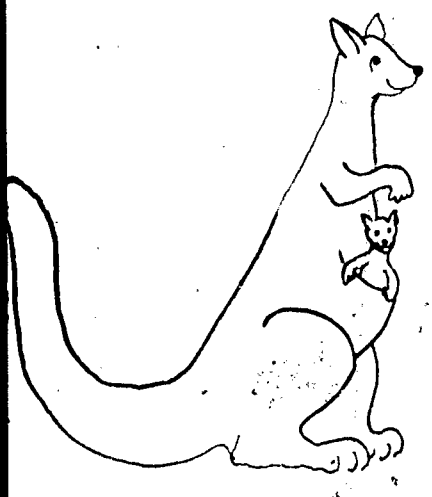
III. ADAPTATION I

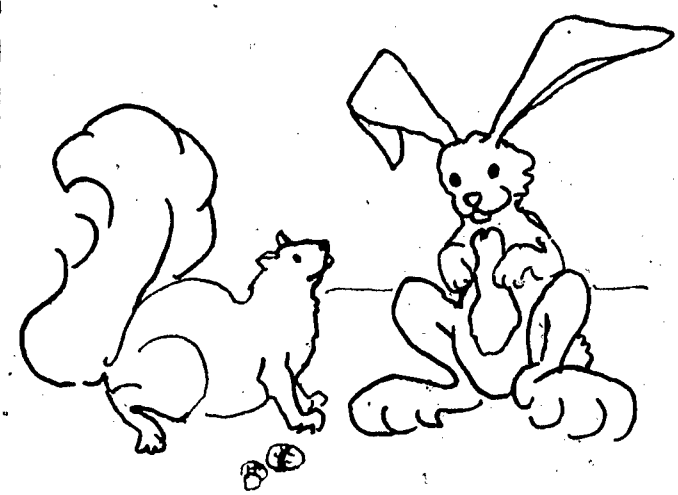
THE PAGES YOU ARE NOW GOING TO WORK WITH EACH HAVE PAIRS OF PICTURES ON THEM. ONE OF THE PAIR OF PICTURES SHOWS SOMETHING USING A PART OF THE BODY IN THE WAY FOR WHICH IT WAS DESIGNED. THE OTHER PICTURE DOESN'T SHOW THIS. YOU ARE TO MAKE AN X ON THE PICTURE THAT SHOWS A PART OF THE BODY BEING USED IN A SPECIAL WAY, AND IN THE RIGHT WAY.

LET'S DO THE EXAMPLE BELOW TOGETHER.

HERE IS A PICTURE OF KANGAROOS, AND A PICTURE OF A RABBIT AND A SQUIRREL. MAKE AN X ON THE PICTURE THAT SHOWS A PART OF THE BODY BEING USED IN A SPECIAL WAY, AND IN THE RIGHT WAY.

III. EXAMPLE





EXPLANATION OF QUESTIONS: ADAPTATION I

TO BE READ BY THE TEACHER TO THE STUDENTS.

13. THESE ARE PICTURES OF DOGS. MARK AN "X" ON THE PICTURE THAT SHOWS A PART OF THE DOG'S BODY BEING USED IN A SPECIAL AND RIGHT WAY.

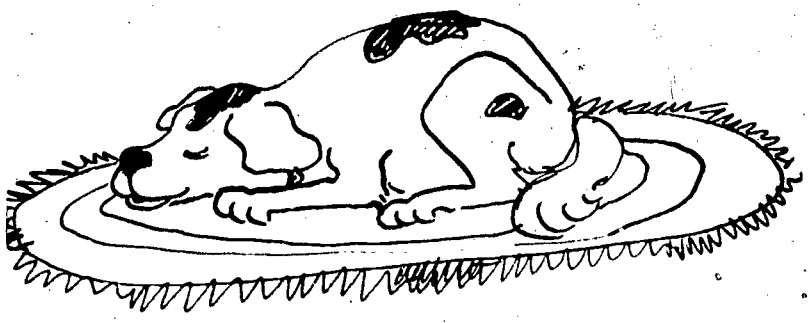
14. THESE ARE PICTURES OF CHILDREN. MARK AN "X" ON THE PICTURE THAT SHOWS A PART OF THE CHILD'S BODY BEING USED IN A SPECIAL AND RIGHT WAY.

15. THESE ARE PICTURES OF CATS. MARK AN "X" ON THE PICTURE THAT SHOWS A PART OF THE CAT'S BODY BEING USED IN A SPECIAL AND RIGHT WAY.

16. THIS IS A PICTURE OF A MONKEY IN A CAGE, AND A MONKEY HANGING FROM A TREE. MARK AN "X" ON THE PICTURE THAT SHOWS A PART OF THE MONKEY'S BODY BEING USED IN A SPECIAL AND RIGHT WAY.

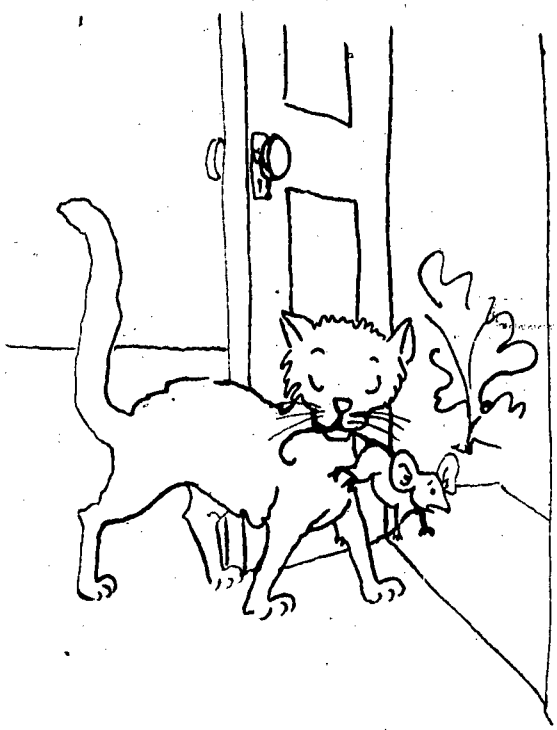
17. THESE ARE PICTURES OF FROGS. MARK AN "X" ON THE PICTURE THAT SHOWS A PART OF THE FROG'S BODY BEING USED IN A SPECIAL AND RIGHT WAY.

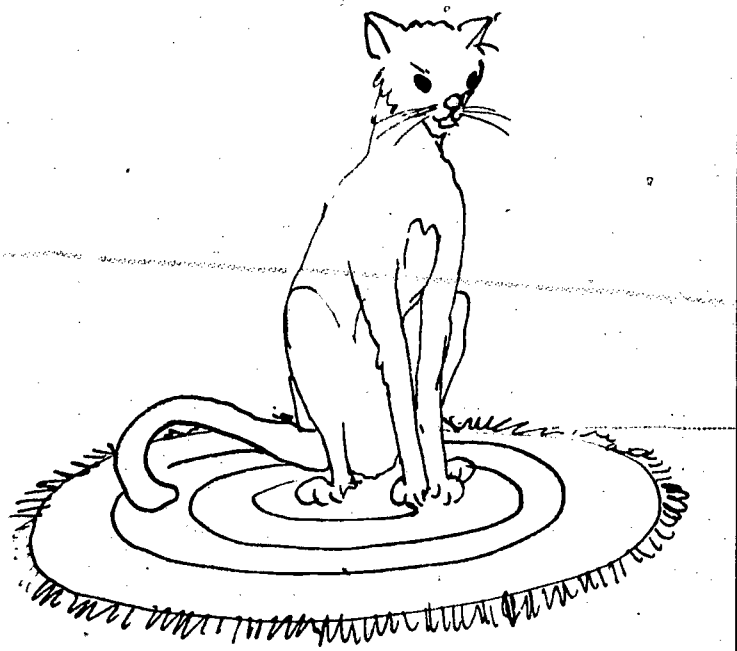
QUESTION 13:



QUESTION 14:

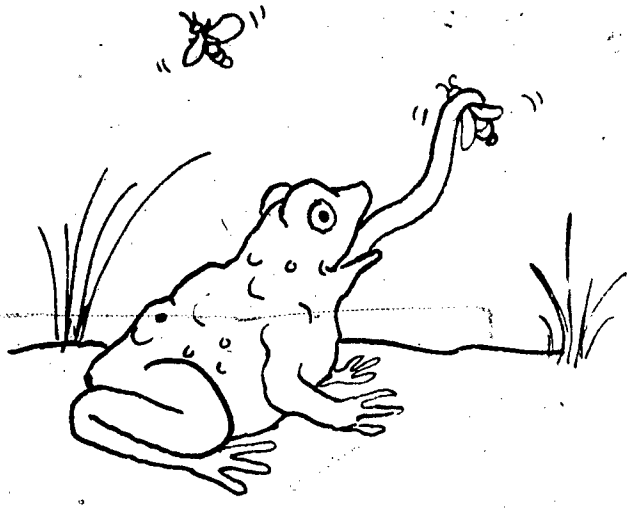
QUESTION 15:





QUESTION 16:

QUESTION 17:



DIRECTIONS

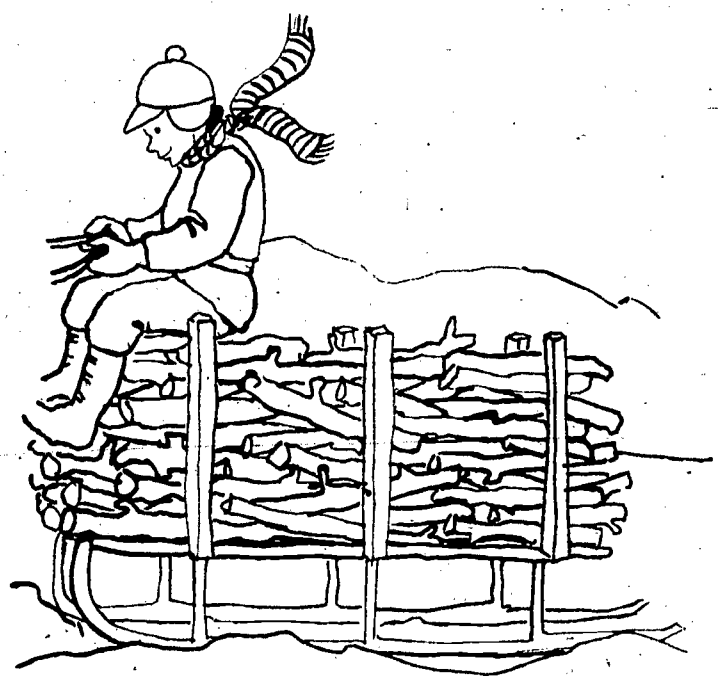
IV. ADAPTATION II

PEOPLE AND ANIMALS CHANGE THE WAY THEY LIVE IN THE DIFFERENT SEASONS. ON THE FOLLOWING PAGES THERE ARE TWO PICTURES. ONE OF THE PAIR OF PICTURES SHOWS THAT THE PEOPLE, ANIMALS, OR PLANTS ARE READY FOR WINTER. IN THE OTHER PICTURE THE PEOPLE, ANIMALS, OR PLANTS ARE NOT READY FOR WINTER. YOU ARE TO MAKE AN X ON THE PICTURE THAT SHOWS THAT THE PEOPLE, ANIMALS, OR PLANTS ARE READY FOR WINTER.

LET'S DO THE EXAMPLE BELOW TOGETHER.

THIS IS A PICTURE OF A MAN RIDING A SLEIGH, AND A PICTURE OF PEOPLE PLAYING ON THE BEACH. MARK AN X ON THE PICTURE THAT SHOWS THE PEOPLE ARE READY FOR WINTER.

IV. EXAMPLE



EXPLANATION OF QUESTIONS: ADAPTATION II

TO BE READ BY THE TEACHER TO THE STUDENTS.

18. THESE ARE PICTURES OF PEOPLE WORKING. MARK AN "X" ON THE PICTURE THAT SHOWS THE PEOPLE READY FOR WINTER.

19. THESE ARE PICTURES OF BEARS DOING DIFFERENT THINGS. MARK AN "X" ON THE PICTURE THAT SHOWS THE BEARS READY FOR WINTER.

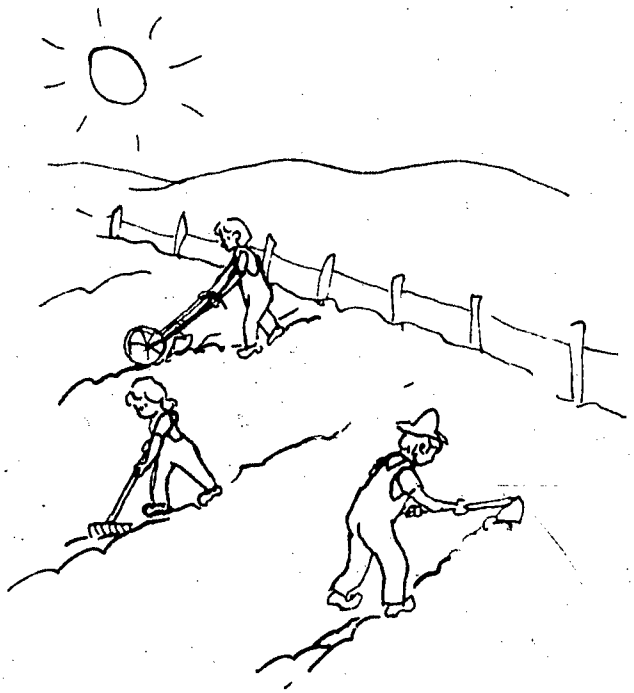
20. THIS IS A PICTURE OF A BIRD ON THE NEST, AND PICTURE OF BIRDS FLYING. MARK AN "X" ON THE PICTURE THAT SHOWS THE BIRDS READY FOR WINTER.

21. THIS IS A PICTURE OF MANY BUTTERFLIES FLYING, AND A PICTURE OF TWO BUTTERFLIES. MARK AN "X" ON THE PICTURE THAT SHOWS THE BUTTERFLIES READY FOR WINTER.

22. THIS IS A PICTURE OF WOOLY BEAR CATERPILLARS SPINNING COCOONS, AND PICTURES OF WOOLY CATERPILLARS EATING PLANTS. MARK AN "X" ON THE PICTURE THAT SHOWS THE CATERPILLARS READY FOR WINTER.

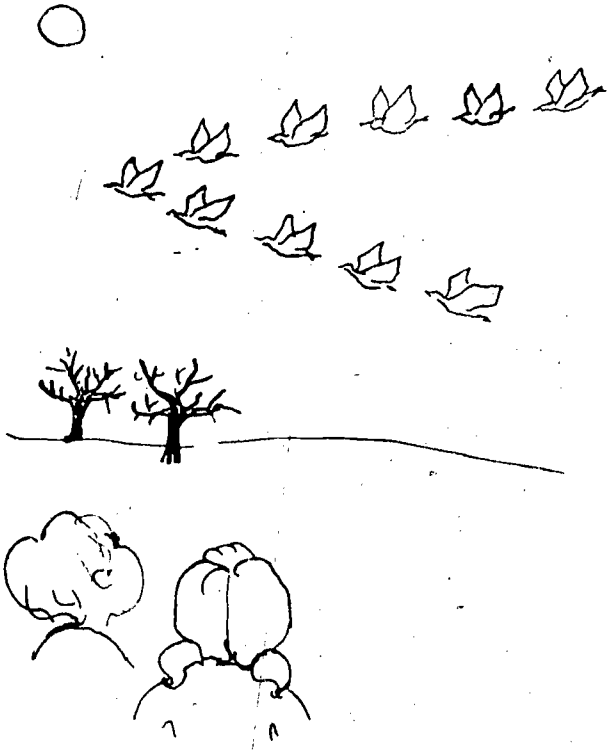
23. THIS IS A PICTURE OF A PLANT WITH A FLOWER, AND A PICTURE OF A PLANT WITH SEEDS. MARK AN "X" ON THE PICTURE THAT SHOWS THE PLANT READY FOR WINTER.

QUESTION 18:



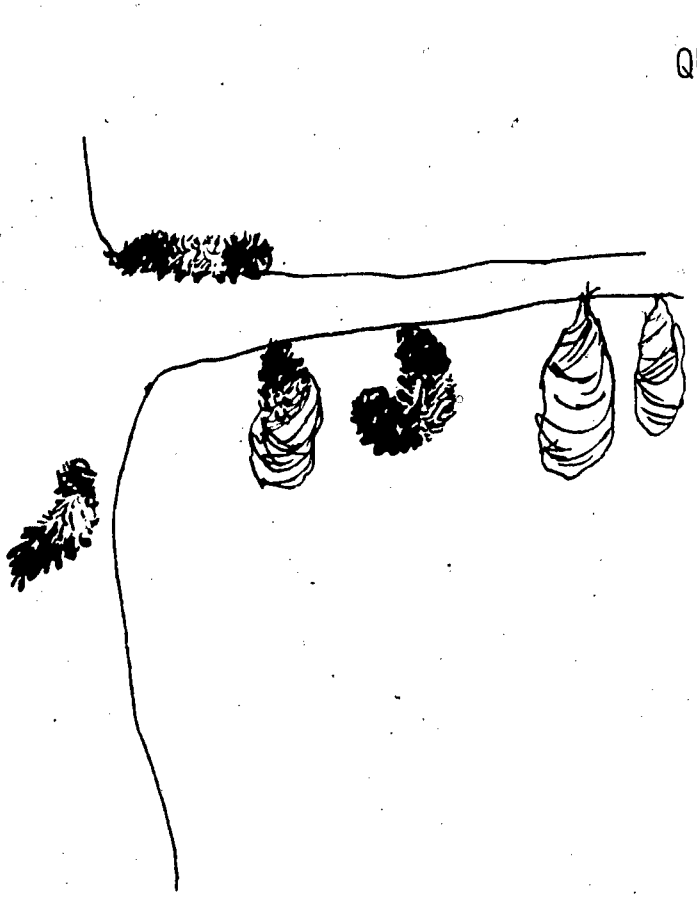
QUESTION 19:

QUESTION 20:



QUESTION 21:

QUESTION 22:



QUESTION 23:

DIRECTIONS

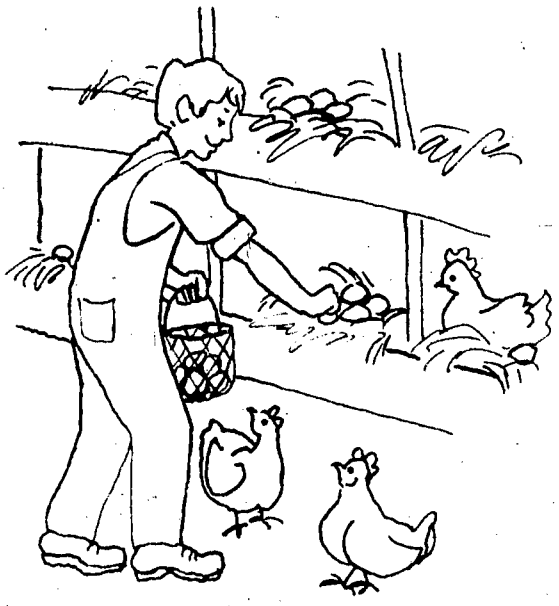
V. INTERDEPENDENCE

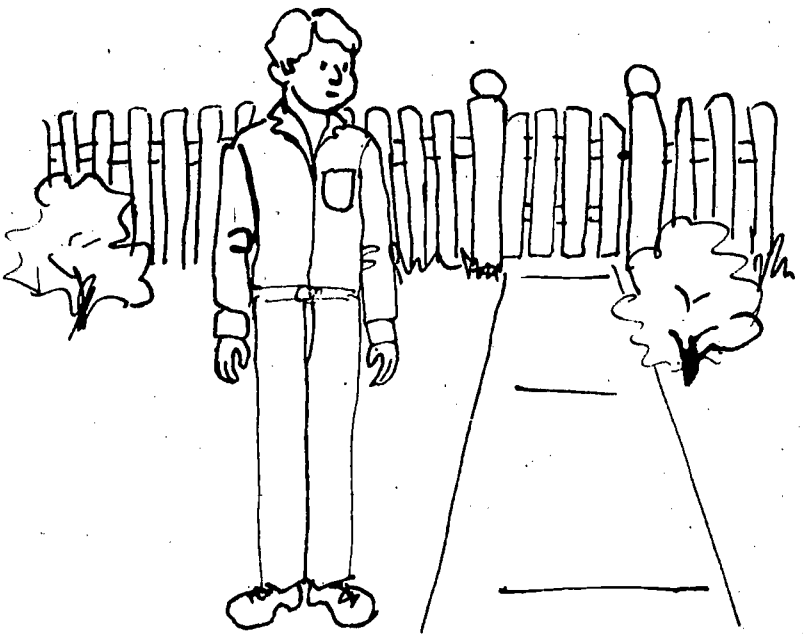
ON THE FOLLOWING PAGES, YOU WILL BE TRYING TO FIND PICTURES THAT SHOW THAT SOMEONE OR SOMETHING IS DEPENDING ON SOMEONE OR SOMETHING ELSE. AS BEFORE, THERE ARE PAIRS OF PICTURES ON EACH PAGE. YOU ARE TO MAKE AN X ON THE ONE PICTURE OF THE PAIR THAT SHOWS THAT SOMETHING IS DEPENDING ON, OR NEEDS, SOMETHING ELSE.

LET'S DO THE EXAMPLE BELOW TOGETHER.

THIS IS A PICTURE OF A MAN PICKING UP EGGS AND A MAN STANDING IN HIS YARD. MAKE AN X ON THE PICTURE THAT SHOWS SOMETHING NEEDS SOMETHING ELSE.

V . EXAMPLE





EXPLANATION OF QUESTIONS: INTERDEPENDENCE

TO BE READ BY THE TEACHER TO THE STUDENTS.

24. THIS IS A PICTURE OF A BOY STANDING ON HIS HEAD, AND A PICTURE OF A MOTHER AND HER CHILDREN CLEANING A ROOM. MARK AN "X" ON THE PICTURE THAT SHOWS SOMEONE DEPENDS ON SOMEONE OR SOMETHING ELSE.

25. THIS IS A PICTURE OF MICE EATING IN A WHEATFIELD, AND A PICTURE OF A MOUSE SITTING IN A WHEATFIELD. MARK AN "X" ON THE PICTURE THAT SHOWS SOMETHING DEPENDING ON SOMETHING ELSE.

26. THIS IS A PICTURE OF A CAR GETTING GASOLINE, AND A PICTURE OF TWO CARS IN A PARKING LOT. MARK AN "X" ON THE PICTURE THAT SHOWS SOMETHING DEPENDING ON SOMETHING ELSE.

27. THIS IS A PICTURE OF TADPOLES SWIMMING IN A POND, AND A TURTLE EATING TADPOLES. MARK AN "X" ON THE PICTURE THAT SHOWS SOMETHING DEPENDING ON SOMETHING ELSE.

28. THIS IS A PICTURE OF A BOY WALKING, AND A PICTURE OF A BOY MILKING A COW. MARK AN "X" ON THE PICTURE THAT SHOWS SOMEONE DEPENDS ON SOMEONE OR SOMETHING ELSE.

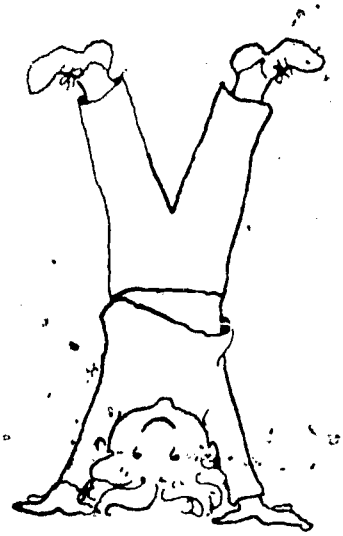
29. THIS IS A PICTURE OF A MOTHER AND HER CHILD, AND A PICTURE OF A BABY. MARK AN "X" ON THE PICTURE THAT SHOWS SOMEONE DEPENDS ON SOMEONE OR SOMETHING ELSE.

30. THIS IS A PICTURE OF A BOY LOOKING OVER A LAKE, AND A PICTURE OF A BOY AND GIRL WATCHING A SUNSET. MARK AN "X" ON THE PICTURE THAT SHOWS SOMEONE DEPENDS ON SOMEONE OR SOMETHING ELSE.

31. THIS IS A PICTURE OF THE SUN AND VARIOUS OTHER THINGS, AND A PICTURE OF THE MOON SHINING OVER A FOREST. MARK AN "X" ON THE PICTURE THAT SHOWS SOMETHING DEPENDING ON SOMETHING ELSE.

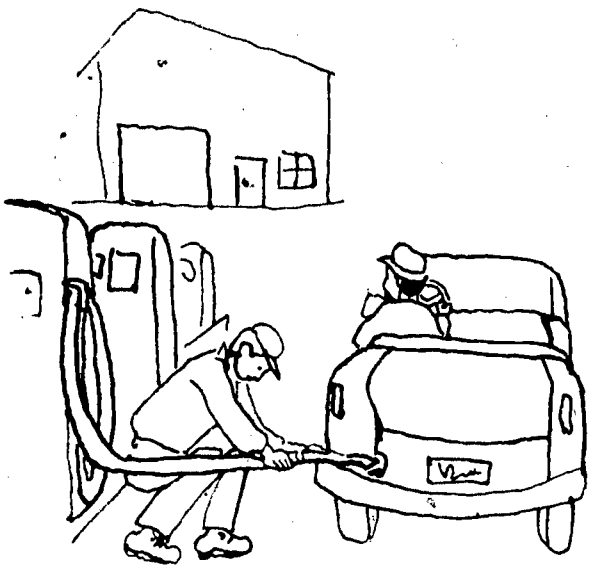
32. THIS IS A PICTURE OF TWO TERRARIUMS, AND A PICTURE OF A GLASS OF SOIL AND A GLASS OF STONES. MARK AN "X" ON THE PICTURE THAT SHOWS SOMETHING DEPENDING ON SOMETHING ELSE.

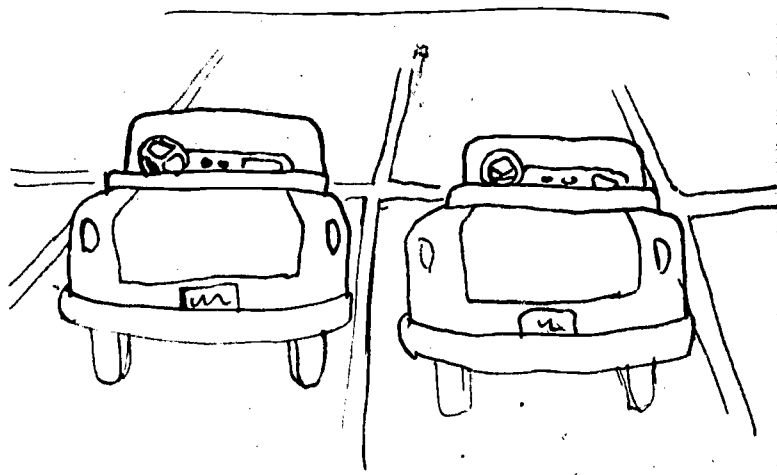
QUESTION 24:



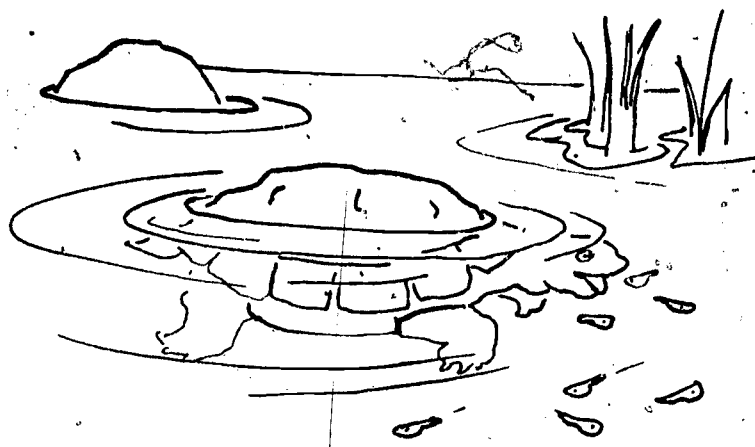
QUESTION 25:

QUESTION 26:

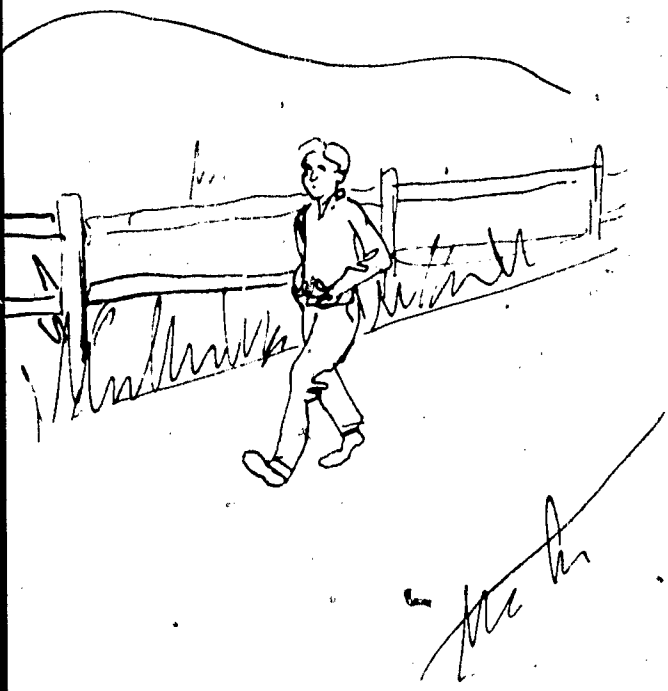


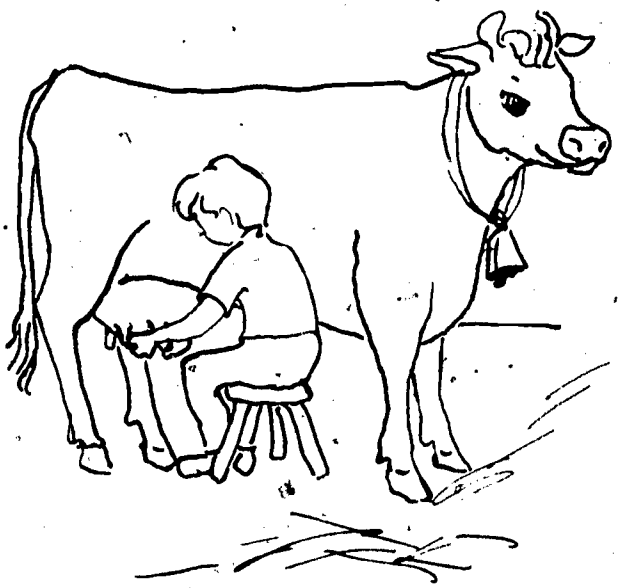


QUESTION 27:

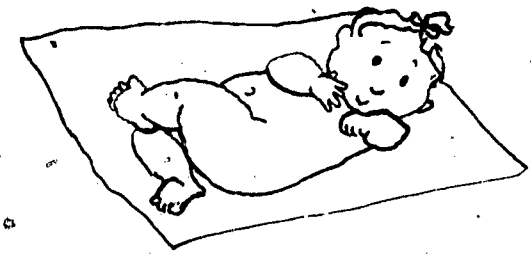


QUESTION 28:

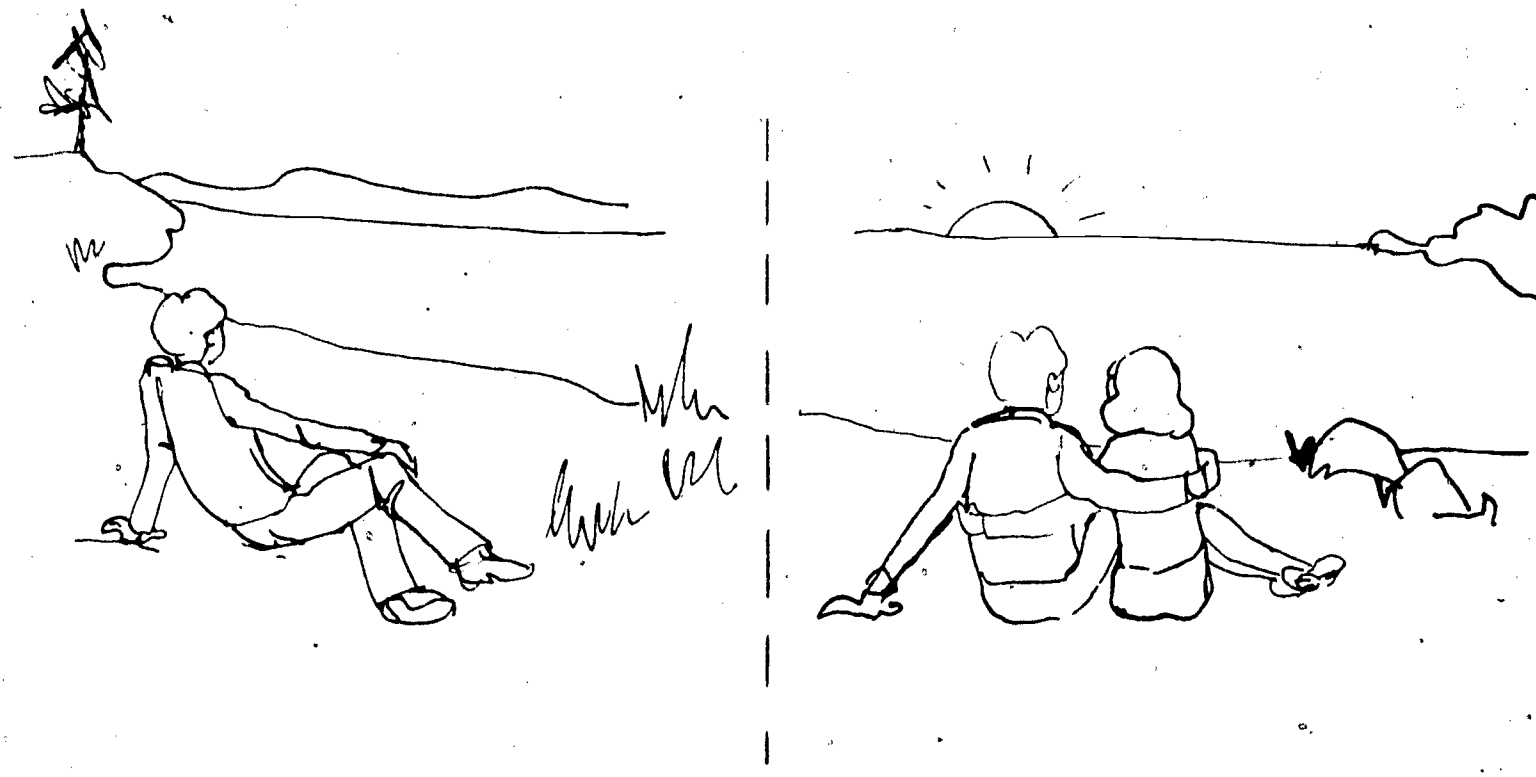




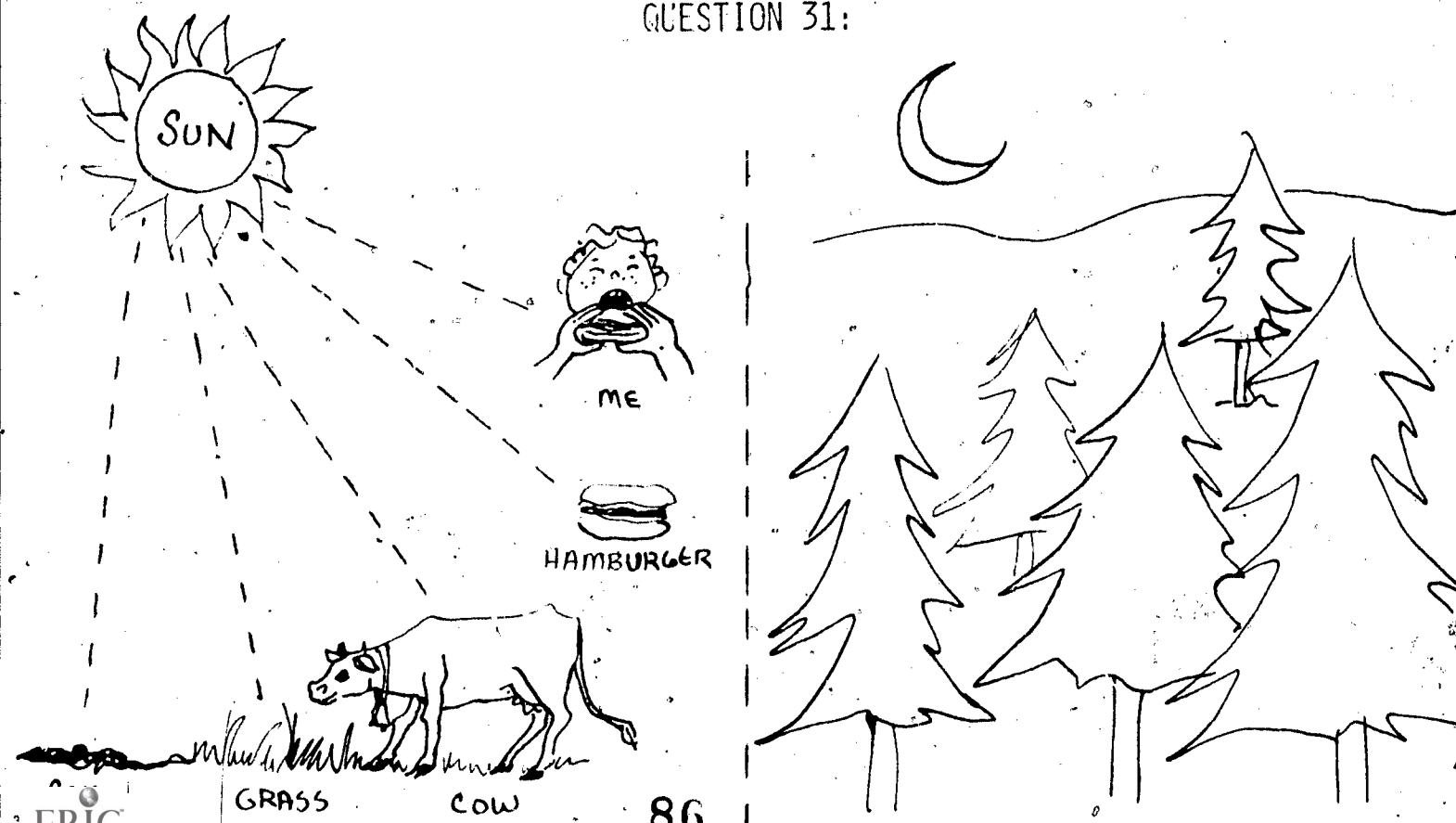
QUESTION 29:



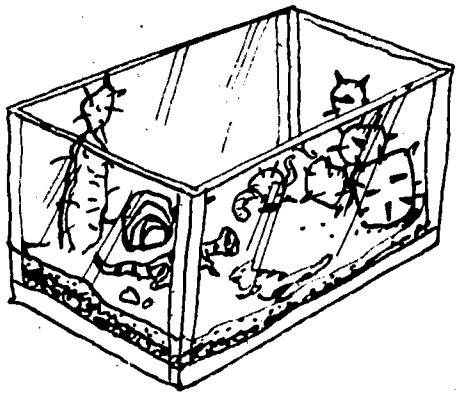
QUESTION 30:

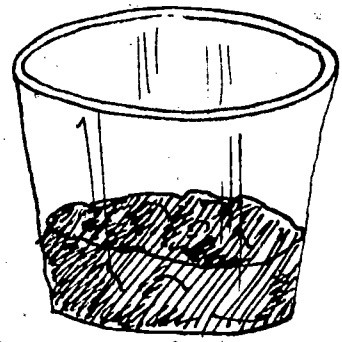


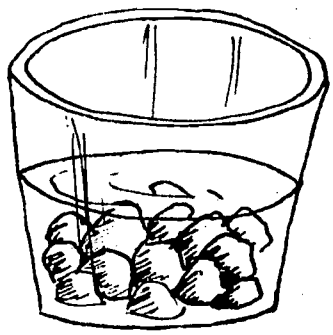
QUESTION 31:



QUESTION 32:







DIRECTIONS

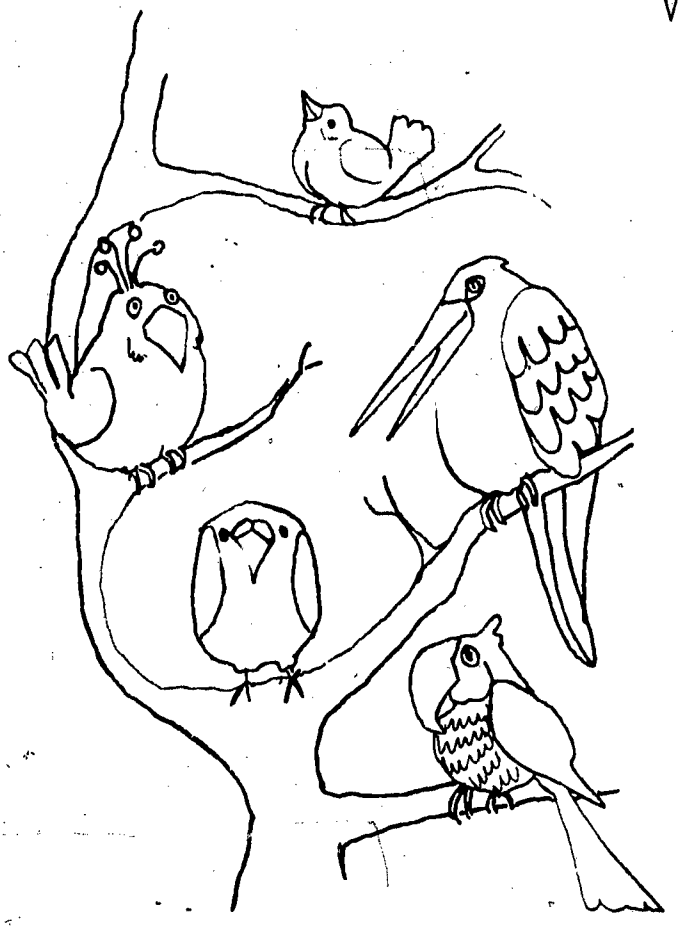
VI. DIVERSITY

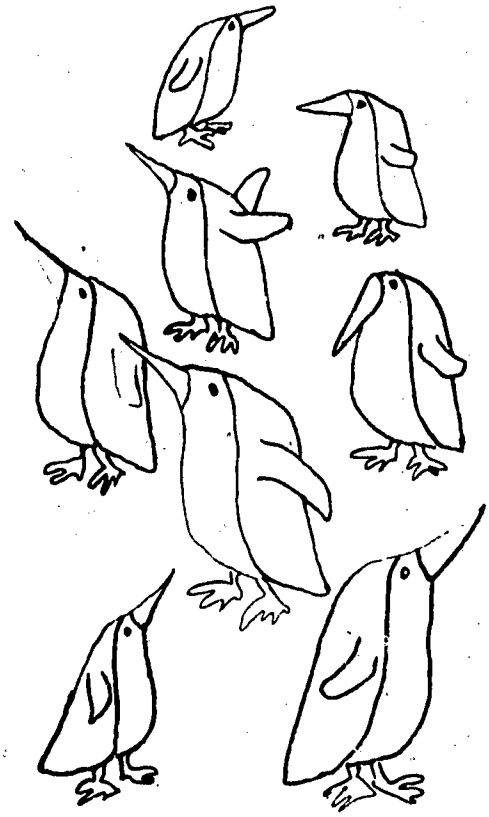
YOU WILL FIND PAIRS OF PICTURES ON EACH OF THE PAGES YOU WILL BE WORKING WITH. ONE OF THE PAIR OF PICTURES WILL SHOW DIFFERENT AND UNRELATED KINDS OF THINGS. SOME OF THE PICTURES WILL SHOW THINGS THAT ARE ALL ALIKE OR RELATED. YOU ARE TO LOOK AT BOTH PICTURES AND MAKE AN X ON THE PICTURE THAT SHOWS MANY KINDS OF THINGS.

LET'S DO THE EXAMPLE BELOW TOGETHER.

THESE ARE PICTURES OF BIRDS. MAKE AN X ON THE PICTURE THAT SHOWS DIFFERENT KINDS OF BIRDS.

VI . EXAMPLE





EXPLANATION OF QUESTIONS: DIVERSITY

TO BE READ BY THE TEACHER TO THE STUDENTS.

33. THESE ARE PICTURES OF INSECTS. MARK AN "X" ON THE PICTURE THAT SHOWS DIFFERENT KINDS LIVING TOGETHER.

34. THIS IS A PICTURE OF INSECTS IN A SPIDER WEB, AND A PICTURE OF FISH. MARK AN "X" ON THE PICTURE THAT SHOWS THE GREATEST DIFFERENCE.

35. THESE ARE PICTURES OF FISH. MARK AN "X" ON THE PICTURE THAT SHOWS DIFFERENT KINDS LIVING TOGETHER.

36. THIS IS A PICTURE OF THREE GIRLS, AND A PICTURE OF A FAMILY. MARK AN "X" ON THE PICTURE THAT SHOWS THE GREATEST DIFFERENCE.

37. THIS IS A PICTURE OF CHAIRS, AND A PICTURE OF BICYCLES. MARK AN "X" ON THE PICTURE THAT SHOWS THE GREATEST DIFFERENCE.

38. THESE ARE PICTURES OF THINGS WITH WHEELS. MARK AN "X" ON THE PICTURE THAT SHOWS THE GREATEST DIFFERENCE.

39. THIS IS A PIECE OF DIRT (OR TURF), AND AN ANT HILL. MARK AN "X" ON THE PICTURE THAT SHOWS THE GREATEST DIFFERENCE.

40. THESE ARE PICTURES OF TAIL SHAPES OF BIRDS. MARK AN "X" ON THE PICTURE THAT SHOWS THE GREATEST DIFFERENCE.

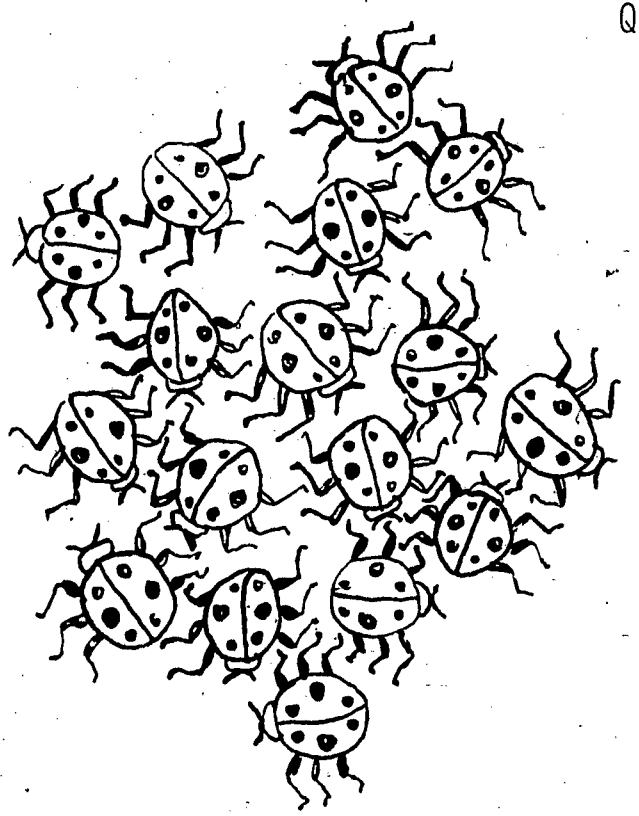
41. THESE ARE PICTURES OF LEAVES. MARK AN "X" ON THE PICTURE THAT SHOWS THE GREATEST DIFFERENCE.

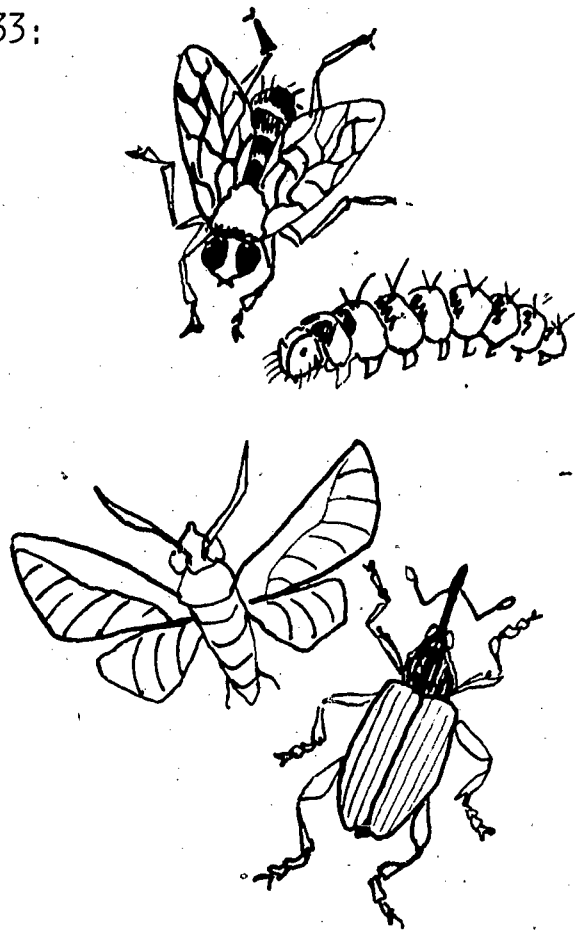
42. THESE ARE PICTURES OF CONTAINERS FILLED WITH THINGS. MARK AN "X" ON THE PICTURE THAT SHOWS THE GREATEST DIFFERENCE.

43. THESE ARE PICTURES OF HEADS AND BILLS OF BIRDS. MARK AN "X" ON THE PICTURE THAT SHOWS THE GREATEST DIFFERENCE.

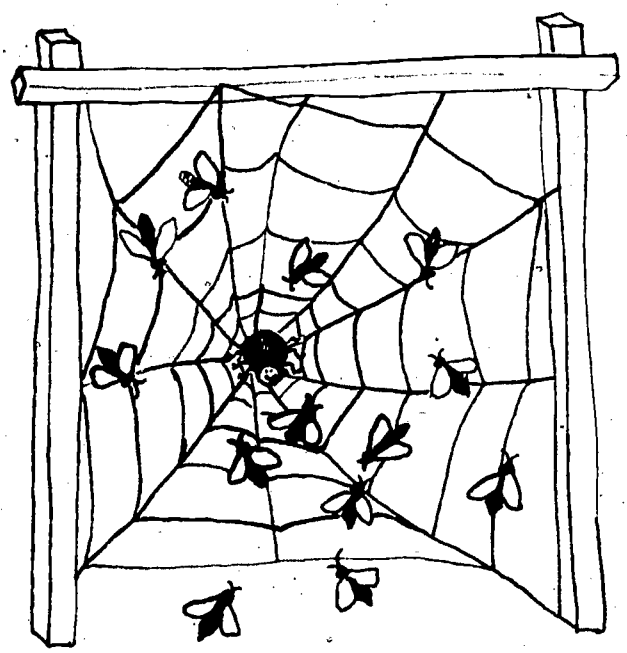
44. THESE ARE PICTURES OF FORESTS. MARK AN "X" ON THE PICTURE THAT SHOWS THE GREATEST DIFFERENCE.

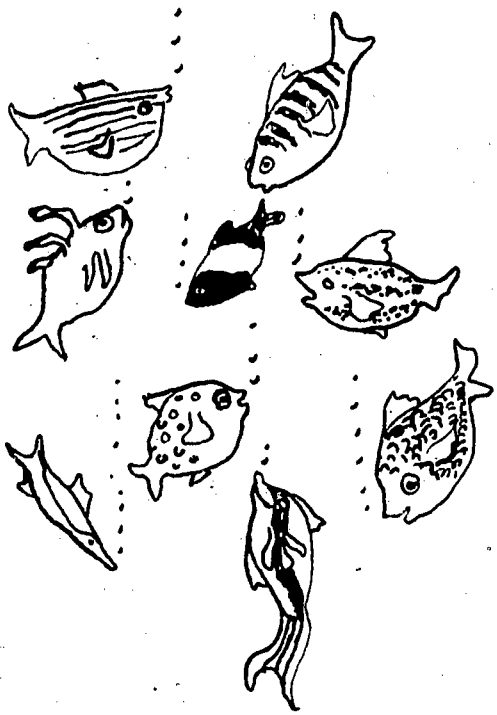
QUESTION 33:



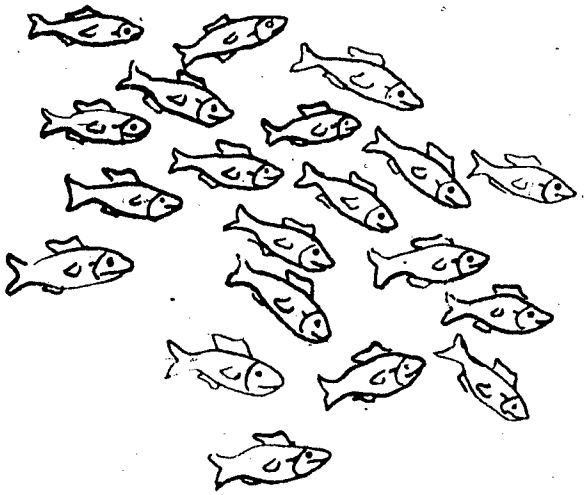


QUESTION 34:

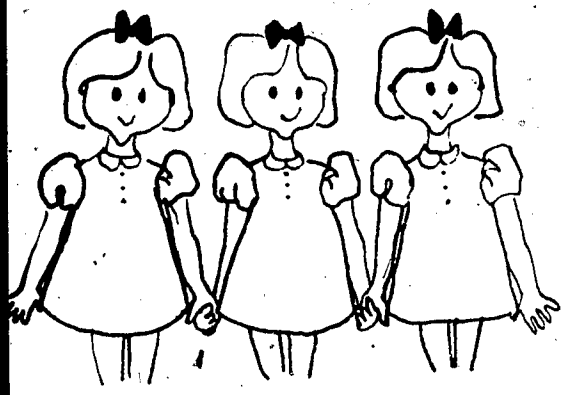


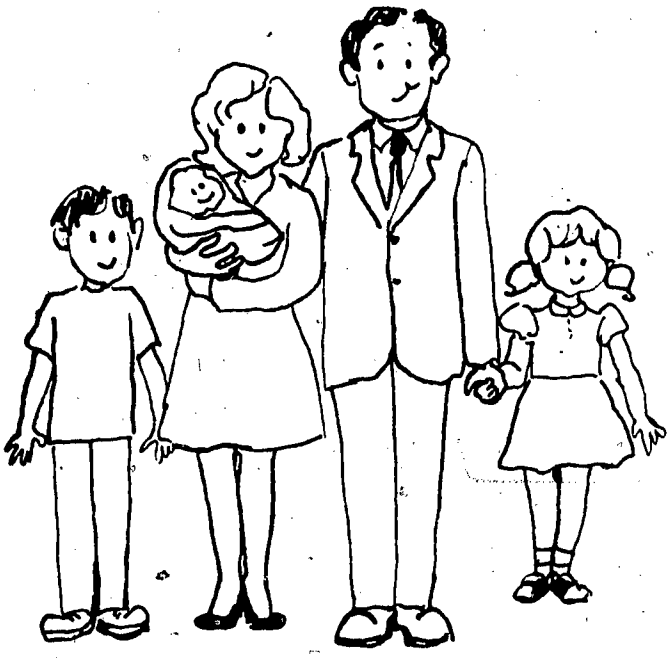


QUESTION 35:

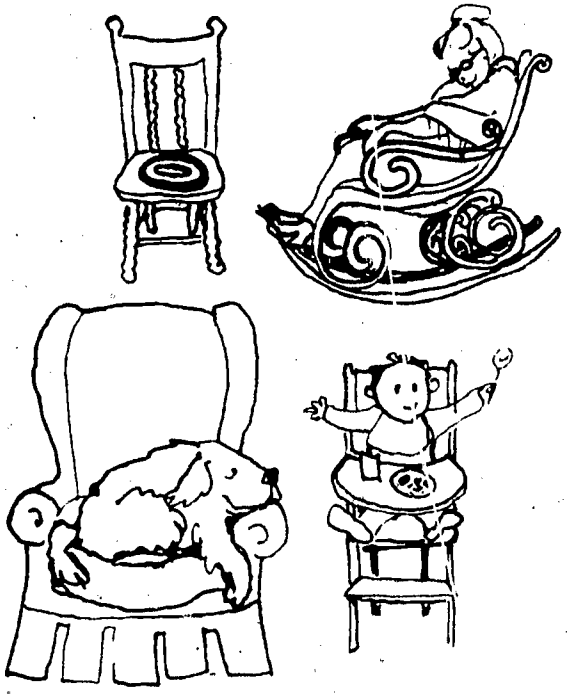


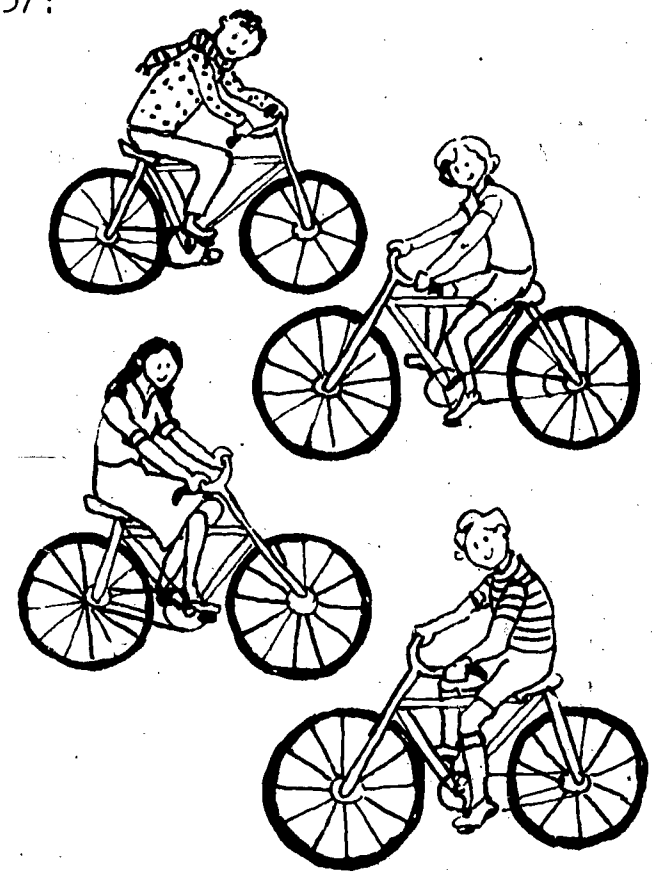
QUESTION 36:



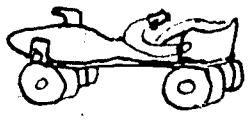


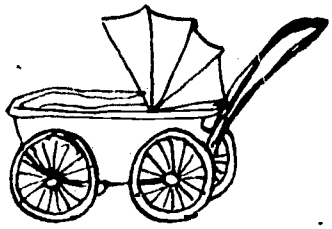
QUESTION 37:

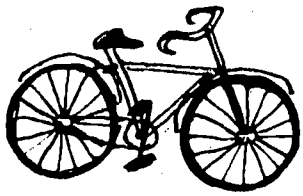


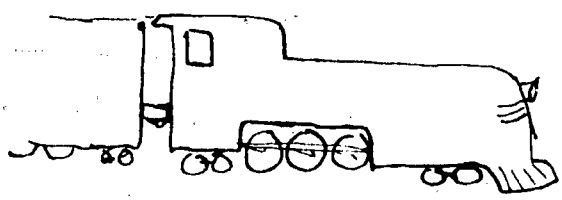


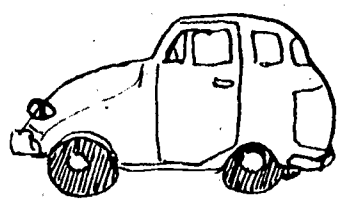
QUESTION 38:

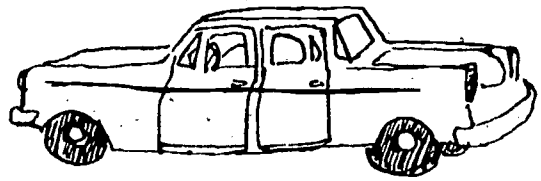


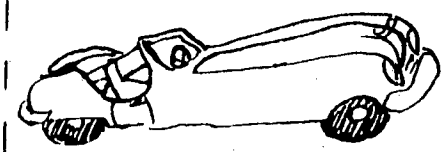


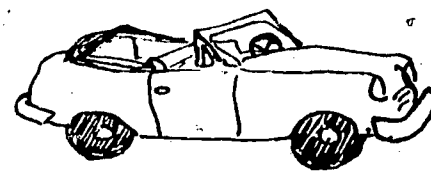




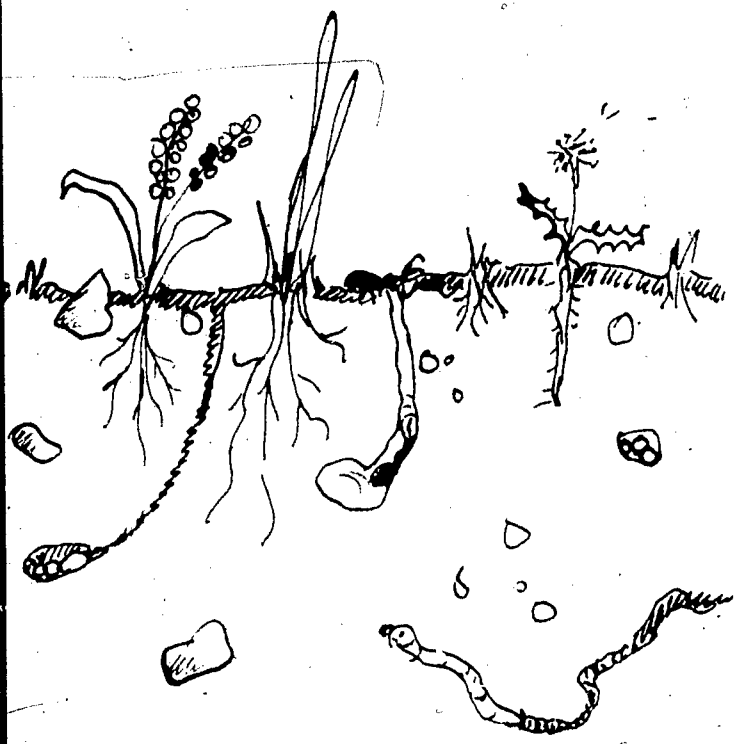


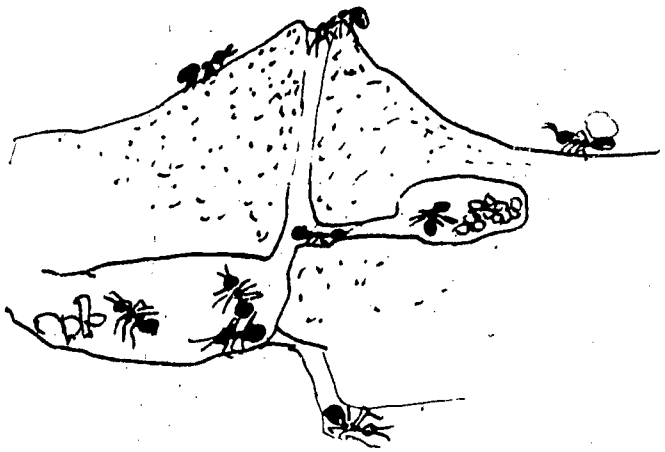




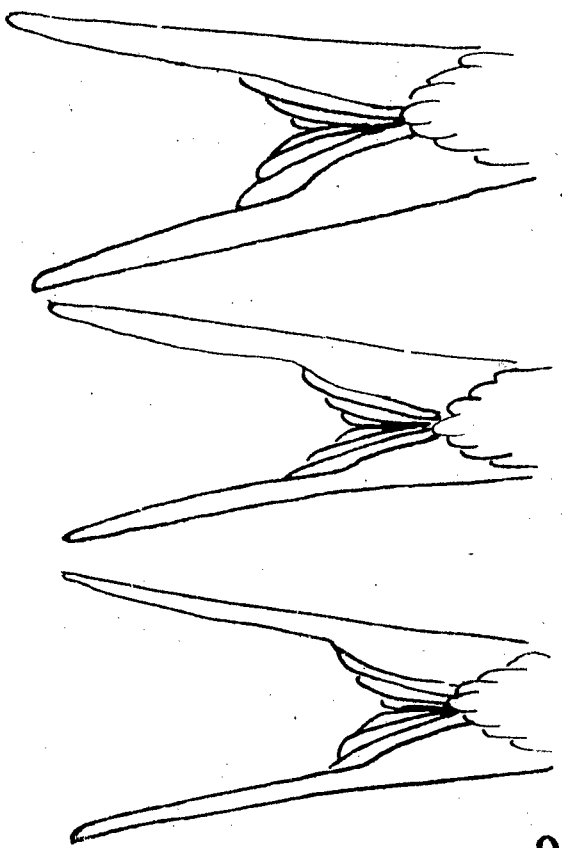


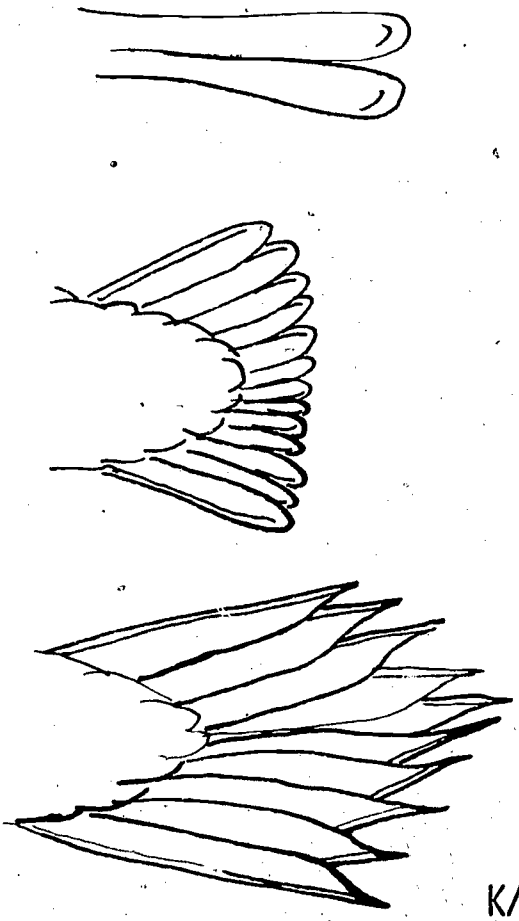
QUESTION 39:



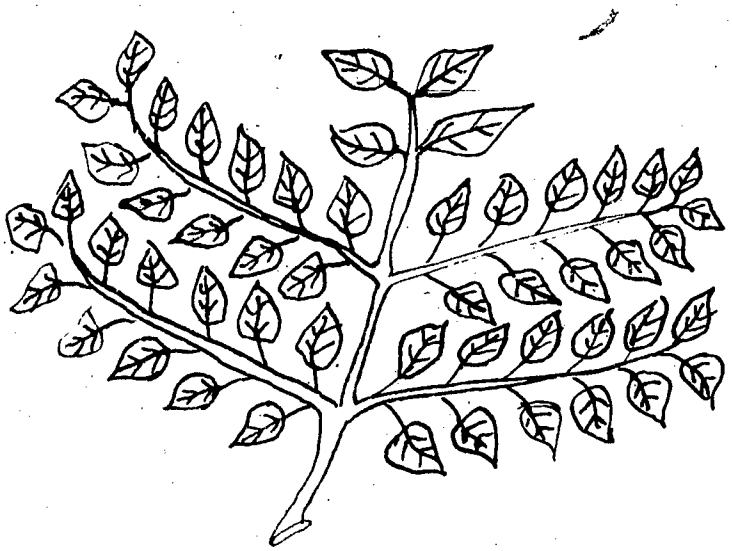


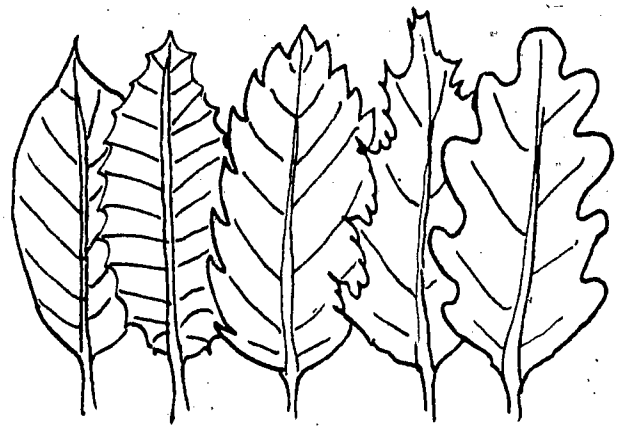
QUESTION 40:



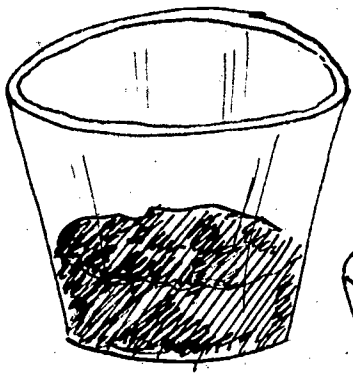


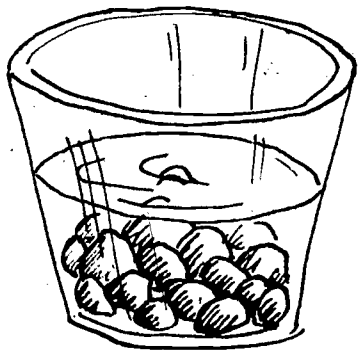
QUESTION 41:

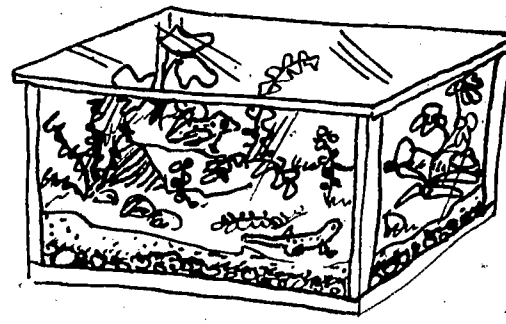


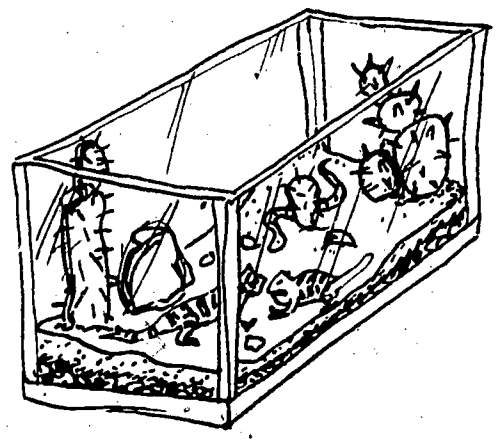


QUESTION 42:

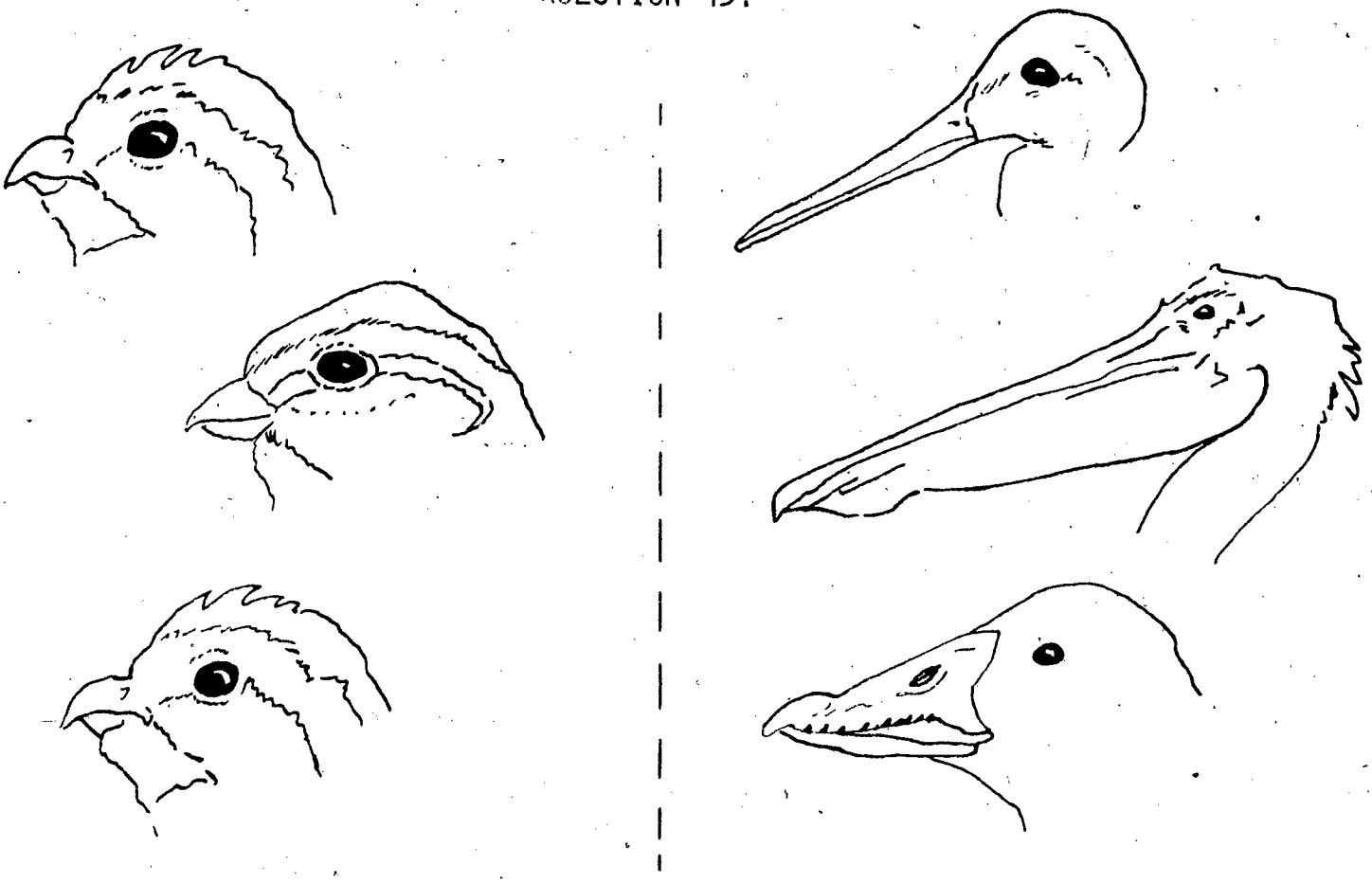




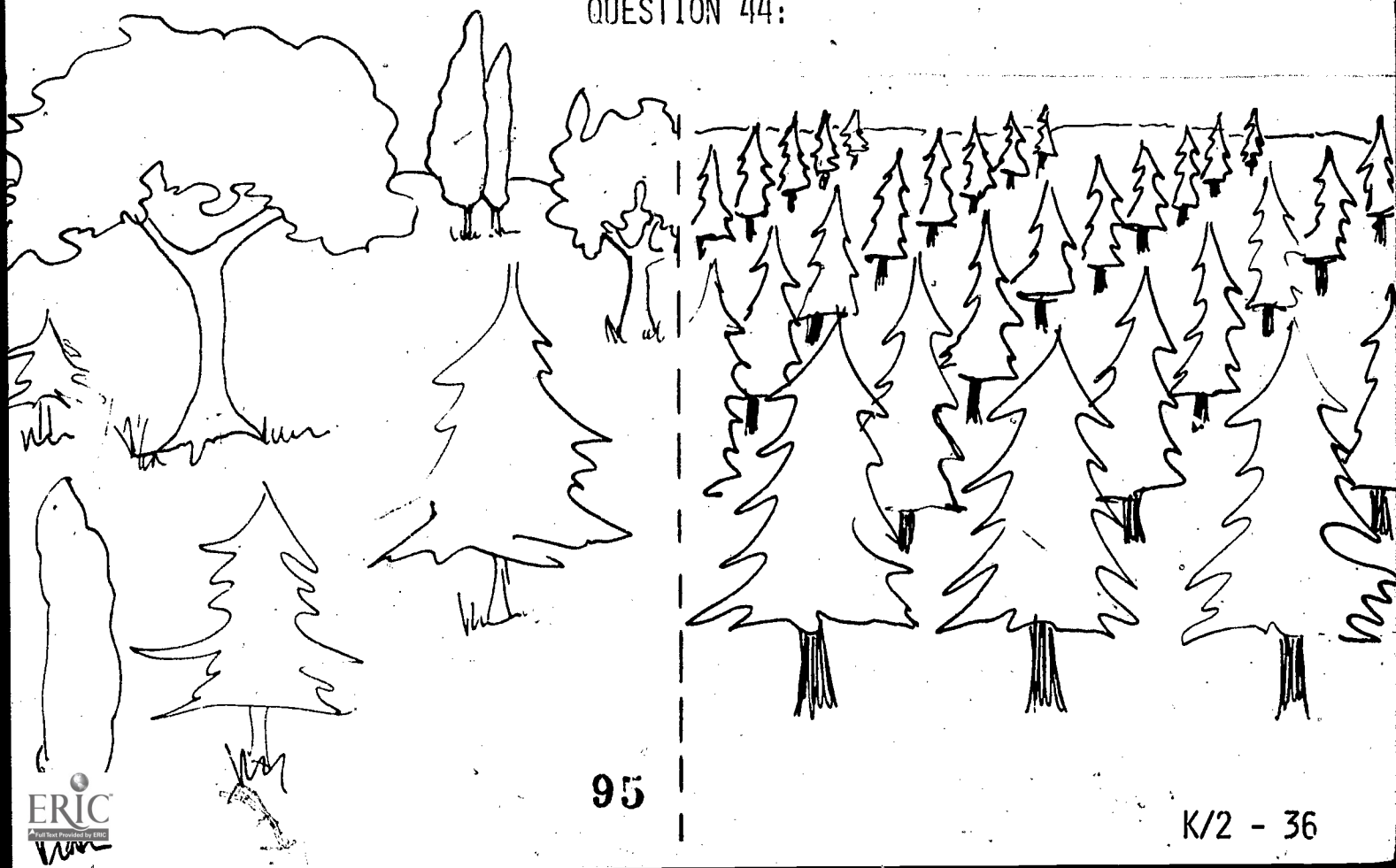




QUESTION 43:



QUESTION 44:



DIRECTIONS

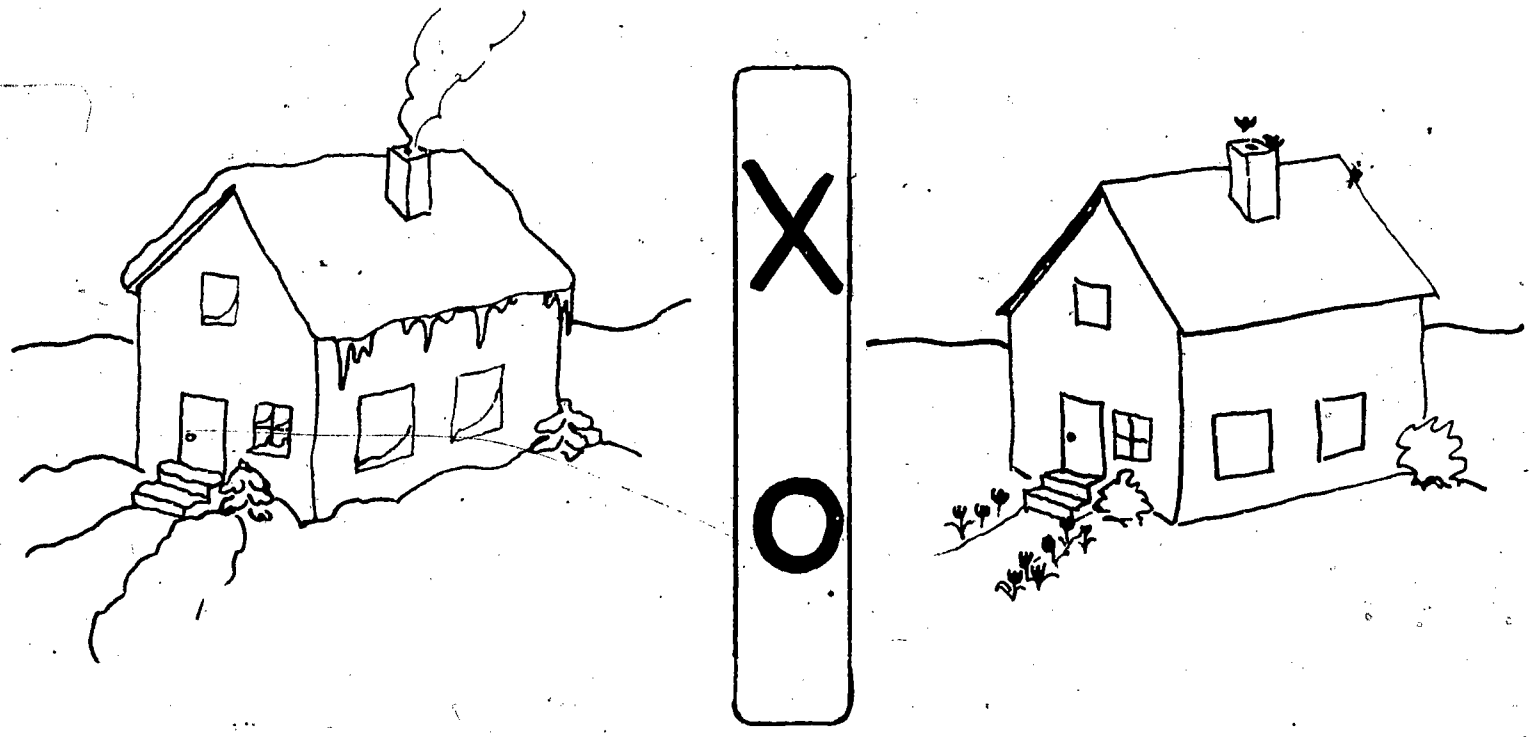
VII. CHANGE

The directions for this section of the test are somewhat different. You may want to take extra time to make sure the children understand them.

THE PAGES ON WHICH YOU ARE NOW GOING TO WORK EACH HAVE PAIRS OF PICTURES ON THEM. BETWEEN THE PAIRS OF PICTURES IS A BOX WITH AN X AND AN O (ZERO) IN IT. YOU ARE TO LOOK AT THE TWO PICTURES WHILE I DESCRIBE THEM. I WILL DESCRIBE THE LEFT PICTURE, THEN THE RIGHT PICTURE. IF THE RIGHT PICTURE SHOWS THAT A REAL CHANGE OF AT LEAST ONE DAY HAS TAKEN PLACE, YOU ARE TO CIRCLE THE X. IF NO REAL CHANGE HAS TAKEN PLACE IN THE RIGHT PICTURE, YOU SHOULD CIRCLE THE O. FOR EACH PAIR OF PICTURES, YOU SHOULD CIRCLE EITHER AN X OR THE O.

Repeat the explanations and directions if necessary until the children understand what they are to do. When the directions are understood, begin with the questions.

VII . EXAMPLE



EXPLANATION OF QUESTIONS: CHANGE

TO BE READ BY THE TEACHER TO THE STUDENTS

45. THE LEFT PICTURE IS OF A TOWER WITH A CLOCK IN IT. THE RIGHT PICTURE IS ALSO OF A TOWER WITH A CLOCK. IF THE RIGHT PICTURE SHOWS THAT A REAL CHANGE (MORE THAN A DAY) HAS TAKEN PLACE, CIRCLE THE "X" IN THE BOX. IF NO REAL CHANGE HAS TAKEN PLACE, CIRCLE THE "O" IN THE BOX.

46. THE LEFT PICTURE IS OF A GIRL PICKING FLOWERS. THE RIGHT PICTURE IS OF A GIRL ICE SKATING. IF THE RIGHT PICTURE SHOWS THAT A REAL CHANGE (MORE THAN A DAY) HAS TAKEN PLACE, CIRCLE THE "X" IN THE BOX. IF NO REAL CHANGE HAS TAKEN PLACE, CIRCLE THE "O" IN THE BOX.

47. THE RIGHT PICTURE IS OF SOME TADPOLES, AND THE LEFT PICTURE IS OF SOME FROGS. IF THE RIGHT PICTURE SHOWS THAT A REAL CHANGE HAS TAKEN PLACE, CIRCLE THE "X" IN THE BOX. IF NO REAL CHANGE HAS TAKEN PLACE, CIRCLE THE "O" IN THE BOX.

48. THESE ARE PICTURES OF CHILDREN PLAYING IN THE YARD. IF THE RIGHT PICTURE SHOWS THAT A REAL CHANGE (MORE THAN A DAY) HAS TAKEN PLACE, CIRCLE THE "X" IN THE BOX. IF NO REAL CHANGE HAS TAKEN PLACE, CIRCLE THE "O" IN THE BOX.

49. THE LEFT PICTURE IS OF A BOY TRYING TO REACH ON TO A BENCH. THE RIGHT PICTURE IS OF A BOY HAMMERING NAILS. IF THE RIGHT PICTURE SHOWS THAT A REAL CHANGE (MORE THAN A DAY) HAS TAKEN PLACE, CIRCLE THE "X" IN THE BOX. IF NO REAL CHANGE HAS TAKEN PLACE, CIRCLE THE "O" IN THE BOX.

50. THE LEFT PICTURE IS OF A BOY WALKING HIS DOG. THE RIGHT PICTURE IS OF A BOY READING A BOOK, WITH HIS DOG SITTING NEARBY. IF THE RIGHT PICTURE SHOWS THAT A REAL CHANGE (MORE THAN A DAY) HAS TAKEN PLACE, CIRCLE THE "X" IN THE BOX. IF NO REAL CHANGE HAS TAKEN PLACE, CIRCLE THE "O" IN THE BOX.

51. THESE ARE PICTURES OF TWO BOYS SITTING ON SOME STEPS. IF THE RIGHT PICTURE SHOWS THAT A REAL CHANGE (MORE THAN A DAY) HAS TAKEN PLACE, CIRCLE THE "X" IN THE BOX. IF NO REAL CHANGE HAS TAKEN PLACE, CIRCLE THE "O" IN THE BOX.

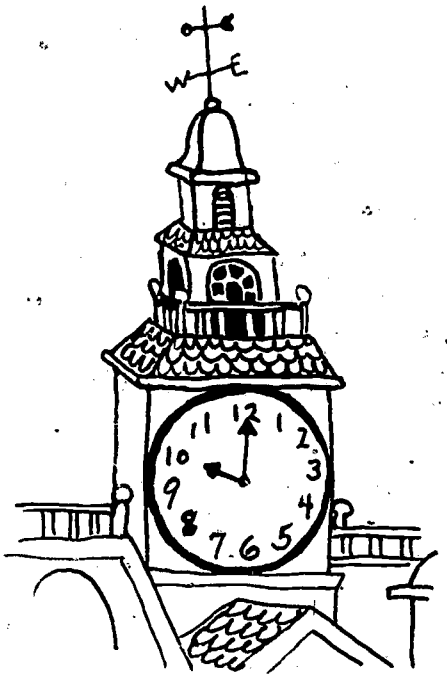
52. THE LEFT PICTURE IS OF A HEN WITH SOME EGGS IN A NEST. THE RIGHT PICTURE IS OF SOME BABY CHICKENS. IF THE RIGHT PICTURE SHOWS THAT A REAL CHANGE (MORE THAN A DAY) HAS TAKEN PLACE, CIRCLE THE "X" IN THE BOX. IF NO REAL CHANGE HAS TAKEN PLACE, CIRCLE THE "O" IN THE BOX.

53. THE LEFT PICTURE IS OF A TREE WITH LEAVES. THE RIGHT PICTURE IS OF A TREE FROM WHICH THE LEAVES HAVE FALLEN OFF. IF THE RIGHT PICTURE SHOWS THAT A REAL CHANGE (MORE THAN A DAY) HAS TAKEN PLACE, CIRCLE THE "X" IN THE BOX. IF NO REAL CHANGE HAS TAKEN PLACE, CIRCLE THE "O" IN THE BOX.

54. THE LEFT PICTURE IS OF SOME WOOLY BEAR CATERPILLARS EATING PLANTS. THE RIGHT PICTURE IS OF SOME WOOLY BEAR CATERPILLARS SPINNING A COCOON. IF THE RIGHT PICTURE SHOWS THAT A REAL CHANGE (MORE THAN A DAY) HAS TAKEN PLACE, CIRCLE THE "X" IN THE BOX. IF NO REAL CHANGE HAS TAKEN PLACE, CIRCLE THE "O" IN THE BOX.

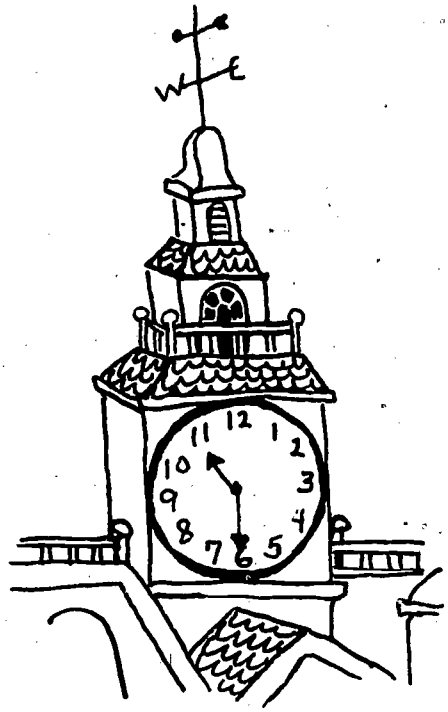
55. THE LEFT PICTURE IS OF ONE BIRD FEEDING YOUNG BIRDS IN A NEST. THE RIGHT PICTURE IS OF TWO BIRDS FEEDING YOUNG BIRDS IN THE NEST. IF THE RIGHT PICTURE SHOWS THAT A REAL CHANGE (MORE THAN A DAY) HAS TAKEN PLACE, CIRCLE THE "X" IN THE BOX. IF NO REAL CHANGE HAS TAKEN PLACE, CIRCLE THE "O" IN THE BOX.

QUESTION 45:



X

O

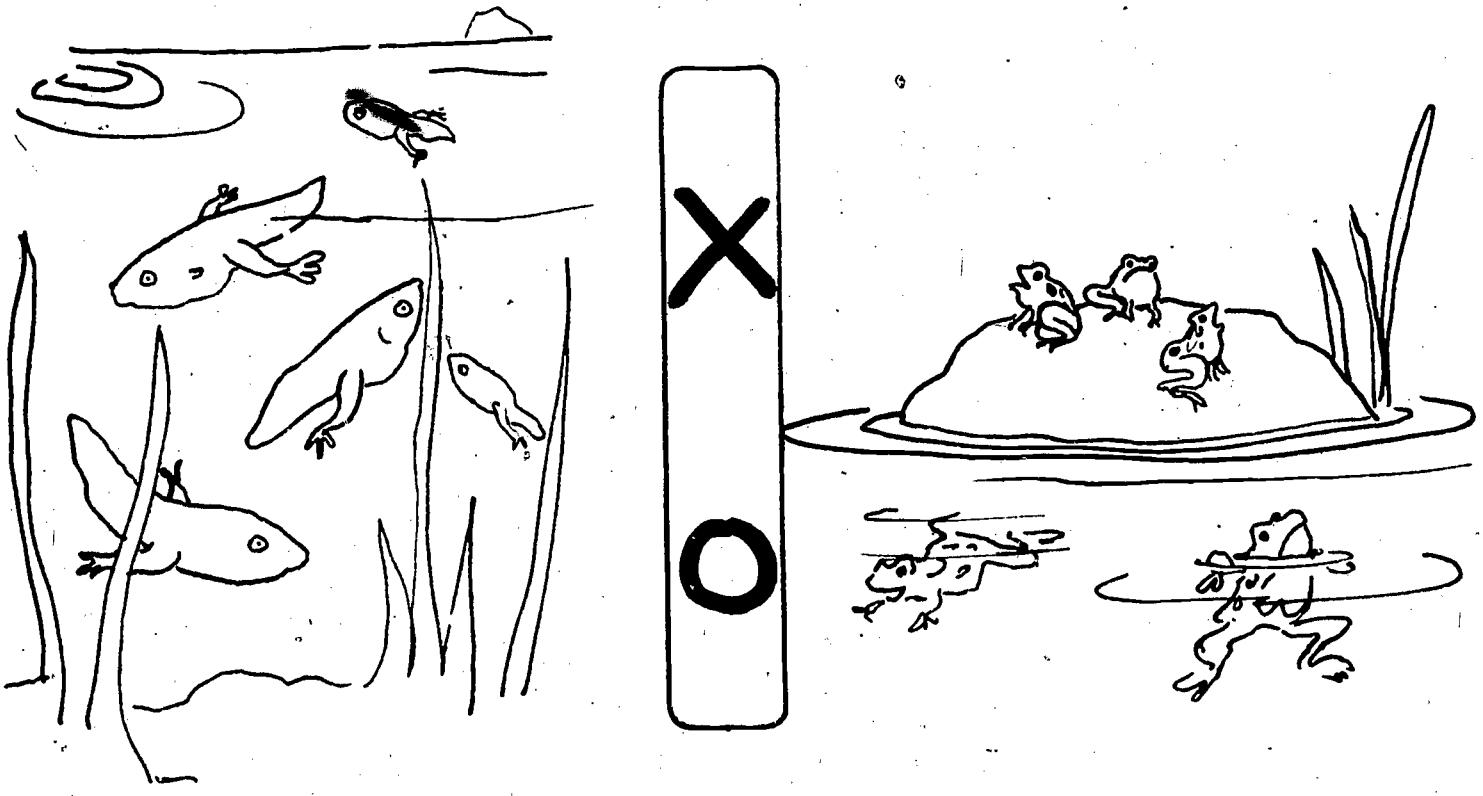


QUESTION 46:

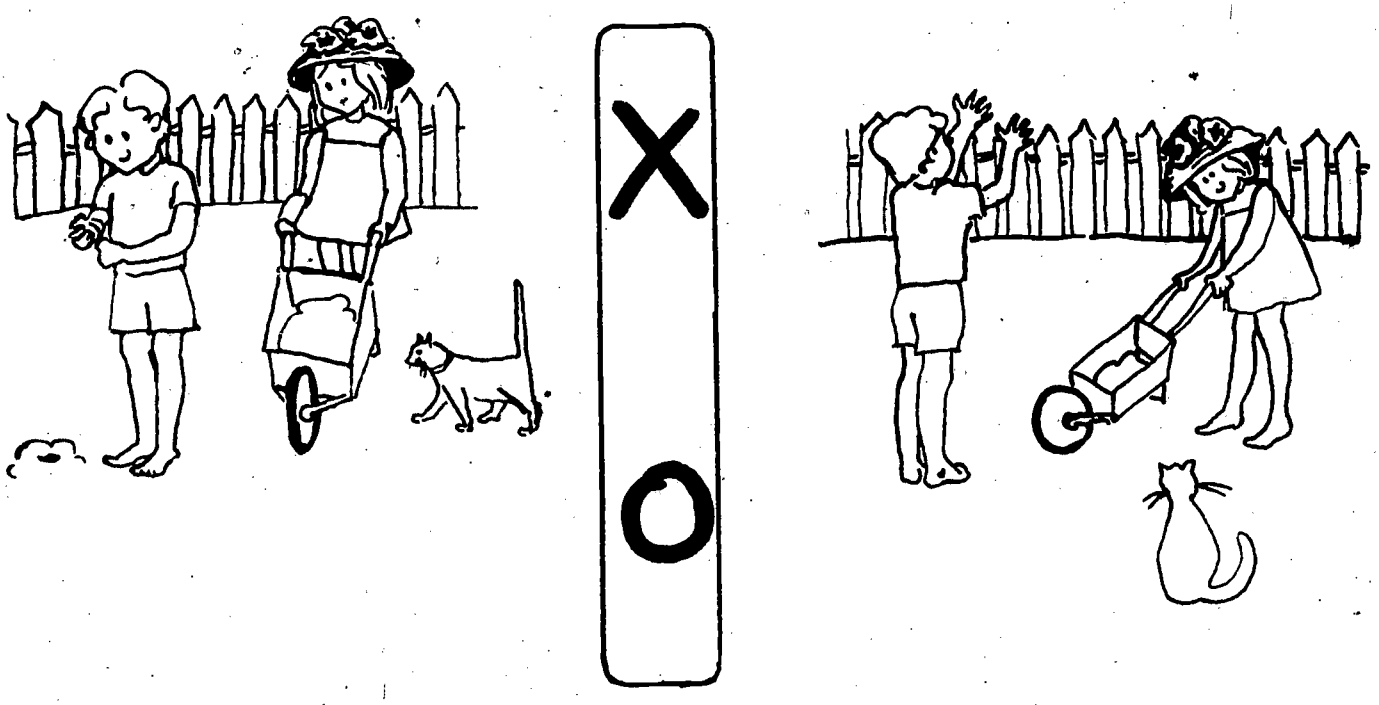
X

O

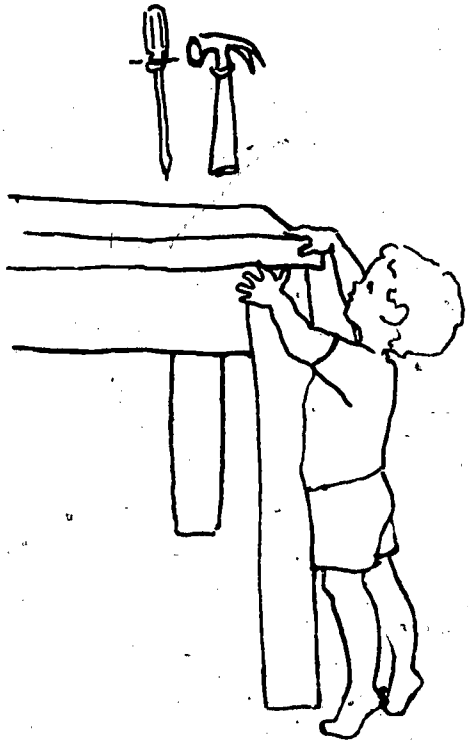
QUESTION 47:



QUESTION 48:



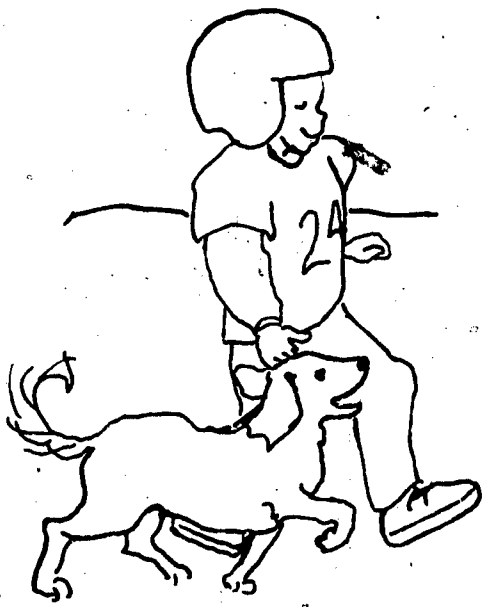
QUESTION 49:



X

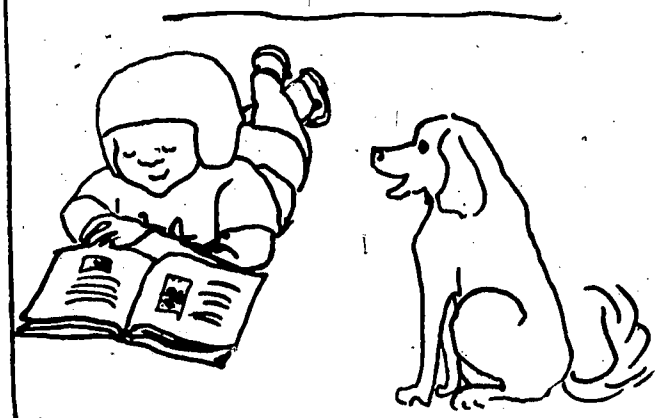
O

QUESTION 50:

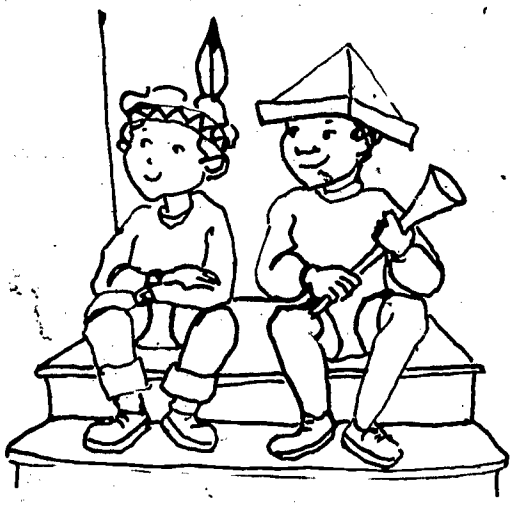


X

O

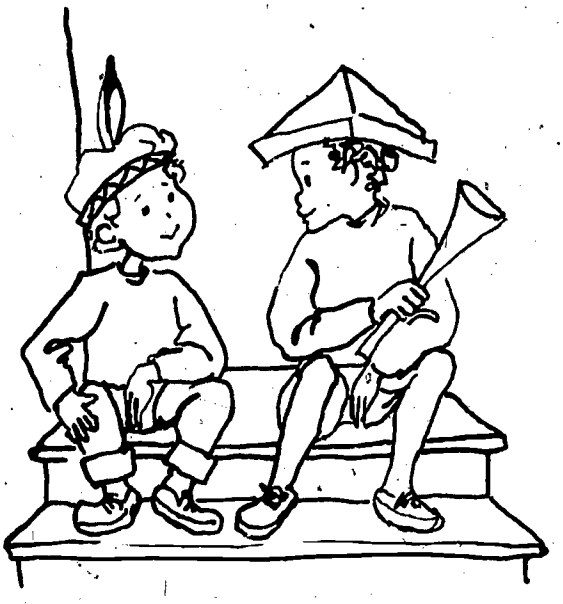


QUESTION 51:

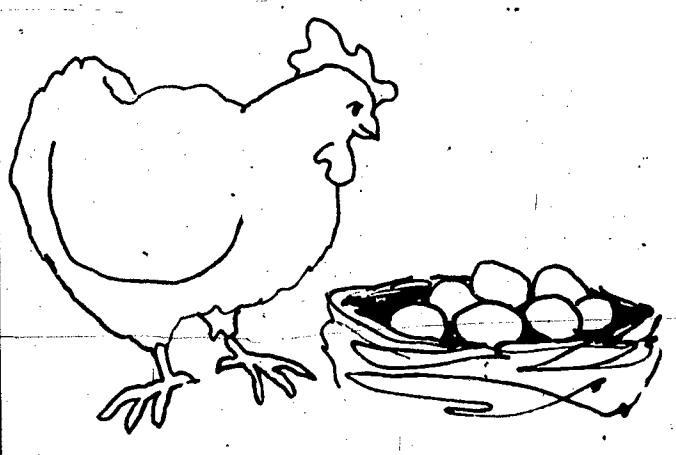


X

O

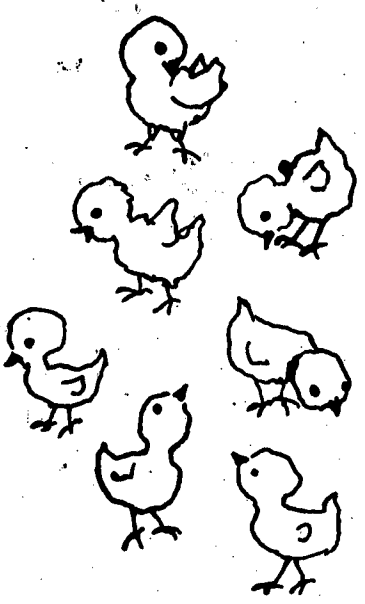


QUESTION 52:

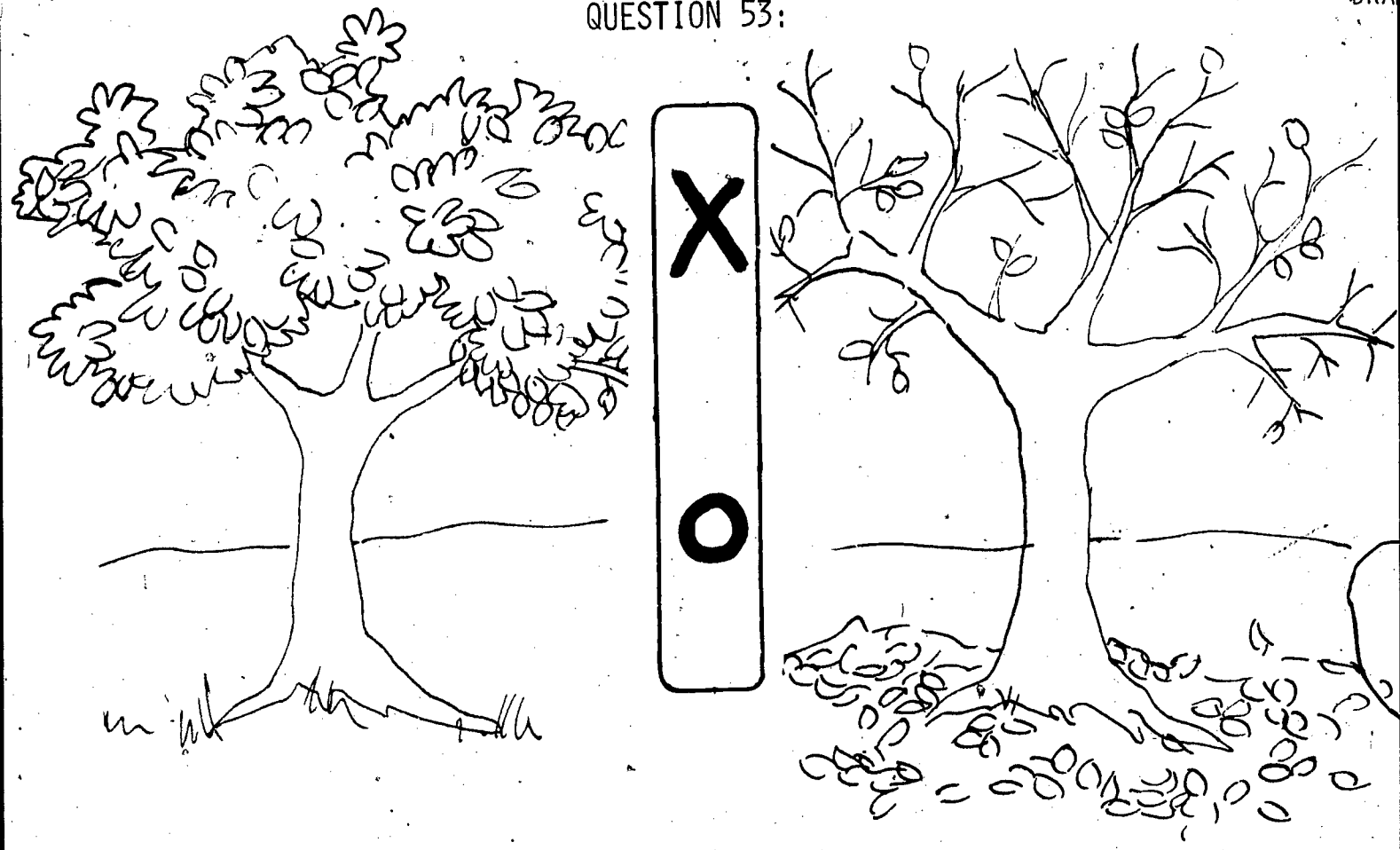


X

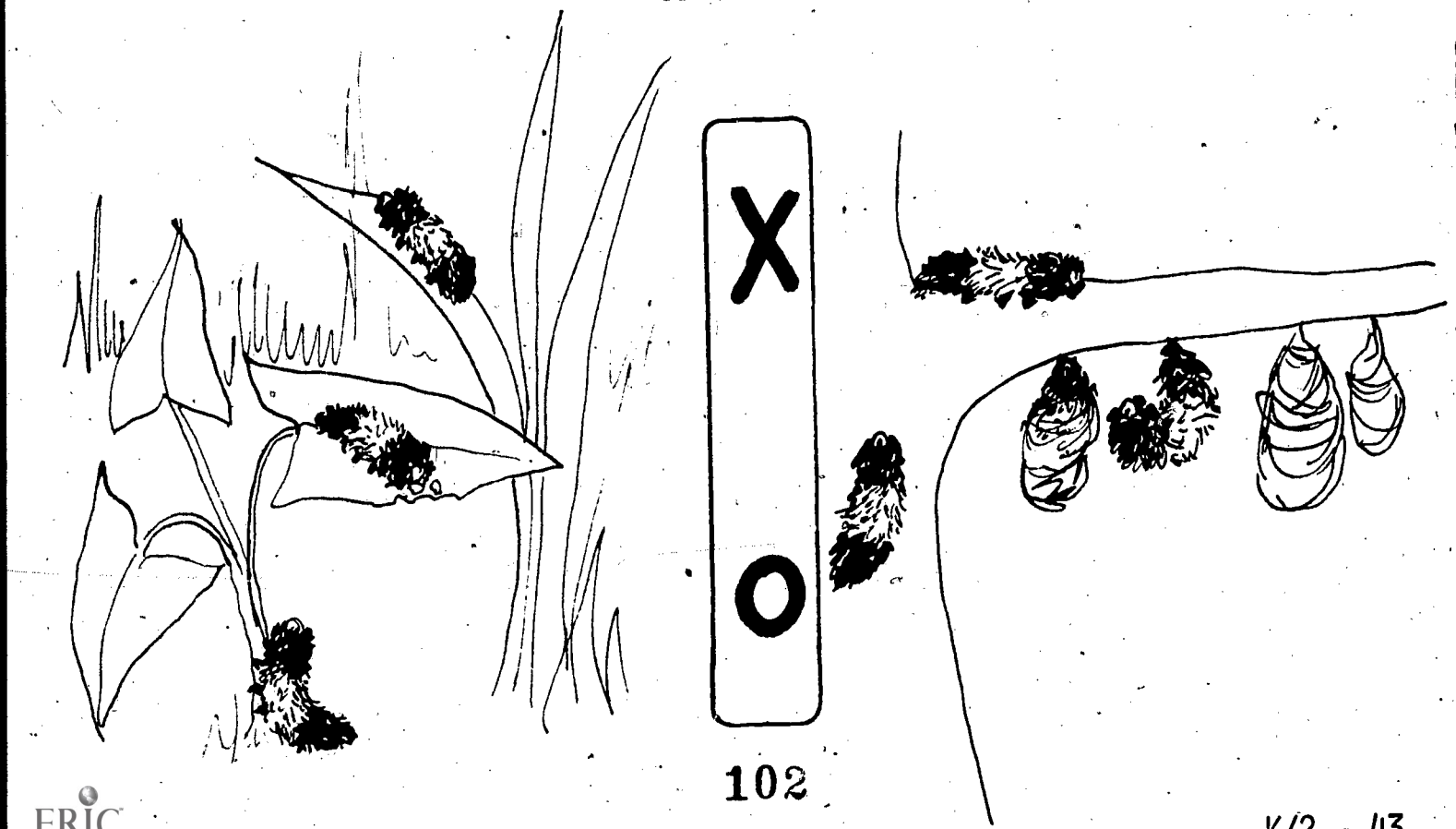
O



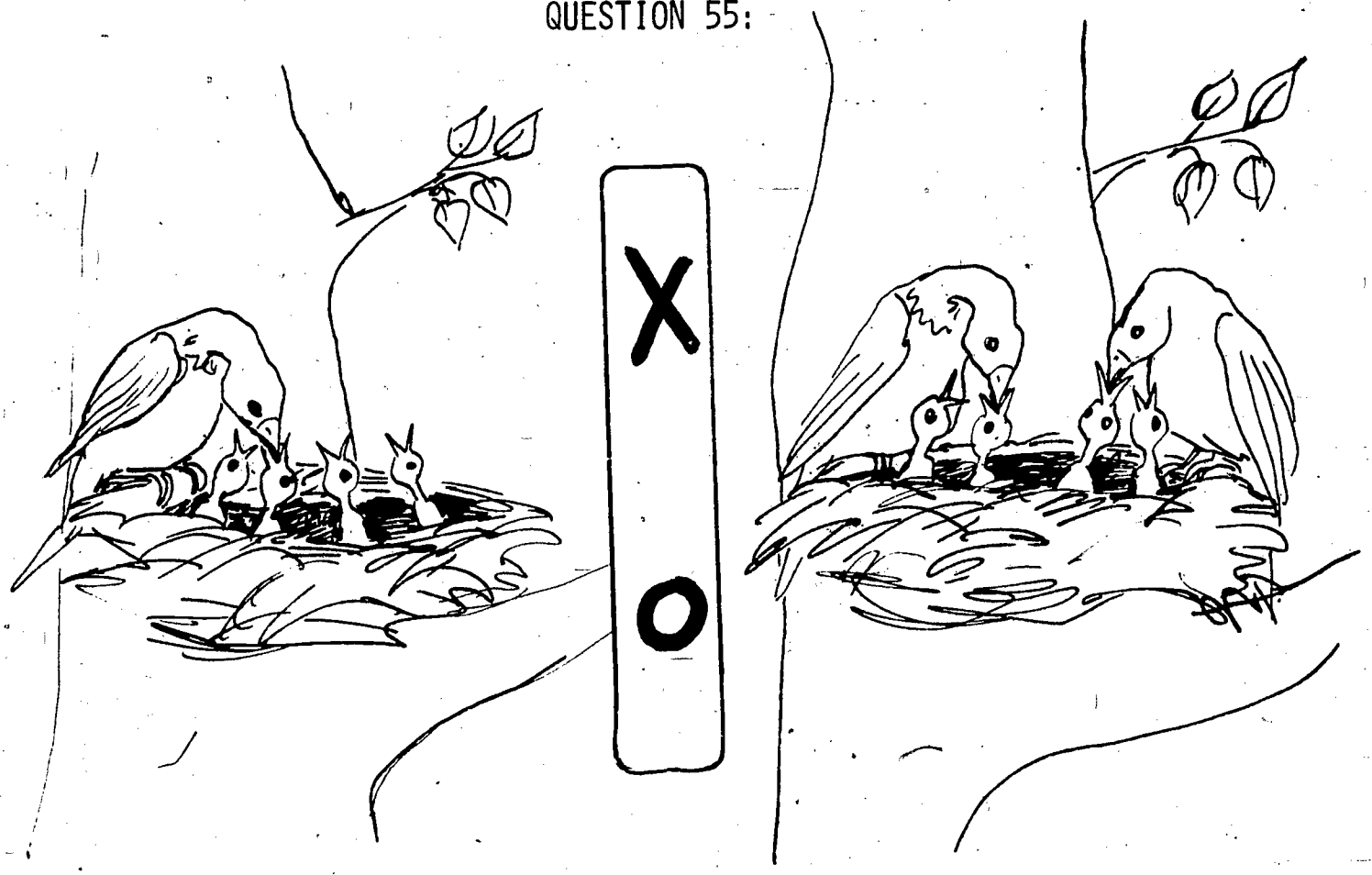
QUESTION 53:



QUESTION 54:



QUESTION 55:



DIRECTIONS

VIII. AFFECTIVE TEST

This is a measure of interests and attitudes of children about the environment. All of the questions are things that children do. The children are asked to make choices between activities presented in the pictures. There are no right or wrong answers to any of the questions.

