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ENERGY EDUCATION
TEACHER NEEDS ASSESSMENT REPORT*

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DISCLAIMER

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Acknowledgments

Special appreciation is extended to:

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I. Abstract

In a cooperative effort with the Department of Education and Cultural Services, the Maine State Office of Energy Resources conducted a State-wide teacher's survey of their needs in energy education.

Approximately 1700 surveys were sent to schools across the State in mid-May 1980. 518 Questionnaires (29% of those sent) were returned and processed through a standard SPSS computer program during the months of June - September 1980. Data was compiled and analyzed during the months of October 1980 - January 1981. A draft of an executive summary of the highlights of the study and this report was written during the month of January 1981. This final report was completed in April 1981.

II. Executive Summary

For several years, the Maine State Office of Energy Resources (OER) has been receiving increasing numbers of information and materials requests from Maine teachers wishing to incorporate energy topics into their teaching. Due to these increasing numbers of requests, the need for the development of a state-wide program in energy education became apparent. It was clear that, although some energy education efforts had been initiated by various agencies and groups, there was an absence of a comprehensive, coordinated approach. Duplication of effort was inevitable.

A joint effort between the (OER) and the Maine Department of Educational and Cultural Services (DECS) was initiated to address this and other energy education issues. A Task Force comprised of educational experts was formed to identify and document energy and education-related activities, resources and opportunities which exist in the state today; to conduct a state-wide needs assessment of Maine teachers; and to make recommendations based upon the results of the survey to OER and DECS to meet the identified needs.

The survey questionnaire was developed and a process for distribution was formulated. Care was taken in the distribution to ensure proper representation of rural and urban schools, all counties, and coastal and inland schools.

Three groups of schools were selected to be surveyed. They were Title IV C schools, Energy Education Minigrant schools and geographically selected schools not covered by the previous two groups.

A total of 1,761 questionnaires were sent to 74 public and private schools. 518 questionnaires were returned from 52 different schools; a return rate of approximately 29%. The sample size of approximately 10,000 (teachers) meant that 370 completed surveys were needed to assure statistical accuracy of the data*.

* Robert V. Krejcie and Daryle W. Margan, "Determining samples size for research activities", Educational and Phychological Measurement, vol. 30, 1970, 607-610.

Based upon the survey data, it is clear that Maine teachers, regardless of grade level and subject area taught, perceive energy education as a very important subject to include in their teaching. Further analysis of the data indicates that teachers are of the opinion that energy conservation is the most important of all the listed areas to be teaching at all grade levels. The teachers rate their students as lacking knowledge in energy concepts, alternate energies, energy problems and issues, and energy effects on careers. Teachers support the integrative approach for energy education although there is some support at the high school level to teach energy as a separate course of study. Surveyed teachers prefer to utilize audio-visual and community resources rather than textbooks for teaching energy education. The results of the survey also indicate a strong need for teacher pre- and in-service training. Based upon these results, recommendations were drawn by the Energy Education Task Force. The following are highlights of those recommendations:

1. The OER, DECS and the University of Maine-Orono should cooperatively establish a comprehensive school energy education program for the State of Maine.

2. This program should be interdisciplinary in nature and should include all grade levels.

3. The survey data should be used as guidelines for the selection, adaptation and/or development of curriculum materials for Maine's schools.

4. A planning committee should immediately be organized to address this need.

III. Background and Rationale

For several years, educators interested in teaching about energy have been contacting the Maine State Office of Energy Resources (OER) and the Maine State Department of Educational and Cultural Servies (DECS) for assistance. Several groups in addition to the OER and DECS, have responded to the energy education needs of Maine teachers in a variety of ways. Although considerable effort had already occurred in relation to assisting teachers, this effort was not effectively coordinated. Inadvertently, approaches to energy education varied and duplication of effort was inevitable. Requests to the OER and DECS as well as other groups, for information have been increasing steadily. The diversity and numbers of requests has resulted in the somewhat haphazard manner in which energy education was addressed in Maine.

It became apparent to the OER and DECS that a state-wide, comprehensive energy education program should be initiated. This approach was considered to be far more efficient than to deal with energy education on a case by case basis.

In order to develop a program which would be based on the actual, expressed needs of Maine teachers, a Task Force was formed to conduct a needs assessment, to study these needs and to make recommendations to the OER and DECS for the development of a program.

The decision to conduct an energy education needs assessment of Maine teachers was made in the fall of 1979. It was felt that surveying the teachers to determine their energy education needs would provide OER with specific direction in its school energy education efforts.

It was felt that gaining teacher input would be positive for three reasons. First, it would provide valuable data which would be useful information for OER and other educators interested in developing energy education materials. Secondly, it would ensure that any materials developed as a result of the survey would be based upon the expressed needs of teachers. And finally, teachers would feel more ownership in materials which were based upon teacher input, and thus be more apt to use those materials.

IV. Formation of the Energy Education Task Force

Once the decision was made to conduct an energy education needs assessment of Maine teachers, a statewide Energy Education Task Force (EETF) was formulated. Since the OER is only one of several agencies in Maine concerned with energy education, groups such as Maine Audubon, the University of Maine-Orono, and other groups and individuals were invited to join our effort.

By forming a Task Force to address energy education in this way, we gained access to the expertise of other energy educators in Maine, as well as ensuring that there was no duplication of this effort.

In December, 1979, nominations to the Task Force were made. It was considered desirable to include in the group, highly motivated individuals who had expressed an interest in working in energy education. Representatives from OER, DECS, elementary and secondary teachers, University of Maine faculty, environmental groups and school management personnnel were all considered desirable. The size of the group would be limited to twelve; and we were striving for a fairly equal number of men and women to ensure a balanced group.

After much discussion, a list was compiled of nominations for participation in the EETF. These included:

1. A fifth grade teacher with sixteen years experience who was an energy education mini-grants recipient and project director.

2. The Director of Environmental Education at the Maine Audubon Society.

3. The home conservation specialist for the Central Maine Power Co., who was a home economics teacher.

4. The Director of Career Education at DECS who had also worked on cooperative projects with OER.

5. The Director of the Maine Studies/Maine Natural History Curriculum Development Project, also an environmental education specialist.

6. An elementary school principal, consultant to the Maine Studies Curriculum Project and a minigrants

project director.

7. The Director of the Children's Resource Center (recyclers of industrial discards used for creative educational projects); also a former teacher.

8. A professor of education at the University of Maine with nine years experience as a junior high science teacher; also a consultant in energy education curriculum development.

9. The Supervisor of the Division of School Facilities for the Bureau of School Management at DECS; also a former State Science Consultant and teacher.

10. The OER Educational Programs Director, formerly the coordinator of education programs in a county energy office; also a participant in a NSF curriculum development project in energy education.

11. A graduate student in energy education who previously coordinated and developed environmental/energy education projects for elementary school children.

12. A former environmental education teacher; presently a naturalist at an alternative education foundation.

13. The Maine State University system's vocational education coordinator.

The nominations to the Task Force were included in a written proposal for the formation of a statewide (EETF). This proposal was approved and signed by the Director of OER who then sent it to the Commissioner of DECS.

The first and foremost concern was that this Task Force be sponsored jointly by the Director of the OER and the Commissioner of DECS. It was a highest priority to involve individuals interested in energy education. It was felt that a successful, quality energy education program could best be developed as the result of cooperative efforts between the State offices of energy and education as well as other interested agencies.

Granted the approval of the Commissioner of DECS, the next task was to write an introductory letter of invitation to the Task Force nominees. (See Appendix A for list of Task Force members).

V. Goals of the Task Force

The three primary goals of the Task Force were as follows:

1. To identify and document energy and education related activities, resources and opportunities which exist in the State today.

2. To conduct and document a needs assessment to determine the energy education needs of Maine students and teachers.

3. To develop a strategy and make recommendations to the OER and DECS, making optimum use of existing resources to meet identified needs.

VI. Development of Needs Assessment Survey Questions

At the first meeting of the Energy Education Task Force (EETF), held on February 27, 1980, the Task Force goals were discussed and an outline was proposed for the subsequent meetings. The entire meeting was spent discussing needs assessment goals and techniques.

The conclusions reached at this first meeting were that a survey should be conducted of both public and private schools (the greater proportion being public), that the survey should be brief, and that participation should be encouraged in the survey by pointing out that all respondents would receive notice of any materials developed as a result of the survey.

Five general areas were decided upon that should be covered in the survey.

1. Knowledge: What is the "state of the art" with teachers? What do they know about energy and what do they feel they need to know?

2. Attitude: Are they interested in energy and energy education? Do they feel it is important?

3. Degree to which energy education is presently taught: What are they teaching about at this time? Where, when and how do they use it in their curriculum?

4. Resources: What exists that they are aware of, what are they presently using, and what else do they need?

5. Implementation: How do they wish to be introduced to energy education or updated on curriculum and background materials? What kind of support do they need?

At the second meeting of the EETF, on March 12, several possible survey questions were discussed which were brought in by the EETF participants. The discussion revealed a few important issues that were not being covered in the five areas listed above. First of all, it was felt that it would be valuable to have teachers rate their perceptions of their students' knowledge about energy. Secondly, five different energy topics were developed that covered many of the interdisciplinary aspects of energy education. These were: energy concepts, energy conservation, energy problems and issues, energy alternatives and energy effects on careers. And finally, it was felt that it would be useful to discover at what grade level the teachers felt that each of the energy

topics should be taught.

The discussion of the survey questions continued into the third meeting of the EETF which was held on March 26. By the end of this meeting a final draft of the survey had been completed. (See Appendix B, survey instrument).

VII. Needs Assessment Survey Distribution Methods

At the next meeting, the EETF discussed how to approach the distribution of the survey. Since there was only one month of school remaining in the school year, it was felt that, rather than doing a random mailing (which would be time consuming), the surveys should be distributed directly through teachers and principals. It was decided to distribute the surveys by contacting three different groups: Title IV C schools, minigrants recipients and geographically selected schools. A different letter was sent to each of the three groups.

Distributing the survey through these groups would not only save time but it would also enable interested individuals to compare and contrast the survey responses from each of the three groups.

Group I: Title IV C Group

Title IV C is a federal grants program through the U.S. Department of Education which provides funding to schools interested in developing innovative curriculum projects. This group was chosen to be surveyed based upon their apparent openness to new ideas. The Title IV C Group does not necessarily represent teachers who are involved in energy education projects. In fact, to our knowledge, only one school out of thirty-four in this group has been involved in an energy education project. Several Title IV C school districts were contacted and asked to participate in the survey. The school administrator was responsible for distribution of the survey to all teachers (K-12, all subject areas) in his/her district.

Group II: Energy Education Minigrants Group

The OER sponsors a small grants program for teachers who wish to develop energy activities for their students. All teachers who have participated in this program were contacted and asked to distribute five (5) questionnaires to other teachers (K-12, all subject areas) in their school system. The minigrants teacher could choose to respond in which case four other teachers' responses were sought. In general, it was felt that this group would be favorably disposed toward energy education since the effort to distribute the questionnaire within the school was initiated by a known energy educator. However, it was requested that the surveys be distributed as randomly as possible.

Group III: Geographically Selected Group

After the first two groups were identified, the geographic locations of those schools was plotted on a map of Maine. It was then apparent that several geographic

areas were not represented in our survey. It also appeared that there was a disproportionate balance in the representation from rural versus urban schools. Superintendents of the school districts in locations missing from our survey were randomly selected and invited to participate in the survey. It was their responsibility to distribute the surveys to teachers (K-12, all subject areas) in their districts.

To determine the number of surveys to distribute, the group consulted a journal entitled: Educational and Psychological Measurement*. According to its figures, for a population of 10,000 (roughly the number of teachers in Maine) the sample should yield a minimum of 370 responses for the study to be statistically valid and within reasonable confidence intervals. It was expected that overall response of about twenty percent would be received. Therefore, just under 1800 surveys were distributed.

* Note: R. V. Krejcie and D. W. Margan, "Determining Sample Size for Research Activities", Educational and Psychological Measurement, vol. 30, 1970, pages 607-610.

VIII. Needs Assessment Survey Response

A total of 1,761 questionnaires were sent to fifty-two schools and school districts throughout the State. (See Appendix C for locations of participating schools.) For a list of participating schools see Appendix D. The survey distribution and response was as follows:

Group	# Surveys Distributed	# Surveys Returned	% Survey Returned
I. Title IV C Schools	929	339	36%
II. Minigrants School	195	60	31%
III. Geographically Selected	637	119	18%
Total:	1761	518	29%

Considering the limited time frame for distribution and return of the survey, the overall return rate of 29% was considered by the EETF to be an excellent response. Consultation with other professionals (experienced in computer programming and educational survey techniques) indicated that a return rate of 30% for unsolicited questionnaires is very good.