Do the example below. Use the same marking system as with other parts of this booklet. Children are to mark an "X" on the picture which best represents their feelings.

Directions to be read to students are CAPITALIZED. Make every effort not to influence the choice of the students by showing your preference to one of the pictures. Please do not discuss the pictures. Read the labels as presented.

HERE IS A PICTURE OF A GIRL SMELLING FLOWERS AND A PICTURE OF A GIRL PICKING FLOWERS. WHAT WOULD YOU DO? PICK THEM OR SMELL THEM?

PLACE AN X ON THE PICTURE YOU WOULD DO.

VIII: EXAMPLE

EXPLANATION OF QUESTIONS: AFFECTIVE

TO BE READ BY THE TEACHER TO THE STUDENT.

56. THIS IS A PICTURE OF A BOY WATCHING A BIRD'S NEST, AND A PICTURE OF A BOY IN A TREE TRYING TO HOLD AN EGG. WHAT WOULD YOU DO? WATCH THE NEST OR CLIMB THE TREE TO HOLD THE EGG? MARK AN "X" ON THE PICTURE THAT YOU WOULD DO:

57. THIS IS A PICTURE OF A BOY CHOPPING ON THE BRANCH OF A TREE, AND A PICTURE OF A BOY WATERING A TREE. WHAT WOULD YOU DO? MARK ON "X" ON THE PICTURE THAT YOU WOULD DO.

58. THIS IS A PICTURE OF A BOY WALKING TO SCHOOL, AND A PICTURE OF A BOY GETTING A RIDE TO SCHOOL. BOTH BOYS LIVE ONLY A SHORT DISTANCE FROM THE SCHOOL. WHAT WOULD YOU DO? MARK AN "X" ON THE PICTURE THAT YOU WOULD DO.

59. THIS IS A PICTURE OF A BOY ROWING A BOAT, AND A PICTURE OF A BOY DRIVING A MOTOR BOAT. WHAT WOULD YOU DO? MARK ON "X" ON THE PICTURE THAT YOU WOULD DO.

60. THIS IS A PICTURE OF A BOY SKIING, AND A PICTURE OF A BOY RIDING A SNOWMOBILE. WHICH WOULD YOU DO? MARK AN "X" ON THE PICTURE THAT YOU WOULD DO.

61. THIS IS A PICTURE OF A CHILD THROWING THE BANANA PEEL ON THE GROUND, AND A PICTURE OF A CHILD THROWING THE BANANA PEEL IN THE TRASH CAN. WHICH WOULD YOU DO? MARK AN "X" ON THE PICTURE THAT YOU WOULD DO.

62. THESE ARE STORIES ABOUT RABBITS. ONE IS ABOUT A WILD RABBIT THAT LIVES IN A FIELD, AND THE OTHER IS ABOUT AN EASTER BUNNY. WHICH WOULD YOU LIKE TO LEARN ABOUT? MARK AN "X" ON THE PICTURE THAT YOU WOULD LIKE TO LEARN ABOUT.

63. THESE ARE STORIES ABOUT BEARS. ONE IS ABOUT A WILD BEAR THAT LIVES IN A FOREST, AND THE OTHER IS ABOUT A TEDDY BEAR. WHICH WOULD YOU LIKE TO LEARN ABOUT? MARK AN "X" ON THE PICTURE THAT YOU WOULD LIKE TO LEARN ABOUT.

64. THESE ARE STORIES ABOUT BIRDS. ONE IS ABOUT A WILD BIRD THAT LIVES IN SOMEONE'S YARD, AND THE OTHER ABOUT A PET BIRD THAT LIVES IN A CAGE. WHICH WOULD YOU LIKE TO LEARN ABOUT? MARK AN "X" ON THE PICTURE THAT YOU WOULD LIKE TO LEARN ABOUT.

65. THIS IS A PICTURE OF A CHILD PHOTOGRAPHING FISH, AND A PICTURE OF A CHILD WATCHING FISH IN A LARGE AQUARIUM. WHICH WOULD YOU LIKE TO DO? MARK AN "X" ON THE PICTURE THAT YOU WOULD DO.

66. THIS IS A PICTURE OF A CHILD BURNING LEAVES, AND A PICTURE OF A CHILD PUTTING LEAVES ON THE GARDEN. WHICH WOULD YOU DO? MARK AN "X" ON THE PICTURE THAT YOU WOULD DO.

67. THIS IS A PICTURE OF A BICYCLE, AND A PICTURE OF A MOTORCYCLE. WHICH WOULD YOU PREFER TO RIDE? MARK AN "X" ON THE PICTURE YOU WOULD DO.

68. THIS IS A PICTURE OF POP CANS THAT HAVE BEEN THROWN AWAY, AND A PICTURE OF GLASS BOTTLES THAT WILL BE RETURNED TO THE STORE. WHICH WOULD YOU DO? MARK AN "X" ON THE PICTURE YOU WOULD DO.

69. THIS IS A PICTURE OF A CHILD SITTING ON THE STEPS OF THE SCHOOL WATCHING OTHER CHILDREN LOOKING FOR THINGS IN THE GRASS, AND A PICTURE OF A CHILD ON HIS HANDS AND KNEES, LOOKING FOR THINGS IN THE GRASS. WHICH WOULD YOU DO. WATCH OR LOOK? MARK AN "X" ON THE PICTURE YOU WOULD DO.

70. THIS IS A PICTURE OF A CHILD HOLDING A WOOLY BEAR CATERPILLAR, AND A PICTURE OF A CHILD LOOKING AT A WOOLY BEAR CATERPILLAR IN A BOX. WHICH WOULD YOU DO. HOLD THE CATERPILLAR OR WATCH IT? MARK AN "X" ON THE PICTURE YOU WOULD DO.

71. THIS IS A PICTURE OF A CHILD EXAMINING A FEATHER THROUGH A MAGNIFYING GLASS, AND THIS IS A PICTURE OF A CHILD TEARING THE FEATHER APART. WHICH WOULD YOU DO, LOOK AT THE FEATHER OR TEAR IT APART? MARK AN "X" ON THE PICTURE YOU WOULD DO.

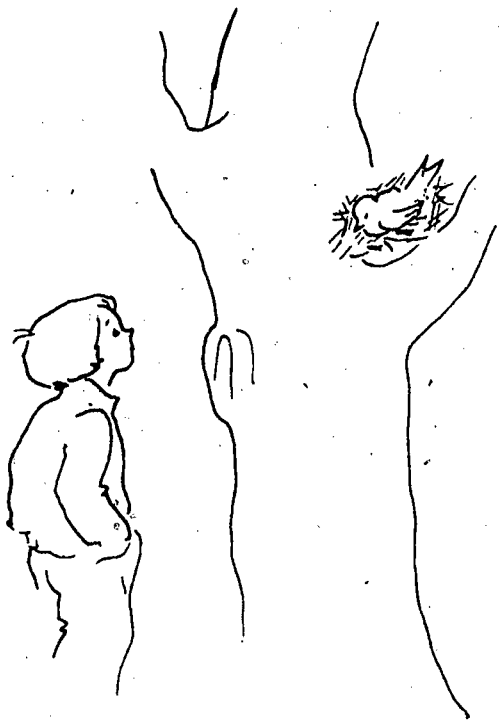
72. THIS IS A PICTURE OF ONE CHILD OFFERING A FROG TO ANOTHER CHILD WHO DOES NOT WANT TO HOLD IT, AND THIS IS A PICTURE OF ONE CHILD OFFERING A FROG TO ANOTHER CHILD WHO DOES WANT TO HOLD IT. DO YOU LIKE TO HOLD FROGS OR NOT? MARK AN "X" ON THE PICTURE YOU WOULD DO.

73. THIS IS A PICTURE OF A CHILD LOOKING AT A TERRARIUM, AND A CHILD WATCHING TV. WHICH WOULD YOU RATHER DO, LOOK AT A TERRARIUM OR WATCH TV? MARK AN "X" ON THE PICTURE YOU WOULD DO.

74. THIS IS A PICTURE OF A CHILD PLAYING WITH TOYS, AND A PICTURE OF A CHILD WATERING A PLANT. WHICH WOULD YOU RATHER DO, PLAY WITH TOYS OR WATER AND CARE FOR A PLANT? MARK AN "X" ON THE PICTURE YOU WOULD DO.

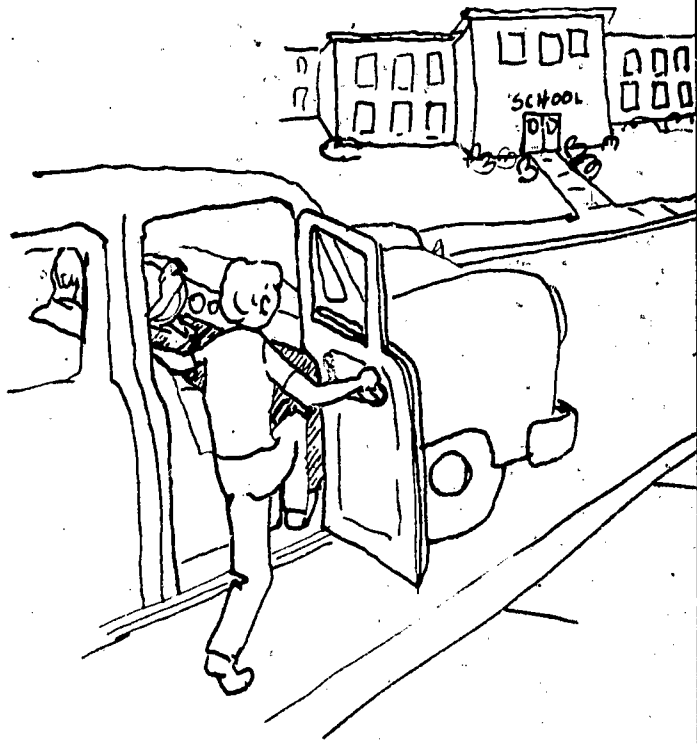
75. THIS IS A PICTURE OF CHILDREN MAKING A TERRARIUM, AND A PICTURE OF CHILDREN WATCHING OTHER CHILDREN MAKING A TERRARIUM. WHICH WOULD YOU RATHER DO, MAKE THE TERRARIUM OR WATCH OTHER CHILDREN MAKE A TERRARIUM? MARK AN "X" ON THE PICTURE YOU WOULD DO.

QUESTION 56:

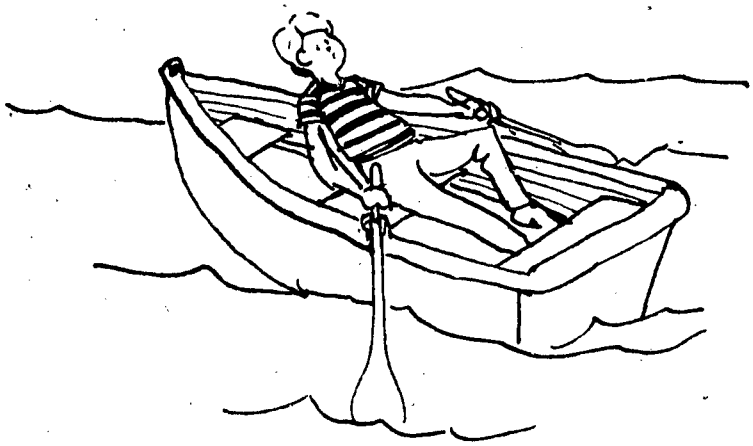


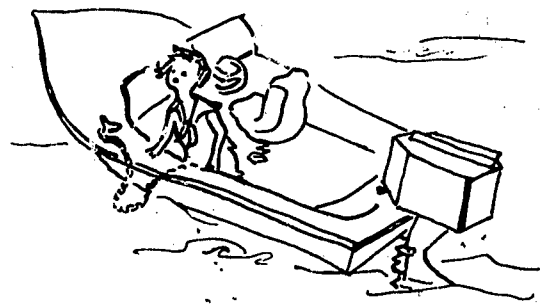
QUESTION 57:

QUESTION 58:

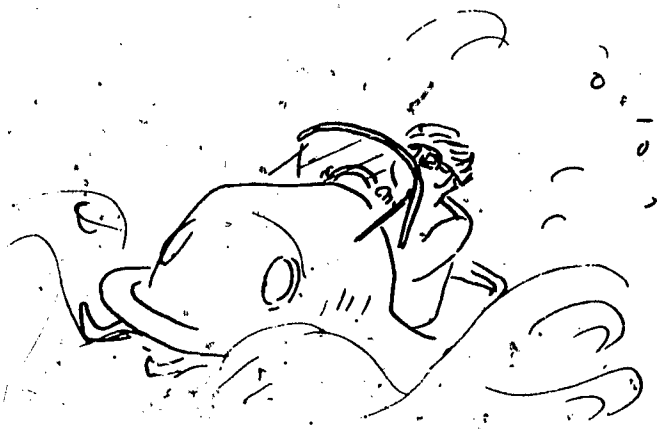


QUESTION 59:





QUESTION 60:

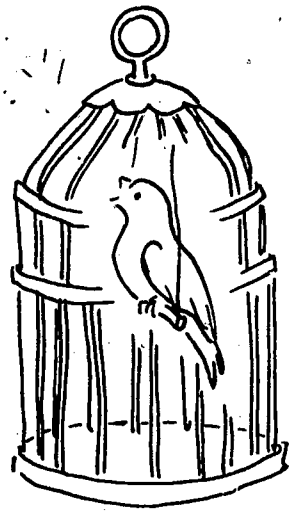


QUESTION 61:

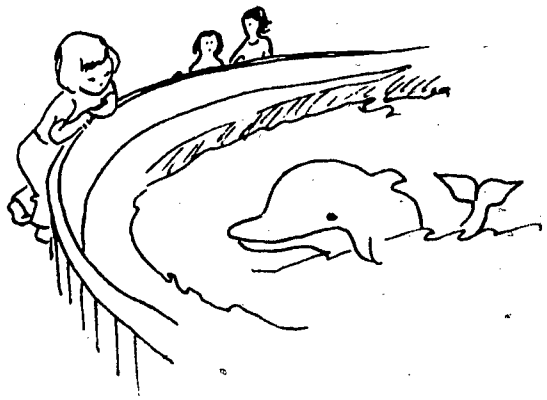
QUESTION 62:

QUESTION 63:

QUESTION 64:

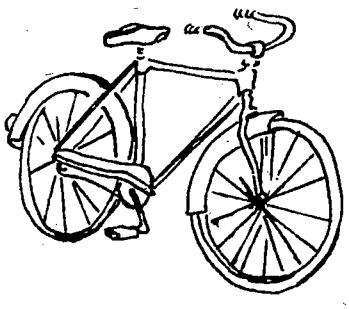


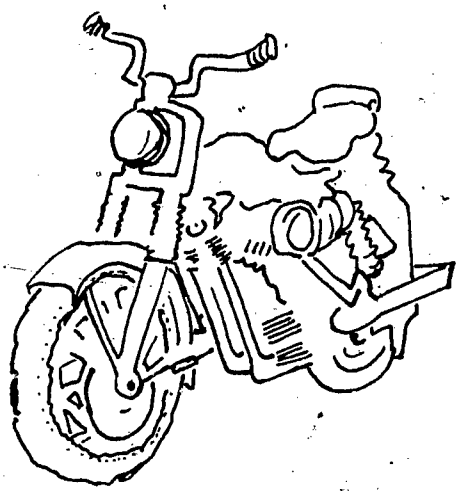
QUESTION 65:



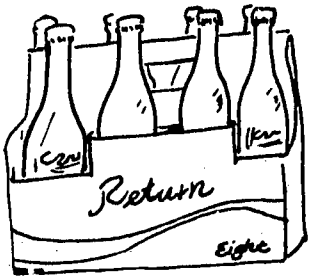
QUESTION 66:

QUESTION 67:

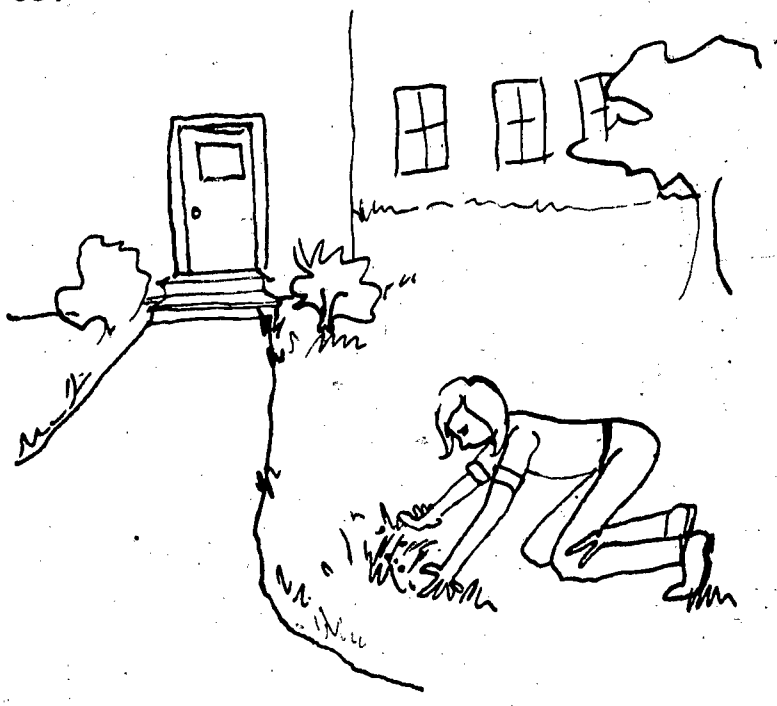




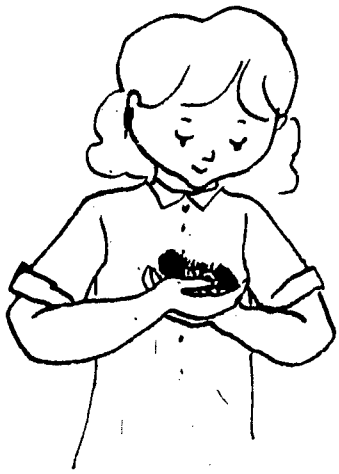
QUESTION 68:



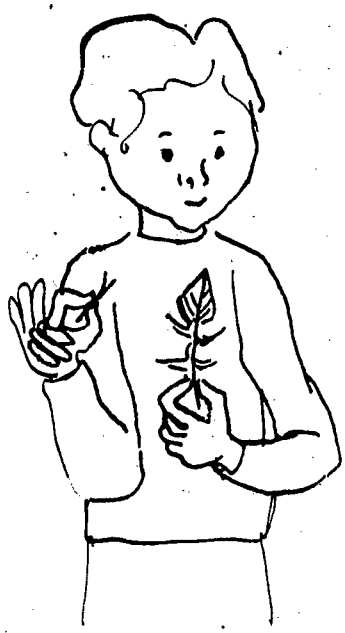
QUESTION 69:



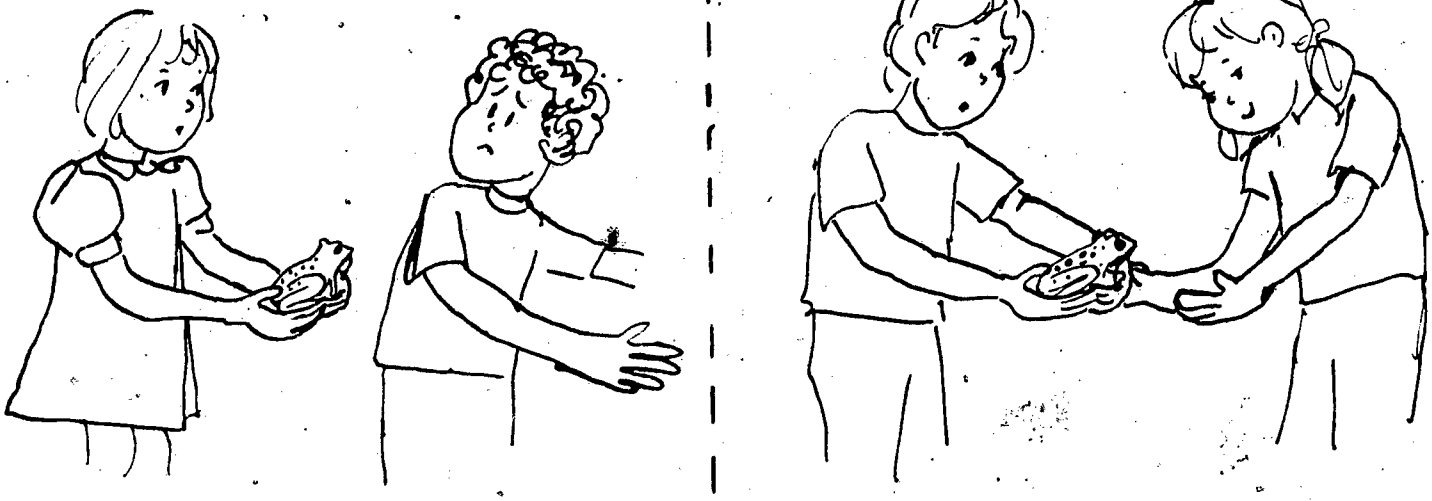
QUESTION 70:



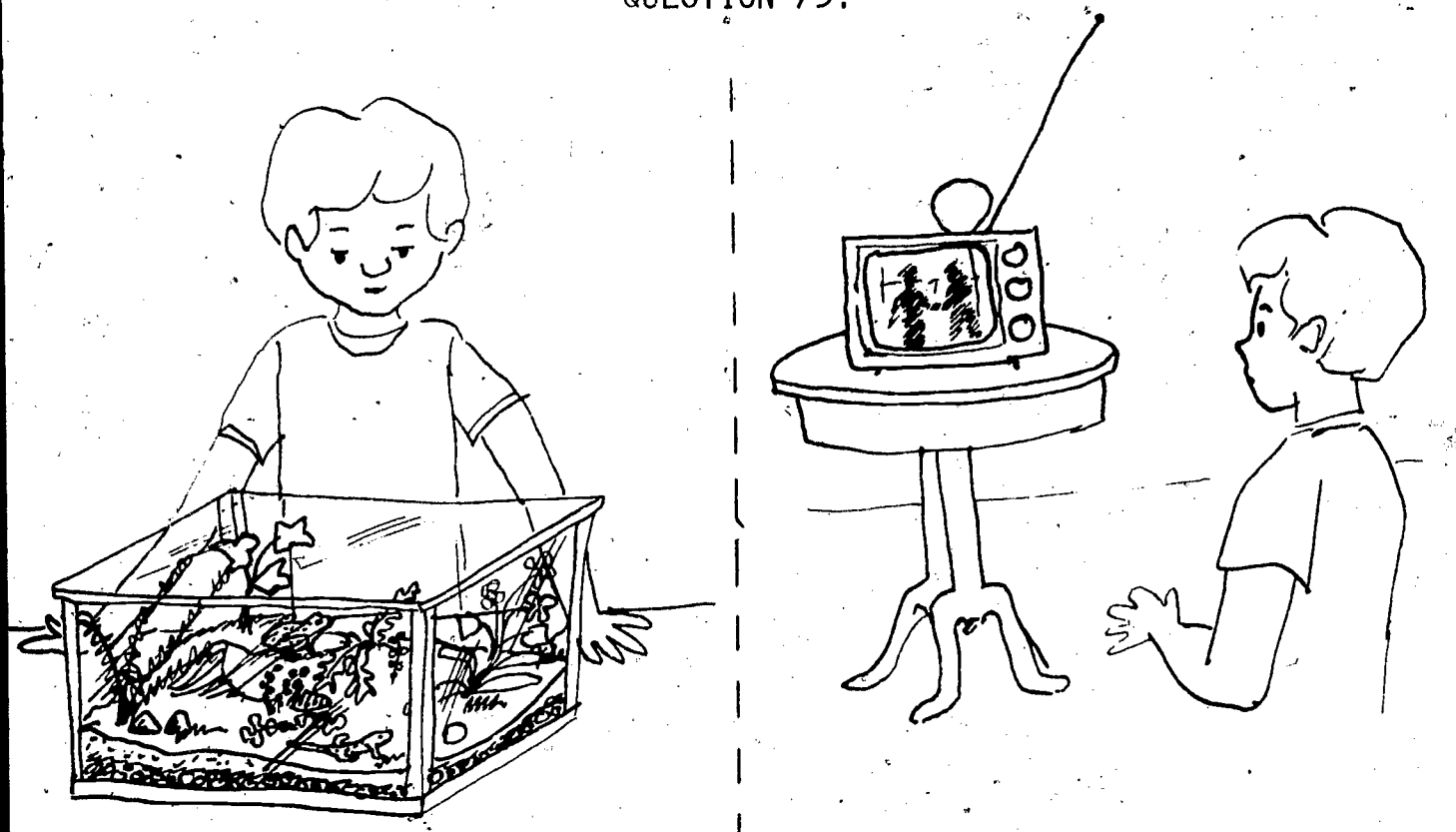
QUESTION 71:



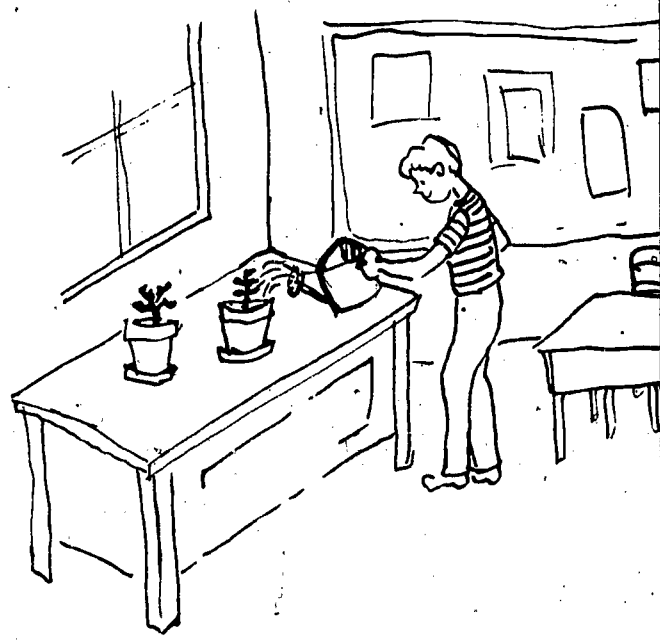
QUESTION 72:



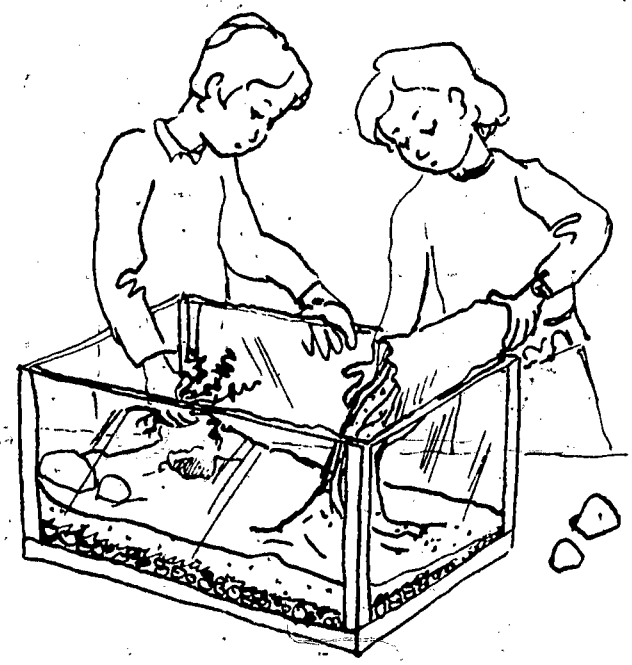
QUESTION 73:

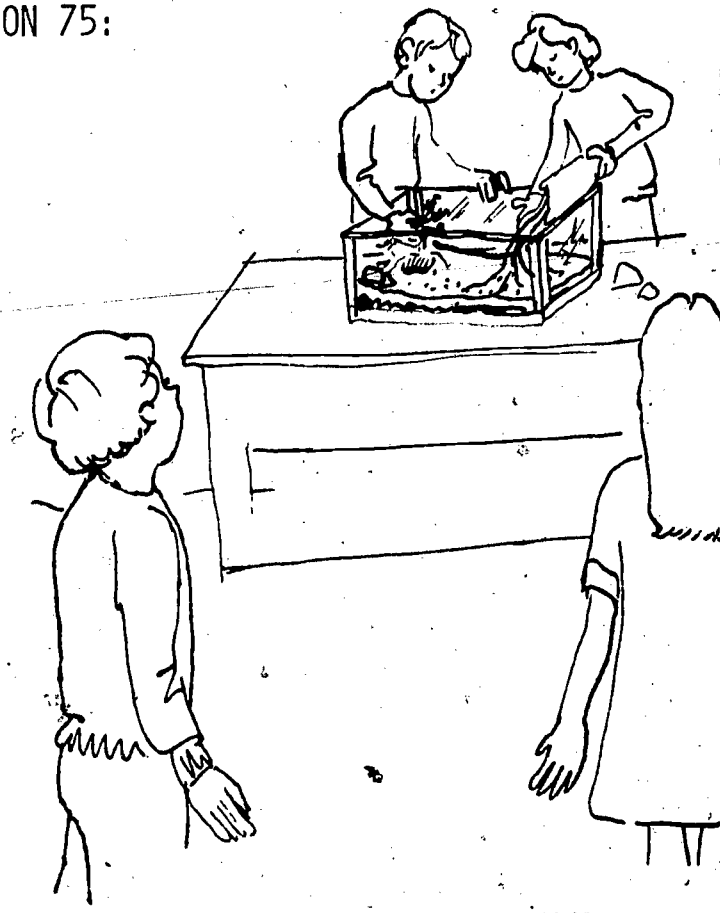


QUESTION 74:



QUESTION 75:





ENVIRONMENTAL EDUCATION: CURRICULUM, INFORMATION, AND TRAINING

% Longfellow Elementary School
35200 Stevens Boulevard
Eastlake, Ohio 44094
Ph: 216-946-5000, ext. 358

Sponsored by a Grant from the U.S. Office of Education

through the

Willoughby-Eastlake City Schools, Willoughby, Ohio

Cognitive and Affective Evaluation of Environmental Concepts

Grades 3-4

INSTRUCTIONS:

IN THIS BOOKLET ARE QUESTIONS CONCERNING WHAT STUDENTS MAY KNOW OR FEEL ABOUT THE ENVIRONMENT. PLEASE ANSWER THE QUESTIONS AS HONESTLY AS POSSIBLE. THERE IS NO PENALTY FOR WRONG ANSWERS.

ALL ANSWERS ARE TO BE RECORDED ON THE ACCOMPANYING ANSWER SHEET. PLEASE FILL IN THE INFORMATION BLANKS AT THE TOP OF THE ANSWER SHEET BEFORE STARTING THE TEST.

Teachers: The test may be given in several sittings to avoid fatigue. It is recommended that you stop between the cognitive and affective sections. Please read the directions and do the example for each section so the students understand the purpose and marking procedures. Then read each question, and have the class proceed through the test together.

The total test should require about 1½ hours to administer.

I. THE EXERCISES BELOW ARE GROUPS OF SEVERAL WORDS. SOME OF THE GROUPS OF WORDS ARE IN THE ORDER IN WHICH THINGS HAPPEN IN NATURE. OTHERS ARE MIXED UP.

IF YOU AGREE THAT THE GROUPS OF WORDS ARE IN THEIR PROPER ORDER, THEN MARK "A" ON YOUR ANSWER SHEET. IF YOU DO NOT FEEL THE GROUPS OF WORDS ARE IN PROPER ORDER, THEN YOU MARK "B" ON THE ANSWER SHEET.

FOR EXAMPLE: spring, summer, fall, winter
(The correct answer is "A".)

FOR EXAMPLE: boy, baby, man
(The correct answer is "B".)

A = IN PROPER ORDER

B = NOT IN PROPER ORDER

1. flour, wheat, bread
2. sun, grass, cow, milk
3. thunder, lightening, snow
4. caterpillar, cocoon, butterfly
5. migrate, lay eggs, build nest
6. fruit, flower, seed
7. sewage treatment plant, water treatment plant, home

II. BELOW ARE SEVEN PATTERNS. SOME PATTERNS ARE EFFICIENT AND MAKE THINGS WORK EASIER. OTHERS ARE NOT AND MAKE THINGS WORK HARDER.

IF YOU AGREE THAT THE PATTERN IS AN EFFICIENT PATTERN, THEN MARK "A" ON THE ANSWER SHEET. IF YOU FEEL THE PATTERN IS NOT EFFICIENT, THEN MARK "B" ON THE ANSWER SHEET.

FOR EXAMPLE: children lining up for lunch
(The correct answer is "A".)

FOR EXAMPLE: a three legged horse
(The correct answer is "B".)

A = EFFICIENT B = NOT EFFICIENT

8. a traffic jam
9. fins on a fish
10. geese flying in a V formation
11. peas in a pod
12. a truck with a flat tire
13. a paddle and a canoe
14. a factory conveyer belt

III. FOR EACH OF THE SEVEN PLACES, MARK "A" ON YOUR ANSWER SHEET IF THREE THINGS ARE FOUND THERE. MARK "B" IF TWO THINGS ARE FOUND THERE. MARK "C" IF ONE THING IS FOUND THERE.

FOR EXAMPLE: A vacant lot is likely to have rubbish, sparrows, and trees.

A. three things
B. two things "A" is the correct answer.
C. one thing

15. A school lawn is likely to have worms, grass, and ants.

A. three things
B. two things
C. one thing

16. A parking lot is likely to have shopping carts, soil, and cars.

A. three things
B. two things
C. one thing

17. A cemetery is likely to have flowers, grass, and squirrels.

A. three things
B. two things
C. one thing

18. A crack in the sidewalk is likely to have soil, plants, and insects.

A. three things
B. two things
C. one thing

19. A terrarium is likely to have rocks, moisture, and mice.

A. three things
B. two things
C. one thing

20. A pond is likely to have cattails, salamanders, and squirrels.

A. three things
B. two things
C. one thing

21. A rotting log is likely to have moisture, insects, and mushrooms.

A. three things
B. two things
C. one thing

IV. EACH OF THE FOLLOWING SENTENCES STATE THAT AN ANIMAL OR A PERSON DEPENDS ON THINGS.

READ EACH SENTENCE. MARK "A" ON YOUR ANSWER SHEET IF THE ANIMAL OR PERSON DEPENDS ON THE THREE THINGS LISTED. MARK "B" IF THE ANIMAL OR PERSON DEPENDS ON TWO OF THE THINGS, AND MARK "C" IF THE ANIMAL OR PERSON DEPENDS ON ONLY ONE OF THE THINGS.

FOR EXAMPLE: Grass depends on soil, water, and sun.

A. three things
B. two things
C. one thing

"A" is the correct answer.

22. Birds depend on insects, water, telephone lines.

A. three things
B. two things
C. one thing

23. Cows depend on farmers, fences, wheat.

A. three things
B. two things
C. one thing

24. Customers depend on money, goods, storekeepers.

A. three things
B. two things
C. one thing

25. Teachers depend on books, schools, hammers.

A. three things
B. two things
C. one thing

26. People depend on plants, air, sun.

A. three things
B. two things
C. one thing

V. READ THE INCOMPLETE SENTENCE WHICH DESCRIBES SOMETHING HAPPENING. THEN READ THE STATEMENTS MARKED "A", "B", OR "C". MARK THE LETTER ON YOUR ANSWER SHEET OF THE STATEMENT WHICH BESTS COMPLETES THE SENTENCE.