A further breakdown of those surveyed indicated a reasonably proportioned response from elementary, junior high and high school teachers as indicated below. (See Appendix E for a more detailed breakdown.)

And % of Responses for Each Group*

Grade Level Surveyed	IV C	MG	Select	Total
K-6	129(62%)	27(12%)	54(26%)	210 (40.5%)
7-8	82(76%)	11(10%)	16(14%)	109 (21%)
9-12	125(68%)	26(12%)	38(20%)	189 (36.5%)

Numbers and percentages do not correspond to whole samples since several respondents either did not indicate their grade level or they were responsible for all grades (principals, librarians, etc). After determining that we had achieved a statistically valid and representative sample from the survey response, the data was compiled.

IX. Preparation of the Survey Data

Once 1800 pages of accurate computor print-out was received, the EETF examined the data and extracted key information. That key information was reduced to a few basic charts designed to give an overview of the general areas covered in the survey.

Three general areas were decided upon that would be represented in the charts. They were:

1. The "whole sample response" to the survey question. (See Appendix F). Whole sample represents the median response to each question by Title IV C, minigrants (MG) and selected groups combined. (Appendix G shows these subgroup responses).

2. The "school response", (See Appendix H), was a breakdown of the responses according to the school grade level taught by the respondent. It included: elementary (K-6), junior high (7-8) and high school (9-12).

3. The subject area responses, (see Appendix I), illustrates how respondents, teaching various different subjects or combinations of subjects, responded to the survey questions.

   Also included is a table (See Appendix J,K) which shows the responses to survey question #2. Unlike the other questions, question #2 could not be answered on a scale of 1-5.

X. Interpretation and Analysis of the Survey Data

A. WHOLE SAMPLE RESPONSE

a. Question #1: All topics mentioned in the survey were ranked as important for teachers to infuse into their teaching. (See Appendix F). On a scale of 1-5 (1=not important, 5=very important), the range was from "energy effects on careers" receiving a median rating of 3.345 to "energy conservation" with a high of 4.704. It was interesting to notice that while "energy conservation" was ranked as the most important topic to be teaching, a glance at question #3 revealed that the students' knowledge of this concept was ranked as good (3.045 on a scale of 1= very poor to 5= excellent). It was the conclusion of the EETF that the teachers feel that, although there is room for improvement, their students understand conservation better relative to the other topics mentioned. This may be due to the fact that conservation is so widely discussed in the media. (See part B of this section for discussion of Question #2).

b. Question #3: The respondents indicated that students' knowledge of all of the energy topic areas except "conservation" was ranked as very low. The range was from "careers" (1.693) to "concepts" (2.629). Coupled with the positive responses to question #1, the need for energy education programs can be viewed as the need to close the gap between what students know (question #3) and what teachers feel they should know (question #1).

c. Question #4: This question supplements question #3 by emphasizing the importance teachers place on having their students understand how their own personal values and lifestyles, and the decisions they make, ultimately affect overall energy use and availability. The range from 3.861 for "future job choices will be affected by energy availability" to 4.554 for "one's life style affects energy consumption" reinforce the need for teaching both values clarification and energy conservation.

d. Question #5: "How would you recommend that energy be taught in the curriculum?" could be answered with a yes or no and the choices were: (1) "Taught as a separate course". or (2) "Integrated into various subject areas". Some respondents checked both choices with a "yes". The overall response to this question surprised us. We anticipated that there would be overwhelming support for "integration almost to the exclusion of "teaching a separate course". Although twice as many respondents thought it should be integrated rather that taught separately, a sizeable portion felt that it was viable to teach it as a separate course, particularly in the upper grades.

e. Question #6: Media resources are clearly needed by Maine's teachers. This question asked about classroom resources that teachers need to assist them in their energy education efforts. "Movies" were ranked as most important (4.214) and "filmstrips" (4.034) and "slides (4.000) followed close behind. Ranked lowest were "textbooks for students" (3.081).

On a scale of 1-5, the range from 3.081 for "textbooks" to 4.214 for "movies" would seem to indicate that all of the resources are important since 3.081 is better than an "average importance" rating. Probably the reason why textbooks ranked lowest (comparatively speaking) is because there is a general move away from textbooks in education, particularly at the elementary level. Many testbooks are inflexible, and they are both expensive and quickly outdated. Movies and films are materials that teachers can readily use--even without preparation. Using media materials that cover energy allows the teacher to learn with the students. And some teachers are already meeting some of their energy education needs by using films that are currently available. The EETF recognizes that although media resources fulfill a certain need on the part of the teachers, the implied "one time occurances " is not considered to be an effective method of implementing an energy education program.

The participants in the survey were asked to list other teaching aids, (Question 6i) which have proved to be particularly useful to help them teach about energy, and to rank them on a scale from 1-5.

The median response for Question 6i was the highest in relation to the other resources listed so we took a second look at the resources listed by the teachers. The three resources which received the most support from the teachers were speakers, field-trips and hands-on projects. This response indicates the value seen in these "resources" as well as giving an indication that teachers (particularly in relation to field-trips and speakers) may feel unprepared to be the "delivers" of energy education themselves. By using speakers and fieldtrips, they themselves do not have to provide the information to their students but can provide, instead an opportunity for students to learn from others. Hands-on projects are usually experiential; a "learn as you go" discovery project, whereby students and teacher alike can learn about energy together. This reinforces the idea that teachers need more training in order to feel confident to teach about energy.

A complete list of "Other Teaching Aids" is included in Appendix L as they appeared on the returned questionnaires.

f. Question #7: In response to the need for "teacher resources" there was not a significant variation to provide the EETF with a clear delineation of priorities for developing resources. Rather, there was a strong interest in many teacher resources ranging from "workshops/in-service training" (3.881) to "background information" (4.054) and "community resources" (4.059). These figures indicate a real desire on the part of teachers to become knowledgeable about energy. Also, the importance placed on community resources reveals that teachers are looking beyond traditional school resources to assist them in their teaching about energy. This may indicate that teachers view energy as a community--not just an educational challenge.

g. QUESTION #8: This question asked for a list of the valuable energy education resources currently being used. All the resources were tabulated generically by type and specific titles were included when the teachers provided that information, (see Appendix L). As a result of tabulating the responses generically, it was found that four types of resources received considerably more support than the others listed by the teachers. These four resources are (in order of support indicated):

1. Media: This includes primarily newspaper, TV, films, slides, and journals.

2. Instruction: This includes in-service workshops, teacher training institutes, university level courses and other educational programs.

3. Agencies: This includes government and private, not-profit agencies such as Office of Energy Resources (OER), Maine Audubon Society, Community Assistance Programs, Cooperative Extension Programs, U.S. Department of Energy (USDOE).

4. Materials: This includes miscellaneous materials supplied by USDOE, OER, National Science Teachers Association, Maine Audubon and local utilities.

Included in Appendix L is the complete list of resources as they appeared on the returned surveys.

B. WHOLE SAMPLE RESPONSE: QUESTION #2 (See Appendix J,K)

There were ten choices to the question "At what grade level do you feel the following energy topics should be taught?" The data was looked at in terms of what percentage of the respondents indicated their preference for teaching each of the five energy topics at a given

grade level. The percentage of responses ranged from 0% to 47.1%. The total responses for each concept area equals approximately 100%. The grade level receiving the highest percentage of response for each topic indicates the greatest number of teachers felt the given topic should be focused on at that level.

a. "Energy concepts". Thirty-two percent of the teachers surveyed thought that energy concepts should be taught K-12. This percentage is twice the response for any of the other nine grade level options. The second highest response was 15.5% for grade level 3-12. 14% felt it should be taught in grades 3-5 and 10% felt it should be taught in grades K-2. Therefore the EETF concludes that energy concepts can and should be taught at all grade levels with a focus in elementary schools.

b. "Energy conservation". Almost half (47.1%) of the teachers surveyed thought energy conservation should be taught at all grade levels. The next two highest percentages were for grade levels K-2 (13.5%) and 3-5 (14.1%) indicating that teaching about conservation must begin in the elementary grades and perhaps be focused there.

c. "Alternative energies". The grade level focus for teaching about alternative energy which received the most support (27.2%) was 6-12. Support of 17.1% was given to grade level 3-12, and a close third was K-12 with 16.8%. This information indicates that, while many of the respondents felt that alternative energy instruction can be taught at all grade levels, perhaps it should be focused in the secondary grades.

d. "Energy problems and issues". The greatest percentage of teachers felt that "energy problems and issues" should be taught in the upper grades, 6-12 (26.7%). Of the upper grades, more felt that it should be focused on in high school, 9-12 (19.5%), than in junior high school, 7-8 (12.8%). A significant number also felt that "problems and issues" could be taught K-12 (15.7%), although only 2.13% felt it should be focused on in K-2, whereas a total of 22% felt it should be taught in either grades 3-5 or 3-12. We conclude from these figures that while many teachers feel that energy problems and issues should begin to be covered in third grade that the primary focus should be grades 6-12.

e. "Energy effects on careers". Clearly the respondents felt that the place for studying energy as it relates to career education was in high school. A large percentage, (44.9%), indicated that the focus should be grades 9-12. However a significant number also felt that it could begin in junior high school (37.7% for 7-8, 6-12 combined).

C. SURVEY RESPONSE BREAKDOWN: Grade Level Taught (See Appendix A).

It was clear to the EETF that this chart (Appendix H) containes data for persons wishing to develop grade-level-specific energy education materials. One important observation was made regarding question #6. In looking at "classroom resources", the choice "other teaching aides" received the highest rating at the elementary level (4.661) as well as receiving very high ratings at both the junior high (4.143) and high school (4.000) levels. (See Section A, part e. for a discussion of these results).

D. SURVEY RESPONSE BREAKDOWN: Subject Area Taught (See Appendix I)

A brief glance at Appendix I substantiates the idea that energy is an interdisciplinary subject that should by no means be restricted to the science classroom. If one compares the responses to question #1 from teachers representing all subject areas (science, special education, math, social studies, art, physical education, etc.) it becomes clear that there is a strong interest in energy education for all subject areas. A more detailed examination of the data may provide quidelines for subject specific energy education program development.

XI . Energy Education Task Force Recommendations.

According to the survey, student knowledge of energy topics was less than satisfactory. Since teachers expressed a strong interest and desire to be teaching about energy, the EETF concluded there exists a real need for a school energy education program. The following are the recommendations hereby submitted by the EETF for the development of such a program.

1. The Office of Energy Resources (OER), the Department of Educational and Cultural Services (DECS) and the University of Maine-Orono (UMO) should establish a comprehensive school energy education program for the State of Maine.

2. A Planning Committee should be formed, jointly chaired by OER, DECS and UMO, for the purpose of developing this State-wide program.

3. The Planning Committee should also include and represent school administrators, teachers, educational groups and other interested individuals and organizations with close relation to educational programs in our schools.

4. The specific tasks of this planning committee should include the following:

   a. Evaluation of existing curriculum resources available in energy education.

   b. Develop a framework for Maine schools K-12 curriculum into which energy concepts may be infused.

   c. Adopt and or develop an interdisciplinary, K-12 energy education curriculum for Maine's schools.

5. The survey data of this needs assessment should be used as guidelines for the selection, adaptation or development of curriculum materials for Maine's schools.