FOR EXAMPLE: If birds disappeared,

A. cats would have no food.
B. there may be too many insects and the insects would eat the plants.
C. there would be a change in the women's fashions.

"B" is the correct answer.

27. If we had no gasoline,

A. we would not have milk to drink.
B. people would travel less.
C. lawns would not be mowed.

28. If there were no electricity,

A. the T.V. would not work.
B. clothes would not dry.
C. birds would not have a place to sit.

29. If there were less clean water than today,

A. the corn would grow taller.
B. there would be fewer animals.
C. we would not have heat in our homes.

30. If we did not mow our lawns,

A. our homes would be colder.
B. the grass would disappear.
C. trees would eventually grow there.

31. If plants did not have roots,

A. the wind would blow harder.
B. the flowers would grow larger.
C. the soil would erode.

VI. THESE NEXT FIVE PICTURES SHOW HOW A FARM AND LAND HAS CHANGED. UNDER EACH PICTURE IS AN INCOMPLETE SENTENCE. YOU ARE TO EXAMINE THE PICTURE, AND THEN COMPLETE THE SENTENCE BY MARKING AN "A", "B", "C", OR "D" ON YOUR ANSWER SHEET FOR THE STATEMENT WHICH BESTS COMPLETES THE SENTENCE.

FOR EXAMPLE: Beside the house there are:

A. two trees.
B. three trees.
C. four trees.
D. five trees.

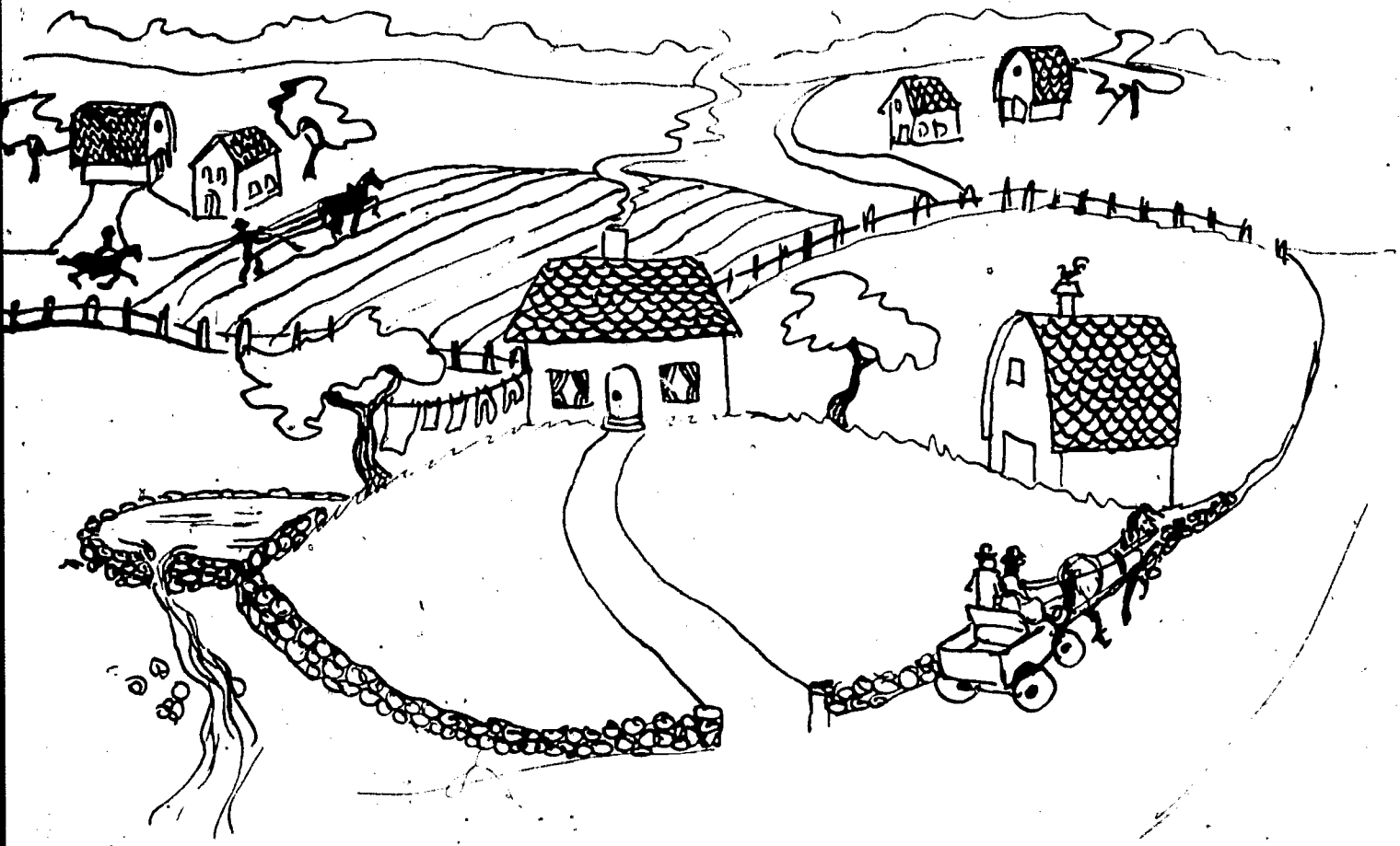
"A" is the correct answer.

(Picture #1)

32. The house and barn are

A. on top of the hill.
B. in a forest.
C. in the country.
D. next to a large city.

(Picture #2)



33. The people in the house have

A. measles.
B. neighbors.
C. ten children.
D. company for supper.

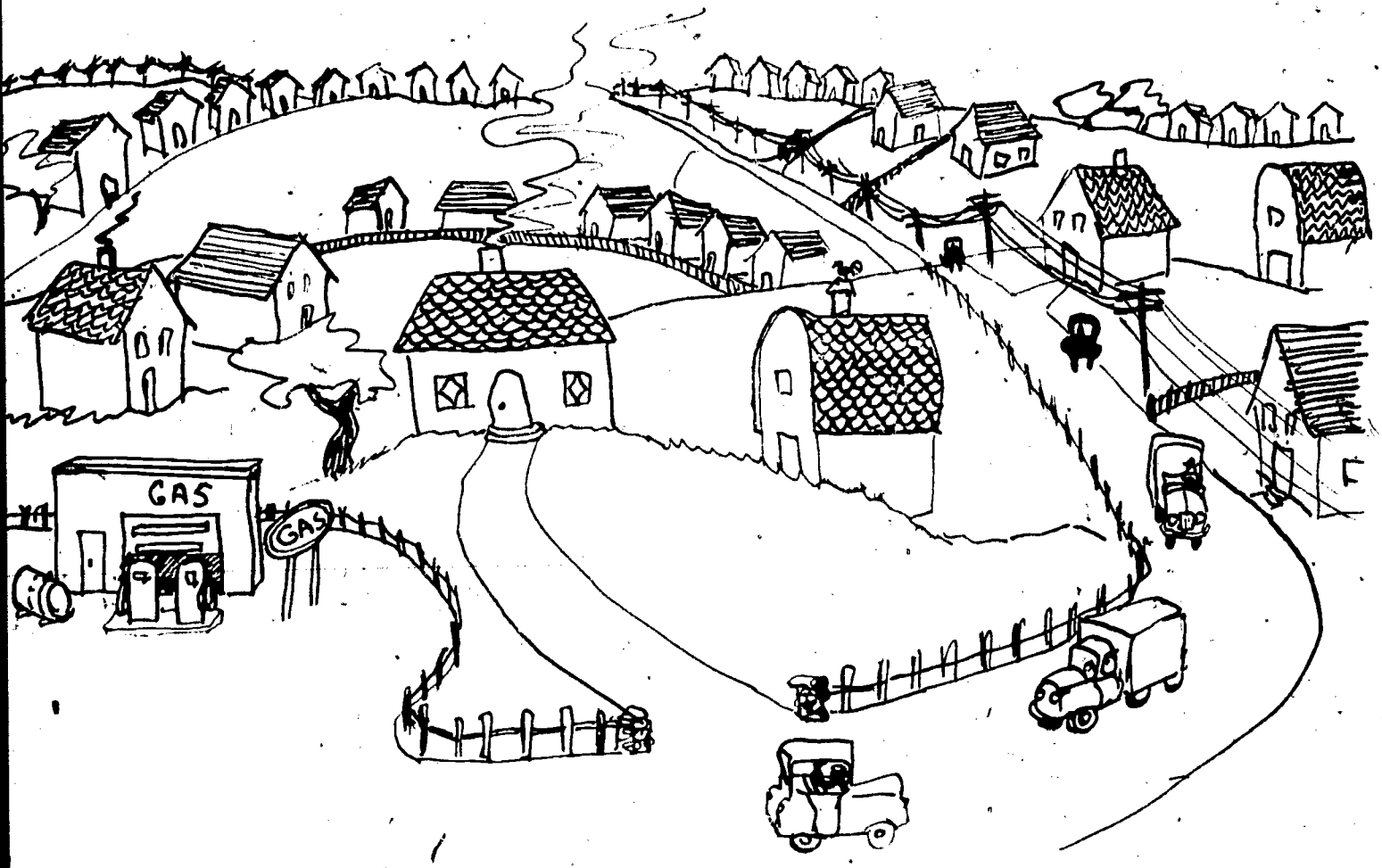
34. Somebody has

A. gone fishing.
B. planted more trees.
C. built a stone wall and pond.
D. milked the cows.

35. The county has

A. built a road.
B. delivered the mail.
C. raised the taxes.
D. cut the grass.

(Picture #3)



36. The farm now has

A. more trees in the yard.
B. more land.
C. more birds in the yard.
D. more neighbors.

37. Next door is

A. a gas station.
B. a swimming pool.
C. a school.
D. a post office.

(Picture #4)

38. The farm has lost its

A. furnace.
B. barn.
C. foundation.
D. location.

39. The farm house has

A. sea breezes to cool it during the summer.
B. a better furnace.
C. stores and apartment buildings as neighbors.
D. been moved to the city.

(Picture #5)

40. Now the house can hardly be seen because

A. of the trees.
B. of the tall buildings.
C. it frequently rains.
D. it is night.

41. All five of the pictures show

A. a change of seasons.
B. a change of government.
C. a change in population growth and traffic patterns.
D. a change in the weather.

VII. ANIMALS AND PEOPLE DO DIFFERENT THINGS IN DIFFERENT SEASONS OF THE YEAR.

BELOW ARE FIVE INCOMPLETE SENTENCES. YOU ARE TO READ THE INCOMPLETE SENTENCE AND DECIDE WHICH SEASON IS CORRECT. ON YOUR ANSWER SHEET, MARK "A" FOR SPRING, "B" FOR SUMMER, "C" FOR FALL, AND "D" FOR WINTER.

FOR EXAMPLE: A man uses snow tires on his car in:

A. spring.
B. summer.
C. fall.
D. winter.

"D" is the correct answer.

42. A bird builds a nest during the:

A. spring.
B. summer.
C. fall.
D. winter.

43. A bird migrates south in preparation for:

A. spring.
B. summer.
C. fall.
D. winter.

44. A man puts screens in his windows in preparation for:

A. spring.
B. summer.
C. fall.
D. winter.

45. Sheep are sheared of their wool in the:

A. spring.
B. summer.
C. fall.
D. winter.

46. A squirrel stores nuts in the:

A. spring.
B. summer.
C. fall.
D. winter.

VIII. DIFFERENT ANIMALS ARE SUITED FOR LIVING IN DIFFERENT KINDS OF PLACES.

LISTED BELOW ARE EXAMPLES OF BODY PARTS ANIMALS MIGHT HAVE, AND FOUR PLACES AN ANIMAL MIGHT BE FOUND.

READ EACH STATEMENT ABOUT THE PARTICULAR BODY PART AND DECIDE IN WHICH OF THE FOUR PLACES THE ANIMAL WITH THAT BODY PART WOULD LIVE. ON YOUR ANSWER SHEET, MARK THE LETTER WHICH BESTS SAYS WHERE THE ANIMAL WILL LIVE.

FOR EXAMPLE: An animal with fins

A. air
B. water
C. surface of the ground
D. underground

"B" is the correct answer.

47. An animal with hands

A. air
B. water
C. surface of the ground
D. underground

48. An animal with large digging front feet

A. air
B. water
C. surface of the ground
D. underground

49. An animal with an air bladder

A. air
B. water
C. surface of the ground
D. underground

50. An animal with a hoof

A. air
B. water
C. surface of the ground
D. underground

AFFECTIVE EVALUATION:

THIS SECTION IS DESIGNED TO DETERMINE HOW YOU FEEL ABOUT THE ENVIRONMENT. THERE ARE NO RIGHT OR WRONG ANSWERS. PLEASE ANSWER AS HONESTLY AS POSSIBLE.

DO NOT BEGIN UNTIL YOUR TEACHER TELLS YOU TO DO SO.

Teacher: If you read the questions to your students, please attempt to do so without biasing the student's responses because of inflections in your voice.

IX. IF YOU HAD YOUR CHOICE, WHICH OF THE FOLLOWING TV SHOWS WOULD YOU WATCH? CHOOSE ONE OF EACH PAIR YOU WOULD DO AND MARK EITHER "A" OR "B" ON YOUR ANSWER SHEET. THERE ARE NO RIGHT OR WRONG ANSWERS. THIS IS ONLY TO FIND OUT WHAT PEOPLE ARE INTERESTED IN SEEING. PLEASE ANSWER AS HONESTLY AS POSSIBLE.

51. Which would you choose?

A. a show about mountain climbing
OR
B. a show about auto racing

52. Which would you choose?

A. a show about deep sea life
OR
B. a show about Disneyworld

53. Which would you choose?

A. a show about a factory
OR
B. a show about a farm

54. Which would you choose?

A. a show about a real bear
OR
B. a show about "Yogi Bear"

55. Which would you choose?

A. a show about hunting
OR
B. a show about canoeing

56. Which would you choose?

A. a show about a motorcyclist
OR
B. a show about a camper

XX. IF YOU HAD YOUR CHOICE, WHICH OF THE FOLLOWING STORIES WOULD YOU CHOOSE TO READ OR TO HAVE READ TO YOU? CHOOSE ONE OF EACH PAIR AND MARK EITHER "A" OR "B" ON YOUR ANSWER SHEET. THERE ARE NO RIGHT OR WRONG ANSWERS. THIS IS TO SHOW WHAT PEOPLE LIKE TO READ ABOUT. PLEASE ANSWER AS HONESTLY AS POSSIBLE.

57. Which story would you choose?

A. a story about a real monkey who lives in a jungle
OR
B. a story about a monkey who has human adventures

58. Which story would you choose?

A. a story about a boy who goes to a fancy restaurant for dinner and sleeps in a soft bed in a hotel
OR
B. a story about a boy who goes on a camping trip

59. Which story would you choose?

A. a story about a bear who lives in a house with furniture and wears clothes
OR
B. a story about a real bear who lives in a cave and sleeps through the winter

60. Which story would you choose?

A. a story about children who swim and sail in the ocean
OR
B. a story about children who spend the summer in the city

61. Which story would you choose?

A. a story about a herd of elephants in Africa
OR
B. a story about an elephant who wears clothes and is a king in his country.

62. Which story would you choose?

A. an adventure story about explorers
OR
B. an adventure story about detectives

XXI. IF YOU HAD YOUR CHOICE, WHICH OF THE FOLLOWING WOULD YOU DO? CHOOSE ONE OF EACH PAIR AND MARK "A" OR "B" ON YOUR ANSWER SHEET. THERE ARE NO RIGHT OR WRONG ANSWERS. THIS IS TO SHOW WHICH THINGS PEOPLE LIKE TO DO. PLEASE ANSWER AS HONESTLY AS POSSIBLE.

63. Which would you do?

A. look for wildflowers growing without picking them
OR
B. pick a bunch of wildflowers as a gift to your mother

64. Which would you do?

A. go for a ride on a toboggan
OR
B. go for a ride on a snowmobile

65. Which would you do?

A. go for a ride in a sailboat
OR
B. go for a ride in a motorboat

66. Which would you do?

A. go hunting for rabbits
OR
B. take pictures of rabbits

67. Which would you do?

A. ride a bicycle
OR
B. ride a motorcycle

68. Which would you do?

A. burn leaves in the fall
OR
B. bag the fall leaves and put them on the garden

69. Which would you do?

A. take newspapers to the recycling station
OR
B. discard newspapers with trash

70. Which whould you do?

A. drink pop from cans
OR
B. drink pop from returnable bottles

XXII. HERE ARE SOME THINGS CHILDREN CAN DO ON A DAY OFF FROM SCHOOL. WOULD YOU DO THESE THINGS ON YOUR DAY OFF? MARK "A" FOR YES, YOU WOULD DO IT, "B" FOR MAYBE, AND "C" FOR NO. THERE ARE NO RIGHT OR WRONG ANSWERS. PLEASE ANSWER AS HONESTLY AS POSSIBLE.

71. Would you go hunting?

A. yes B. maybe C. no

72. Would you collect bottles for recycling?

A. yes B. maybe C. no

73. Would you plant a tree?

A. yes B. maybe C. no

74. Would you go for a hike in the woods?

A. yes B. maybe C. no

75. Would you help pick up litter in the park?

A. yes B. maybe C. no

76. Would you help on a paper drive?

A. yes B. maybe C. no

77. Would you start a vegetable garden?

A. yes B. maybe C. no

78. Would you watch TV all morning?

A. yes B. maybe C. no

79. Would you ride your bike?

A. yes B. maybe C. no

XXIII. HERE ARE STATEMENTS OF SOME THINGS PEOPLE DO. READ EACH STATEMENT AND MARK YOUR ANSWER SHEET. MARK "A" IF YOU ALWAYS DO IT. MARK "B" IF YOU SOMETIMES DO IT. MARK "C" IF YOU NEVER DO IT. THERE ARE NO RIGHT OR WRONG ANSWERS. PLEASE ANSWER AS HONESTLY AS POSSIBLE.

FOR EXAMPLE: Some people walk across the lawn to save time.

A. I always do
B. I sometimes do
C. I never do

80. Some people look for a waste basket to throw their ice cream wrapper in.

A. I always do
B. I sometimes do
C. I never do

81. Some people turn off the lights when they are the last to leave a room.

A. I always do
B. I sometimes do
C. I never do

82. Some people leave their popcorn box on the floor when they go to the movies.

A. I always do
B. I sometimes do
C. I never do

83. Some people throw their candy and gum labels on the ground or floor.

A. I always do
B. I sometimes do
C. I never do

84. Some people try to get very close to look at eggs and young birds in a nest.

A. I always do
B. I sometimes do
C. I never do

85. Some people think studying about the environment is silly and a waste of time.

A. I always do
B. I sometimes do
C. I never do

86. Some people feel industries who pollute the environment should be required to stop.

A. I always do
B. I sometimes do
C. I never do

87. Some people feel that everyone should take an active interest in the environment.

A. I always do
B. I sometimes do
C. I never do

88. Some people feel every student should be required to pass a course in environmental studies.

A. I always do
B. I sometimes do
C. I never do

89. Some people chop on trees with knives and axes.

A. I always do
B. I sometimes do
C. I never do

90. Some people compost their garbage.

A. I always do
B. I sometimes do
C. I never do

ENVIRONMENTAL EDUCATION: CURRICULUM, INFORMATION, AND TRAINING

% Longfellow Elementary School
35200 Stevens Boulevard
Eastlake, Ohio 44094
Ph: 216-946-5000, ext. 358

Sponsored by a Grant from the U.S. Office of Education

through the

Willoughby-Eastlake City Schools, Willoughby, Ohio

Cognitive and Affective Evaluation of Environmental Concepts

Grades 5-6

INSTRUCTIONS:

IN THIS BOOKLET ARE QUESTIONS CONCERNING WHAT STUDENTS MAY KNOW OR FEEL ABOUT THE ENVIRONMENT. PLEASE ANSWER THE QUESTIONS AS HONESTLY AS POSSIBLE. THERE IS NO PENALTY FOR WRONG ANSWERS.

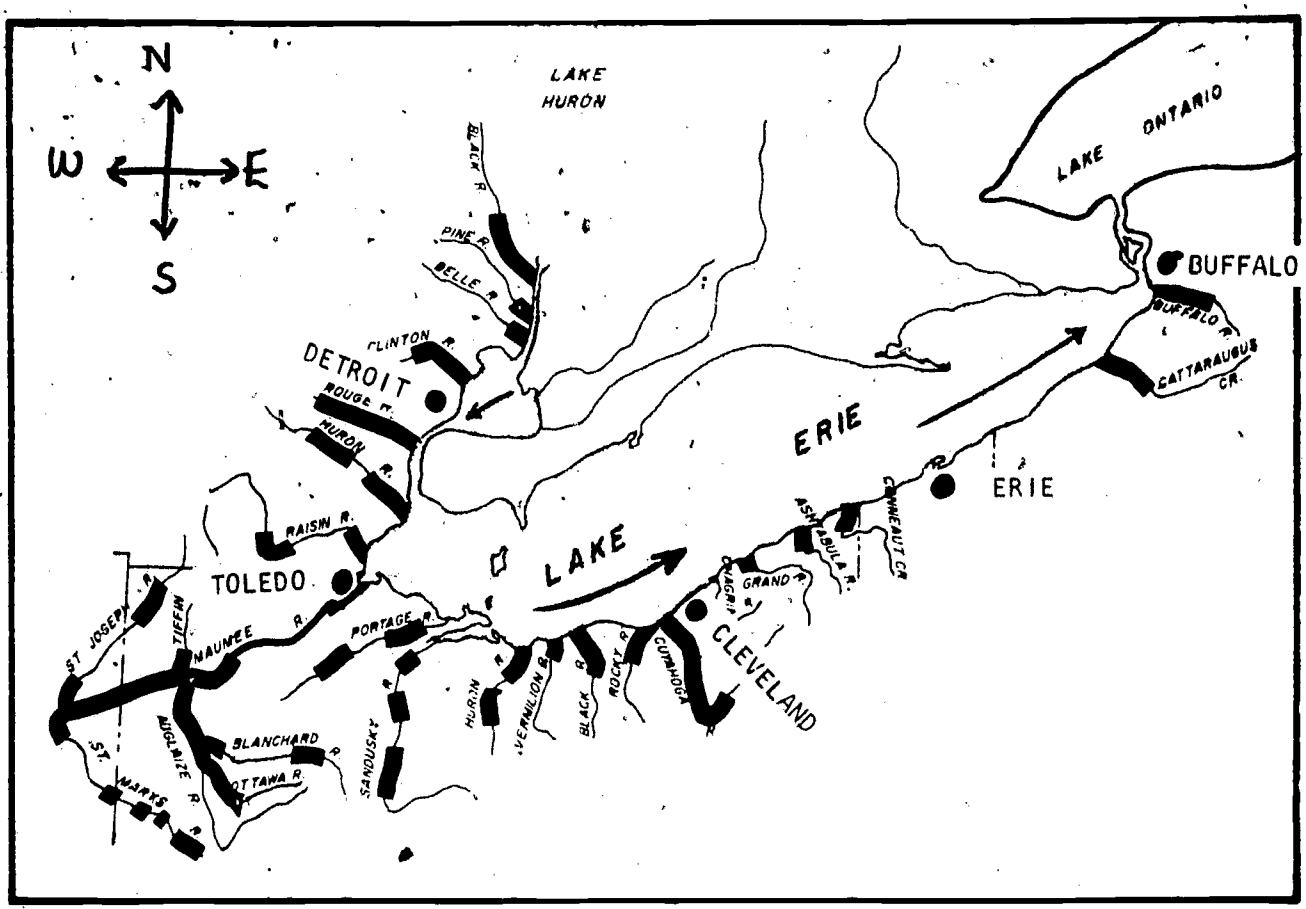
ALL ANSWERS ARE TO BE RECORDED ON THE ACCOMPANYING ANSWER SHEET. PLEASE FILL IN THE INFORMATION BLANKS AT THE TOP OF THE ANSWER SHEET BEFORE STARTING THE TEST.

Teachers: The test may be given in several sittings to avoid fatigue. It is recommended that you stop between the cognitive and affective sections. Please read the directions and do the example for each section so the students understand the purpose and marking procedures. If you have students with reading difficulties, you may read the individual questions to your class.

The total test should require about 1½ hours to administer.

I. ARE THE STATEMENTS ABOUT THE MAP BELOW TRUE OR FALSE. IF YOU AGREE WITH THE STATEMENT, THEN MARK "A" ON YOUR ANSWER SHEET. IF YOU DISAGREE WITH THE STATEMENT, THEN MARK "B" ON YOUR ANSWER SHEET.

USE THIS MAP FOR QUESTIONS 1 - 5.



1. Only the city of Cleveland contributes to the water pollution of Lake Erie.

   A. True B. False

2. The pollution occurring on the United States side of the lake does not effect the Canadian side in any way.

   A. True B. False

3. Pollution of Lake Erie does not effect Lake Ontario.

   A. True B. False

4. From the drainage patterns, we can see that the western half of Lake Erie is a major source of pollution.

   A. True B. False

5. If you were trying to solve the problem of pollution of Lake Erie, the map would be important in determining the extent of the problem.

   A. True B. False

II. ON YOUR ANSWER SHEET MARK THE LETTER OF THE STATEMENT WHICH BESTS COMPLETES THE SENTENCE.

USE THIS PICTURE FOR QUESTIONS 6 - 11.

6. The picture above shows a group of people who are all:

   A. healthy.
   B. wearing dresses.
   C. different.
   D. tall.

7. The people are alike because they are all:

   A. wearing the same type of clothes.
   B. human beings.
   C. cold blooded.
   D. tall.

8. As the children get older they will:

   A. wear their hair long.
   B. grow bigger.
   C. go to school.
   D. move into the city.

9. We can recognize different members of the family because of their:

   A. home.
   B. shapes.
   C. rooms in the house.
   D. birthdays.

10. In the picture all the members of the family have the same shaped:

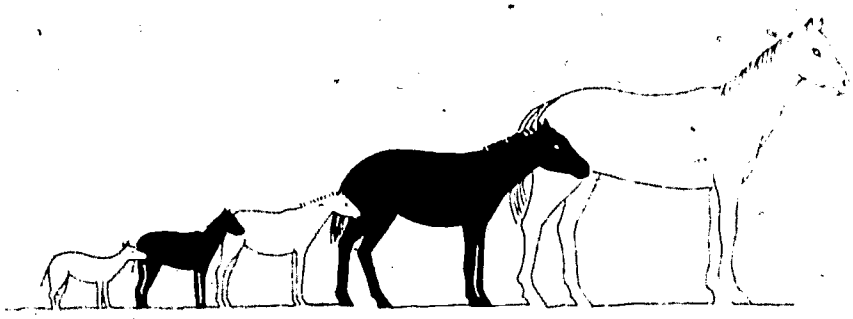
   A. curls.
   B. clothes.
   C. bodies.
   D. head.

11. The members of the family are all dependent on:

   A. their car.
   B. food.
   C. their garage.
   D. wind.

III. ON YOUR ANSWER SHEET, MARK THE LETTER OF THE STATEMENT THAT BEST COMPLETES THE SENTENCE.

USE THIS PICTURE FOR QUESTIONS 12 - 15.



12. The picture above shows the slow process by which a type of animal changes. This slow process is called:

A. movement.
B. circulation.
C. evolution.
D. ecology.

13. Evolution is a special type of:

A. mammal.
B. circulation.
C. design.
D. adaptation.

14. The animal in the picture is a:

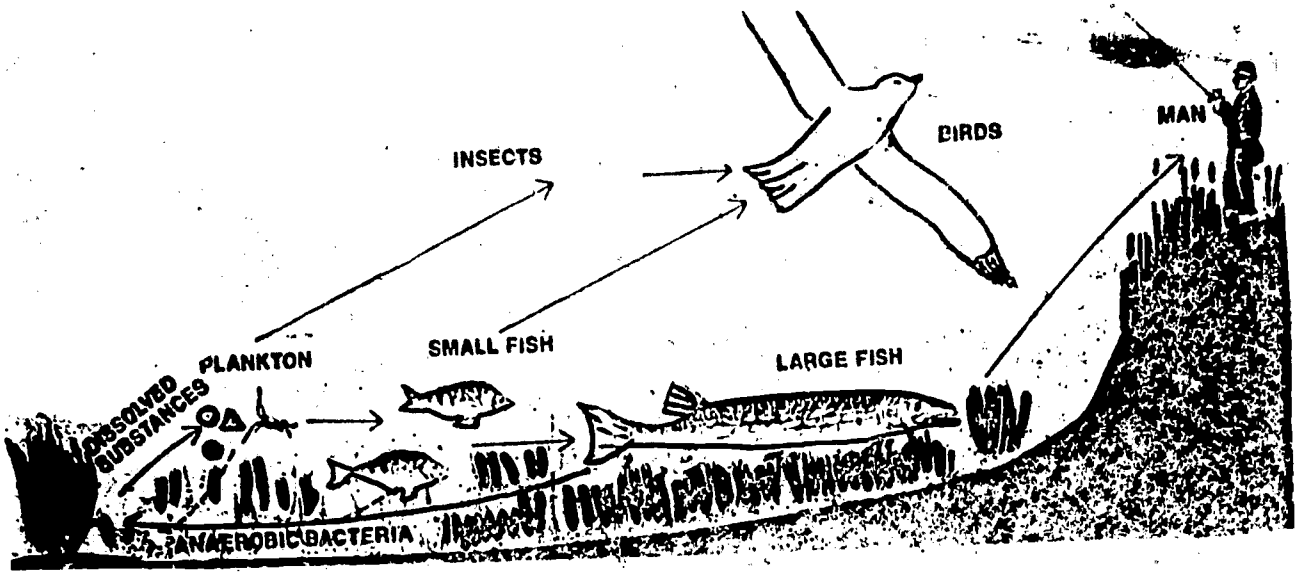
A. reptile.
B. mammal.
C. dog.
D. burrowing animal.

15. As seen in the picture the animal has adapted to its environment by

A. its size.
B. the length of its hair.
C. the number of teeth.
D. its manner of breathing.

IV. ON YOUR ANSWER SHEET, MARK THE LETTER OF THE STATEMENT WHICH BEST COMPLETES THE SENTENCE.

USE THIS PICTURE FOR QUESTIONS 16 - 19.



16. As shown in the picture above, the many animals:

A. are all swimming.
B. are of different sizes.
C. are either mammals or amphibians.
D. live in the pond.

17. In order to survive, many of these animals must:

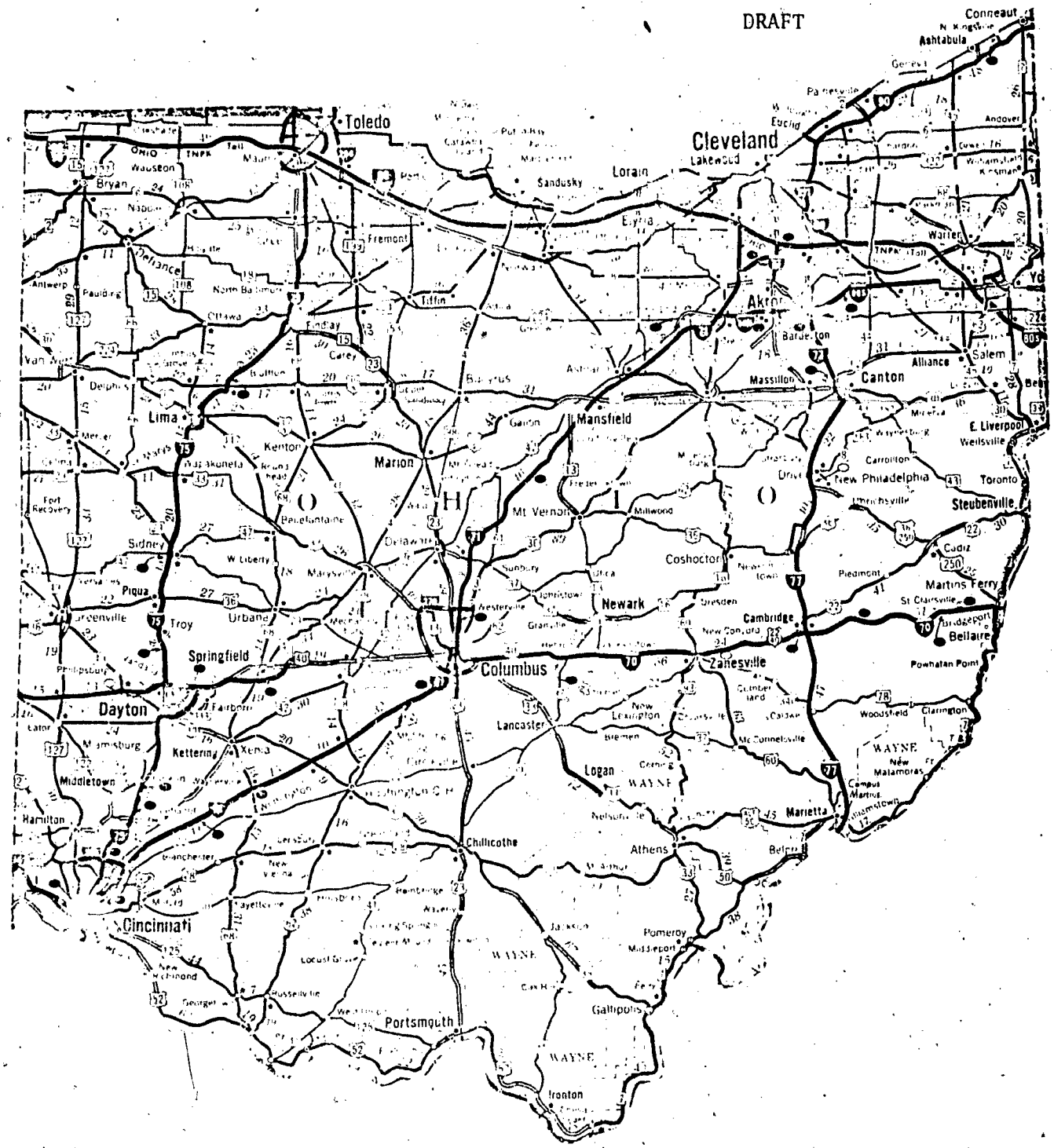
A. learn to change color.
B. help each other.
C. feed on each other.
D. ignore each other.

18. The picture shows:

A. where to catch fish.
B. a fish becoming a bird.
C. dependency.
D. pollution.

19. We can classify the different animals by the:

A. air they breathe.
B. the number of eyes they have.
C. way they migrate.
D. place in which they live.



V. ON YOUR ANSWER SHEET, MARK THE LETTER OF THE STATEMENT WHICH BEST COMPLETES THE STATEMENT.

USE THE MAP OF OHIO FOR QUESTIONS 20 - 29.

20. From the road map we can tell that the major cities in Ohio are dependent on:

A. the road systems.
B. Lake Erie.
C. our national parks.
D: the bus routes.

21. The map pattern shows several roads meeting in the center of the state at:

A. Lima.
B. Cambridge.
C. Columbus.
D. Cleveland.

22. For people who often have to travel great distances, the road map is a major:

A. highway.
B. waste of paper.
C. cause for concern.
D. help.

23. As people buy more and more cars, there will be:

A. fewer roads on the map.
B. more roads on the map.
C. bigger maps.
D. simpler maps.

24. Because of the northward flow of many of Ohio's rivers, people who live far away from Lake Erie can still contribute to its:

A. wave action.
B. cities.
C. pollution.
D. erosion of the shoreline.

25. The map will have to be changed because of the addition of new cities and roads as Ohio grows larger in:

A. population.
B. size.
C. the number of state parks.
D. automobiles.

26. The major roads connect all the big cities because:

A. that is where people buy their food.
B. that is where we find more people.
C. more farmers go to big cities.
D. big cities are pretty.

27. On this map we can tell that there are many different sizes of:

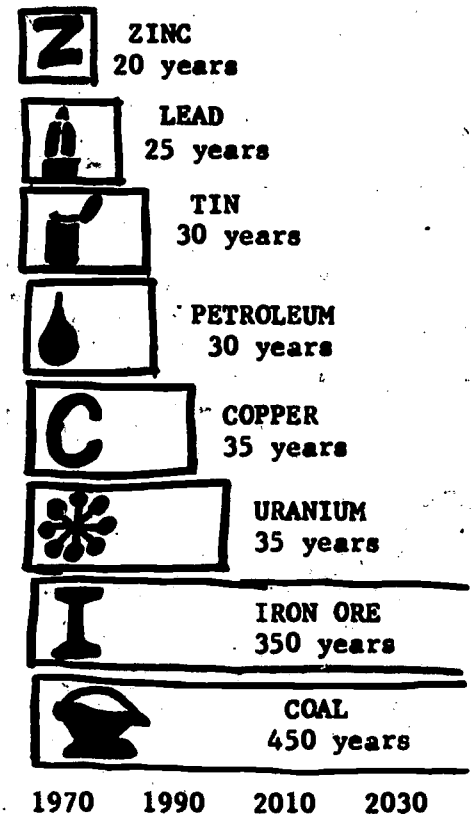
A. smoke stacks contributing to air pollution.
B. rest areas for people to stop when driving.
C. communities where people live.
D. farms.

28. A trip from Toledo to Cincinnati to Cleveland, and then back to Toledo would be fastest if we take roads that formed the shape of a:

A. square.
B. triangle.
C. circle.
D. rectangle.

29. By looking at the map, we can tell that all the roads in the state of Ohio do not have the same number of:

A. lanes.
B. policemen looking for speeders.
C. fences keeping cars on the road.
D. traffic lights.



Known reserves at current consumption

Users ahead of explorers

Known reserves of many key minerals will be depleted in two or three decades at today's rates of consumption. That is, unless science and technology make new breakthroughs — and explorers keep up with consumers.

Scrap is valuable

Aluminum cans are worth $200 a ton as salvage.

VI. ON YOUR ANSWER SHEET, MARK THE LETTER OF THE STATEMENT WHICH BEST COMPLETES THE SENTENCE.

USE THE PICTURE ON THE PRECEEDING PAGE FOR QUESTIONS 30 - 35.

30. The chart shows us that in the near future many of the minerals we use every day will be:

A. here.
B. consumed.
C. helped.
D. polluted.

31. At the current rate, how many of these minerals will be used by the year 2010?

A. two.
B. four.
C. six.
D. all of them.

32. Changes in the earth that eventually form the minerals we use take millions of:

A. hours.
B. dollars.
C. years.
D. days.

33. Whenever we use only one source of supply to fulfill one of man's needs instead of using many different sources, we are taking the chance of:

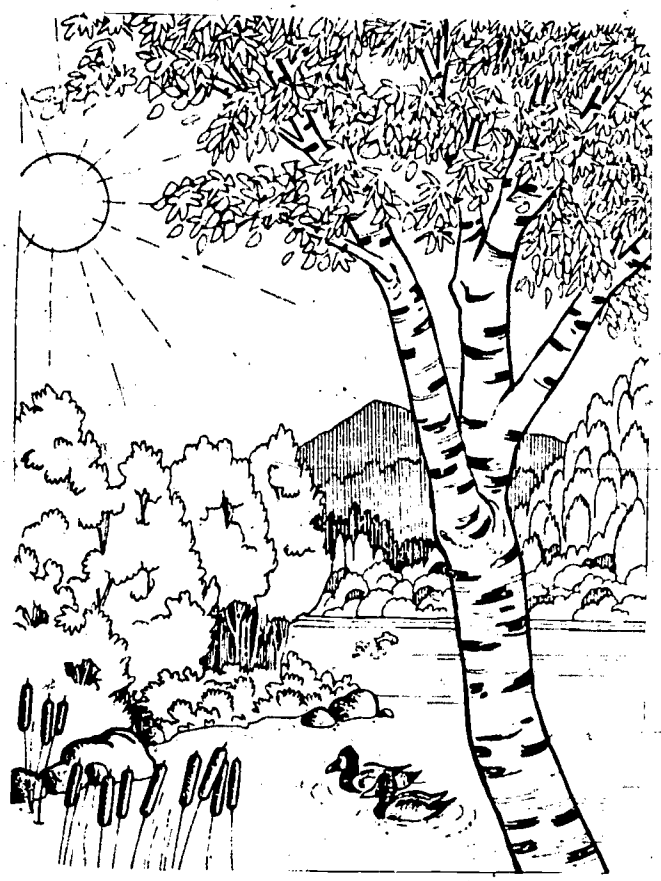
A. using up the resource.
B. creating more of the resource.
C. needing solar energy.
D. becoming ill.

34. Recycling certain waste materials from their neighborhoods might earn schools, clubs, and other organizations extra:

A. prestige.
B. health.
C. money.
D. space.

35. Future needs for resources may be met by recycling our present materials thereby saving:

A. ourselves work.
B. our dollars.
C. our cars from rusting.
D. our mineral resources.



Picture A

Picture B

VII. ON YOUR ANSWER SHEET, MARK THE LETTER OF THE STATEMENT WHICH BEST COMPLETES THE SENTENCE.

USE THE PICTURES ON THE PRECEEDING PAGE FOR QUESTIONS 36 - 40.

36. The two pictures on the preceeding page show a change in:

A. tree size.
B. location.
C. temperature.
D. amount of rainfall.

37. The rabbit in picture B had adapted to his winter environment by means of his:

A. ears.
B. courage.
C. fur.
D. speed.

38. In picture A, for protection the forest animals would be dependent on:

A. plant cover.
B. color of the water.
C. the sunlight.
D. the mountain.

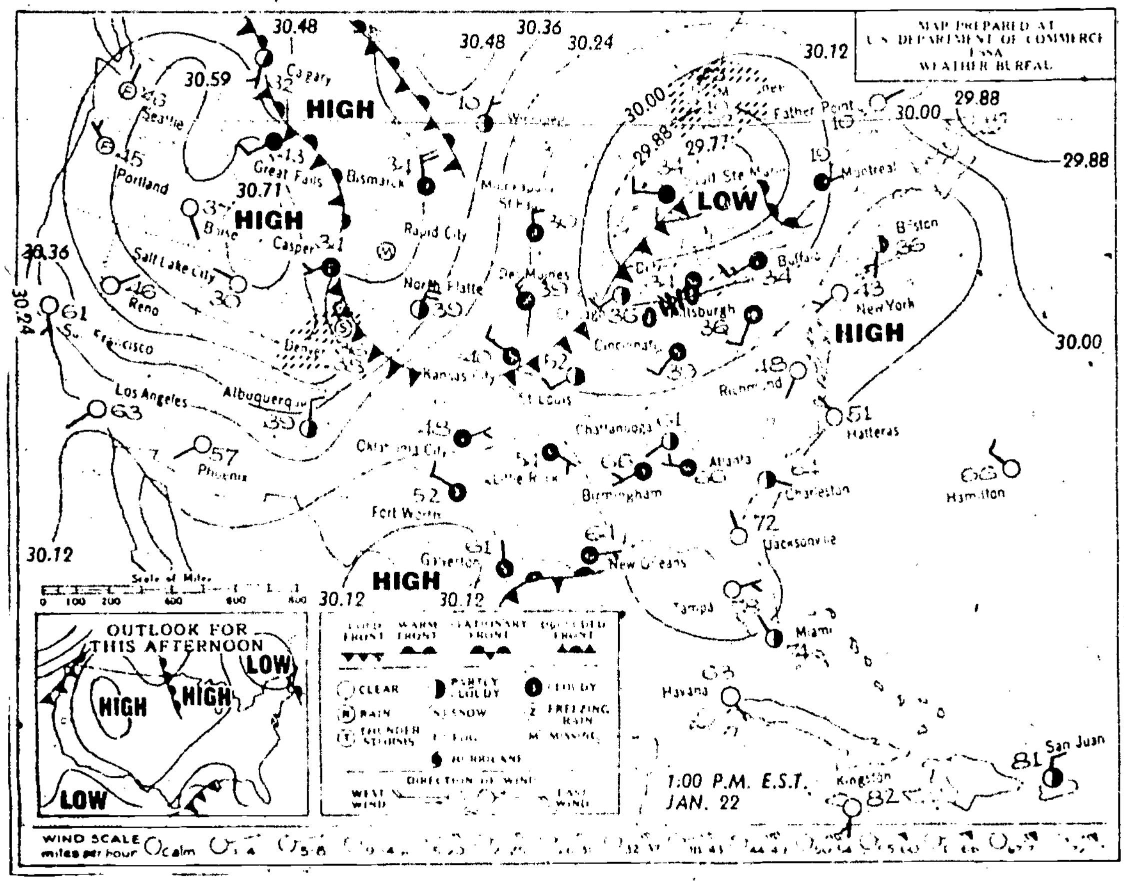
39. Picture A shows different examples of:

A. mountains.
B. seasons.
C. ducks.
D. living things.

40. A cycle can be seen in the pattern of the:

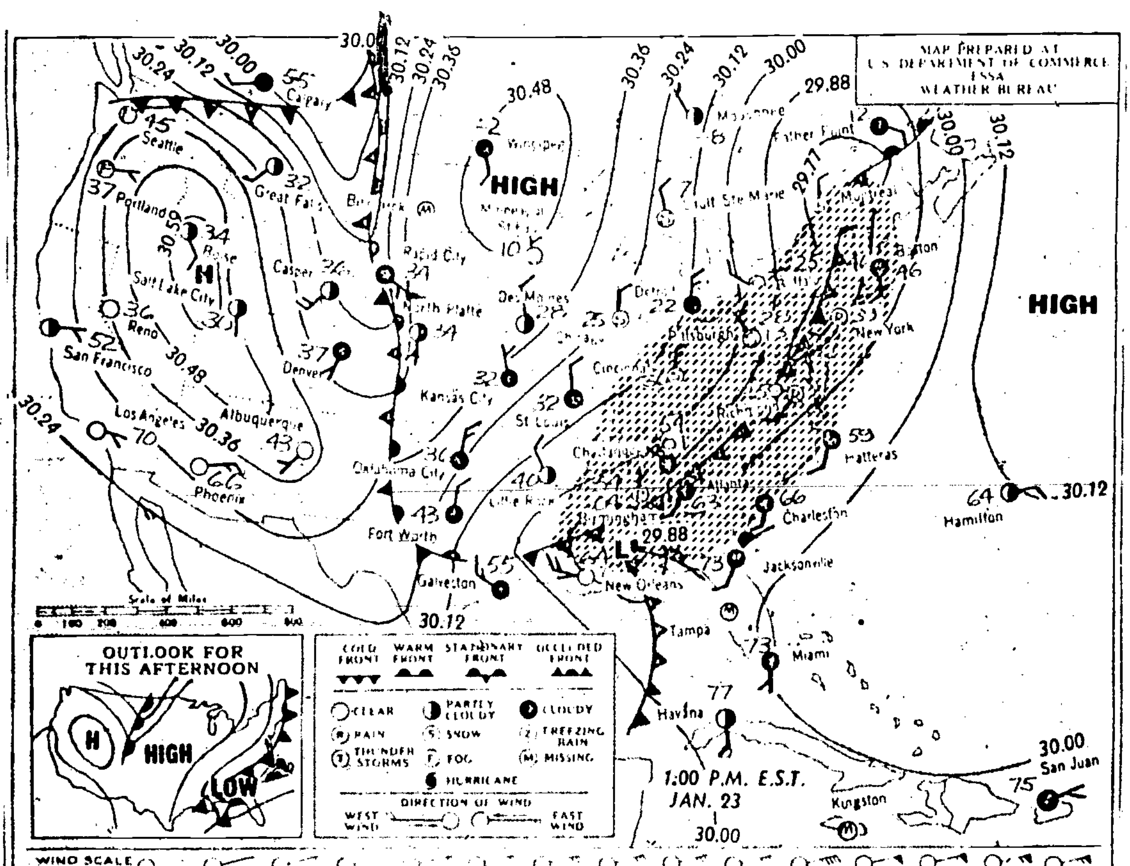
A. seasons.
B. rabbit jumping.
C. sunlight on the water.
D. snow covered rocks.

MAP A



MAP PREPARED AT U.S. DEPARTMENT OF COMMERCE ESSA WEATHER BUREAU
HIGH
HIGH
HIGH
HIGH
LOW
Seattle
Portland
Great Falls
Bismarck
Boise
Casper
Rapid City
Salt Lake City
Reno
San Francisco
Denver
North Platte
Des Moines
Kansas City
St Louis
Cincinnati
Pittsburgh
Buffalo
Montreal
Boston
New York
Richmond
Hatteras
Los Angeles
Albuquerque
Phoenix
Oklahoma City
Chattanooga
Atlanta
Little Rock
Birmingham
Charleston
Fort Worth
Galveston
New Orleans
Jacksonville
Tampa
Miami
Havana
Kingston
San Juan
Hamilton
Father Point
Calgary
30.48
30.36
30.24
30.12
30.59
30.71
29.88
29.77
30.00
OUTLOOK FOR THIS AFTERNOON
COLD FRONT
WARM FRONT
STATIONARY FRONT
OCCLUDED FRONT
CLEAR
PARTLY CLOUDY
CLOUDY
RAIN
SNOW
FREEZING RAIN
THUNDER STORMS
FOG
MISSING
HURRICANE
DIRECTION OF WIND
WEST WIND
EAST WIND
1:00 P.M. E.S.T.
JAN. 22
WIND SCALE miles per hour
Calm
Scale of Miles

MAP B



MAP PREPARED AT U.S. DEPARTMENT OF COMMERCE ESSA WEATHER BUREAU
HIGH
HIGH
H
L
Calgary
Seattle
Portland
Great Falls
Boise
Casper
Rapid City
Salt Lake City
Reno
San Francisco
Denver
North Platte
Winnipeg
Des Moines
Kansas City
St Louis
Cincinnati
Pittsburgh
Montreal
Boston
New York
Hatteras
Los Angeles
Albuquerque
Phoenix
Oklahoma City
Little Rock
Atlanta
Birmingham
Charleston
Jacksonville
Fort Worth
Galveston
New Orleans
Tampa
Miami
Havana
Kingston
San Juan
Hamilton
30.48
30.36
30.24
30.12
30.00
29.88
29.77
OUTLOOK FOR THIS AFTERNOON
COLD FRONT
WARM FRONT
STATIONARY FRONT
OCCLUDED FRONT
CLEAR
PARTLY CLOUDY
CLOUDY
RAIN
SNOW
FREEZING RAIN
THUNDER STORMS
FOG
MISSING
HURRICANE
DIRECTION OF WIND
WEST WIND
EAST WIND
1:00 P.M. E.S.T.
JAN. 23
WIND SCALE miles per hour
Calm
Scale of Miles

VIII. ON YOUR ANSWER SHEET, MARK THE LETTER OF THE STATEMENT WHICH BEST COMPLETES THE SENTENCE.

USE THESE MAPS FOR QUESTIONS 41 - 50.

41. Both maps are called:

A. road maps.
B. topographic maps.
C. satellite photo maps.
D. weather maps.

42. Both maps represent weather in the:

A. summer.
B. spring.
C. winter.
D. fall.

43. Clouds cover the whole U.S. as shown on:

A. map A.
B. map B.
C. both maps.
D. neither map.

44. The state with the higher temperature in Map B is:

A. California.
B. Texas.
C. Florida.
D. New Mexico.

45. On man A, what is the weather like in Denver?

A. clear
B. snowing
C. warm
D. very windy

46. From map B, a person living in Ohio:

A. would wear heavy clothing to work or school on that day.
B. would have a nice, clear day.
C. would make plans to travel.
D. would plant a garden.

47. Both maps show weather patterns:

A. one week apart.
B. one year apart.
C. one month apart.
D. one day apart.

48. On Map A, it is windier in:

A. Phoenix.
B. Bismarck.
C. Charleston.
D. Los Angeles.

49. On map A, it is warmer in:

A. Phoenix.
B. Bismarck.
C. Charleston.
D. Los Angeles.

50. A cold front passing through Ohio is indicated by:

A. map A.
B. map B.
C. both maps.
D. neither map.

AFFECTIVE EVALUATION:

THIS SECTION IS DESIGNED TO DETERMINE HOW YOU FEEL ABOUT THE ENVIRONMENT. THERE ARE NO RIGHT OR WRONG ANSWERS. PLEASE ANSWER AS HONESTLY AS POSSIBLE.

DO NOT BEGIN UNTIL YOUR TEACHER TELLS YOU TO DO SO.

Teacher: If you read the questions to your students, please attempt to do so without biasing the student's responses because of inflections in your voice.

XIX. HERE ARE STATEMENTS OF SOME THINGS PEOPLE DO. READ EACH STATEMENT AND MARK YOUR ANSWER SHEET. MARK "A" IF YOU ALWAYS DO IT. MARK "B" IF YOU SOMETIMES DO IT. MARK "C" IF YOU NEVER DO IT. THERE ARE NO RIGHT OR WRONG ANSWERS. PLEASE ANSWER AS HONESTLY AS POSSIBLE.

51. Some people look for a waste basket to throw their ice cream wrapper in.
    A. I always do.
    B. I sometimes do.
    C. I never do.

52. Some people turn off the lights when they are the last to leave a room.
    A. I always do.
    B. I sometimes do.
    C. I never do.

53. Some people leave their popcorn box on the floor when they go to the movies.
    A. I always do.
    B. I sometimes do.
    C. I never do.

54. Some people throw their candy and gum labels out the window of the car.
    A. I always do.
    B. I sometimes do.
    C. I never do.

55. Some people disturb eggs and young birds in the nest.
    A. I always do.
    B. I sometimes do.
    C. I never do.

56. Some people think studying about the environment is silly and a waste of time.
    A. I always do.
    B. I sometimes do.
    C. I never do.

57. Some people feel industries who pollute the environment should be required to stop.
    A. I always do.
    B. I sometimes do.
    C. I never do.

58. Some people chop on trees with an axe or knife:
    A. I always do.
    B. I sometimes do.
    C. I never do.

59. Some people compost their garbage.
    A. I always do.
    B. I sometimes do.
    C. I never do.

XX. HERE ARE SOME CHOICES OF ACTIVITIES WHICH MAY EFFECT THE ENVIRONMENT. READ THE STATEMENT. MARK "A", "B", "C" ON YOUR ANSWER SHEETS FOR THE ANSWER WHICH BEST DESCRIBES HOW YOU WOULD FEEL ABOUT IT. THERE ARE NO RIGHT OR WRONG ANSWERS. PLEASE ANSWER AS HONESTLY AS POSSIBLE.

60. Rake leaves in the fall into bags instead of burning them.

A. I would be happy to.
B. I would be unhappy if I had to.
C. I don't know.

61. Buy milk in returnable bottles instead of cartons.

A. I would be happy to.
B. I would be unhappy if I had to.
C. I don't know.

62. Eat an apple which might have had a worm in it instead of one which was treated with insecticides.

A. I would be happy to.
B. I would be unhappy if I had to.
C. I don't know.

63. Tie up newspapers for recycling instead of throwing them out with the trash.

A. I would be happy to.
B. I would be unhappy if I had to.
C. I don't know.

64. Use cloth handkerchiefs instead of kleenex.

A. I would be happy to.
B. I would be unhappy if I had to.
C. I don't know.

65. Turn down the volume on the stereo instead of playing music loud.

A. I would be happy to.
B. I would be unhappy if I had to.
C. I don't know.

XXI. THESE NEWSPAPER HEADLINES MIGHT HAVE BEEN IN THE WEEKLY READER, NEWSPAPER, OR MAGAZINE. ON YOUR ANSWER SHEET, MARK "A", "B", OR "C" FOR THE ANSWER WHICH BEST DESCRIBES WHAT YOU WOULD DO IF YOU SAW THE HEADLINE NOW. THERE ARE NO RIGHT OR WRONG ANSWERS.

66. "Cost of Cleaning Air Pollution Explained"

A. I would read the article now.
B. I would read the article later.
C. I wouldn't read the article at all.

67. "Two Laws to Protect Environment Passed"

A. I would read the article now.
B. I would read the article later.
C. I wouldn't read the article at all.

68. "State Says Fishing Waters Face A Pollution Crisis"

A. I would read the article now.
B. I would read the article later.
C. I wouldn't read the article at all.

69. "Government Urged to Control Population Growth in India"

A. I would read the article now.
B. I would read the article later.
C. I wouldn't read the article at all.

70. "Fish Deaths Tied to Polluted Waters"

A. I would read the article now.
B. I would read the article later.
C. I wouldn't read the article at all.

71. "Housing Problem Eased with the Drop in Birthrate"

A. I would read the article now.
B. I would read the article later.
C. I wouldn't read the article at all.

72. "Pollution Controls on Cars Cause Poor Gas Mileage"

A. I would read the article now.
B. I would read the article later.
C. I wouldn't read the article at all.

73. "New Land Acquired at Wildlife Refuge"

A. I would read the article now.
B. I would read the article later.
C. I wouldn't read the article at all.

74. "Town Fighting Oil Pipeline"

A. I would read the article now.
B. I would read the article later.
C. I wouldn't read the article at all.

75. "Environmental Protection is Top Priority of the Governor"

A. I would read the article now.
B. I would read the article later.
C. I wouldn't read the article at all.

XXII. HERE ARE SOME THINGS CHILDREN CAN DO ON A DAY OFF FROM SCHOOL. WOULD YOU DO THESE THINGS? IF YES, MARK "A" ON YOUR ANSWER SHEET. IF MAYBE, MARK "B", AND IF YOU WOULD NOT DO IT, MARK "C". THERE ARE NO RIGHT OR WRONG ANSWERS. PLEASE ANSWER AS HONESTLY AS POSSIBLE.

76. Would you start a vegetable garden?

A. yes B. maybe C. no

77. Would you go hunting?

A. yes B. maybe C. no

78. Would you collect bottles for recycling?

A. yes B. maybe C. no

79. Would you go for a hike in the woods?

A. yes B. maybe C. no

80. Would you help pick up litter in the park?

A. yes B. maybe C. no

81. Would you collect newspapers for recycling?

A. yes B. maybe C. no

82. Would you rake leaves and store them in a compost pile?

A. yes B. maybe C. no

XXIII. HERE ARE SOME STATEMENTS ABOUT THE ENVIRONMENT AND CONTROL OF POLLUTION. ON THE ANSWER SHEET, MARK THE LETTER WHICH BEST DESCRIBES WHAT YOU THINK OF EACH ONE. THERE ARE NO RIGHT OR WRONG ANSWERS. PLEASE ANSWER AS HONESTLY AS POSSIBLE.

83. People should not use air conditioners in their homes.

A. I agree.
B. I do not know.
C. I disagree.

84. More off-shore wells should be dug to solve the power shortage problem.

A. I agree.
B. I do not know.
C. I disagree.

85. Buses to the city should be free during rush hours to reduce traffic.

A. I agree.
B. I do not know.
C. I disagree.

86. Putting pollution controls on cars is not worth the expense.

A. I agree.
B. I do not know.
C. I disagree.

87. Non-returnable bottles should be forbidden by law.

A. I agree.
B. I do not know.
C. I disagree.

88. Strip mining should be regulated.

A. I agree.
B. I do not know.
C. I disagree.

89. Industry should be allowed to burn as much soft coal as it needs.

A. I agree.
B. I do not know.
C. I disagree.

90. Air conditioners should not be installed in cars.

A. I agree.
B. I do not know.
C. I disagree.

ENVIRONMENTAL EDUCATION: CURRICULUM, INFORMATION, AND TRAINING

% Longfellow Elementary School
35200 Stevens Boulevard
Eastlake, Ohio 44094
Ph: 216-946-5000, ext. 358

Sponsored by a Grant from the U.S. Office of Education

through the

Willoughby-Eastlake City Schools, Willoughby, Ohio

Cognitive and Affective Evaluation of Environmental Concepts

Bio-Physical, Secondary

INSTRUCTIONS:

IN THIS BOOKLET ARE QUESTIONS CONCERNING WHAT STUDENTS MAY KNOW OR FEEL ABOUT THE ENVIRONMENT. PLEASE ANSWER THE QUESTIONS AS HONESTLY AS POSSIBLE. THERE IS NO PENALTY FOR WRONG ANSWERS.

ALL ANSWERS ARE TO BE RECORDED ON THE ACCOMPANYING ANSWER SHEET. PLEASE FILL IN THE INFORMATION BLANKS AT THE TOP OF THE ANSWER SHEET BEFORE STARTING THE TEST.

Teachers: The test may be given in two sittings. It is recommended that you stop between the cognitive and affective sections. Please be sure the students understand the marking system and use of the answer sheets.

The total test should require about 1½ hours to administer.

1. Plants and animals living together in a pond make up a :

   a. ecad.
   b. community.
   c. biome.
   d. habitat.

2. An activity used in school to help students to decide how they feel about the environment is:

   a. a displacement activity.
   b. a problem solving activity.
   c. a replacement activity.
   d. a value clarification activity.

3. A set of beliefs that each of us should have to guide us in living an environmentally sound life is called:

   a. future shock.
   b. an environmental inventory.
   c. an environmental creed.
   d. exploitative attitudes.

4. Growth of a population is directly limited by many factors. These include all of the following except:

   a. survival rate.
   b. death rate.
   c. employment rate.
   d. space.

5. The major source of energy in the United States for power stations and industrial usage comes from:

   a. fossil fuels.
   b. nuclear fusion.
   c. solar furnaces.
   d. wind generators.

6. The following pathway of "food-to-man" most accurately illustrates that:

   soil--farmer--processor--distributor--wholesaler--preparation--retailer--you

   a. we are very close to nature in obtaining our needs.
   b. we are very far removed from nature in obtaining our needs.
   c. it is easier to buy food than to grow your own.
   d. modern man has a highly advanced technology.

7. If an individual really "cares" for his environment it is most important that he:

   a. take all possible measures to prevent air and water pollution.
   b. be aware of environmental problems.
   c. determine his personal "environmental philosophy" and make an effort to live by it.
   d. go back to a more primitive life style in order to prevent further pollution.

8. Which of the following is a false statement?

   a. There is a general agreement on what is desirable for human life.
   b. In order to determine limits to growth, a global view of the environment is necessary.
   c. The concerns of many individuals center around those which are personal and short term.
   d. There are limits to all growth.

9. "Environment" is a term, idea, or concept which:

   a. may mean many things to each person.
   b. is a very simple idea.
   c. is a very complex idea that we cannot really understand.
   d. is concerned primarily with pollution problems.

10. An environment includes:

   a. cities, towns, and governments, and other man-made areas.
   b. forests, streams, and fields, and other natural areas.
   c. man-made and natural areas.
   d. underground, above ground, and underwater areas.

11. In its most meaningful sense, your environment consists of:

   a. the earth on which you live.
   b. only the immediate surroundings in which you live.
   c. all internal and external factors which affect you.
   d. the quality of air and land and water about you.

12. While the United States has about 6 - 7 percent of the world's population, we consume about:

   a. 6 - 7% of the world's non-renewable resources.
   b. 10 - 20% of the world's non-renewable resources.
   c. 20 - 50% of the world's non-renewable resources.
   d. 75 - 90% of the world's non-renewable resources.

13. An environment which is balanced contains:

a. a small number of diverse species of plants and a large number of diverse species of animals.
b. a small number of diverse plants and animals.
c. a large number of diverse species of plants and animals.
d. a large number of diverse species of plants and a small number of diverse species of animals

14. Man and his relation to the ecosystem can best be described by the phrase:

a. being profoundly affected by the ecosystem.
b. having a profound effect on the ecosystem.
c. both profoundly affecting each other.
d. two separate entities affecting each other only incidently.

15. At the present time, world population is doubling about:

a. every 10 years.
b. every 35 years.
c. every 80 years.
d. every 100 years.

16. An ecosystem is:

a. a group of people who form an ecological agency.
b. a system which determines the economy of a community.
c. a system by which ecologists record the results of their studies.
d. a community of plants and animals which interact in a specific area.

17. An aquarium is a:

a. polyclimax.
b. microcosom.
c. benthos.
d. mores.

18. When a person is talking about solid waste disposal, he is referring to:

a. dumping of industrial wastes into streams and rivers.
b. removal of excess pollution from lakes.
c. paying higher taxes to control the pollution of the community.
d. paper, rubbish, and garbage collected in the community.

19. The major root cause for our environmental problems is:

a. the wind and water are unable to cleanse themselves because we are dumping wastes into them too quickly.
b. man thinks he is the center of the universe and that everything on earth is for his good.
c. the United States has not spent enough money on trying to solve the pollution problem.
d. power companies are not able to generate enough electricity to operate the anti-pollution devices.

20. One of the purposes of the "brain storm" technique is"

a. to get as many different ideas before working on a problem.
b. to clear your mind of all extra thoughts that might confuse you.
c. to reach a quick decision.
d. to decide what will be the jobs of each person on the committee.

21. When studying an environmental problem, you need to consider:

a. only the ecological aspects.
b. only the social aspects.
c. both the political and economic aspects.
d. both the ecological and social aspects.

22. Often times, before you can begin a study of the environment, you must:

a. get permission from city officials to study the community.
b. inventory the community to determine its quality.
c. contact the local protection agency and inform them of your intention.
d. experiment with baseline data.

23. When studying a pollution problem, which of the following is not of serious concern:

a. You have the necessary equipment and time to do the study.
b. The results of the study will not make anyone mad at you.
c. The problem is one that can be solved.
d. Whether the problem has been studied before.

24. When beginning to solve an environmental problem, the first most important step is to:

a. identify the exact nature of the problem.
b. collect the data.
c. talk with other students to arrange for needed transportation.
d. decide where you plan to do your analysis.

25. When conducting a survey of a natural area as a forest or pond to determine the kinds and amounts of plants that live there, you will find that:

a. the various methods of counting plants work equally well.
b. some methods to count plants will work better than others.
c. the various methods used to count animals will also work to count plants.
d. Some methods to count animals will also work to count plants.

26. When you inventory your environment, you are:

a. sampling or counting the number and types of things present.
b. looking at the impact nature has made on man's life.
c. predicting future life styles of man.
d. calculating the results made from the study of the environment.

27. "Eye-Balling" is a way of:

a. inventorying the environment.
b. arriving at absolute conclusions.
c. passing messages to friends.
d. collecting detailed information needed when solving an environmental problem.

28. A device to measure air pollution in an area is to use:

a. the Ringelman Scale.
b. the Winkler Method.
c. the sling psychrometer.
d. pH paper.

29. The Ohio Environmental Protection Agency (EPA) is:

a. a citizen organization concerned with protection of the environment.
b. a governmental organization concerned with protection of the environment.
c. an industrial organization concerned with protection of the environment.
d. a student organization concerned with protection of the environment.

30. The first step in establishing water quality standards is to determine:

a. what the water is used for.
b. level of pollution.
c. if there are discharges from industry.
d. what enforcement exists.

31. The total water consumption of the United States were divided by the number of people, the average consumption per day would be about:

a. 10 gallons.
b. 25 gallons.
c. 50 gallons.
d. 100 gallons.

32. The Winkler Method is used to determine the level of:

a. dissolved oxygen in the water.
b. amount of sulfur dioxide in the air.
c. pH level of the soil.
d. preservatives in food.

33. Pollution Indicators:

a. are living organisms that indicate the level of pollution in an area.
b. are the types of pollutants dumped into an area.
c. are the types of organizations that are concerned with pollution control.
d. are legislators running for office who are concerned about the pollution of our earth.

34. When conducting an environmental study, expensive and sophisticated equipment:

a. is necessary if you want results that are accurate and reliable.
b. may not be necessary depending on the nature of the problem.
c. is easy to operate.
d. is necessary because it results in fewer errors than man.

35. When collecting data for an environmental study:

a. collect only what you need because if you collect more, you won't use it anyway.
b. collect more than you need, because you may have forgotten something.
c. it is acceptable to store it in your head until you have an opportunity to write it down.
d. write portions of it in several places, because if you lose some of it, you will still have portions of what you collected.

36. An Air Quality Act is:

a. legislation passed by federal legislators concerning the level and types of pollutants which are cast into the air.
b. a single act play about the efforts of air pollution.
c. an anti-pollution device used to control the level of emissions into the atmosphere.
d. the indirect cost that people must pay, as through cleaning bills and deterioration of buildings, because of air pollution.

37. One of the most effective ways to solve an environmental problem is to:

a. have many people working together in teams, all dealing with different parts of the problem.
b. work individually because you cannot trust others to do their part.
c. give the problem to an expert because students are not capable of solving environmental problems.
d. obtain all of the results from a search of the literature.

38. Throughout our country, it is reported that the most significant source of air pollution is:

a. private home.
b. factories and industries.
c. electric generating plants.
d. the automobile.

39. Which is the proper sequence for solving a problem?

a. research literature, collect data, identify problem.
b. identify problem, collect data, interpret results.
c. identify problem, collect data, research literature.
d. collect data, identify problem, interpret results.

40. The formula presented below represents:

$$6O_2 + C_6H_{12}O_6 \longrightarrow 6CO_2 + 6H_2O$$

Energy (released)

a. green plants using the sun to make food and grow.
b. the burning of fuel to produce energy.
c. particulate air pollution being emitted into the atmosphere.
d. the nuclear reaction used to manufacture electricity in nuclear power plants.

41. It is anticipated that the annual U.S. demand for energy will double in the next:

a. 10 years.
b. 30 years.
c. 50 years.
d. 70 years.

42. When one studies about fossil fuels that are available, one readily learns:

a. there is an unlimited supply of fossil fuels that are available for man's use.
b. that the U.S. is energy independent from other countries of the world.
c. that little environmental damage results from the mining of fossil fuels.
d. that the rate of formation is much slower than the rate of use.

43. Coal is a type of:

a. solar energy.
b. nuclear energy.
c. fossil fuel energy.
d. geothermal energy.

44. The term "cyborg" has been coined by futurists to describe:

a. futuristic robots.
b. man-machine linkups
c. computer travel.
d. voiceless communication.

45. Hidden costs which may appear in the future as a result of our indiscriminate use of energy are:

a. solar energy research.
b. public costs for scientific research for alternative energy sources.
c. health costs as a result of a deteriorating environment.
d. costs to support projects such as pipelines in Alaska.

46. The development of huge interconnections called magalopolis are the result of:

a. urban sprawl.
b. astrodomed cities.
c. monorail systems.
d. space shuttles.

47. As the world continues in its present uses of energy, resources, and expanded economic and human growth, the following will undoubtedly occur:

a. a new technology to solve our problems.
b. wilderness areas will steadily shrink and disappear.
c. people to look for areas of low density population.
d. underdeveloped nations begin to practice birth control.

48. Probably the most significant technology in changing our lives had been in the area of:

a. plastics.
b. space travel.
c. transportation.
d. atomic power.

49. Our ultimate source of fuel of energy for the earth is from:

a. gasification.
b. nuclear reactors.
c. fusion.
d. photosynthesis.

50. Future shock might be defined as:

a. preparing for the possibility of nuclear war and its genetic impact.
b. the inability to cope psychologically and biologically with new technologies.
c. the inability to adapt to space travel.
d. learning to develop techniques for preventing radical social behavior.

AFFECTIVE INSTRUMENT - SECONDARY STUDENTS

This booklet contains statements about the environment. You are to respond to each item, indicating whether you agree or disagree with the statement.

For each statement, indicate "A", "B", "C", "D", or "E" on the answer sheet, using the following rating system:

A = strongly disagree
B = disagree
C = somewhat agree, somewhat disagree
D = agree
E = strongly agree

Because there are no right or wrong answers for any of the statements, please answer as honestly as possible.

Two examples are provided below:

a. Industries should be allowed to pollute the environment.

b. I am an integral part of the environment.

The items begin on the next page. Do not turn the page until your teacher indicates to do so. This is not a timed exercise.

RATING SYSTEM

A = strongly disagree
B = disagree
C = somewhat agree, somewhat disagree
D = agree
E = strongly agree

51. We need wilderness, woods, hills, meadows, free-flowing rivers, clean and unpolluted air and water.

52. The state has the ultimate responsibility for improving the environment.

53. The fact that we are using up many natural resources will effect the quality of life of future generations.

54. Pollutants are caused by both natural and man-made processes.

55. Industries should be forced to quit polluting air and water.

56. Environmental problems are closely related to economic, political, and social concerns.

57. Man's past relationship with the environment affects us today.

58. I feel studying about the environment is an important part of my schooling.

59. What happens to the environment of the United States also effects the environment of the world.

60. Most students do not understand man's effect on the environment.

61. Most of the concern about environmental problems has been over-exaggerated.

62. Solitude and silence in nature enables man to perceive many things he ordinarily misses.

63. It is important for me to consider whether the things I want for my life are worth the environmental damage that may result trying to obtain them.

64. It is more important to preserve the freedom of the individual than to enforce laws to protect the quality of life for the future.

65. Growth does not necessarily mean progress.

66. The ultimate responsibility for solving our environmental problems lie with each individual.

67. Today's interest in ecology and the environment is just another passing fad.

68. I feel it is important for people to be actively involved in maintaining a quality environment, and I would be willing to join an environmental organization.

RATING SYSTEM

A = strongly disagree
B = disagree
C = somewhat agree, somewhat disagree
D = agree
E = strongly agree

69. In order to obtain a quality life style, people whould be willing to spend a portion of their income for environmental upkeep, such as cleaning water and air.

70. It is impossible not to pollute the environment.

71. Man's survival is due to his ability to adapt and to change his environment.

72. Every student should be required to pass a course in environmental studies.

73. One of the more comforting aspects of present research on energy resources is that the oil companies are working hard to keep our present consumption satisfied.

74. Many things people enjoy doing do not cost a lot of money.

75. I have a set of personal beliefs which will help guide me in living an environmentally sound life.

76. There is a natural area that is so important to me that I would legally fight to keep anyone from polluting or destroying it.

77. The real cause of pollution is not caused by industries dumping waste products into the environment, but rather because of my personal desires and demands for a comfortable life.

78. Most people are not concerned with protection of the environment.

79. I would be willing to pay more for returnable bottles even though it would cost more in terms of time and convenience.

80. With the proper education, I believe people would realize the importance of wise management of our environment.

81. Only strong governmental controls will reduce pollution problems.

82. Schools must spend more time and money studying about environmental problems even if it means eliminating some of the current programs.

83. Everyone should become active in a group which works to improve the environment of the community.

84. It is unfair to expect big business and industries to conform to environmental standards.

RATING SYSTEM

A = strongly disagree
B = disagree
C = somewhat agree, somewhat disagree
D = agree
E = strongly agree

85. A quality life does not always mean material goods as cars, clothes, and an expensive house.

86. I would adjust my personal life style in order to provide a significant increase in the quality of the environment within my community.

87. Environmental quality should be neglected when economic considerations are involved.

88. Technology has given us many problems, but it is only through technology that the future will exist for us at all.

89. I am personally responsible for the present state of pollution.

90. If Americans are to continue to enjoy a high quality of life, our environment will continue to suffer.

91. Man is the only form of life that has rights.

92. Choices between human needs (essentials) and human wants or desires (non-essentials) must be considered if we are to improve the quality of our environment.

93. Governments have no right to tell industries or individuals what to do.

94. I have seen some types of environmental pollution that have motivated me to immediate action.

95. People should have the right to do whatever they wish on their own property no matter how damaging it is to the environment.

96. An individual has too much power in determining the way he lives.

97. An economic system designed to protect environmental quality would have to include the cost of pollution control.

98. Controls should be placed on industries which will protect the environment even if it means things will cost more.

99. It is important that we respect the rights of other people, and the rights of plants and animals and our environment.

100. Immediate short-run gains versus long-term investment is one of the main reasons we have a problem with the pollution of our environment.