6. Teacher pre- and in-service training should be a primary focus for the resultant energy education program.

7. Efforts to acquire funding for developing or adapting curriculum materials should begin immediately.

APPENDIX A
MEMBERS OF THE ENERGY EDUCATION TASK FORCE

Lloyd Barrow College of Education University of Maine at Orono Orono, Maine 04469	Professor of Education at UMO. Nine years experience as a junior-high science teacher, consultant in energy education curriculum
Dean Bennett Gardiner Junior High School Gardiner, Maine 04345	Maine Studies Project Director and Natural History Studies Project Director. Environmental Education Specialist.
James Brown Shapleigh Memorial School MSAD East Waterboro, Maine 04030	Fifth grade teacher, Shapleigh Memorial School over 16 years experience, Masters Degree. Energy Education Minigrant Project Director. NSF Science Project. USMES Curriculum Project.
Sally Hartigan Office of Energy Resources State House Station #53 Augusta, Maine 04336	Coordinated and developed environmental/energy education programs in Dover Plains, NY and Boothbay Harbor, Maine. Master's degree in energy education through Goddard College's Institute for Social Ecology.
June LaCombe Maine Audubon Society 118 Old Route One Falmouth, Maine 04105	Director of Environmental Education at Maine Audubon Society. Planned and presented a series of workshops linking natural history and energy concepts to teachers throughout Maine. Chairperson of the Board of Directors of Maine Conservation Education Foundation.
Roderick Ladd, Jr.,Principal Peru Elementary School West Peru, Maine 04290	Principal Peru Elementary School. Maine Studies Project consultant. Energy Education Minigrant Project Director
Ruth W. McGary Central Maine Power Co. 225 Water Street Augusta, Maine 04336	Former Home Economics teacher. Presently Home Service Advisor at Central Maine Power Company,Augusta. Designs and presents energy

	education programs to school and community groups. Masters Degree.
Jamien Morehouse, Director Children's Resource Center Ocean House Road Cape Elizabeth, Maine 04107	Former teacher and formerly the Director of the Children's Resource Center in South Portland. Presently coordinating the State-wide Information Exchange in cooperation with the Mid-Coast Teacher Center in Rockland.
Christina C. Rule Office of Energy Resources State House Station #53 Augusta, Maine 04330	Education Programs Director, Office of Energy Resources. Former coordinator of education programs in county energy office. Participated in NSF curriculum development project in energy education. Developed and field tested K-3 energy education curriculum.
Douglas Stafford Department of Education & Cultural Services State House Augusta, Maine 04333	Former State Science consultant. Eighteen years experience teaching, secondary and college. Presently Supervisor, Division of School Facilities, Bureau of School Management, Department of Education and Cultural Services.
Steve Thompson Department of Education & Cultural Services State House Augusta, Maine 04333	Department of Education and Cultural Services. Director of Career Education. Worked on cooperative projects with OER

energy conservation availability & alternative sources					
d. energy issues involve social, political & economic factors.	1	2	3	4	5
e. basic scientific principles help us to use & conserve energy	1	2	3	4	5

5. How would you recommend that energy be taught in the curriculum?

	yes	no
a. integrated into various subject areas		
b. taught as a separate course		

6. Please rank the following classroom resources from 1-5 as to their importance for further helping you teach about energy. (1=not important, 5=very important).

a. energy education instructional TV	1	2	3	4	5
b. textbooks for students	1	2	3	4	5
c. filmstrips	1	2	3	4	5
d. movies	1	2	3	4	5
e. slides	1	2	3	4	5
f. student workbooks	1	2	3	4	5
g. activities guides	1	2	3	4	5
h. assemblies	1	2	3	4	5
i. other teaching aides (please specify)	1	2	3	4	5

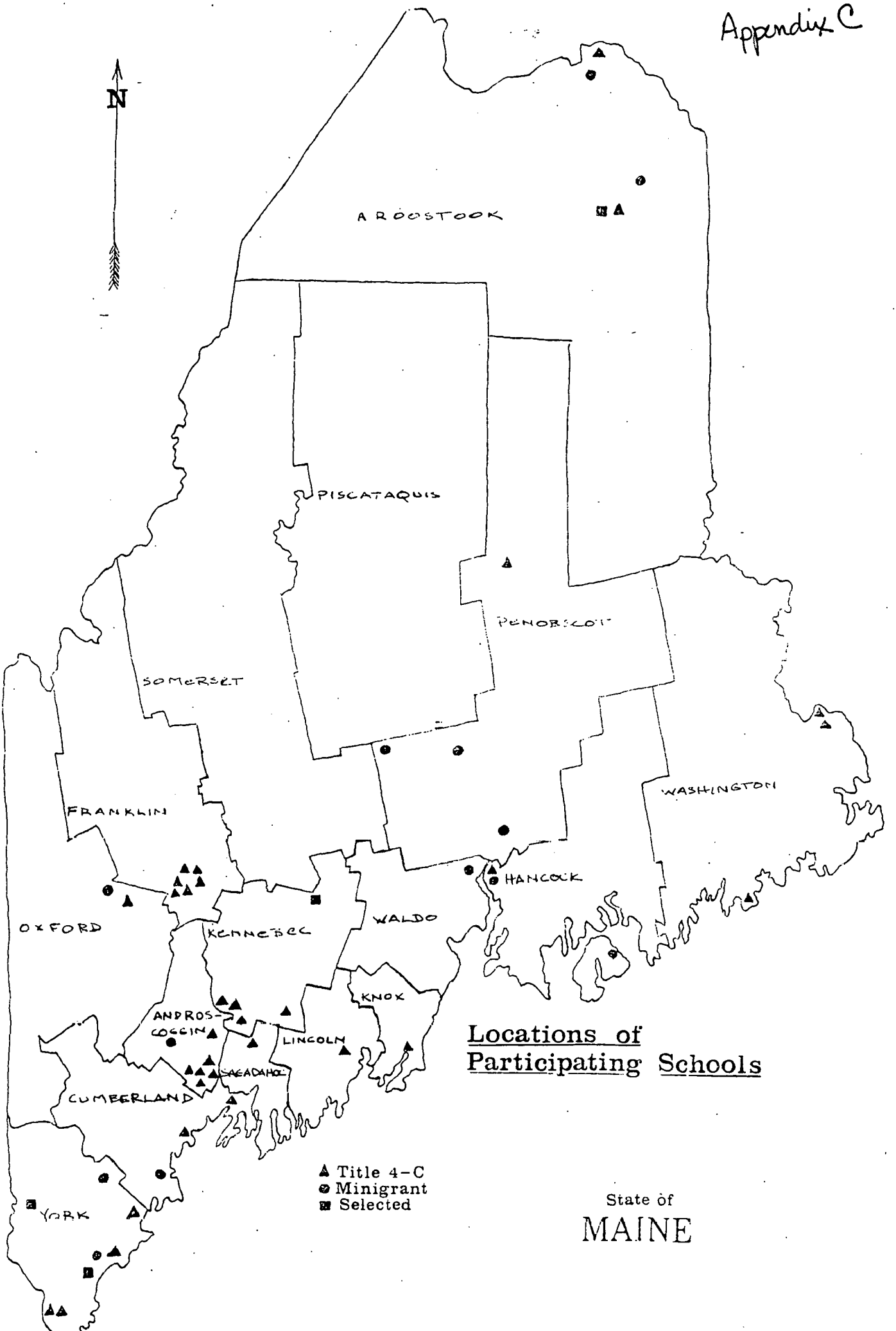
7. Please rank the importance of the following teacher resources. (1=not important, 5=very important).

a. teacher workshops/in-service training	1	2	3	4	5
b. background information	1	2	3	4	5
c. in classroom presentations	1	2	3	4	5
d. follow-up assistance (follow-up to workshops and/or in-class presentations.)	1	2	3	4	5
e. community resources	1	2	3	4	5
f. school awareness raising.	1	2	3	4	5

8. Please list the resources/workshops which you have found most effective in helping you teach about energy and where they may be obtained. Please use separate sheet if more space is needed.

Thank you!

Appendix C


N
AROOSTOOK
PISCATAQUIS
PENOBSCOT
SOMERSET
FRANKLIN
WASHINGTON
HANCOCK
OXFORD
KENNEBEC
WALDO
KNOX
ANDROS-
COGGIN
LINCOLN
SAGADAHOC
CUMBERLAND
YORK
▲ Title 4-C
● Minigrant
■ Selected
Locations of
Participating Schools
State of
MAINE

APPENDIX D

LIST OF PARTICIPATING SCHOOLS BY COUNTY AND SUBGROUP

Special appreciation is given to the administrators and teachers in the following schools for contributing their time and thought to the survey. This list also includes which subgroup the school belongs.

Androscoggin County

Durham Elementary (Title 4C)
Lisbon Elementary (Title 4C)
Lisbon High School (Title 4C)
M. T. Morse School - Lisbon Falls (Title 4C)
Sabattus Elementary (Title 4C)
Sherwood Heights School - Auburn (Minigrant)
Sugg Middle School - Lisbon Falls (Title 4C)

Aroostook County

Foster School - Washburn (Title 4C)
Madawaska High School (Title 4C)
Washburn Schools (inc. Intermediate School) (Selected)
Wisdom High School - St. Agatha (Title 4C)

Cumberland County

Brunswick High School (Title 4C)
Deering High School - Portland (Minigrant)
Yarmouth Intermediate School (Title 4C)

Franklin County

Cushing School - Wilton (Title 4C)
Ingalls School - Farmington (Title 4C)
Mallet School - Farmington (Title 4C)
Mt. Blue High School - Farmington (Title 4C)
Wilton Academy (Title 4C)
Wilton Central School (Title 4C)

Hancock County

Bucksport High School (Minigrant)
Eagle Lake School - Bar Harbor (Minigrant)
Jewett School - Bucksport (Title 4C)

Kennebec County

Gardiner Jr. High School (Title 4C)
Libby-Tozier School -Litchfield (Title 4C)
Oak Hill High School - Wales (Title 4C)
Wales Central (Title 4C)

Waterville School District (Selected)

Knox County

Georges Valley High School - Thomaston (Title 4C)

Lincoln County

Nobleboro Central (Title 4C)

Oxford County

Peru Elementary - W. Peru (Title 4C)
Rumford High School (Minigrant)

Penobscot County

Brewer High School (Minigrant)
Central High School - E. Corinth (Minigrant)
Dexter Regional High School (Minigrant)
Katahdin Avenue School - Millinocket (Title 4C)

*Piscataquis County

Sagadahoc County

Richmond Jr. and Senior High Schools (Title 4C)

*Somerset County

Waldo County

Smith School - Winterport (Minigrant)

Washington County

Calais Elementary School (Title 4C)
Calais Middle School (Title 4C)
Jonesport/Beals Island High School - Jonesport (Title 4C)

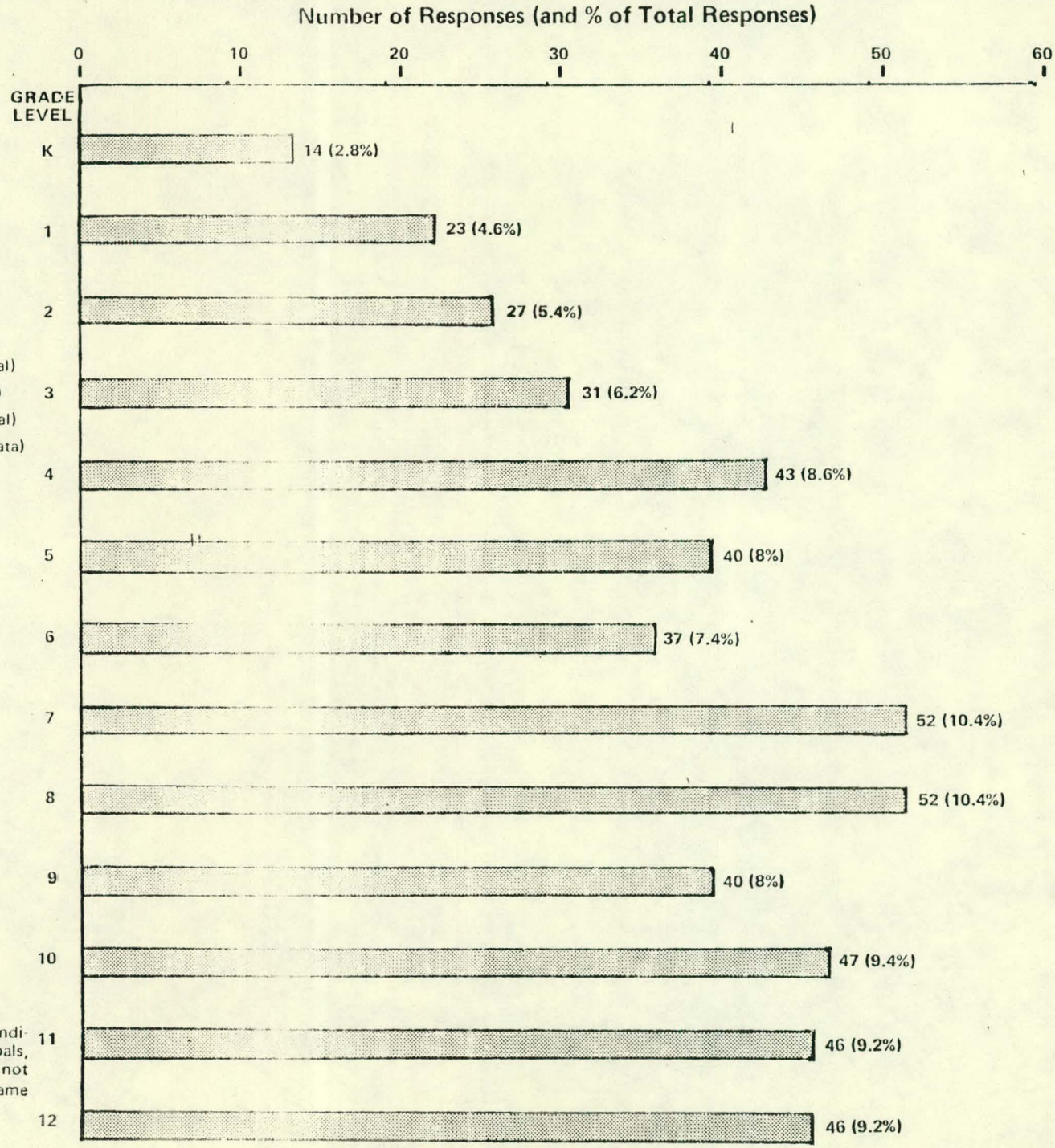
York County

Bonny Eagle Jr. High School - W. Buxton (Minigrant)
Kennebunk Jr. High School (Minigrant)
Lyman Elementary - Kennebunk (Title 4C)
Marshwood High School - Eliot (Title 4C)
Marshwood Jr. High School - Eliot (Title 4C)
Ogunquit Schools (Selected)
Saco Middle School (Title 4C)
Shapleigh Memorial School (Minigrants)
Wells School District (Selected)

*NOTE: Surveys were distributed to schools in both Piscataquis and Somerset Counties; however, none were returned.