ENVIRONMENTAL EDUCATION: CURRICULUM, INFORMATION, AND TRAINING

% Longfellow Elementary School
35200 Stevens Boulevard
Eastlake, Ohio 44094
Ph: 216-946-5000, ext. 358

Sponsored by a Grant from the U.S. Office of Education

through the

Willoughby-Eastlake City Schools, Willoughby, Ohio

Cognitive and Affective Evaluation of Environmental Concepts

Socio-Cultural, Secondary

INSTRUCTIONS:

IN THIS BOOKLET ARE QUESTIONS CONCERNING WHAT STUDENTS MAY KNOW OR FEEL ABOUT THE ENVIRONMENT. PLEASE ANSWER THE QUESTIONS AS HONESTLY AS POSSIBLE. THERE IS NO PENALTY FOR WRONG ANSWERS.

ALL ANSWERS ARE TO BE RECORDED ON THE ACCOMPANYING ANSWER SHEET. PLEASE FILL IN THE INFORMATION BLANKS AT THE TOP OF THE ANSWER SHEET BEFORE STARTING THE TEST.

Teachers: The test may be given in two sittings. It is recommended that you stop between the cognitive and affective sections. Please be sure the students understand the marking system and use of the answer sheets.

The total test should require about 1½ hours to administer.

1. "Environment" is a term, idea, or concept which:

   a. may mean many things to each person.
   b. is a very simple idea.
   c. is a very complex idea that we cannot really understand.
   d. is concerned primarily with pollution problems.

2. An environment includes:

   a. cities, towns, and governments, and other man-made areas.
   b. forests, streams, and fields, and other natural areas.
   c. man-made and natural areas.
   d. underground, above ground, and underwater areas.

3. In its most meaningful sense, your environment consists of:

   a. Primarily the immediate surroundings in which you live.
   b. all internal and external factors which affect you.
   c. the quality of air and land and water about you.
   d. the earth on which you live.

4. While the United States has about 6 - 7 percent of the world's population, we consume about:

   a. 6 - 7% of the world's non-renewable resources.
   b. 10 - 20% of the world's non-renewable resources.
   c. 20 - 50% of the world's non-renewable resources.
   d. 75 - 90% of the world's non-renewable resources.

5. Man in his relation to the ecosystem can best be described by the phrase:

   a. being profoundly affected by the ecosystem.
   b. having a profound effect on the ecosystem.
   c. both profoundly affecting each other.
   d. two separate entities affecting each other only incidently.

6. At the present time, world population is doubling about:

   a. every 10 years.
   b. every 35 years.
   c. every 80 years.
   d. every 100 years.

7. A person's quality of life will be limited by:

   a. his willingness and ability to obtain it.
   b. other people in the community.
   c. the system.
   d. family background.

8. An activity used in school to help students to decide how they feel about the environment may be named:

   a. a carry-through.
   b. a problem solving activity.
   c. a replacement activity.
   d. a value clarification activity.

9. A set of beliefs that each of us should have to guide us in living an environmentally sound life is called:

   a. future shock.
   b. an environmental inventory.
   c. an environmental creed.
   d. exploitative attitudes.

10. If an individual really "cares" for his environment, it is most important that he:

   a. take all possible measures to prevent air and water pollution.
   b. be aware of environmental problems.
   c. determine his personal "environmental philosophy" and make an effort to live by it.
   d. go back to a more primitive life style in order to prevent further pollution.

11. Which of the following is a false statement?

   a. There is a general agreement on what is desirable for human life.
   b. In order to determine limits to growth, a global view of the environment is necessary.
   c. The concerns of many individuals center around those which are personal and short term.
   d. There are limits to all growth.

12. The Ohio Environmental Protection Agency (EPA) is:

   a. a citizen organization concerned with protection of the environment.
   b. a governmental organization concerned with protection of the environment.
   c. an industrial organization concerned with protection of the environment.
   d. a city organization concerned with protection of the environment.

13. When collecting data for an environmental study:

   a. collect only what you need because if you collect more, you won't use it anyway.
   b. collect more than you need, because you may have forgotten something.
   c. it is acceptable to store it in your head until you have an opportunity to write it down.
   d. write portions of it in several places, because if you lose some of it, you will still have portions of what you collected.

14. One of the most effective ways to solve an environmental problem is to:

    a. obtain all of the results from a search of the literature.
    b. give the problem to an expert because students are not capable of solving environmental problems.
    c. work individually because you cannot trust others to do their part.
    d. have many people working together in teams, all dealing with different parts of the problem.

15. The term "cyborg" has been coined by futurists to describe:

    a. futuristic robots.
    b. computer travel.
    c. man-machine linkups.
    d. voiceless communication.

16. When considering the life style you desire, you should consider:

    a. how much power and wealth it will bring you.
    b. what position it will get you in the community.
    c. how much happiness and power it will bring.
    d. how it will affect the environment.

17. Hidden costs which may appear in the future as a result of our indiscriminate use of energy are:

    a. solar energy research.
    b. public costs for scientific research for alternative energy sources.
    c. health costs as a result of a deteriorating environment.
    d. costs to support projects such as pipelines in Alaska.

18. The development of huge interconnections called magalopolis are the result of:

    a. urban sprawl.
    b. astrodomed cities.
    c. monorail systems.
    d. space shuttles.

19. As the world continues in its present uses of energy, resources, and expanded economic and human growth, the following will undoubtedly occur:

    a. a new technology to solve our problems.
    b. wilderness areas will steadily shrink and disappear.
    c. people to look for areas of low density population.
    d. underdeveloped nations begin to practice birth control.

20. Probably the most significant technology in changing our lives had been in the area of:

    a. plastics.
    b. space travel.
    c. transportation.
    d. atomic power.

21. Future shock might be defined as:

a. the inability to cope psychologically and biologically with new technologies.
b. preparing for the possibility of nuclear war and its genetic impact.
c. the inability to adapt to space travel.
d. learning to develop techniques for preventing radical social behavior.

22. One of the purposes of the "brain storm" technique is:

a. to get as many different ideas before working on a problem.
b. to clear your mind of all extra thoughts that might confuse you.
c. reach a quick decision.
d. to decide what will be the jobs of each person on the committee.

23. Often times, before you can begin a study of the environment, you must:

a. get permission from city officials to study the community.
b. inventory the community to determine its quality.
c. contact the local protection agency and inform them of your intention.
d. experiment with baseline data.

24. When studying a pollution problem, which of the following is not of serious concern:

a. you have the necessary equipment and time to do the study.
b. whether the problem has been studied before.
c. the problem is one that can be solved.
d. the results of the study will not make anyone mad at you.

25. When beginning to solve an environmental problem, the first, most important step is to:

a. identify the exact nature of the problem.
b. collect the data.
c. talk with other students to arrange for help in analyzing the data.
d. decide where you plan to do your analysis.

26. When you inventory your environment, you are:

a. predicting future life styles of man.
b. looking at the impact nature has made on man's life.
c. sampling or counting the number and types of things present.
d. calculating the results made from the study of the environment.

27. As you seek to reach a quality life, you should measure it by:

a. standards set by the system.
b. standards set up by your ancestors.
c. standards set by your peers.
d. your own personal yardstick.

28. A topographical map describes which type of features of an area:

a. commercial.
b. historical.
c. physical.
d. sociological.

29. Early settlers in Ohio were engaged typically in:

a. shipping.
b. trading.
c. fur trapping.
d. farming.

30. Our demands on the environment for a better quality of life affects:

a. only ourselves.
b. mostly young people.
c. the immediate community.
d. everyone directly or indirectly.

31. After developing a quality of life plan and comparing it to the ways and means of life plan, it may become most important to change:

a. the number of necessities.
b. the number of luxuries.
c. the amount of money set aside for housing.
d. the amount of money needed for environmental upkeep.

32. Which statement is <u>not</u> true about collecting data about a community?

a. The researcher should not influence the data.
b. It is necessary to record date, location, observer, and the observation when recording data.
c. It is acceptable to remember the data until you have an opportunity to write it down.
d. Data should be analyzed objectively.

33. The first step in solving a problem is:

a. gathering data.
b. reaching a decision.
c. defining the problem.
d. taking action.

34. Public opinion on any issue can best be determined by:

a. asking college and university professors.
b. a survey.
c. the principal of the school.
d. the news on TV or radio.

35. An activity where students play the part of different people concerned with the environment is called:

a. a pantomime activity.
b. an experience continuum activity.
c. a problem solving activity.
d. a role playing activity.

36. Defining a "Quality of Life" should be the responsibility of:

a. the governmental agencies in charge of environmental control.
b. the elected officials.
c. the voting public.
d. the individual.

37. The presentation of environmental problems on a "good or bad" basis is:

a. a true representation of the realities of the problem.
b. an oversimplication of a complex problem.
c. a valuable perspective in that it clarifies a complex situation.
d. usually does not consider the economic ramification of the problems.

38. Data collection would probably follow:

a. identification of problems, selection of specific problem.
b. analysis of data, solution proposal.
c. statistic inference, data compilation.
d. final study, release of funds.

39. A quality that could be used to measure another person's greatness would be:

a. his wealth, house, cars.
b. his position in the community.
c. how he treats others.
d. how much education he has.

40. Socio-cultural values are:

a. subjective.
b. objective.
c. always proportional.
d. seldom significant.

41. A diversified economy means that:

a. different crops are grown.
b. farms and factories co-exist.
c. different kinds of stores are located.
d. agricultural, industrial, and commercial activities exist in the area.

42. The term "demography" refers to:

a. political subdivisions.
b. geographical features.
c. historical background
d. population studies.

43. Zoning legislation is designed to:

a. reduce pollution.
b. increase the tax base.
c. provide for effective land use.
d. diversify economic activities.

44. If you were to keep a daily record of your activities, you would find that most of them involves:

a. only yourself.
b. only people you see or touch directly.
c. only your immediate family.
d. a great number of people.

45. Your daily life should take into consideration:

a. day to day plans.
b. the total life purpose.
c. the physical needs for the present.
d. primarily the day's work.

46. Economics is the science of:

a. cybernetics.
b. manufacture and distribution of goods and products.
c. advertising of goods and products.
d. wholesale and retail products.

47. Goals are established by a group for the purpose of:

a. scoring a point with the community.
b. competing with another group.
c. long-range planning.
d. public relations.

48. The purpose of the zoning laws in your community is:

a. to protect against uncontrolled growth.
b. to eliminate industry.
c. to discourage mobile home owners.
d. to protect farmland from housing developments.

49. To determine future development patterns of your community is one of the functions of the:

a. Health Department.
b. Planning Commission.
c. Zoning Inspector.
d. Local Building Contractor.

50. The agency responsible for controlling the amount of pollution industry can discharge is the:

a. County Game Protector's Office.
b. Health Department.
c. Environmental Protection Agency.
d. Sanitary Engineer's Office.

AFFECTIVE INSTRUMENT - SECONDARY STUDENTS

This booklet contains statements about the environment. You are to respond to each item, indicating whether you agree or disagree with the statement.

For each statement, indicate "A", "B", "C", "D", or "E" on the answer sheet, using the following rating system:

A = strongly disagree
B = disagree
C = somewhat agree, somewhat disagree
D = agree
E = strongly agree

Because there are no right or wrong answers for any of the statements, please answer as honestly as possible.

Two examples are provided below:

a. Industries should be allowed to pollute the environment.

b. I am an integral part of the environment.

The items begin on the next page. Do not turn the page until your teacher indicates to do so. This is not a timed exercise.

RATING SYSTEM

A = strongly disagree
B = disagree
C = somewhat agree, somewhat disagree
D = agree
E = strongly agree

51. We need wilderness, woods, hills, meadows, free-flowing rivers, clean and unpolluted air and water.

52. The state has the ultimate responsibility for improving the environment.

53. The fact that we are using up many natural resources will effect the quality of life of future generations.

54. Pollutants are caused by both natural and man-made processes.

55. Industries should be forced to quit polluting air and water.

56. Environmental problems are closely related to economic, political, and social concerns.

57. Man's past relationship with the environment affects us today.

58. I feel studying about the environment is an important part of my schooling.

59. What happens to the environment of the United States also effects the environment of the world.

60. Most students do not understand man's effect on the environment.

61. Most of the concern about environmental problems has been over-exaggerated.

62. Solitude and silence in nature enables man to perceive many things he ordinarily misses.

63. It is important for me to consider whether the things I want for my life are worth the environmental damage that may result trying to obtain them.

64. It is more important to preserve the freedom of the individual than to enforce laws to protect the quality of life for the future.

65. Growth does not necessarily mean progress.

66. The ultimate responsibility for solving our environmental problems lie with each individual.

67. Today's interest in ecology and the environment is just another passing fad.

68. I feel it is important for people to be actively involved in maintaining a quality environment, and I would be willing to join an environmental organization.

RATING SYSTEM

A = strongly disagree
B = disagree
C = somewhat agree, somewhat disagree
D = agree
E = strongly agree

69. In order to obtain a quality life style, people whould be willing to spend a portion of their income for environmental upkeep, such as cleaning water and air.

70. It is impossible not to pollute the environment.

71. Man's survival is due to his ability to adapt and to change his environment.

72. Every student should be required to pass a course in environmental studies.

73. One of the more comforting aspects of present research on energy resources is that the oil companies are working hard to keep our present consumption satisfied.

74. Many things people enjoy doing do not cost a lot of money.

75. I have a set of personal beliefs which will help guide me in living an environmentally sound life.

76. There is a natural area that is so important to me that I would legally fight to keep anyone from polluting or destroying it.

77. The real cause of pollution is not caused by industries dumping waste products into the environment, but rather because of my personal desires and demands for a comfortable life.

78. Most people are not concerned with protection of the environment.

79. I would be willing to pay more for returnable bottles even though it would cost more in terms of time and convenience.

80. With the proper education, I believe people would realize the importance of wise management of our environment.

81. Only strong governmental controls will reduce pollution problems.

82. Schools must spend more time and money studying about environmental problems even if it means eliminating some of the current programs.

83. Everyone should become active in a group which works to improve the environment of the community.

84. It is unfair to expect big business and industries to conform to environmental standards.

RATING SYSTEM

A = strongly disagree
B = disagree
C = somewhat agree, somewhat disagree
D = agree
E = stron ly agree

85. A quality life does not always mean material goods as cars, clothes, and an expensive house.

86. I would adjust my personal life style in order to provide a significant increase in the quality of the environment within my community.

87. Environmental quality should be neglected when economic considerations are involved.

88. Technology has given us many problems, but it is only through technology that the future will exist for us at all.

89. I am personally responsible for the present state of pollution.

90. If Americans are to continue to enjoy a high quality of life, our environment will continue to suffer.

91. Man is the only form of life that has rights.

92. Choices between human needs (essentials) and human wants or desires (non-essentials) must be considered if we are to improve the quality of our environment.

93. Governments have no right to tell industries or individuals what to do.

94. I have seen some types of environmental pollution that have motivated me to immediate action.

95. People should have the right to do whatever they wish on their own property no matter how damaging it is to the environment.

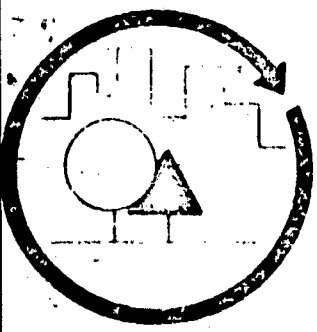
96. An individual has too much power in determining the way he lives.

97. An economic system designed to protect environmental quality would have to include the cost of pollution control.

98. Controls should be placed on industries which will protect the environment even if it means things will cost more.

99. It is important that we respect the rights of other people, and the rights of plants and animals and our environment.

100. Immediate short-run gains versus long-term investment is one of the main reasons we have a problem with the pollution of our environment.



ENVIRONMENTAL EDUCATION
CURRICULUM, INFORMATION, AND TRAINING

DENNIS M. WINT, Consultant
Longfellow Elementary School
35200 Stevens Boulevard
Eastlake, Ohio 44094
Phone: (216) 946-5000, Ext. 358

EUGENE A. KNIGHT, Consultant
72-C Electric Avenue
Westerville, Ohio 43081
Ph. (614) 891-2752

March 7, 1975

Dear Coordinator:

I am most appreciative that your school has agreed to participate in this evaluative effort to determine the impact of the environmental curriculum on students. With this letter, please find copies of the evaluation instruments, answer sheets, and teacher directions. You may be particularly interested in the letter to teachers which specifies the procedures to be followed in administration of these instruments.

The procedure which I would like to follow is:

1. All materials should be in your hands by March 9.
2. Send the material packets to the teachers for administration between March 10 - 13.
3. Teachers must return both answer sheets and test booklets to you immediately after testing. Please contact teachers who have not returned their materials by March 13.
4. Immediately provide either the IQ or Reading Readiness score for each student and cover the name of the students with the enclosed blank labels.
5. Either Gene Knight or I will pick up the test booklets and answer sheets on March 14, 15, or 16.

Please be sure to keep all of the test results from each teacher together, in the original envelope.

Accurate timing for administration of these instruments is essential. The evaluation will be seriously hampered if the results not be forwarded to me immediately upon administration of the test and recording of student data.

Should you have any questions concerning the procedures or testing phase, please contact me. Many thanks for your cooperation.

Sincerely,

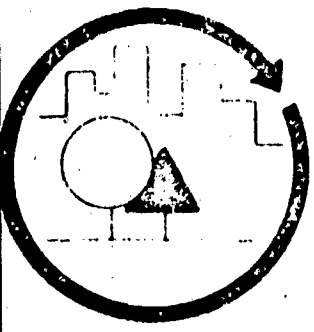
Dennis M. Wint

Dennis M. Wint
Consultant

DMW:am
Enclosures

Funded by a partial grant from the ESEA Title III Office of the U.S. Office of Education, Washington, D.C.

Sponsored by the Willoughby-Eastlake City Schools, Willoughby, Ohio



ENVIRONMENTAL EDUCATION
CURRICULUM, INFORMATION, AND TRAINING

DENNIS M. WINT, Consultant
Longfellow Elementary School
35200 Stevens Boulevard
Eastlake, Ohio 44094
Phone: (216) 946-5000, Ext. 358

EUGENE A. KNIGHT, Consultant
72-C Electric Avenue
Westerville, Ohio 43081
Ph. (614) 891-2752

March 7, 1975

Dear Teacher:

I am most appreciative that you have agreed to participate in this evaluative effort to determine the impact of the environmental curriculum materials developed by the Center for the Development of Environmental Curriculum. Accompanying this letter, please find all of the materials except marking pencils, required for administration of the tests.

You are requested to administer the tests between March 10 - 13. After administration, immediately return both test booklets and answer sheets to your school coordinator. You will not score the tests as this will be done by computer.

Each test booklet contains a cognitive section followed by an affective section. You are to administer the cognitive section first, and follow-up with the affective section. Because of the length of the test, it is recommended that you break between the cognitive and affective section.

Students taking the K-2 test are to mark directly in the test booklet.

All other students (tests for grades 3-4, grades 5-6, bio-physical secondary, and socio-cultural secondary) are to mark on the answer sheets. No marks are made in the test booklet.

Directions for use of the answer sheet is as follows:

1. Before beginning the test, be sure the information at the top is completed as follows:

NAME	-	name of student as it appears on personnel records
DATE	-	first day of testing
AGE	-	age at date of testing
SEX	-	"M" for male or "F" for female
GRADE	-	grade level of the student
SCHOOL DISTRICT	-	name of school district
SCHOOL NAME	-	name of school
INSTRUCTOR	-	name of teacher
SUBJECT AREA	-	name of class in which test is being administered For elementary class, this may be left blank.

Funded by a partial grant from the ESEA Title III Office of the U.S. Office of Education, Washington, D.C.

Sponsored by the Willoughby-Eastlake City Schools, Willoughby, Ohio

2. DO NOT WRITE IN THE AREAS OF "IDENTIFICATION OR "TEST SCORES."

3. Students must use a #2 pencil for marking their answer sheets. An IBM pencil will not work.

4. Before starting the test, be sure the students understand the marking procedure. Directions are included at the upper left hand corner of each test. Answers can be erased, but must be done so completely. Stray marks or double marks will invalidate the question.

5. Do not bend or fold the answer sheets.

6. If the test is administered in more than one sitting, be sure you collect the answer sheets and test booklets after completing the first half of the test. At the second sitting, return each student's answer sheet to him or her. Test booklets can be returned randomly.

7. Be aware that although 115 answer places are provided, there are only 90 questions for the 3-4 and 5-6 tests, and 100 questions for the bio-physical and socio-cultural secondary tests. The remaining places for answers are to be left blank.

These are not timed tests. Please allow students the opportunity to answer each question. Because there is no penalty for wrong answers, have students answer each question even though they may have to guess.

After completion of the test, immediately return the answer sheets and booklets to your school coordinator no later than the evening of March 13. Your coordinator will be adding additional information needed for the analysis of the results. The names of all students taking each test will be removed by the coordinator prior to the return of the answers to me. Thus, test results will be anonymous.

Analysis of the tests will compare the results of students of teachers who have taught two units versus the results of students of teachers not involved in the program. No effort will be made to compare teachers or school systems involved in the program.

Time is of the essence, and failure to administer the tests during the specified time period can seriously jeopardize this evaluative effort.

Additional points related to testing procedures are:

1. Administer the tests under standard testing procedures.

2. If you become aware of students who do not follow directions, become confused about marking procedures, or anything else that might invalidate their responses, please attach a slip of paper to the answer sheet(s) with the word VOID on it.

3. If a student is absent from the testing period, and cannot make up the portion missed before the end of the day on March 13, send the answer sheet to the coordinator as is.

4. With the affective portions, please make every attempt not to influence the choice of the students. This is a special note to elementary teachers who may read the questions to their students.

5. For secondary teachers who are administering the test to more than one section, one set of test booklets are provided. These are to be used for the different sections. Sufficient answer sheets have been provided for all of the students.

6. It may be possible that an insufficient number of either test booklets or answer sheets have been provided. Should that happen, administer as many tests as you have. No effort will be made to test students missed during this testing period.

7. Return all unused answer sheets when returning the test booklets and the completed answer sheets.

I realize that for busy teachers, these tests may pose an inconvenience, but the U.S. Office of Education, the granting agency partially supporting this project, requests that student impact data be obtained and reported. The timing is critical because the report must be completed and submitted in time for the next funding cycle which begins about April 1, 1975. I trust you can understand both the necessity and urgency of this evaluation. Should the test results indicate that the curriculum materials do not have significant impact on student performances, no monies will be allocated to support the project after the end of this school year.

Again, my sincerest thanks for your cooperation. Should you have additional questions about the test or procedures, please feel free to contact either your coordinator or me.

Sincerely,

Dennis M. Wint

Dennis M. Wint
Consultant

DMW:am
Enclosures

NAME	DATE	AGE	SEX M F	GRADE

SCHOOL DISTRICT | SCHOOL NAME
INSTRUCTOR | SUBJECT AREA

DIRECTIONS:

Read each question [illegible] When you have decided which answer [illegible] with a No. 2 pencil [illegible] Make your marks [illegible] completely [illegible] erase [illegible] count [illegible]

IDENTIFICATION

0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9

SAMPLE

1. CHICAGO is
   - 1-A a country
   - 1-B a mountain
   - 1-C an island

1 A B C ■ E

TEST SCORES

NAME OF TEST	SCORE	DATE

1 A B C D E	A B C D E	47 A B C D E	70 A B C D E	93 A B C D E
2 A B C D E	A B C D E	48 A B C D E	71 A B C D E	94 A B C D E
3 A B C D E	A B C D E	49 A B C D E	72 A B C D E	95 A B C D E
4 A B C D E	A B C D E	50 A B C D E	73 A B C D E	96 A B C D E
5 A B C D E	A B C D E	51 A B C D E	74 A B C D E	97 A B C D E
6 A B C D E	A B C D E	52 A B C D E	75 A B C D E	98 A B C D E
7 A B C D E	A B C D E	53 A B C D E	76 A B C D E	99 A B C D E
8 A B C D E	A B C D E	54 A B C D E	77 A B C D E	100 A B C D E
9 A B C D E	A B C D E	55 A B C D E	78 A B C D E	101 A B C D E
10 A B C D E	A B C D E	56 A B C D E	79 A B C D E	102 A B C D E
11 A B C D E	A B C D E	57 A B C D E	80 A B C D E	103 A B C D E
12 A B C D E	A B C D E	58 A B C D E	81 A B C D E	104 A B C D E
13 A B C D E	A B C D E	59 A B C D E	82 A B C D E	105 A B C D E
14 A B C D E	A B C D E	60 A B C D E	83 A B C D E	106 A B C D E
15 A B C D E	A B C D E	61 A B C D E	84 A B C D E	107 A B C D E
16 A B C D E	A B C D E	62 A B C D E	85 A B C D E	108 A B C D E
17 A B C D E	A B C D E	63 A B C D E	86 A B C D E	109 A B C D E
18 A B C D E	A B C D E	64 A B C D E	87 A B C D E	110 A B C D E
19 A B C D E	A B C D E	65 A B C D E	88 A B C D E	111 A B C D E
20 A B C D E	A B C D E	66 A B C D E	89 A B C D E	112 A B C D E
21 A B C D E	A B C D E	67 A B C D E	90 A B C D E	113 A B C D E
22 A B C D E	A B C D E	68 A B C D E	91 A B C D E	114 A B C D E
[illegible] C D E	46 A B C D E	69 A B C D E	92 A B C D E	115 A B C D E

ARNOLD GRAPHIC IND

PS 7764 AGI (6216)

APPENDIX 5.0

Summary of Evaluation Data for Experimental and Control Students in Grades Kindergarten through Grade Two

LEGEND

Score:	Mean standarized score for students involved in the testing.
CogTot:	Cognitive Total
Depend:	Cognitive Subconcept "Dependency and Interdependency"
Pattern:	Cognitive Subconcept "Pattern"
Change:	Cognitive Subconcept "Change"
Adapt:	Cognitive Subconcept "Adaptation"
Divers:	Cognitive Subconcept "Diversity"
Affect:	Affective total
T - Value:	Results of the T-Test
D. F.:	Degrees of Freedom
Signific:	Level of Significance
Part. Corr.:	Results of the Partial Correlation Analysis

APPENDIX 5.1

EVALUATION OF STUDENT IMPACT

ENVIRONMENTAL EDUCATION: CURRICULUM, INFORMATION, AND TRAINING

GRADE LEVEL: K-2

SCHOOL: All Schools
1,2,3,5,6

	Score	CogTot	Depend	Pattern	Change	Adapt	Divers	Affect
ANALYSIS: All Scores								
Experimental		45.97	7.51	9.85	8.40	9.56	10.32	45.48
Control		46.38	7.31	10.19	8.55	9.34	10.06	44.74
T - Value		-.86	1.22	-2.44	-.83	1.45	1.28	1.60
D. F.		517.	530.	527.	528.	529.	526.	528.
Signific.		.392	.223	.015	.409	.147	.202	.109
ANALYSIS: Stanine Conversion Scores (Schools #1,3,5,6)								
Experimental	6.00	45.53	7.45	9.92	8.39	9.45	10.32	44.12
Control	5.87	45.88	7.02			9.24	9.99	44.93
T - Value	.51	-.57	2.01	-..	..13	1.11	1.22	-1.35
D. F.	332.	325.	318.	312.	317.	327.	300.	333.
Signific.	.611	.569	.045*	.434	.260	.268	.222	.178
Part. Corr.		-.038	.110	-.050	.057	.055	.063	-.083
D. F.		324.	324.	324.	324.	324.	324.	324.
Signific.	—	.492	.048*	.371	.303	.322	.261	.135

*SIGNIFICANT AT .05

APPENDIX 5.2

EVALUATION OF STUDENT IMPACT

ENVIRONMENTAL EDUCATION: CURRICULUM, INFORMATION, AND TRAINING

GRADE LEVEL: K-2

SCHOOL: #1

	Score	CogTot	Depend	Pattern	Change	Adapt	Divers	Affect
ANALYSIS: All Scores								
Experimental		40.09	5.70	8.17	7.39	8.43	10.39	40.74
Control		41.20	5.76	9.56	7.08	9.28	9.52	44.52
T - Value		-.74	-.10	-2.75	.57	-1.59	1.67	-2.78
D. F.		44.	46.	46.	43.	46.	43.	46.
Signific.		.461	.919	.008	.572	.120	.103	.008
ANALYSIS: Stanine Conversion Scores								
Experimental	6.48	40.09	5.70	8.17	7.39	8.43	10.39	40.74
Control	6.12	41.20	5.76			9.28	9.52	44.52
T - Value	.59	-.74	-.10	-2.	.57	-1.59	1.67	-2.78
D. F.	43.	44.	46.	46.	43.	46.	43.	46.
Signific.	.556	.461	.919	.008	.572	.120	.103	.008
Part. Corr.		-.147	-.007	-.396	.066	-.285	.219	-.417
D..F.	—	45.	45.	45.	45.	45.	45.	45.
Signific.		.326	.962	.006	.660	.052	.140	.004

APPENDIX 5.3
EVALUATION OF STUDENT IMPACT

ENVIRONMENTAL EDUCATION: CURRICULUM, INFORMATION, AND TRAINING

GRADE LEVEL: K-2

SCHOOL: #3

	Score	CogTot	Depend	Pattern	Change	Adapt	Divers	Affect
ANALYSIS: All Scores								
Experimental		43.96	7.24	10.21	7.76	9.14	9.60	43.40
Control		45.29	7.58	10.19	8.25	8.90	10.37	43.69
T - Value		-1.46	-1.21	.11	-1.47	.77	-2.08	-.32
D. F.		125.	124.	104.	127.	115.	121.	127.
Signific.		.148	.230	.913	.144	.444	.040	.748
ANALYSIS: Stanine Conversion Scores								
Experimental	5.77	43.96	7.24	10.21	7.76	9.14	9.60	43.40
Control	5.87	45.29	7.58	10.19	8.25	8.90	10.37	43.69
T - Value	-.20	-1.46	-1.21		.77	.77	-2.08	-.32
D. F.	127.	125.	124.	104.	127.	115.	121.	127.
Signific.	.839	.148	.230	.913	.144	.444	.040	.748
Part. Corr.		-.124	-.105	.013	-.126	.073	-.175	.025
D. F.	—	126.	126.	126.	126.	126.	126.	126.
Signific.		.163	.238	.884	.156	.414	.049	.778

APPENDIX 5.4

EVALUATION OF STUDENT IMPACT

ENVIRONMENTAL EDUCATION: CURRICULUM, INFORMATION, AND TRAINING

GRADE LEVEL: K-2

SCHOOL: #5

	Score	CogTot	Depend	Pattern	Change	Adapt	Divers	Affect
ANALYSIS: All Scores								
Experimental		51.26	8.65	9.56	10.57	10.61	11.87	48.13
Control		99.18	7.11	10.60	9.49	10.20	11.07	46.98
T - Value		2.65	4.13	-3.15	3.53	1.56	2.83	.89
D. F.		65.	58.	45.	64.	43.	50.	59.
Signific.		.010*	.000*	.003	.001*	.125	.007*	.376
ANALYSIS: Stanine Conversion Scores								
Experimental	7.57	51.26	8.65	9.56	10.57	10.61	11.87	48.13
Control	6.33	99.18	7.11			10.20	11.07	46.98
T - Value	2.85	2.65	4.13	-3.	.53	1.56	2.83	.89
D. F.	53.	65.	58.	45.	64.	43.	50.	59.
Signific.	.006*	.010*	.000*	.003	.001*	.125	.007*	.376
Part. Corr.		.195	.385	-.423	.321	.175	.257	.003
D. F.	—	64.	64.	64.	64.	64.	64.	64.
Signific.		.117	.001*	.001	.009*	.161	.037*	.979

* SIGNIFICANT AT .05

APPENDIX 5.5

EVALUATION OF STUDENT IMPACT

ENVIRONMENTAL EDUCATION: CURRICULUM, INFORMATION, AND TRAINING

GRADE LEVEL: K-2

SCHOOL: #6

	Score	CogTot	Depend	Pattern	Change	Adapt	Divers	Affect
ANALYSIS: All Scores								
Experimental		47.40	7.96	10.42	8.69	9.78	10.55	44.76
Control		46.58	7.02	10.20	7.84	9.13	9.02	44.06
T - Value		.93	2.77	.77	2.08	2.11	3.02	.73
D. F.		107.	101.	98.	98.	116.	93.	117.
Signific.		.352	.007*	.442	.040*	.037*	.003*	.407
ANALYSIS: Stanine Conversion Scores								
Experimental	5.46	47.40	7.96	10.42	8.69	9.78	10.55	44.76
Control	5.09	46.11	6.86			8.54	8.29	44.66
T - Value	.63	1.16	2.27		.14	3.09	2.93	.09
D. F.	66.	46.	44.	44.	43.	56.	41.	66.
Signific.	.533	.250	.028*	.022*	.003*	.003*	.006*	.927
Part. Corr.		.127	.260	.277	.356	.340	.345	-.007
D. F.	—	80.	80.	80.	80.	80.	80.	80.
Signific.		.257	.018*	.012*	.001*	.002*	.002*	.949

APPENDIX 5.6

EVALUATION OF STUDENT IMPACT

ENVIRONMENTAL EDUCATION: CURRICULUM, INFORMATION, AND TRAINING

GRADE LEVEL: 1 (only)

SCHOOL: #2

	Score	CogTot	Depend	Pattern	Change	Adapt	Divers	Affect
ANALYSIS: All Scores								
Experimental		41.32	6.04	9.22	6.70	8.70	8.81	45.11
Control		45.58	7.35	10.27	9.00	8.65	10.31	44.27
T - Value		-2.64	-1.86	-2.28	-4.50	.10	-2.05	.73
D. F.	—	99.	42.	47.	50.	46.	39.	51.
Signific.		.011	.070	.027	.000	.920	.047	.467
ANALYSIS: Grade Equivalent Scores								
Experimental	1.65	41.32	6.04	9.22	6.70	8.70	8.81	45.11
Control	1.43	45.58	7.35	10.27	9.00	8.65	10.31	44.27
T - Value	1.72	-2.64	-1.86	-2.28	-4.50	.10	-2.05	.73
D. F.	37.	49.	42.	47.	50.	46.	39.	51.
Signific.	.093	.011	.070	.027	.000	.920	.047	.467
Part. Corr.		-.435	-.297	-.383	-.576	-.071	-.306	.128
D. F.	—	48.	48.	48.	48.	48.	48.	48.
Signific.		.002	.036	.006	.001	.625	.031	.378

APPENDIX 5.7

EVALUATION OF STUDENT IMPACT

ENVIRONMENTAL EDUCATION: CURRICULUM, INFORMATION, AND TRAINING

GRADE LEVEL: 2 (only)

SCHOOL: #2

	Score	CogTot	Depend	Pattern	Change	Adapt	Divers	Affect
ANALYSIS: All Scores								
Experimental		48.32	8.26	9.89	8.95	10.16	11.05	47.42
Control		50.83	8.39	10.44	10.56	10.89	10.56	44.00
T - Value		-2.10	-.46	-.80	-2.55	-2.63	1.57	2.40
D. F.		25.	35.	26.	20.	21.	27.	33.
Signific.	—	.046	.647	.431	.019	.016	.127	.022*
ANALYSIS: Grade Equivalent Scores								
Experimental	2.28	48.32	8.26	9.89	8.95	10.16	11.05	47.42
Control	1.39	50.83	8.39	10.44	10.56	10.89	10.56	44.00
T - Value	12.45	-2.10	-.46	-.80	-2.55	-2.63	1.57	2.40
D. F.	31.	25.	35.	26.	20.	21.	27.	33.
Signific.	.000*	.046	.647	.431	.019	.016	.127	.022*
Part. Corr.		-.270	-.251	-.086	-.297	-.222	1.69	.058
D. F.	—	34.	34.	34.	34.	34.	34.	34.
Signific.		.112	.139	.620	.078	.193	.324	.736

* SIGNIFICANT AT .05

APPENDIX 6.0

Summary of Evaluation Data for Experimental and Control Students in Grades Three and Four

LEGEND

Score:	Mean standarized score for students involved in the testing.
CogTot:	Cognitive Total
Depend:	Cognitive Subconcept "Dependency and Interdependency"
Pattern:	Cognitive Subconcept "Pattern"
Change:	Cognitive Subconcept "Change"
Adapt:	Cognitive Subconcept "Adaptation"
Divers:	Cognitive Subconcept "Diversity"
Affect:	Affective Total
D. F.:	Degrees of Freedom
Signific:	Level of Significance
Part. Corr:	Partial Correlation

APPENDIX 6.1

EVALUATION OF STUDENT IMPACT

ENVIRONMENTAL EDUCATION: CURRICULUM, INFORMATION, AND TRAINING

GRADE LEVEL: 3-4

SCHOOL: All Schools

	Score	CogTot	Depend	Pattern	Change	Adapt	Divers	Affect
ANALYSIS: All Scores								
Experimental		33.36	6.61	9.08	8.08	5.18	3.85	72.64
Control		33.02	6.53	9.27	7.90	5.28	4.05	70.70
T - Value		.65	.54	-.88	.98	-.60	-1.57	2.67
D. F.	—	491.	501.	509.	490.	474.	487.	471.
Signific.		.517	.587	.379	.325	.550	.118	.008*
ANALYSIS: Stanine Conversion Scores								
Experimental	5.65	34.02	6.95	9.27	8.43	5.43	3.95	72.77
Control	5.45	33.17	6.71	9.39	7.83	5.29	3.95	70.45
T - Value	1.11	1.50	1.47	-.59	3.06	.74	-.01	2.64
D. F.	350.	345.	335.	354.	314.	329.	336.	344.
Signific.	.267	.134	.142	.555	.002*	.461	.991	.009*
Part. Corr.		.002	.033	-.099	.065	-.027	-.058	.105
D. F.	—	363.	363.	363.	363.	363.	363.	363.
Signific.		.968	.535	.058	.218	.612	.269	.045*