HOW MANY SCHOOL SYSTEMS AND TEACHERS RESPONDED TO THE SURVEY?

a. Number of school systems that responded: 52
b. Number of teachers who responded: 518
c. Number of K-6 teachers responding: 210 (40.5% of total)
d. Number of 7-8 teachers responding: 109 (21% of total)
e. Number of 9-12 teachers responding: 189 (36.5% of total)
508 (10 missing data)



*NOTE: Percentages to not add up to 100% since 10 responses indicated responsibility for several grade levels (principals, guidance personnel, for example) and 10 cases did not incicate grade level. Totals add up to 498 for the same reason.

Appendix 2

APPENDIX F
SURVEY QUESTION RESPONSES OF WHOLE SAMPLE

1. How importand do you feel it is to infuse the following energy topics into your teaching?

	WHOLE SAMPLE	
ENERGY CONCEPTS	*(2)	**4.083
ENERGY CONSERVATION	(1)	4.704
ALTERNATIVE ENERGIES	(3)	4.041
ENERGY PROBLEMS & ISSUES	(4)	3.964
ENERGY EFFECTS ON CAREERS	(5)	3.345

2. At what grade level ...etc. (See Appendix J & K).

3. How would you assess the students' knowledge of these concept areas?

ENERGY CONCEPTS	(2)	2.629
ENERGY CONSERVATION	(1)	3.045
ALTERNATIVE ENERGIES	(4)	2.564
ENERGY PROBLEMS & ISSUES	(3)	2.583
ENERGY EFFECTS ON CAREERS	(5)	1.693

4. How important do you feel it is that students at your grade level should understand that?

FUTURE JOB CHOICES WILL BE AFFECTED BY ENERGY AVAILABILITY	(5)	3.861
ONE'S LIFESTYLE AFFECTS ENERGY CONSUMP.	(1)	4.554
DECISIONS NEED TO BE MADE RELATED TO ENERGY CONSERVATION	(2)	4.242

* The numbers in the left column in parenthesis represent the rank ordering of the support for the teaching of the concept area mentioned.

** The numbers with the decimal point represents the whole sample's median response.

ENERGY ISSUES INVOLVE SOCIAL, POLITICAL & ECONOMIC FACTORS	(4)	3.868
BASIC SCIENTIFIC PRINCIPLES HELP US TO USE & CONSERVE ENERGY	(3)	4.022

5. How would you recommend that energy be taught in the curriculum?

INTEGRATED INTO VARIOUS SUBJECT AREAS	(1)	0.945
TAUGHT AS A SEPARATE COURSE	(1)	0.441

6. Please rank the following classroom resources as to their importance for further helping you teach about energy.

		ALL
ENERGY EDUCATION INSTRUCTIONAL TV	(6)	3.360
TEXTBOOKS FOR STUDENTS	(8)	3.081
FILMSTRIPS	(2)	4.034
MOVIES	(1)	4.214
SLIDES	(3)	4.000
STUDENT WORKBOOKS	(5)	3.457
ACTIVITY GUIDES	(4)	3.991
ASSEMBLIES	(7)	3.286

OTHER TEACHING AIDES (PLEASE SPECIFY) (SEE APPENDIX L).

7. Please rank the importance of the following teacher resources.

TEACHER WORKSHOPS/ INSERVICE TRAINING	(5)	3.881
BACKGROUND INFORMATION	(2)	4.054
IN CLASSROOM PRESENTATION	(3)	4.043
FOLLOW-UP	(6)	3.754
COMMUNITY RESOURCES	(1)	4.059
AWARENESS	(4)	4.036

*NOTE: 1. The column of numbers with the decimal points represent the median response on a scale from 1-5, (1= not important, 5= very important).

APPENDIX G.

SURVEY QUESTION RESPONSE SUBGROUP: TITLE 4C, MINIGRANT AND SELECTED

1. How important do you feel it is to infuse the following energy topics into your teaching?

	4C	MG	SELECT
ENERGY CONCEPTS	*(2) **3.994 (3)***	(1) 4.837 (1)	(2) 4.016 (2)
ENERGY CONSERVATION	(1) 4.643 (3)	(2) 4.653 (2)	(1) 4.774 (1)
ALTERNATIVE ENERGIES	(4) 3.920 (3)	(3) 4.375 (1)	(3) 4.000 (2)
ENERGY PROBLEMS &	(3) 3.927 (1)	(4) 3.789 (3)	(2) 3.793 (2)
ENERGY EFFECTS ON CAREERS	(5) 3.333 (2)	(5) 3.389 (1)	(5) 3.145 (3)

2. At what grade level do you feel the topic should be taught? (See Appendix J & K).

3. How would you assess the students' knowledge of these concept areas?

ENERGY CONCEPTS	(2) 2.614 (2)	(3) 2.563 (3)	(3) 2.663 (1)
ENERGY CONSERVATION	(1) 2.979 (3)	(1) 3.096 (2)	(1) 3.228 (1)
ALTERNATIVE ENERGIES	(4) 2.476 (3)	(2) 2.690 (1)	(2) 2.680 (2)
ENERGY PROBLEMS & ISSUES	(3) 2.568 (2)	(4) 2.556 (3)	(4) 2.610 (1)
ENERGY EFFECTS ON CAREERS	(5) 1.788 (1)	(5) 1.438 (3)	(5) 1.481 (2)

* The numbers in the left column in parenthesis represent the rank ordering of the support for the teaching of the concept area mentioned.

** The numbers with the decimal points represent the whole sample's median response.

*** The numbers in the right hand colum in parenthesis rank order how the three groups responded to each question.

4. How important do you feel it is that students at your grade level should understand that?

FUTURE JOB CHOICES WILL BE AFFECTED BY ENERGY AVAILABILITY	(5)	3.863	(3)	(4)	4.000	(1)	(4)	3.729 (2)
ONE'S LIFESTYLE AFFECTS ENERGY CONSUMP.	(1)	4.512	(3)	(1)	4.629	(1)	(1)	4.623 (2)
DECISIONS NEED TO BE MADE RELATED TO ENERGY CONSERVATION, AVAIL. & ALTERN. SOURCES	(2)	4.216	(2)	(2)	4.474	(1)	(4.	4.162 (3)
ENERGY ISSUES INVOLVE SOCIAL, POLITICAL & ECONOMIC FACTORS	(4)	3.897	(2)	(5)	3.977	(1)	(5)	3.650 (3)
BASIC SCIENTIFIC PRINCIPLES HELP US TO USE & CONSERVE ENERGY	(3)	4.024	(2)	(3)	4.400	(1)	(3)	3.857 (3)

5. How would you recommend that energy be taught in the curriculum?

INTEGRATED INTO VARIOUS SUBJECT AREA	(1)	0.930	(3)	(1)	0.963	(2)	(1)	0.974 (1)
TAUGHT AS A SEPARATE COURSE	(2)	0.404	(3)	(2)	0.607	(1)	(2)	0.511 (2)

6. Please rank the following classroom resources as to their importance for future helping you teach about energy.

	4C		MG		SELECT	
ENERGY EDUCATION INSTRUCTIONAL TV	(6)	3.355 (3)	(6)	3.395 (1)	(6)	3.379 (2)
TEXTBOOKS FOR STUDENTS	(8)	3.106 (2)	(7)	3.224 (1)	(8)	2.848 (3)
FILMSTRIPS	(2)	3.952 (3)	(3)	4.105 (2)	(1)	4.226 (1)
MOVIES	(1)	4.158 (3)	(1)	4.516 (1)	(2)	4.192 (2)
SLIDES	(4)	3.741 (3)	(4)	4.018 (1)	(4)	3.895 (2)
STUDENT WORKBOOKS	(5)	3.480 (2)	(5)	3.567 (1)	(7)	3.268 (3)
ACTIVITY GUIDES	(3)	3.883 (3)	(2)	4.375 (1)	(3)	4.091 (2)
ASSEMBLIES	(7)	3.274 (2)	(8)	3.143 (3)	(5)	3.525 (1)

OTHER TEACHING AIDES (PLEASE SPECIFY) (SEE APPENDIX L).

7. Please rank the importance of the following teacher resources.

TEACHER WORKSHOP-INSERVICE TRAINING	(5)	3.786 (3)	(4)	4.095 (1)	(5)	4.029 (2)
BACKGROUND INFORMATION	(2)	4.009 (3)	(1)	4.179 (1)	(3)	4.118 (2)
IN CLASSROOM PRESENTATIONS	(3)	3.996 (3)	(2)	4.172 (1)	(2)	4.125 (2)
FOLLOW-UP	(6)	3.708 (3)	(6)	3.925 (1)	(6)	3.814 (2)
COMMUNITY RESOURCES	(1)	4.039 (3)	(3)	4.148 (1)	(4)	4.057 (2)
AWARENESS	(4)	3.981 (3)	(5)	4.040 (2)	(1)	4.216 (1)

*Note: 1. The column of numbers with the decimal points represent the median response on a scale from 1-5, (1= not important, 5= very important).

APPENDIX H

SURVEY QUESTION RESPONSE BREAKDOWN: Grade Level Taught

1. How important do you feel it is to infuse the following energy topics into your teaching?

	ELEM. (K-6)	JR. HIGH (7-8)	HIGH SCH. (9-12)
ENERGY CONCEPTS	*(2) 4.304 (1)	(2) 4.173 (2)	(4) 3.857 (3)
ENERGY CONSERVATION	(1) 4.789 (1)	(1) 4.750 (2)	(1) 4.547 (3)
ALTERNATIVE ENERGIES	(3) 3.973 (3)	(3) 4.115 (1)	(2) 4.069 (2)
ENERGY PROBLEMS & ISSUES	(4) 3.830 (3)	(4) 4.066 (1)	(3) 4.035 (2)
ENERGY EFFECTS ON CAREERS	(5) 3.033 (3)	(5) 3.521 (2)	(5) 3.630 (1)

2. At what grade level do you feel the topics should be taught? (See Appendix J & K)

3. How would you assess the students' knowledge of these concept areas?

ENERGY CONCEPTS	(2) 2.714 (1)	(2) 2.655 (2)	(4) 2.520 (3)
ENERGY CONSERVATION	(1) 3.195 (1)	(1) 2.991 (2)	(1) 2.894 (3)
ALTERNATIVE ENERGIES	(3) 2.524 (2)	(3) 2.487 (3)	(3) 2.660 (1)
ENERGY PROBLEMS & ISSUES	(4) 2.407 (3)	(4) 2.466 (2)	(2) 2.819 (1)
ENERGY EFFECTS ON CAREERS	(5) 1.472 (3)	(5) 1.515 (2)	(5) 1.942 (1)

4. How important do you feel it is that students at your grade level should understand that?

	ELEM. (K-6)	JR. HIGH (7-8)	HIGH SCH. (9-12)
FUTURE JOB CHOICES WILL BE AFFECTED BY ENERGY AVAILABILITY	*(5) 3.000 (3)	(4) 4.087 (2)	(3) 4.431 (1)
ONE'S LIFESTYLE AFFECTS ENERGY CONSUMP.	(1) 4.180 (3)	(1) 4.672 (2)	(1) 4.683 (1)
DECISIONS NEED TO BE MADE RELATED TO ENERGY CONSERVATION, AVAIL. & ALTERN. SOURCES	(2) 3.827 (3)	(2) 4.224 (2)	(2) 4.605 (1)
ENERGY ISSUES INVOLVE SOCIAL, POLITICAL & ECONOMIC FACTORS	(4) 3.011 (3)	(5) 3.961 (2)	(4) 4.429 (1)
BASIC SCIENTIFIC PRINCIPLES HELP US TO USE & CONSERVE ENERGY	(3) 3.545 (3)	(3) 4.214 (2)	(5) 4.325 (1)

5. How would you recommend that energy be taught in the curriculum?

INTEGRATED INTO VARIOUS SUBJECT AREAS	*(1) 0.954 (3)	(1) 0.941 (4)	(1) 0.943 (2)
TAUGHT AS A SEPARATE COURSE	(2) 0.419 (3)	(2) 0.441 (2)	(2) 0.466 (1)

6. Please rank the following classroom resources as to their importance for further helping you teach about energy.

	ELEM. (K-6)	JR. HIGH (7-8)	HIGH SCH. (9-12)
ENERGY EDUCATION INSTRUCTIONAL TV	*(6) 3.685 (1)	(9) 3.129 (3)	(7) 3.163 (2)
TEXTBOOKS FOR STUDENTS	(9) 2.951 (3)	(8) 3.179 (1)	(8) 3.162 (2)
FILMSTRIPS	(3) 4.298 (1)	(2) 4.212 (2)	(4) 3.633 (3)
MOVIES	(2) 4.327 (2)	(1) 4.371 (1)	(1) 4.025 (3)
SLIDES	(5) 4.034 (1)	(5) 3.883 (3)	(5) 3.490 (2)
STUDENT WORKBOOKS	(8) 3.300 (3)	(6) 3.742 (1)	(6) 3.483 (2)
ACTIVITY GUIDES	(4) 4.195 (1)	(3) 4.152 (2)	(3) 3.702 (3)
ASSEMBLIES	(7) 3.470 (1)	(7) 3.280 (2)	(9) 3.096 (3)
OTHER TEACHING AIDES (PLEASE SPECIFY) (ALSO SEPARATE LIST	(1) 4.611 (1)	(4) 4.143 (2)	(2) 4.000 (3)

7. Please rank the importance of the following teacher resources.

TEACHER WORKSHOPS/ SERVICE TRAINING	*(5) 3.934 (1)	(6) 3.774 (3)	(5) 3.904 (2)
BACKGROUND INFORMATION	(3) 4.194 (1)	(4) 3.964 (3)	(1) 4.000 (2)
IN CLASSROOM PRESENTATIONS	(2)4.246 (1)	(3) 3.976 (2)	(3) 3.936 (3)
FOLLOW-UP	(6) 3.809 (1)	(5) 3.781 (2)	(6) 3.693 (3)

COMMUNITY RESOURCES	(1) 4.277 (1)	(2) 3.985 (2)	(4) 3.923 (3)
AWARENESS	(4) 4.129 (1)	(1) 4.014 (2)	(2) 3.948 (3)

APPENDIX I.

SURVEY QUESTION RESPONSES BREAKDOWN: SUBJECT AREA TAUGHT

1. How important do you feel it is to infuse the following topics into your teaching?

	*All	Art	Business	English
ENERGY CONCEPTS	**(2) 4.256***	(2) 3.750	(3) 3.000	(4) 3.000
ENERGY CONSERVATION	(1) 4.256	(3) 3.500	(3) 3.900	(3) 3.750
ALTERNATIVE ENERGIES	(3) 3.902	(4) 3.250	(4) 2.833	(2) 3.500
ENERGY PROBLEMS & ISSUES	(4) 3.739	(3) 3.5000	(2) 3.167	(2) 3.500
ENERGY EFFECTS ON CAREERS	(5) 2.946	(1) 4.500	(3) 3.900	(3) 3.125

2. At what grade level do you feel the topics should be taught? (See Appendix IX).

3. How would you access the students' knowledge of these concepts areas?

ENERGY CONCEPTS	(2) 2.704	(2) 2.667	(5) 2.143	(3) 2.600
ENERGY CONSERVATION	(1) 3.193	(3) 2.500	(1) 2.800	(1) 2.818
ALTERNATIVE ENERGIES	(3) 2.467	(2) 2.167	(3) 2.400	(4) 2.429
ENERGY PROBLEMS & ISSUES	(4) 2.358	(1) 3.250	(2) 2.600	(2) 2.714
ENERGY EFFECTS ON CAREERS	(5) 1.433	(5) 2.000	(4) 2.250	(5) 1.923

4. How important do you feel it is that students at your grade level should understand that?

FUTURE JOB CHOICE WILL BE AFFECTED BY	(4) 2.884	(4) 4.500	(2) 4.167	(3) 4.500

ONE'S LIFESTYLE AFFECTS ENERGY CONSUMP.	(1) 4.102	(1) 5.000	(3) 4.100	(1) 4.750
DECISIONS NEED TO BE MADE RELATED TO ENERGY CONSERVATION, AVAIL. & ALTERN. SOURCES	(2) 3.625	(2) 4.900	(3) 4.100	(2) 4.643
ENERGY ISSUES INVOLVE SOCIAL, POLITICAL & ECONOMIC FACTPRS	(5) 2.843	(2) 4.900	(1) 4.500	(5) 4.300
BASIC SCIENTIFIC PRINCIPLES HELP US TO USE & CONSERVE ENERGY	(3) 3.444	(3) 4.750	(4) 3.500	(4) 4.333

5. How would you recommend that energy be taught in the curriculum?

INTEGRATED INTO VARIOUS SUBJECT AREAS	(1) 0.957	(1) 1.000	(3) 0.833	(1) 0.895
TAUGHT AS A SEPARATE COURSE	(2) 0.383	(2) 0.667	(2) 0.214	(2) 0.692

6. Please rank the following classroom resources as to their importance for further helping you teach about energy.

ENERGY EDUCATION INSTRUCTIONAL TV	(6) 3.711	(4) 3.500	(2) 3.750	(7) 2.955
TESTBOOKS FOR STUDENTS	(9) 2.940	(6) 2.000	(6) 3.250	(8) 2.950
FILMSTRIPS	(3) 4.326	(4) 3.500	(6) 3.250	(3) 3.500
MOVIES	(2) 4.352	(2) 4.833	(3) 3.500	(3) 3.444
SLIDES	(5) 4.045	(4) 3.500	(1) 3.833	(6) 3.083
STUDENT WORKBOOKS	(8) 3.245	(5) 3.000	(8) 3.100	(5) 3.333

ACTIVITY GUIDES	(4) 4.260	(5) 3.000	(3) 3.300	(3) 3.500
ASSEMBLIES	(7) 3.500	(3) 4.167	(7) 3.167	(2) 3.571
OTHER TEACHING AIDES	(1) 4.589	(1) 5.000	(4) 3.333	(1) 4.5000

7. Please rank the importance of the following teacher resources.

TEACHER WORKSHOPS/ INSERVICE TRAINING	(5) 3.826	(4) 3.500	(6) 3.167	(5) 3.000
BACKGROUND INFORMATION	(3) 4.173	(4) 3.500	(5) 3.300	(2) 4.000
IN CLASSROOM PRESENTATION	(1) 4.221	(3) 3.750	(2) 3.750	(4) 3.864
FOLLOW-UP	(6) 3.732	(1) 4.500	(3) 3.667	(6) 3.571
COMMUNITY RESOURCES	(2) 4.209	(2) 4.167	(1) 4.000	(3) 3.944
AWARENESS	(4) 4.115	(2) 4.167	(4) 3.500	(1) 4.200

*Subject area "ALL" corresponds primarily to elementary teachers who teach all subjects.
**The number in the left column in parentesis represent the rank ordering of the support fo
the teaching of the concept area mentioned.
1-5, (1= not important, 5= very important).

SURVEY QUESTION RESPONSES BY SUBJECT AREA TAUGHT (CON'T)

Survey Question #

1. How important do you feel it is to infuse the following energy topics into your teaching?

	Guidance	History	Home Economics	Industrial Arts	Fine Arts
ENERGY CONCEPTS	(4) 2.250	(5) 3.125	(4) 3.750	(5) 4.150	(2) 3.786
ENERGY CONSERVATION	(2) 3.000	(1) 4.714	(1) 4.750	(1) 4.846	(1) 4.6000
ALTERNATIVE ENERGIES	(4) 2.250	(4) 3.500	(2) 4.250	(2) 4.444	(4) 3.500
ENERGY PROBLEMS & ISSUES	(3) 2.750	(2) 4.333	(3) 4.125	(4) 4.200	(3) 3.722
ENERGY EFFECTS ON CAREERS	(1) 4.250	(3) 3.750	(5) 3.125	(3) 4.417	(5) 3.214

2. At what grade level do you feel the topics should be taught?

(See appendix J and K)

3. How would you access the students' knowledge of these concepts areas?

ENERGY CONCEPTS	(4) 3.000	(4) 2.625	(3) 2.333	(4) 2.125	(3) 2.733
ENERGY CONSERVATION	(1) 3.000	(2) 3.200	(1) 2.900	(1) 2.700	(1) 2.969
ALTERNATIVE ENERGIES	(2) 2.833	(3) 3.000	(2) 2.500	(3) 2.500	(4) 2.5000
ENERGY PROBLEMS & ISSUES	(3) 2.667	(1) 3.333	(2) 2.500	(2) 2.643	(2) 2.808
ENERGY EFFECTS ON CAREERS	(3) 2.667	(5) 1.500	(4) 1.500	(5) 1.833	(5) 1.773

SURVEY QUESTION RESPONSES BY SUBJECT AREA TAUGHT (CON'T)

Survey Question #

4. How important do you feel it is that students at your level should understand that?

	Guidance	History	Home Economics	Industrial Arts	Language Art
FUTURE JOB CHOICE WILL BE AFFECTED BY ENERGY AVAILABILITY	(3) 4.000	(3) 3.667	(2) 4.000	(1)4.727	(3) 4.167
ONE'S LIFESTYLE AFFECTS ENERGY CONSUMP.	(1) 4.667	(1) 4.333	(1) 4.500	(2) 4.650	(4.607
DECISIONS NEED TO BE MADE RELATED TO ENERGY CONSERVATION, AVAIL. & ALTERN. SOURCES	(3) 4.000	(2) 3.750	(1) 4.500	(3) 4.556	(4) 4.125
ENERGY ISSUES INVOLVE SOCIAL. POLITICAL & ECONOMIC FACTORS	(2)4.250	(5) 3.125	(3) 3.417	(4) 4.050	(5) 4.000
BASIC SCIENTIFIC PRINCIPLES HELP US TO USE & CONSERVE ENERGY	(1) 4.667	(4) 3.625	(2) 4.000	(4) 4.050	(2) 4.188

5. How would you recommend that energy be taught in the curriculum?

INTEGRATED INTO VARIOUS SUBJECT AREAS	(1) 1.000	(1) 0.929	(1) 1.000	(1) 1.000	(1) 0.900
TAUGHT AS A SEPARATE COURSE	(2) 0	(2) 0.600	(2) 0.500	(2) 0.667	(2) 0.750

6. Please rank the following classroom resources as to their importance for further helping you teach about energy.

ENERGY EDUCATION INSTRUCTIONAL TV	(6) 2.833	(6) 3.125	(7) 3.571	(6) 3.286	
TEXTBOOKS FOR STUDENTS	(7) 2.167	(8) 2.333	(6) 3.167	(9) 3.000	(9) 3.000
FILMSTRIPS	(5) 3.000	(2) 3.875	(2) 4.000	(6) 3.583	(4) 3.929
MOVIES	(1) 3.750	(1) 4.6000	(3) 3.833	(2) 4.222	(3) 4.000
SLIDES	(3) 3.250	(3) 3.375	(5) 3.500	(4) 3.750	(5) 3.875
STUDENT WORKBOOKS	(4) 3.167	(4) 3.333	(4) 3.700	(3) 3.800	(7) 3.125
ACTIVITY GUIDES	(2) 3.500	(7) 3.000	(1) 4.500	(5) 3.700	(2) 4.050
ASSEMBLIES	(1) 3.750	(5) 3.250	(7) 2.500	(8) 3.143	(8) 3.111
OTHER TEACHING AIDES	(5) 3.000	(7) 3.000	(2) 4.000	(1) 4.700	(1) 4.857

7. Please rank the importance of the following teacher resources.

TEACHER WORKSHOPS/ INSERVICE TRAINING	(4) 3.000	(2) 3.875	(1) 4.600	(1) 4.556	(5) 4.000
BACKGROUND INFO.	(3) 3.833	(2) 3.875	(3) 4.100	(2) 4.143	(6) 3.944
IN CLASSROOM PRESENTATION	(2) 4.000	(2) 3.875	(2) 4.333	(5) 3.818	(1) 4.318
FOLLOW-UP	(3) 3.833	(3) 3.200	(4) 4.000	(6) 3.813	(4) 4.111
COMMUNITY RESOURCES	(1) 4.250	(4) 3.083	(3) 4.100	(4) 3.909	(2) 4.300
AWARENESS	(2) 4.000	(1) 4.333	(5) 3.875	(3) 4.000	(3) 4.188