* SIGNIFICANT AT .05

APPENDIX 6.2

EVALUATION OF STUDENT IMPACT

ENVIRONMENTAL EDUCATION: CURRICULUM, INFORMATION, AND TRAINING

GRADE LEVEL: 3-4

SCHOOL: #1

	Score	CogTot	Depend	Pattern	Change	Adapt	Divers	Affect
ANALYSIS: All Scores								
Experimental		30.36	6.52	8.56	7.64	4.40	3.24	73.88
Control		33.73	6.82	9.68	8.02	5.14	4.07	70.41
T - Value		-2.38	-.62	-2.56	-.78	-1.76	-2.15	-1.70
D. F.	—	38.	36.	48.	40.	44.	48.	46.
Signific.		.022	.541	.014	.443	.085	.036	.096
ANALYSIS: Stanine Conversion Scores								
Experimental	5.42	30.33	6.54	8.54	7.67	4.38	3.21	73.83
Control	4.81	33.49	6.77	9.69	7.95	5.08	4.00	69.49
T - Value	1.38	-2.12	-.45	-2.51	-.55	-1.58	-1.94	2.05
D. F.	37.	37.	35.	46.	39.	44.	48.	43.
Signific.	.210	.041	.656	.016	.588	.121	.058	.046*
Part. Corr.	—	-.473	-.142	-.376	-.218	-.295	-.314	.174
D. F.	—	60.	60.	60.	60.	60.	60.	60.
Signific.		.001	.212	.003	.088	.020	.013	.178

* SIGNIFICANT AT .05

APPENDIX 6.3

EVALUATION OF STUDENT IMPACT

ENVIRONMENTAL EDUCATION: CURRICULUM, INFORMATION, AND TRAINING

GRADE LEVEL: 3-4

SCHOOL: #3

	Score	CogTot	Depend	Pattern	Change	Adapt	Divers	Affect
ANALYSIS: All Scores								
Experimental		35.22	7.13	9.89	8.54	5.54	4.11	68.63
Control		33.82	6.40	9.60	8.29	5.78	3.96	69.50
T - Value		1.49	2.39	.78	.71	-.10	.61	-.56
D. F.	—	88.	82.	89.	88.	88.	87.	86.
Signific.		.140	.019*	.438	.478	.919	.545	.574
ANALYSIS: Stanine Conversion Scores								
Experimental	6.33	35.22	7.13	9.89	8.54	5.54	4.11	68.63
Control	5.59	32.09	6.39	9.04	7.61	5.30	3.74	66.83
T - Value	1.58	2.42	1.71	1.74	1.96	.57	1.07	.99
D. F.	44.	36.	32.	42.	42.	40.	35.	55.
Signific.	.121	.021*	.097	.089	.056*	.575	.291	.328
Part. Corr.		.076	.236	-.025	-.032	-.075	.117	-.081
D. F.	—	66.	66.	66.	66.	66.	66.	66.
Signific.		.539	.053*	.842	.799	.545	.343	.510

* SIGNIFICANT AT .05

APPENDIX 6.4

EVALUATION OF STUDENT IMPACT

ENVIRONMENTAL EDUCATION: CURRICULUM, INFORMATION, AND TRAINING

GRADE LEVEL: 3-4

SCHOOL: #5

	Score	CogTot	Depend	Pattern	Change	Adapt	Divers	Affect
ANALYSIS: All Scores								
Experimental		34.88	7.04	10.17	8.13	5.50	4.04	74.21
Control		30.52	5.92	9.60	7.20	4.28	3.52	71.28
T - Value		2.76	2.48	1.06	1.43	1.98	1.35	1.27
D. F.		46.	46.	42.	46.	45.	45.	40.
Signific.	—	.008*	.017*	.294	.160	.054*	.185	.210
ANALYSIS: Stanine Conversion Scores								
Experimental	5.51	34.52	7.00	10.04	8.04	5.39	4.04	73.74
Control	5.36	30.52	5.92	9.60	7.20	4.28	3.52	71.28
T - Value	.79	2.54	2.35	.83	1.29	1.79	1.33	1.06
D. F.	46.	45.	46.	41.	46.	43.	45.	39.
Signific.	.435	.015*	.023*	.410	.204	.081	.191	.296
Part. Corr.		.362	.323	.141	.195	.261	.228	-.187
D. F.	—	45.	45.	45.	45.	45.	45.	45.
Signific.		.012*	.027*	.343	.190	.077	.124	.209

* SIGNIFICANT AT .05

APPENDIX 6.5

EVALUATION OF STUDENT IMPACT

ENVIRONMENTAL EDUCATION: CURRICULUM, INFORMATION, AND TRAINING

GRADE LEVEL: 3-4

SCHOOL: #6

	Score	CogTot	Depend	Pattern	Change	Adapt	Divers	Affect
ANALYSIS: All Scores								
Experimental		30.36	5.15	8.81	7.33	4.52	2.30	71.59
Control		33.69	6.62	9.93	7.38	5.38	4.38	71.07
T - Value		-2.02	-2.75	-1.58	-.07	-1.48	-5.50	.23
D. F.	—	51.	40.	48.	49.	49.	50.	54.
Signific.		.048	.009	.121	.947	.144	.000	.818
ANALYSIS: Stanine Score Conversions								
Experimental	6.75	31.90	6.05	9.55	8.40	5.25	2.65	73.55
Control	6.54	33.72	6.76	9.96	7.32	5.36	4.32	71.36
T - Value	.44	-1.13	-1.44	-.71	1.86	-.21	-3.96	.85
D. F.	43.	42.	33.	43.	43.	40.	38.	43.
Signific.	.665	.265	.160	.482	.069	.833	.000	.397
Part. Corr.		-.336	-.412	.245	-.011	-.256	.619	.031
D. F.	—	42.	42.	42.	42.	42.	42.	42.
Signific.		.026	.005	.109	.943	.094	.001	.843

EVALUATION OF STUDENT IMPACT

ENVIRONMENTAL EDUCATION: CURRICULUM, INFORMATION, AND TRAINING

GRADE LEVEL: 3

SCHOOL: #2,3

	Score	CogTot	Depend	Pattern	Change	Adapt	Divers	Affect
ANALYSIS: All Scores								
Experimental		33.25	6.46	9.17	7.87	5.04	3.92	71.22
Control		32.21	6.07	8.91	7.89	5.26	4.09	69.73
T - Value		1.15	1.47	.71	-.06	-.80	-.81	1.32
D. F.	—	161.	166.	183.	174.	149.	158.	160.
Signific.		.253	.144	.481	.950	.427	.418	.188
ANALYSIS: Grade Equivalent Scores								
Experimental	2.971	30.00	6.43	7.71	7.27	4.67	3.92	72.16
Control	3.177	32.44	6.00	8.72	8.09	5.33	4.30	71.42
T - Value	-1.14	-1.73	1.14	-1.95	-1.94	-1.69	-1.36	.46
D. F.	77.	88.	84.	90.	86.	90.	89.	90.
Signific.	.256	.087	.257	.054	.056	.094	.179	.650
Part. Corr.		.126	.132	.075	.043	-.045	-.029	.119
D. F.	—	89.	89.	89.	89.	89.	89.	89.
Signific.		.232	.212	.478	.688	.672	.784	.263

APPENDIX 6.7

EVALUATION OF STUDENT IMPACT

ENVIRONMENTAL EDUCATION: CURRICULUM, INFORMATION, AND TRAINING

GRADE LEVEL: 3 only

SCHOOL: #2

	Score	CogTot	Depend	Pattern	Change	Adapt	Divers	Affect
ANALYSIS: All Scores								
Experimental		32.09	6.09	8.77	7.48	4.75	3.81	72.69
Control		29.32	5.48	7.68	7.16	4.68	4.32	70.08
T - Value		1.81	1.50	1.87	.63	.16	-1.58	1.46
D. F.	—	47.	57.	63.	50.	42.	49.	40.
Signific.		.076	.139	.067	.533	.870	.120	.153
ANALYSIS: Grade Equivalent Scores								
Experimental	2.97	30.00	6.42	7.71	7.27	4.67	3.92	72.16
Control	3.00	29.41	5.59	7.36	7.27	4.73	4.45	70.59
T - Value	-.15	.34	2.01	.59	-.01	-.12	-1.52	.75
D. F.	51.	50.	62.	51.	51.	43.	47.	42.
Signific.	.879	.733	.049*	.558	.989	.909	.135	.458
Part. Corr.		.180	.126	.150	.068	.018	-.136	.147
D. F.	—	68.	68.	68.	68.	68.	68.	68.
Signific.		.137	.297	.216	.578	.880	.261	.226

* SIGNIFICANT AT .05

APPENDIX 6.8

EVALUATION OF STUDENT IMPACT

ENVIRONMENTAL EDUCATION: CURRICULUM, INFORMATION, AND TRAINING

GRADE LEVEL: 3 only

SCHOOL: #3

Score	CogTot	Depend	Pattern	Change	Adapt	Divers	Affect
ANALYSIS: All Scores							
Experimental							
Control							
T - Value	1.49	2.39	.78	.71	-.10	.61	-.56
D. F.	88.	82.	89.	88.	88.	87.	86.
Signific.	.140	.019*	.438	.478	.919	.545	.574
ANALYSIS:							
Experimental							
Control							
T - Value							
D. F.							
Signific.							
Part. Corr.							
D. F.							
Signific.							

NOTE: No further analysis can be conducted. The experimental class did not have any standarized scores.

* SIGNITIFANT AT .05

APPENDIX 6.9

EVALUATION OF STUDENT IMPACT

ENVIRONMENTAL EDUCATION: CURRICULUM, INFORMATION, AND TRAINING

GRADE LEVEL: 4 only

SCHOOL: #2

	Score	CogTot	Depend	Pattern	Change	Adapt	Divers	Affect
ANALYSIS: All Scores								
Experimental		34.69	7.14	8.91	8.67	5.68	4.30	74.08
Control		34.52	7.22	8.80	8.50	5.93	4.07	71.91
T - Value		.18	-.35	.26	.60	-.82	.98	1.35
D. F.	—	97.	91.	99.	84.	79.	90.	78.
Signific.		.860	.731	.798	.552	.414	.329	.180
ANALYSIS: Stanine Conversion Scores								
Experimental	5.19	34.69	7.14	8.91	8.67	5.68	4.30	74.08
Control	5.40	34.60	7.22	8.89	8.47	5.98	4.04	72.18
T - Value	-.72	.09	-.36	.04	.71	-.95	1.05	1.19
D. F.	92.	93.	87.	99.	81.	77.	87.	76.
Signific.	.474	.926	.720	.965	.479	.344	.295	.239
Part. Corr.		.064	-.014	.061	.084	-.052	.101	.133
D. F.	—	138.	138.	138.	138.	138.	138.	138.
Signific.		.454	.866	.471	.324	.545	.236	.119

APPENDIX 7.0

Summary of Evaluation Data for Experimental and Control Students in Grades Five and Six

LEGEND

Score:	Mean standarized score for students involved in the testing.
CogTot:	Cognitive Total
Depend:	Cognitive Subconcept "Dependency and Interdependency"
Pattern:	Cognitive Subconcept "Pattern"
Change:	Cognitive Subconcept "Change"
Adapt:	Cognitive Subconcept "Adaptation"
Divers:	Cognitive Subconcept "Diversity"
Affect:	Affective total
D. F.:	Degrees of Freedom
Signific:	Level of Significance
Part. Corr:	Partial Correlation

APPENDIX 7.1

EVALUATION OF STUDENT IMPACT

ENVIRONMENTAL EDUCATION: CURRICULUM, INFORMATION, AND TRAINING

GRADE LEVEL: 5-6

SCHOOL: All Schools

	Score	CogTot	Depend	Pattern	Change	Adapt	Divers	Affect
ANALYSIS: All Scores								
Experimental		37.91	11.72	4.44	5.00	6.13	6.11	89.57
Control		36.01	10.74	4.34	4.64	6.02	6.06	87.25
T - Value		2.91	3.61	1.08	3.08	.69	.45	2.41
D. F.	—	362.	350.	365.	343.	361.	360.	360.
Signific.		.004*	.000*	.282	.002*	.488	.655	.016*
ANALYSIS: Stanine Conversion Scores								
Experimental	6.00	37.90	11.72	4.44	5.00	6.13	6.11	89.57
Control	5.49	36.01	10.74	4.34	4.64	6.02	6.06	87.25
T - Value	2.87	2.91	3.61	1.08	3.08	.69	.45	2.41
D. F.	365.	362.	350.	365.	343.	361.	360.	360.
Signific.	.004*	.004*	.000*	.282	.002*	.488	.655	016*
Part. Corr.		.009	.135	.014	.120	-.019	-.030	.110
D. F.	—	364.	364.	364.	364.	364.	364.	364.
Signific.		.090	.010*	.791	.022*	.718	.567	.036*

* SIGNIFICANT AT .05

APPENDIX 7.2

EVALUATION OF STUDENT IMPACT

ENVIRONMENTAL EDUCATION: CURRICULUM, INFORMATION, AND TRAINING

GRADE LEVEL: 5-6

SCHOOL: #1

	Score	CogTot	Depend	Pattern	Change	Adapt	Divers	Affect
ANALYSIS: All Scores								
Experimental		39.30	12.20	4.60	5.27	6.50	6.27	93.40
Control		31.52	9.13	3.83	4.27	5.17	6.00	84.96
T - Value		5.13	4.94	3.63	3.00	2.94	1.08	3.76
D. F.	—	41.	40.	42.	29.	42.	46.	50.
Signific.		.000*	.000*	.001*	.006*	.005*	.285	.000*
ANALYSIS: Stanine Conversion Scores								
Experimental	6.93	39.30	12.20	4.60	5.27	6.50	6.27	93.40
Control	5.30	31.52	9.13	3.83	4.22	5.17	6.00	84.96
T - Value	3.99	5.13	4.94	3.63	3.00	2.94	1.08	3.76
D. F.	46.	41.	40.	42.	29.	42.	46.	50.
Signific.	.000	.000*	.000*	.001*	.006*	.005*	.285	.000*
Part. Corr.		.407	.414	.278	.273	.206	.025	.371
D. F.	—	50.	50.	50.	50.	50.	50.	50.
Signific.		.003*	.002*	.046*	.050*	.142	.861	.007*

* SIGNIFICANT AT .05

APPENDIX 7.3

EVALUATION OF STUDENT IMPACT

ENVIRONMENTAL EDUCATION: CURRICULUM, INFORMATION, AND TRAINING

GRADE LEVEL: 5-6

SCHOOL: #3

	Score	CogTot	Depend	Pattern	Change	Adapt	Divers	Affect
ANALYSIS: All Scores								
Experimental		33.97	10.28	4.14	4.62	5.34	5.48	91.41
Control		35.07	10.31	4.38	4.59	5.72	5.83	89.31
T - Value		-.62	-.05	-.99	.12	-.81	-1.01	.97
D. F.	—	55.	54.	49.	55.	55.	48.	54.
Signific.		.535	.962	.327	.908	.422	.319	.336
ANALYSIS: Stanine Conversion Scores								
Experimental	5.24	33.97	10.28	4.14	4.62	5.34	5.48	91.41
Control	6.10	35.07	10.31	4.38	4.59	5.72	5.83	89.31
T - Value	-1.59	-.62	-.05	-.99	.12	-.81	-1.01	.97
D. F.	47.	55.	54.	49.	55.	55.	48.	54.
Signific.	.120	.535	.962	.327	.908	.422	.319	.336
Part. Corr.		.081	.144	-.028	.120	-.009	-.047	.144
D. F.	—	55.	55.	55.	55.	55.	55.	55.
Signific.		.547	.285	.839	.374	.945	.730	.285

APPENDIX 7.4

EVALUATION OF STUDENT IMPACT

ENVIRONMENTAL EDUCATION: CURRICULUM, INFORMATION, AND TRAINING

GRADE LEVEL: 5-6

SCHOOL: #5

	Score	CogTot	Depend	Pattern	Change	Adapt	Divers	Affect
ANALYSIS: All Scores								
Experimental		39.62	12.36	4.65	5.20	6.20	6.22	89.12
Control		37.20	11.16	4.44	4.78	6.30	6.04	88.59
T - Value		2.82	3.24	1.95	2.51	-.52	1.11	.37
D. F.	—	157.	150.	148.	162.	165.	148.	162.
Signific.		.005*	.001*	.053*	.013*	.606	.267	.710
ANALYSIS: Stanine Conversion Scores								
Experimental	5.93	39.62	12.36	4.65	5.20	6.20	6.22	89.12
Control	5.38	37.20	11.16	4.44	4.78	6.30	6.04	88.59
T - Value	1.98	2.82	3.24	1.95	2.51	-.52	1.11	.37
D. F.	162.	157.	150.	148.	162.	165.	148.	162.
Signific.	.049*	.005*	.001*	.053*	.013*	.606	.267	.710
Part. Corr.		.159	.197	.129	.151	.105	.030	-.001
D. F.	—	164.	164.	164.	164.	164.	164.	164.
Signific.		.041*	.011*	.098	.052*	.180	.702	.985

* SIGNIFICANT AT .05

APPENDIX 7.5

EVALUATION OF STUDENT IMPACT

ENVIRONMENTAL EDUCATION: CURRICULUM, INFORMATION, AND TRAINING

GRADE LEVEL: 5-6

SCHOOL: #6

	Score	CogTot	Depend	Pattern	Change	Adapt	Divers	Affect
ANALYSIS: All Scores								
Experimental		36.38	11.15	4.15	4.71	6.23	6.19	86.88
Control		36.83	11.12	4.41	4.63	6.12	6.29	84.39
T - Value		-.34	.04	-1.30	.33	.37	-.44	1.22
D. F.	—	86.	87.	80.	84.	87.	86.	84.
Signific.		.737	.965	.197	.743	.711	.660	.227
ANALYSIS: Stanine Conversion Scores								
Experimental	5.98	36.38	11.15	4.15	4.71	6.23	6.19	86.88
Control	5.37	36.83	11.12	4.41	4.63	6.12	6.29	84.39
T - Value	2.46	-.34	.04	-1.30	.33	.37	-.44	1.22
D. F.	86.	86.	87.	80.	84.	87.	86.	84.
Signific.	.016*	.737	.965	.197	.743	.711	.660	.227
Part. Corr.		-.097	-.041	-2.15	-.006	-.010	-.105	.181
D. F.	—	86.	86.	86.	86.	86.	86.	86.
Signific.		.368	.705	.044	.954	.928	.331	.091

* SIGNIFICANT AT .05

APPENDIX 8.1

EVALUATION OF STUDENT IMPACT

ENVIRONMENTAL EDUCATION: CURRICULUM, INFORMATION, AND TRAINING

SUBJECT AREA: Bio-physical

GRADE LEVEL: Junior High School

SCHOOL: All Schools

Score	CogTot	ET	QL	INV.	MGT.	PROB.	FUT.	AFFECT.
ANALYSIS: All Scores								
Experimental	21.47	5.68	3.20	2.49	1.97	2.84	4.27	172.33
Control	18.18	4.97	2.46	2.02	1.58	2.39	3.89	169.16
T - Value	6.50	3.91	6.70	4.56	4.25	3.79	2.45	2.32
D. F. —	555.	540.	572.	548.	557.	551.	534.	519.
Signific.	.000*	.000*	.000*	.000*	.000*	.000*	.014*	.021*
ANALYSIS: Stanine Conversion Scores								
Experimental 6.00	21.46	5.66	3.20	2.49	1.99	2.86	4.26	172.36
Control 5.33	18.25	4.97	2.50	2.01	1.60	2.40	3.89	168.79
T - Value 4.49	6.15	3.68	6.27	4.53	4.09	3.64	2.37	2.55
D. F. 460.	525.	508.	542.	522.	520.	514.	501.	487.
Signific. .000*	.000*	.000*	.000*	.000*	.000*	.000*	.018*	.011*
Part. Corr.	.180	.078	.211	.126	.131	.078	.022	.049
D. F. —	558.	558.	558.	558.	558.	558.	558.	558.
Signific.	.001*	.065	.001*	.003*	.002*	.064	.600	.243

* SIGNIFICANT AT .05

APPENDIX 8.2

EVALUATION OF STUDENT IMPACT

ENVIRONMENTAL EDUCATION: CURRICULUM, INFORMATION, AND TRAINING

SUBJECT AREA: Bio-physical

GRADE LEVEL: Junior High School

SCHOOL: #3

Score	CogTot	ET	QL	INV.	MGT.	PROB.	FUT.	AFFECT.
ANALYSIS: All Scores								
Experimental	24.08	6.40	3.74	2.80	2.23	3.11	4.68	175.80
Control	18.64	5.18	2.55	2.06	1.51	2.49	4.01	169.94
T - Value	8.37	5.19	8.35	5.47	6.09	3.87	3.48	3.51
D. F. —	343.	343.	339.	343.	341.	304.	343.	342.
Signific.	.000*	.000*	.000*	.000*	.000*	.000*	.001*	.001*
ANALYSIS: Stanine Conversion Scores								
Experimental 6.51	24.19	6.42	3.73	2.82	2.23	3.12	4.72	175.72
Control 5.51	18.80	5.20	2.58	2.06	1.55	2.52	4.04	169.69
T - Value 5.24	8.03	5.00	8.03	5.57	5.65	3.62	3.41	3.51
D. F. 310.	328.	328.	325.	328.	327.	327.	327.	327.
Signific. .000*	.000*	.000*	.000*	.000*	.000*	.000*	.001*	.001*
Part. Corr.	.317	.160	.353	.198	.251	.104	.056	.142
D. F. —	327.	327.	327.	327.	327.	327.	327.	327.
Signific.	.001*	.004*	.001*	.001*	.001*	.059	.313	.010*

* SIGNIFICANT AT .05

APPENDIX 8.3

EVALUATION OF STUDENT IMPACT

ENVIRONMENTAL EDUCATION: CURRICULUM, INFORMATION, AND TRAINING

SUBJECT AREA: Bio-physical

GRADE LEVEL: Junior High School

SCHOOL: #4

	Score	CogTot	ET	QL	INV.	MGT.	PROB.	FUT.	AFFECT.
ANALYSIS: All Scores									
Experimental		18.51	5.04	2.50	2.09	1.77	2.49	3.81	168.81
Control		16.27	4.19	1.96	1.65	2.15	2.08	3.31	168.65
T - Value		2.13	1.97	2.05	1.85	-1.35	1.42	1.32	.05
D. F.	—	46.	39.	41.	42.	34.	39.	39.	40.
Signific.		.039*	.056	.047*	.071	.187	.163	.195	.961
ANALYSIS: Stanine Conversion Scores									
Experimental	5.62	18.51	5.04	2.50	2.09	1.77	2.49	3.81	168.81
Control	4.46	16.25	4.25	2.04	1.63	2.21	2.04	3.13	169.17
T - Value	3.51	2.02	1.76	1.67	1.86	-1.51	1.46	1.80	-.10
D. F.	36.	40.	35.	36.	36.	31.	34.	36.	35.
Signific.	.001*	.050*	.086	.103	.071	.140	.154	.080	.919
Part. Corr.		-.014	.038	.052	.055	-.188	.003	.038	-.099
D. F.	—	129.	129.	129.	129.	129.	129.	129.	129.
Signific.		.877	.668	.552	.529	.032	.977	.664	.263

* SIGNIFICANT AT .05

APPENDIX 8.4

EVALUATION OF STUDENT IMPACT

ENVIRONMENTAL EDUCATION: CURRICULUM, INFORMATION, AND TRAINING

SUBJECT AREA: Bio-physical

GRADE LEVEL: Junior High School

SCHOOL: #5

Score	CogTot	ET	QL	INV.	MGT.	PROB.	FUT.	AFFECT.
ANALYSIS: All Scores								
Experimental	19.46	4.80	2.95	2.32	1.63	2.73	3.93	168.86
Control	17.52	4.63	2.40	2.06	1.52	2.17	3.77	166.54
T - Value	1.96	.47	2.51	1.20	.57	2.09	.44	.66
D. F.	101.	99.	105.	105.	105.	104.	102.	92.
Signific.	.053*	.638	.013*	.231	.570	.039*	.658	.514
ANALYSIS: Stanine Conversion Scores								
Experimental	5.23	19.39	4.75	2.98	2.27	1.68	2.79	3.86	169.07
Control	5.14	17.25	4.50	2.45	2.05	1.45	2.14	3.70	165.14
T - Value	.31	2.06	.66	2.33	1.00	1.19	2.32	.40	1.08
D. F.	95.	94.	92.	98.	97.	98.	95.	94.	86.
Signific.	.754	.042*	.509	.022*	.322	.237	.022*	.692	.284
Part. Corr.	—	.199	.040	.233	.111	.052	.217	.037	.058
D. F.		97.	97.	97.	97.	97.	97.	97.	97.
Signific.		.048*	.695	.020*	.274	.612	.031*	.717	.572

* SIGNIFICANT AT .05

APPENDIX 9.0

Summary of Evaluation Data for Experimental and Control Students in Senior High School, Bio-physical Disciplines

LEGEND

Score:	Mean standarized score for students involved in the testing.
CogTot:	Cognitive Total
ET:	Cognitive Subconcepts for Unit "Earth Thoughts"
QL:	Cognitive Subconcepts for Unit "Quality of Life"
INV:	Cognitive Subconcepts for Unit "Environmental Inventory"
MGT:	Cognitive Subconcepts for Unit "Environmental Management"
PROB:	Cognitive Subconcepts for Unit "Environmental Problems"
FUT:	Cognitive Subconcepts for Unit "Futurism"
AFFECT:	Affective Total
T - Value:	Results of the T-Test
D. F.	Degrees of Freedom
Signific:	Level of Significance
Part. Corr:	Results of the Partial Correlation Analysis

APPENDIX 9.1

EVALUATION OF STUDENT IMPACT

ENVIRONMENTAL EDUCATION: CURRICULUM, INFORMATION, AND TRAINING

SUBJECT AREA: Bio-physical

GRADE LEVEL: Senior High School

SCHOOL: All Schools

Score	CogTot	ET	QL	INV.	MGT.	PROB.	FUT.	AFFECT.
ANALYSIS: All Scores								
Experimental	24.24	6.46	3.20	2.90	2.21	3.50	4.74	172.66
Control	21.06	5.48	2.51	2.47	1.87	2.74	4.24	167.56
T - Value	4.58	4.30	5.66	3.21	3.12	5.06	2.69	3.13
D. F.	468.	462.	468.	455.	460.	457.	464.	448.
Signific.	.000*	.000*	.000*	.001*	.002	.000*	.007*	.002*
ANALYSIS: Stanine Conversion Scores								
Experimental	5.67	24.34	6.48	3.22	2.91	2.24	3.54	4.73	173.76
Control	5.10	20.67	5.61	2.56	2.56	2.00	2.72	4.28	168.14
T - Value	2.83	4.58	3.41	4.75	2.32	1.83	4.68	2.08	3.13
D. F.	300.	327.	334.	322.	341.	334.	338.	334.	345.
Signific.	.005*	.000*	.001*	.000*	.021*	.068	.000*	.039*	.002*
Part. Corr.	—	.143	.132	.204	.102	.096	.175	.062	.108
D. F.		347.	347.	347.	347.	347.	347.	347.	347.
Signific.		.008*	.013*	.001*	.057	.073	.001*	.245	.043*

* SIGNIFICANT AT .05

APPENDIX 9.2

EVALUATION OF STUDENT IMPACT

ENVIRONMENTAL EDUCATION: CURRICULUM, INFORMATION, AND TRAINING

SUBJECT AREA: Bio-physical

GRADE LEVEL: Senior High School

SCHOOL: #2

Score	CogTot	ET	QL	INV.	MGT.	PROB.	FUT.	AFFECT.
ANALYSIS: All Scores								
Experimental	25.50	6.92	3.43	3.06	2.46	3.67	4.72	175.44
Control	17.92	4.83	2.03	2.44	1.84	2.26	3.64	168.44
T - Value	8.34	6.79	8.00	2.99	3.43	6.10	4.09	2.86
D. F.	175.	175.	175.	175.	175.	174.	175.	174.
Signific.	.000*	.000*	.000*	.003*	.001*	.000*	.000*	.005*
ANALYSIS: Stanine Coversion Scores								
Experimental 6.02	25.77	6.95	3.42	3.11	2.53	3.78	4.73	176.32
Control 3.94	17.79	4.78	2.00	2.38	1.83	2.21	3.68	168.82
T - Value 7.40	8.61	6.89	7.71	3.33	3.66	6.62	3.75	2.94
D. F. 156.	157.	156.	157.	157.	157.	154.	157.	155.
Signific. .000*	.000*	.000*	.000*	.001*	.000*	.000*	.000*	.004*
Part. Corr.	.287	.226	.354	.027	.108	.185	.116	-.005
D. F. —	156.	156.	156.	156.	156.	156.	156.	156.
Signific.	.001*	.004*	.001*	.732	.176	.020*	.146	.948

* SIGNIFICANT AT .05

APPENDIX 9.3

EVALUATION OF STUDENT IMPACT

ENVIRONMENTAL EDUCATION: CURRICULUM, INFORMATION, AND TRAINING

SUBJECT AREA: Bio-physical

GRADE LEVEL: Senior High School

SCHOOL: #3

	Score	CogTot	ET	QL	INV.	MGT.	PROB.	FUT.	AFFECT.
ANALYSIS: Stanine Conversion Scores									
Mean	5.11	21.38	5.91	2.98	2.36	1.73	3.11	4.24	171.80
Std. Error	.194	.946	.321	.164	.201	.144	.249	.288	2.615
Std. Dev.	1.30	6.34	2.15	1.10	1.35	.96	1.67	1.93	17.54

NOTE: Both teachers from this school were experimental.
No control teachers were involved in the testing.

APPENDIX 9.4

EVALUATION OF STUDENT IMPACT

ENVIRONMENTAL EDUCATION: CURRICULUM, INFORMATION, AND TRAINING

SUBJECT AREA: Bio-physical

GRADE LEVEL: Senior High School

SCHOOL: #5

Score	CogTot	ET	QL	INV.	MGT.	PROB.	FUT.	AFFECT.
ANALYSIS: All Scores								
Experimental	24.77	6.08	3.12	2.96	2.46	3.62	5.28	174.42
Control	24.03	6.31	2.95	2.95	2.12	3.54	4.93	173.93
T - Value	.36	-.35	.53	.04	1.10	.21	.60	.11
D. F. —	33.	35.	42.	48.	41.	40.	39.	38.
Signific.	.718	.731	.601	.971	.278	.833	.555	.913
ANALYSIS: Stanine Conversion Scores								
Experimental 5.45	24.80	6.10	3.15	2.95	1.57	3.60	5.20	177.00
Control 5.53	23.74	6.11	3.11	2.95	1.25	3.79	4.63	172.16
T - Value -.19	.42	-.01	.10	.01	.38	-.44	.85	.85
D. F. 37.	28.	31.	37.	36.	36.	30.	34.	36.
Signific. .854	.679	.995	.918	.996	.383	.661	.403	.402
Part. Corr.	.076	-.033	.071	.012	.147	.042	.097	.012
D. F. —	36.	36.	36.	36.	36.	36.	36.	36.
Signific.	.650	.843	.671	.944	.378	.805	.563	.942

APPENDIX 9.5

EVALUATION OF STUDENT IMPACT

ENVIRONMENTAL EDUCATION: CURRICULUM, INFORMATION, AND TRAINING

SUBJECT AREA: Bio-physical

GRADE LEVEL: Senior High School

SCHOOL: #6

Score	CogTot	ET	QL	INV.	MGT.	PROB.	FUT.	AFFECT.
ANALYSIS: All Scores								
Experimental	24.27	6.31	3.00	3.06	2.08	3.51	4.96	167.41
Control	22.01	5.55	2.65	2.26	1.78	2.68	4.33	163.65
T - Value	1.66	1.68	1.57	3.46	1.84	2.98	1.77	1.21
D. F. —	122.	110.	120.	104.	139.	114.	112.	93.
Signific.	.100	.097	.120	.001*	.068	.003*	.079	.228
ANALYSIS: Stanine Conversion Scores								
Experimental 5.64	24.56	6.33	3.13	3.13	2.13	3.51	5.05	169.05
Control 6.33	23.19	6.44	3.06	2.67	2.20	3.02	4.88	166.18
T - Value -2.18	.85	-.20	.26	1.75	-.33	1.50	.39	.81
D. F. 96.	97.	87.	94.	88.	103.	96.	88.	70.
Signific. .032*	.396	.839	.793	.083	.738	.137	.699	.423
Part. Corr.	.217	.202	.159	.278	.191	.286	.210	.132
D. F. —	103.	103.	103.	103.	103.	103.	103.	103.
Signific.	.026*	.038*	.106	.002*	.051*	.003*	.031*	.179

* SIGNIFICANT AT .05

APPENDIX 10.0

Summary of Evaluation Data for Experimental and Control Students in Junior High School, Socio-cultural Disciplines

LEGEND:

Score:	Mean standarized score for students involved in the testing.
CogTot:	Cognitive Total
ET:	Cognitive Subconcepts for Unit "Earth Thoughts"
QL:	Cognitive Subconcepts for Unit " Quality of Life"
INV:	Cognitive Subconcepts for Unit "Environmental Inventory"
MGT:	Cognitive Subconcepts for Unit "Environmental Management"
PROB:	Cognitive Subconcepts for Unit "Environmental Problems"
POLIT:	Cognitive Subconcepts for Unit "Politics"
FUT:	Cognitive Subconcepts for Unit "Futurism"
AFFECT:	Affective Total

T - Value:	Results of the T-Test
D. F.:	Degrees of Freedom
Signific:	Level of Significance.
Part. Corr:	Results of the Partial Correlation Analysis

EVALUATION OF STUDENT IMPACT

ENVIRONMENTAL EDUCATION: CURRICULUM, INFORMATION, AND TRAINING

SUBJECT AREA: Socio-cultural

GRADE LEVEL: Junior High School

SCHOOL #5

	Score	CogTot	ET	QL	INV.	MGT.	PROB.	POLIT.	FUT.	AFFECT.
ANALYSIS: All Scores										
Experimental		23.46	4.52	6.10	4.13	.46	4.17	2.28	2.23	164.34
Control		22.60	3.82	5.53	3.92	.60	4.14	2.54	2.31	161.77
T - Value		.81	2.44	1.68	.76	-1.84	.11	-1.26	-.39	1.02
D. F.	—	151.	163.	156.	136.	162.	159.	159.	162.	162.
Signific.		.417	.016*	.095	.447	.067	.915	.209	.698	.311
ANALYSIS: Stanine Conversion Scores										
Experimental	5.53	23.37	4.57	6.11	4.10	.43	4.08	2.24	2.25	164.35
Control	5.43	22.44	3.82	5.58	3.94	.50	4.21	2.56	2.31	162.01
T - Value	.33	.83	2.53	1.48	.57	-2.06	-.43	-1.47	-.26	.86
D. F.	146.	140.	149.	146.	130.	148.	147.	146.	149.	149.
Signific.	.743	.408	.012*	.140	.567	.041	.664	.145	.798	.389
Part. Corr.		.068	.199	.138	.057	-.149	.003	-.110	-.038	.077
D. F.	—	148.	148.	148.	148.	148.	148.	148.	148.	148.
Signific.		.412	.015*	.091	.488	.069	.972	.181	.643	.352

* SIGNIFICANT AT .05

APPENDIX 11.0

Summary of Evaluation Data for Experimental and Control Students in Senior High School, Socio-cultural Disciplines

LEGEND:

Score:	Mean standarized score for students involved in the testing.
CogTot:	Cognitive Total
ET:	Cognitive Subconcepts for Unit "Earth Thoughts"
QL:	Cognitive Subconcepts for Unit "Quality of Life"
INV:	Cognitive Subconcepts for Unit "Environmental Inventory"
MGT:	Cognitive Subconcepts for Unit "Environmental Management"
PROB:	Cognitive Subconcepts for Unit " Environmental Problems"
POLIT:	Cognitive Subconcepts for Unit "Politics"
FUT:	Cognitive Subconcepts for Unit "Futurism"
AFFECT:	Affective Total

T - Value:	Results of the T-Test
D. F:	Degrees of Freedom
Signific:	Level of Significance
Part Corr:	Results of the Partial Correlation Analysis

EVALUATION OF STUDENT IMPACT

ENVIRONMENTAL EDUCATION: CURRICULUM, INFORMATION, AND TRAINING

SUBJECT AREA: Socio-cultural

GRADE LEVEL: Senior High School

SCHOOL #4

Score	CogTot	ET	QL	INV.	MGT.	PROB.	POLIT.	FUT.	AFFECT.
ANALYSIS: All Scores									
Experimental	28.48	5.36	7.13	4.49	.71	5.65	3.06	2.71	164.49
Control	26.95	4.82	7.01	4.16	.77	5.40	2.58	2.70	162.77
T - Value	1.98	2.56	.48	1.77	-1.01	1.17	2.98	.07	.91
D. F. —	274.	282.	273.	282.	281.	268.	282.	282.	282.
Signific.	.048*	.011*	.633	.077	.313	.242	.003*	.944	.366
ANALYSIS: Stanine Conversion Scores									
Experimental 6.20	28.43	5.35	7.13	4.49	.71	5.63	3.05	2.70	164.47
Control 5.87	26.78	4.74	6.99	4.14	.77	5.35	2.58	2.71	162.80
T - Value 1.82	2.13	2.88	.56	1.84	-1.20	1.35	2.88	-.06	.84
D. F. 251.	262.	271.	260.	273.	273.	253.	272.	273.	272.
Signific. .070	.034*	.004*	.574	.067	.232	.179	.004*	.953	.401
Part. Corr.	.072	.119	-.018	.081	-.065	.035	.162	-.040	.028
D. F. —	272.	272.	272.	272.	272.	272.	272.	272.	272.
Significic.	.232	.049*	.773	.184	.285	.568	.007*	.512	.644

* SIGNIFICANT AT .05

APPENDIX 12.0

Summary of Attitudinal Scores for Secondary Students Involved in the Testing

	B/T		S/C	
	JHS	SHS	JHS	SHS
Attitudinal Scores				
Mean for all students with stanine conversion scores taking the test.				
Experimental	172.33	171.91	164.47	164.35
Control	169.16	168.45	162.80	162.01
Difference	3.17	3.46	1.67	2.34