SURVEY QUESTION RESPONSES BY SUBJECT AREA TAUGHT (CON'T)

Survey Question #

1. How important do you feel it is to infuse the following energy topics into your teaching?

	Language	Library Resources	Math	Music	Principal
ENERGY CONCEPTS	(3) 3.000	(3) 4.000	(3) 4.050	(3) 2.500	(2) 4.667
ENERGY CONSERVATION	(1) 4.250	(1) 5.000	(1) 4.659	(1) 2.833	(1) 4.750
ALTERNATIVE ENERGIES	(2) 3.250	(1) 5.000	(2) 4.111	(4) 2.167	(3) 4.000
ENERGY PROBLEMS & ISSUES	(2) 3.250	(2) 4.500	(3) 4.050	(4) 2.167	(2) 4.667
ENERGY EFFECTS ON CAREERS	(4) 2.333	(4) 3.500	(4) 4.000	(2) 2.667	(3) 4.000

2. At what grade level do you feel the topics should be taught?

(See Appendix J and K)

3. How would you assess the students' knowledge of these concept areas?

ENERGY CONCEPTS	(2) 3.000	(2) 2.250	(4) 2.333	(3) 2,375	(2) 2.500
ENERGY CONSERVATION	(1) 3.200	(2) 2.250	(1) 2.594	(1) 2.750	(1) 3.000
ALTERNATIVE ENERGIES	(3) 2.875	(1) 2.750	(3) 2.393	(2) 2.667	(2) 2.500
ENERGY PROBLEMS & ISSUES	(3) 2.875	(2) 2.250	(2) 2.542	(1) 2.750	(3) 2.100
ENERGY EFFECTS ON CAREERS	(4) 2.000	(3) 2.000	(5) 1.679	(4) 1.667	(4) 1.500

SURVEY QUESTION RESPONSES BY SUBJECT AREA TAUGHT (CON'T)

Survey Question #		Language	Library Resources	Math	Music	Principal
4.	How important do you feel it is that students at your grade level should understand that?					
	FUTURE JOB CHOICES WILL BE AFFECTED BY ENERGY AVAILABILITY	(3) 4.000	(3) 3.000	(4) 4.346	(3) 4.333	(2) 4.500
	ONE'S LIFESTYLE AFFECTS ENERGY CONSUMP.	(2) 4.125	(1) 4.250	(1) 4.708	(1) 4.800	(1) 4.750
	DECISIONS NEEDS TO BE MADE RELATED TO ENERGY CONSERVATION, AVAIL. & ALTERN. SOURCES	(1) 4.250	(1) 4.250	(3) 4.500	(2) 4.625	(2) 4.500
	ENERGY ISSUES INVOLVE SOCIAL, POLITICAL & ECONOMIC FACTORS	(3) 4.000	(3) 3.000	(2) 4.595	(2) 4.625	(4) 4.000
	BASIC SCIENTIFIC PRINCIPLES HELP US TO USE & CONSERVE ENERGY	(4) 3.500	(2) 3.500	(3) 4.500	(3) 4.333	(3) 4.167
5.	How would you recommend that energy be taught in the curriculum?					
	INTEGRATED INTO VARIOUS SUBJECT AREAS	(1) 0.833	(1) 1.000	(1) 0.846	(1) 0.917	(1) 1.000
	TAUGHT AS A SEPARATE COURSE	(2) 0.750	(1) 1.000	(2) 0.500	(2) 0.250	(2) 0.0

SURVEY QUESTION RESPONSES BY SUBJECT AREA TAUGHT (CON'T)

Survey
Question #

6. Please rank the following classroom resources as to their importance for further helping you teach about energy.

	Language	Library Resources	Math	Music	Principal
ENERGY EDUCATION INSTRUCTIONAL TV	(3) 4.000	(1) 4.500	(8) 3.111	(5) 2.500	(7) 2.250
TEXTBOOKS FOR STUDENTS	(3) 4.000	(5) 2.500	(9) 2.864	(5) 2.500	(5) 3.500
FILMSTRIPS	(1) 4.667	(2) 4.000	(4) 3.400	(3) 3.000	(1) 4.750
MOVIES	(1) 4.667	(1) 4.500	(1) 4.050	(3) 3.000	(2) 4.500
SLIDES	(1) 4.667	(4) 3.000	(2) 3.556	(4) 2.833	(5) 3.500
STUDENT WORKBOOKS	(2) 4.250	(5) 2.500	(7) 3.154	(4) 2.833	(4) 3.833
ACTIVITY GUIDES	(4) 3.667	(1) 4.500	(3) 3.455	(1) 3.833	(3) 4.167
ASSEMBLIES	(5) 3.500	(3) 3.500	(6) 3.167	(2) 3.500	(6) 3.000
OTHER TEACHING AIDES	(6) 3.000	(6) 0	(5) 3.250	(3) 3.000	(2) 4.500

7. Please rank the importance of the following teacher resources.

TEACHER WORKSHOPS/ INSERVICE TRAINING	(6) 3.000	(1) 5.000	(5) 3.600	(4) 3.167	(1) 4.750
BACKGROUND INFORMATION	(5) 3.250	(2) 4.000	(1) 4.100	(3) 3.500	(3) 4.167
IN CLASSROOM PRESENTATION	(4) 3.750	(3) 3.500	(2) 4.029	(3) 3.500	(3) 4.167

FOLLOW-UP	(3) 3.875	(3) 3.500	(6) 3.500	(3) 3.500	(2) 4.500
COMMUNITY RESOURCES	(2) 4.125	(1) 5.000	(3) 4.000	(1) 4.167	(3) 4.167
AWARENESS	(1) 4.250	(1) 5.000	(4) 3.917	(2) 4.000	(1) 4.750

SURVEY QUESTION RESPONSES BY SUBJECT AREA TAUGHT (CON'T)

Survey Question #

1. How important do you feel it is to infuse the following energy topics into your teaching?

	Physical Education	Social Studies	Science	Special Education	Career Education
ENERGY CONCEPTS	(3) 3.5000	(4) 3.650	(2) 4.738	(4) 3.789	(2) 4.000
ENERGY CONSERVATION	(1) 4.333	(1) 4.389	(1) 4.804	(1) 4.682	(2) 4.000
ALTERNATIVE ENERGIES	(2) 4.000	(3) 3.667	(3) 4.679	(2) 4.250	(2) 4.000
ENERGY PROBLEMS & ISSUES	(3) 3.500	(2) 4.125	(4) 4.530	(3) 3.944	(1) 5.000
ENERGY EFFECTS ON CAREERS	(4) 3.167	(5) 3.250	(5) 3.833	(5) 3.167	(1) 5.000

2. At what grade level do you feel the topics should be taught?

SEE TABLE I

3. How would you assess the students' knowledge of these concept areas?

ENERGY CONCEPTS	(2) 2.400	(4) 2.542	(2) 2.943	(2) 2.417	(1) 3.000
ENERGY CONSERVATION	(1) 2.938	(1) 3.091	(1) 3.148	(1) 3.000	(1) 3.000
ALTERNATIVE ENERGIES	(4) 2.000	(3) 2.750	(4) 2.883	(3) 2.000	(2) 2.000
ENERGY PROBLEMS & ISSUES	(3) 2.063	(2) 2.818	(3) 2.931	(4) 1.857	(1) 3.000
ENERGY EFFECTS ON CAREERS	(5) 1.313	(5) 2.063	(5) 1.880	(5) 1.250	(2) 2.000

SURVEY QUESTION RESPONSES BY SUBJECT AREA TAUGHT (CON'T)

Survey Question #

4. How important do you feel it is that students at your grade level should understand that?

	Social Studies-R	Math Social Studies	Math Science	Science English	History Science
FUTURE JOB CHOICE WILL BE AFFECTED BY ENERGY AVAILABILITY	(4) 4.167	(4) 4.167	(4) 4.143	(3) 4.250	(2) 4.000
ONE'S LIFESTYLE AFFECTS ENERGY CONSUMP.	(2) 4.500	(2) 4.500	(1) 4.821	(1) 5.000	(1) 5.000
DECISIONS NEED TO BE MADE RELATED TO ENERGY CONSERVATION, AVAIL. & ALTERN. SOURCES	(1) 4.750	(1) 4.750	(3) 4.550	(1) 5.000	(2) 4.000
ENERGY ISSUES INVOLVE SOCIAL, POLITICAL & ECONOMIC FACTORS	(2) 4.500	(2) 4.500	(5) 4.063	(2) 4.750	(3) 3.000
BASIC SCIENTIFIC PRINCIPLES HELP US TO USE & CONSERVE ENERGY	(3) 4.250	(3) 4.250	(2) 4.708	(4) 4.000	(2) 4.500

5. How would you recommend that energy be taught in the curriculum?

INTEGRATED INTO VARIOUS SUBJECT AREA	(1) 1.000	(1) 1.000	(1) 0.933	(1) 0.750	(1) 1.000
TAUGHT AS A SEPARATE COURSE	(2) 0.500	(2) 0.500	(2) 0.600	(1) 0.750	(2) 0.500

SURVEY QUESTION RESPONSE BY SUBJECT AREA TAUGHT (CON'T)

Survey
Question #

6. Please rank the following classroom resources as to their importance for further helping you teach about energy.

	Social Studies-R	Math Social Studies	Math Science	Science English	History Science
ENERGY EDUCATION INSTRUCTIONAL TV	(4) 1.500	(4) 1.500	(7) 3.500	(6) 2.000	(3) 3.000
TEXTBOOKS FOR STUDENTS	(3) 2.000	(3) 2.000	(6) 3.600	(4) 3.750	(3) 3.000
FILMSTRIPS	(2) 3.500	(2) 3.500	(2) 4.375	(3) 4.000	(2) 4.000
MOVIES	(2) 3.500	(2) 3.500	(1) 4.500	(2) 4.250	(2) 4.000
SLIDES	(1) 4.000	(1) 4.000	(4) 4.063	(3) 4.000	(2) 4.000
STUDENT WORKBOOKS	(1) 4.000	(1) 4.000	(5) 4.000	(4) 3.750	(1) 5.000
ACTIVITY GUIDES	(2) 3.500	(2) 3.500	(3) 4.143	(1) 4.750	(3) 3.000
ASSEMBLIES	(1) 4.000	(1) 4.000	(8) 3.111	(5) 3.000	(4) 0
OTHER TEACHING AIDES	(5) 0	(5) 0	(1) 4.500	(7) 0	(1) 5.000

7. Please rank the importance of the following teacher resources.

TEACHER WORKSHOPS/ INSERVICE TRAINING	(2) 4.500	(2) 4.500	(3) 4.214	(3) 3.750	(1) 5.000
BACKGROUND INFORMATION	(1) 4.667	(1) 4.667	(2) 4.357	(1) 4.250	(3) 0
IN CLASSROOM PRESENTATION	(1) 4.667	(1) 4.667	(1) 4.429	(2) 4.000	(3) 0

FOLLOW-UP	(2) 4.500	(2) 4.500	(6) 3.929	(4) 3.000	(3) 0
COMMUNITY RESOURCES	(3) 4.000	(3) 4.000	(5) 3.938	(2) 4.000	(1) 5.000
AWARENESS	(4) 3.333	(4) 3.333	(4) 4.000	(2) 4.000	(2) 4.000

Appendix J

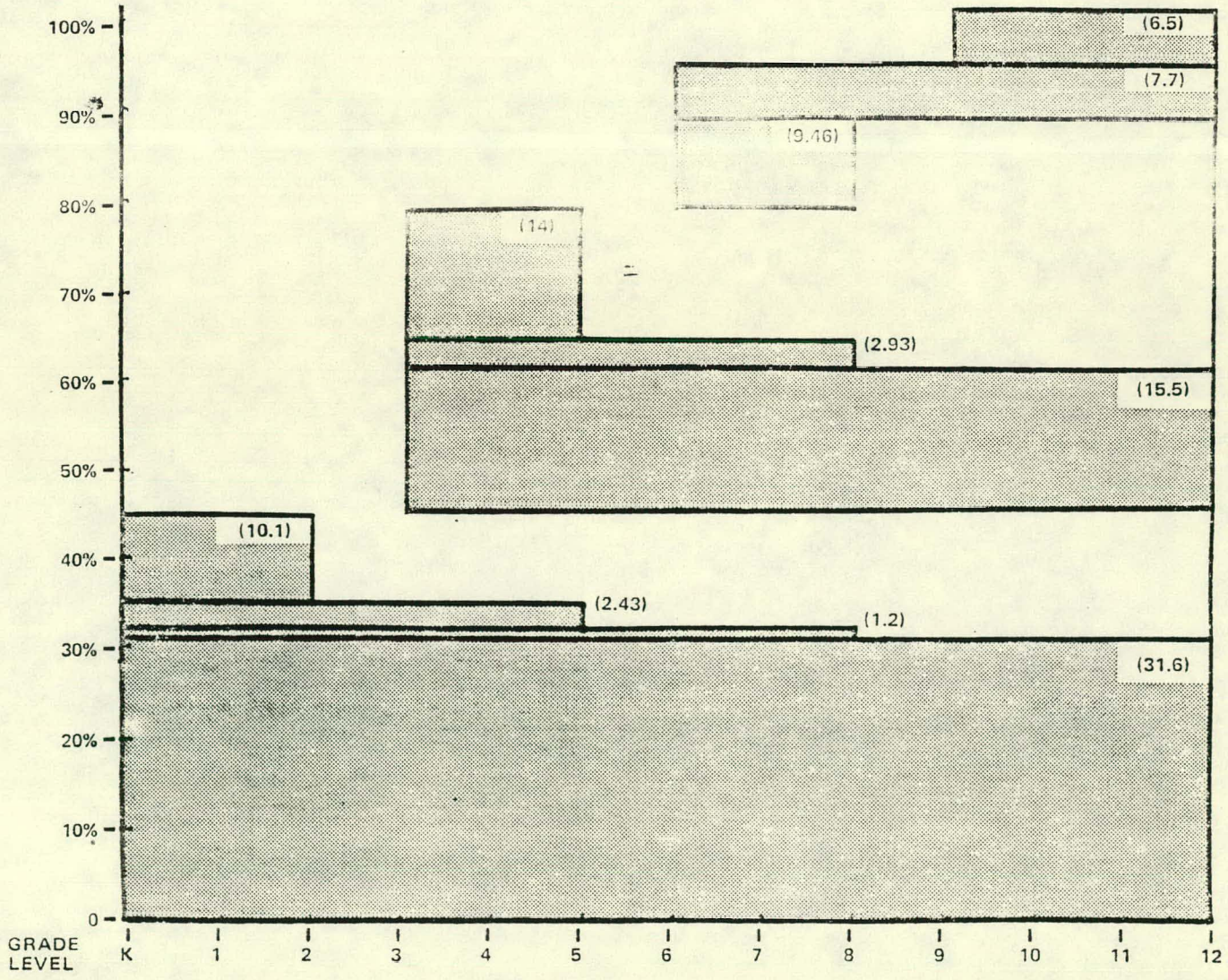
Question 2

*GRADE LEVEL RECOMMENDATION TO TEACH ENERGY TOPICS

The following five graphs illustrate the percentage of responses (Question 2) which support the teaching of the topics (energy concepts, conservation, etc.) at the designated grade levels. Each graph represents 100% of the responses.

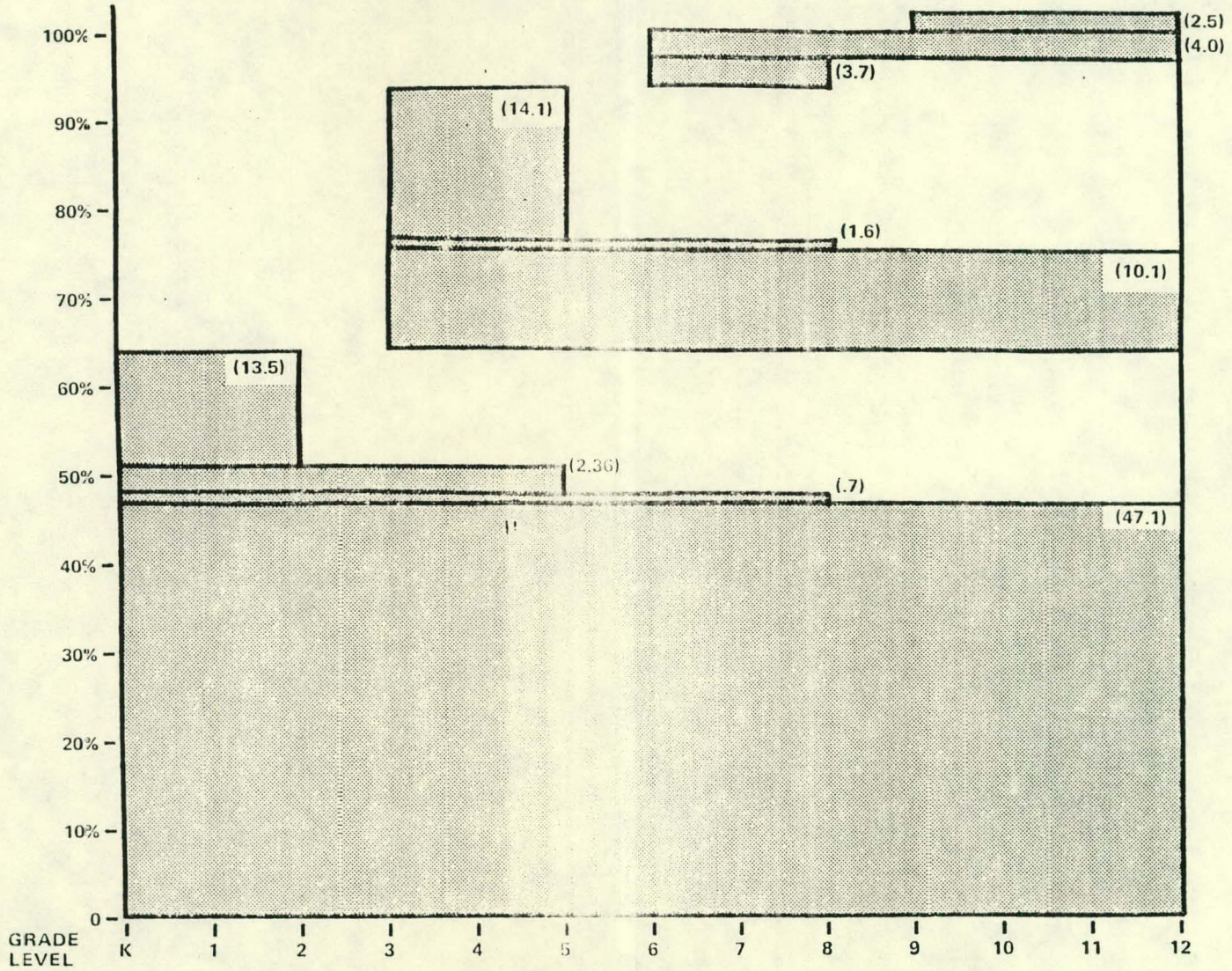
The purpose of these graphs is to provide information for educators interested in developing grade level specific energy education programs.

CONCEPTS

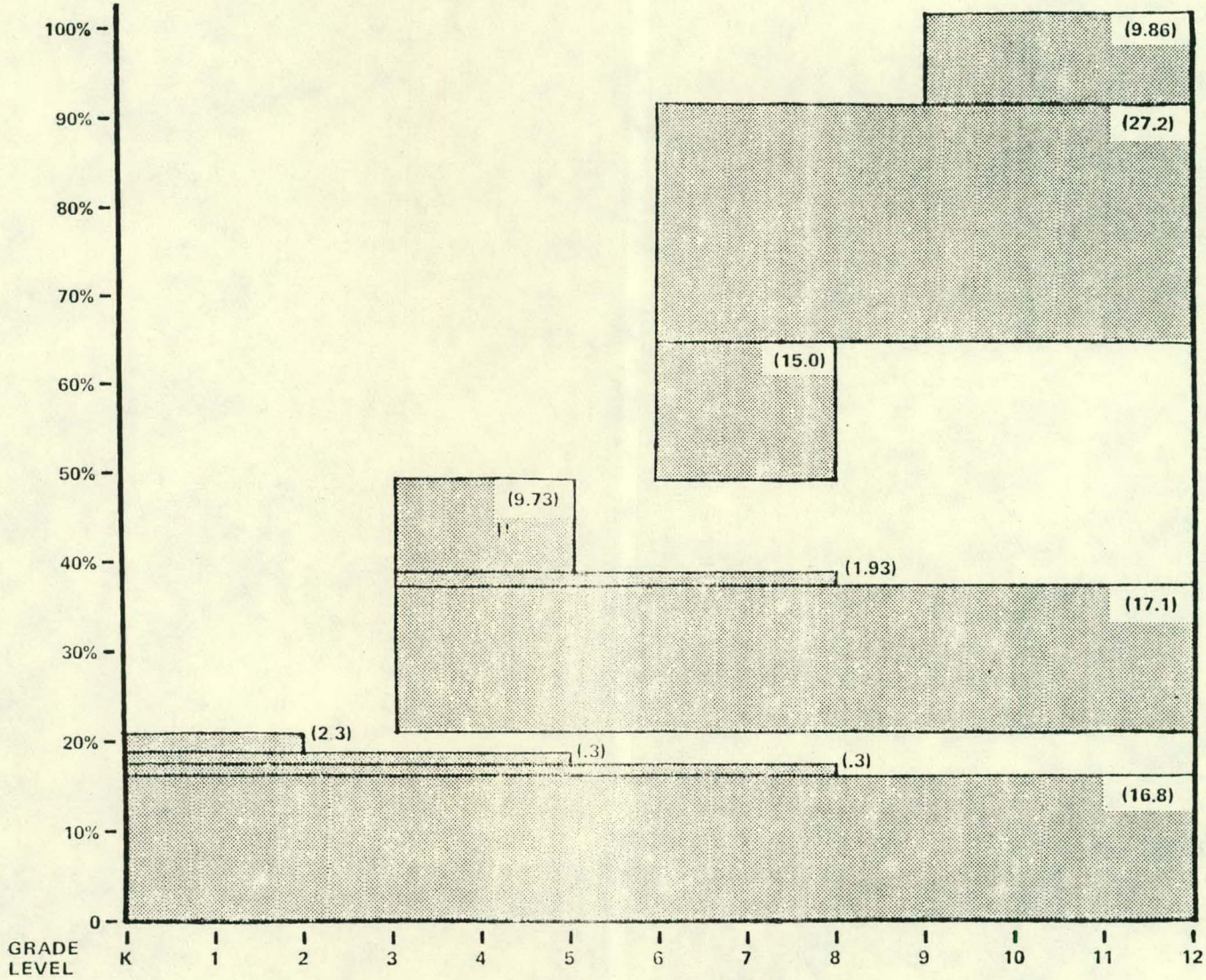


*NOTE: Graphs represent whole sample response

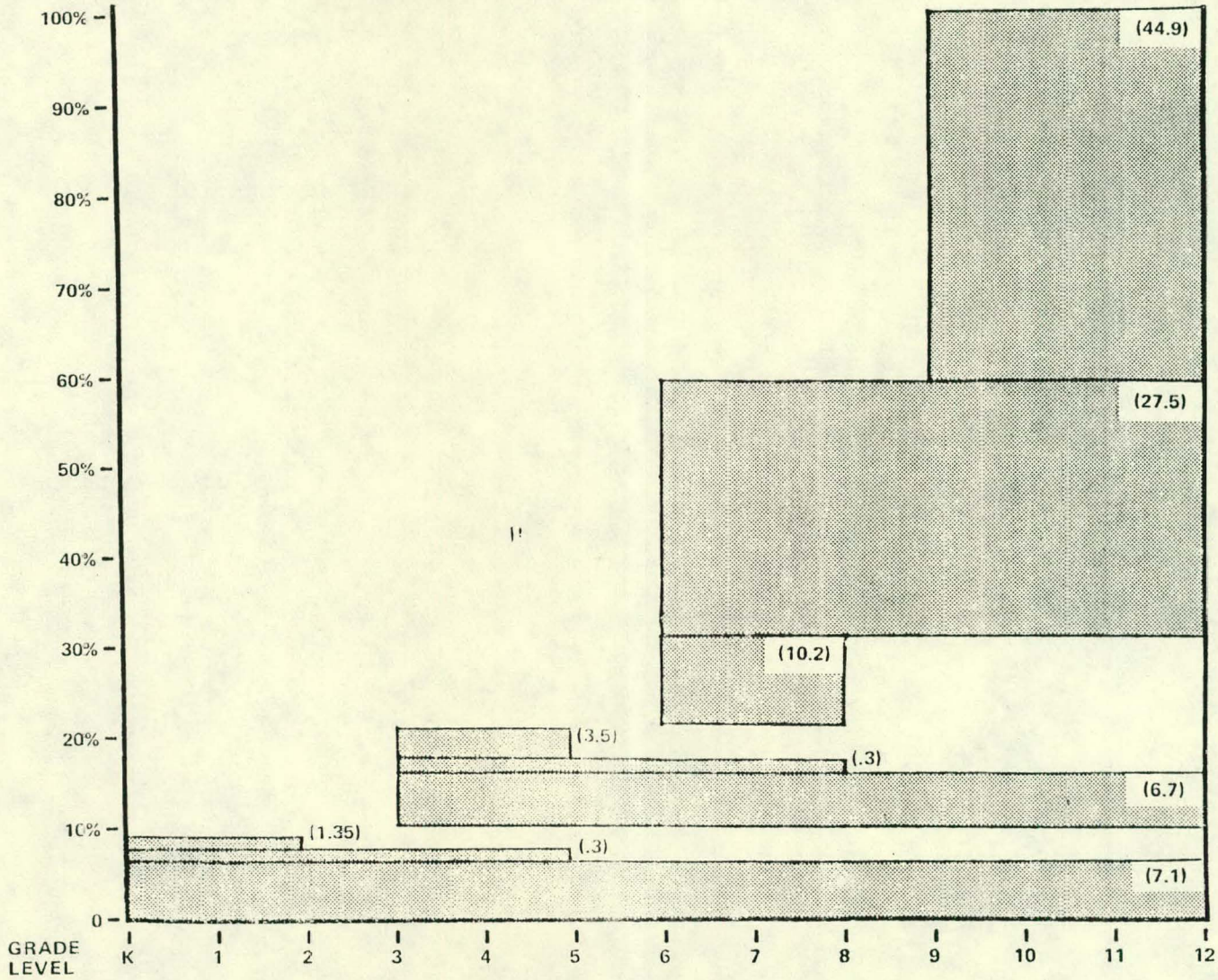
CONSERVATION



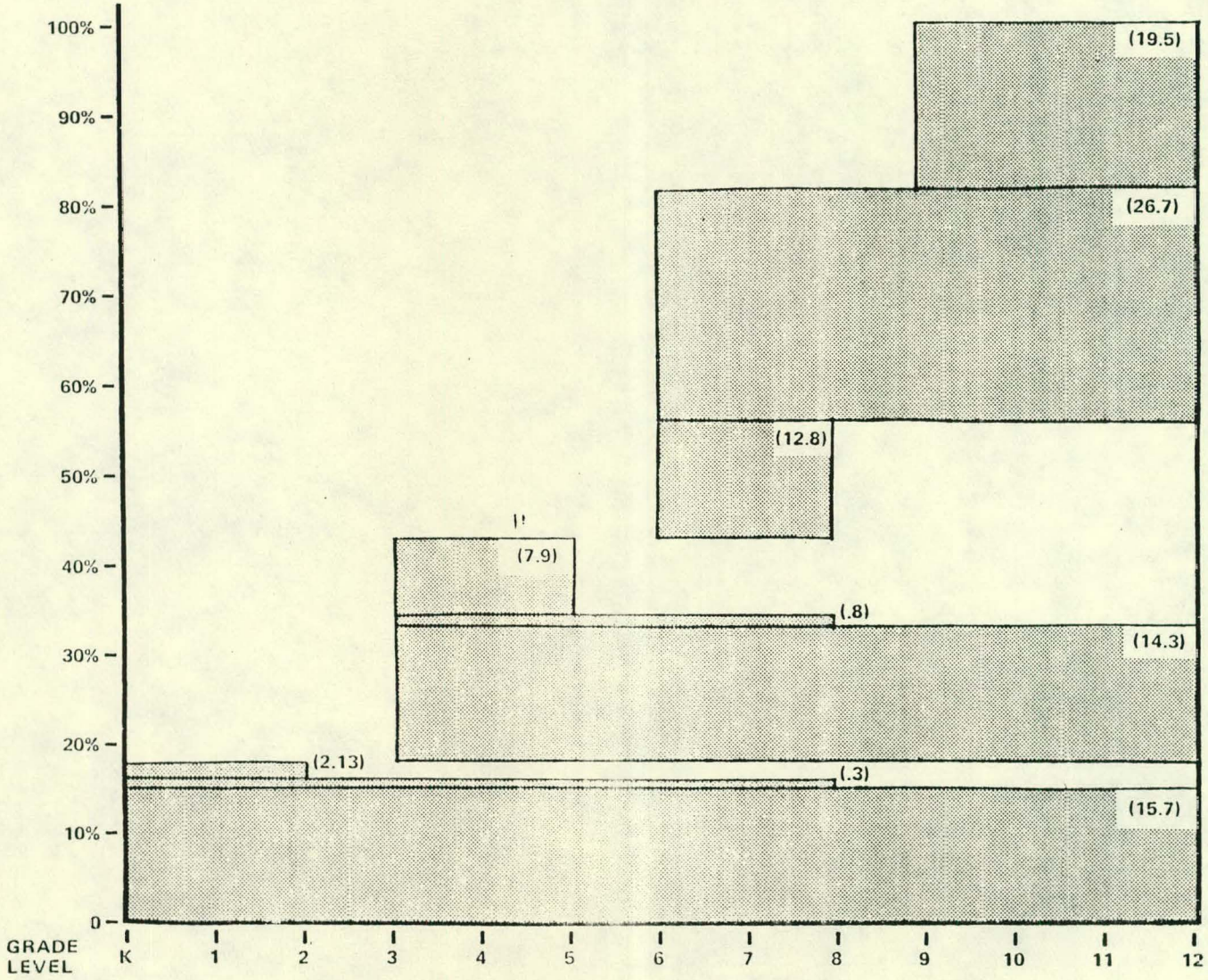
ALTERNATIVE ENERGY



ENERGY EFFECTS ON CAREERS



ENERGY PROBLEMS AND ISSUES



APPENDIX K

Question 2: Grade Level Recommendations to Teach Energy Topics - Whole Sample and Subgroups Tables

The following tables show the percentage of responses to Question 2.

2. At what grade level do you feel the topics should be taught?

WHOLE SAMPLE (Selected, MG, 4C)

	Energy Concepts	Energy Conservation	Alternative Energies	Energy Problems Issues	Energy Effects on Careers
K-2	10.1	13.5	2.3	2.13	1.35
K-12	31.6	47.1	16.8	15.7	7.1
3-5	14	14.1	9.73	7.9	3.5
3-8	2.93	1.6	1.93	.8	.3
3-12	15.5	10.1	17.1	14.3	6.7
6-8	9.46	3.7	15.0	12.8	10.2
6-12	7.7	4.0	27.2	26.7	27.5
9-12	6.5	2.5	9.86	19.5	44.9
K-15	2.43	2.36	.3	-	.3
K-8	1.2	.7	.3	.3	-

Selected group

	Concepts	Conservation	Alternatives	Issues	Careers
K-2	14.4	15.0	1.9	1.2	1.0
K-12	33.7	45.8	11.7	11.7	5.0
3-5	11.5	15.9	10.7	9,7	--
3-8	1.9	1.9	1.0	--	--
3-12	10.6	7.5	21.4	17.5	6.9
6-8	7.7	2.8	14.6	8.7	12.9
6-12	9.6	3.7	27.2	31.1	29.7
9-12	7.7	2.8	11.7	20.4	44.6
K-5	2.9	3.7	--	--	--
K-8	--	.9	--	--	--

Table I - Con't

MINIGRANT GROUP

	Concepts	Conservation	Alternatives	Issues	Careers
K-2	6.7	16.4	3.3	3.4	1.7
K-12	30.0	47.5	23.0	22.0	10.0
3-5	15.0	11.5	11.5	8.5	5.0
3-8	3.3	1.6	1.6	1.7	--
3-12	21.7	11.5	14.8	8.5	8.3
6-8	10.0	3.3	13.1	13.6	8.3
6-12	6.7	4.9	29.5	22.0	23.3
9-12	5.0	1.6	3.3	20.3	43.3
K-5	1.7	1.6	--	--	--
K-8	--	--	--	--	--

4C GROUP

	Concepts	Conservation	Alternatives	Issues	Careers
K-12	9.2	9.1	1.2	1.9	--
K-12	31.2	48.2	15.8	13.5	6.3
3-5	15.7	14.9	7.0	5.6	2.1
3-8	3.6	1.5	3.2	.9	.3
3-12	14.2	11.4	15.5	17.0	5.1
6-8	10.7	5.0	17.3	16.1	9.4
6-12	6.8	3.5	24.9	27.2	29.6
9-12	4.5	3.2	14.6	17.8	46.8
K-5	2.7	1.8	.3	--	.3
K-8	1.2	1.2	.3	.3	--

* Colums may not add up to 100% due to missing data.

APPENDIX L

LIST OF RESOURCES MENTIONED IN RESPONSE TO QUESTION 6 & 8

There were two questions where teachers were asked about helpful resources in energy education. Question 6 asked "Please rank the following classroom resources as to their importance for further helping you teach about energy". Part i of this question asked respondents to list other resources not mentioned in the question. The following is a list of these. The number appearing after the resource represents the number of times the resource was mentioned by different teachers. Many teachers did not complete this section of the questionnaire indicating an unawareness of what is available to them.

Speakers (3)
Fieldtrips (27)
Hands-on Projects (19)
Newspapers/News (10)
Visual Aids (8)
Resource People (7)
Other Teachers (5)
Class Discussion (3)
Background Information (2)
Pamphlets (1)
Stationwork (1)
Student Materials (1)
Energy Fairs (1)
Teacher Education (1)
Displays (1)
Poster Contests (1)
Books (1)

Question 8 asked "Please list the resources/workshops which you have found most effective in helping you teach about energy and where they may be obtained. If a specific resource was mentioned by more than one teacher, the number of times it was mentioned is in parenthesis. The particularitems are listed as they appeared on the questionnaires.

Government Publications

Farmers Home Administration
Department of Energy
National Science Teachers Association
    Energy and Education, newsletter (2)
    Project for an Energy Enriched Curriculum (4)
Environment News, newsletter
Consumer Information Catalog
Office of Environment Protection

Industrial Publicaktions

Mobil Corp.
Shell Oil
Dead River Co.
Northern Lights Ltd, Farmington
Exxon Co.
Central Maine Power Co.

Educational Television (7)

Field Trips

Maine Audubon Society (2)
Rumford Falls Power Co.
Maine Yankee (2)

Text Books

Holt, Co.
Energy: A Physical Science

Professional Books

Energy Future
Harvard University

Energy, Man and Society
Earl Cook

The Consumers World

Save Energy-Save Dollars

Solar Concepts
Maine Audubon

Small is Beautiful
E. F. Skchumacker

Solar Energy-Power for Tomorrow
J. J. Haggerty

Coal Gasification
Texas Star

The Energy Outlook
Stanley Angrist

What Energy Crisis?
Journal of Am. Bankers Association
Garden Way Publishers

Materials from Private Groups

Maine Audubon (9)
Cornerstones
Shelter Institute (2)

Newspaper (17)

Maine Times
Bangor Daily News

Maine Teacher

What Energy Crisis?
Journal of Am. Bankers Association
Garden Way Publishers

Materials from Private Groups.

Maine Audubon (9)
Cornerstones
Shelter Institute (2)
Northwest Solar Energy Center (3)

Newspapers. (17)

Maine Times
Bangor Daily News
Maine Teacher

Magazines (9)

Popular Science (3)
Time (3)
Newsweek (3)
Field and Stream
Mother Earth News (2)
Country Journal

Films

"The World of Energy"
DOE films (4)
Shell Oil (2)
Exxon (2)
"Exploring Matter and Energy"
Texaco
Mobile

Guest Speakers (3)

Central Maine Power
Lewis Parker
Maine Public Service Co.

Workshops (10)

National Science Foundation
University of Maine-Orono (5)
Maine Audubon
University of Maine-Farmington (2)
University of Rhode Island (4)
Office of Energy Resources (2)
Annual Energy Education Practictioners Conference
University of Vermont

Educational Publications.

Weekly Reader (4)
News Explorer
Solar Energy Project
Project Tree (5)
Scholastic News Times
Maine Teacher

Government Services.

Mark Anker
Oxford County CAP
Minigrant Program (2)
Office of Energy Resources (3)

Colleges/Universities.

Westbrook College
University of Southern Maine
Bates College
Rick Shea
Bowdoin College
Dept. of Physics
Cooperation Extension Service (3)
University of Maine-Farmington (3)
Steve Godemsky
Western Maine Energy Center - UMF
University of Maine-Orono
"Energy and Man" - D. Hill

Miscellaneous.

Libraries
Poster Contests
Maine Conservation School
Energy Bus - UMF (94)
Science/Energy Fairs (5)

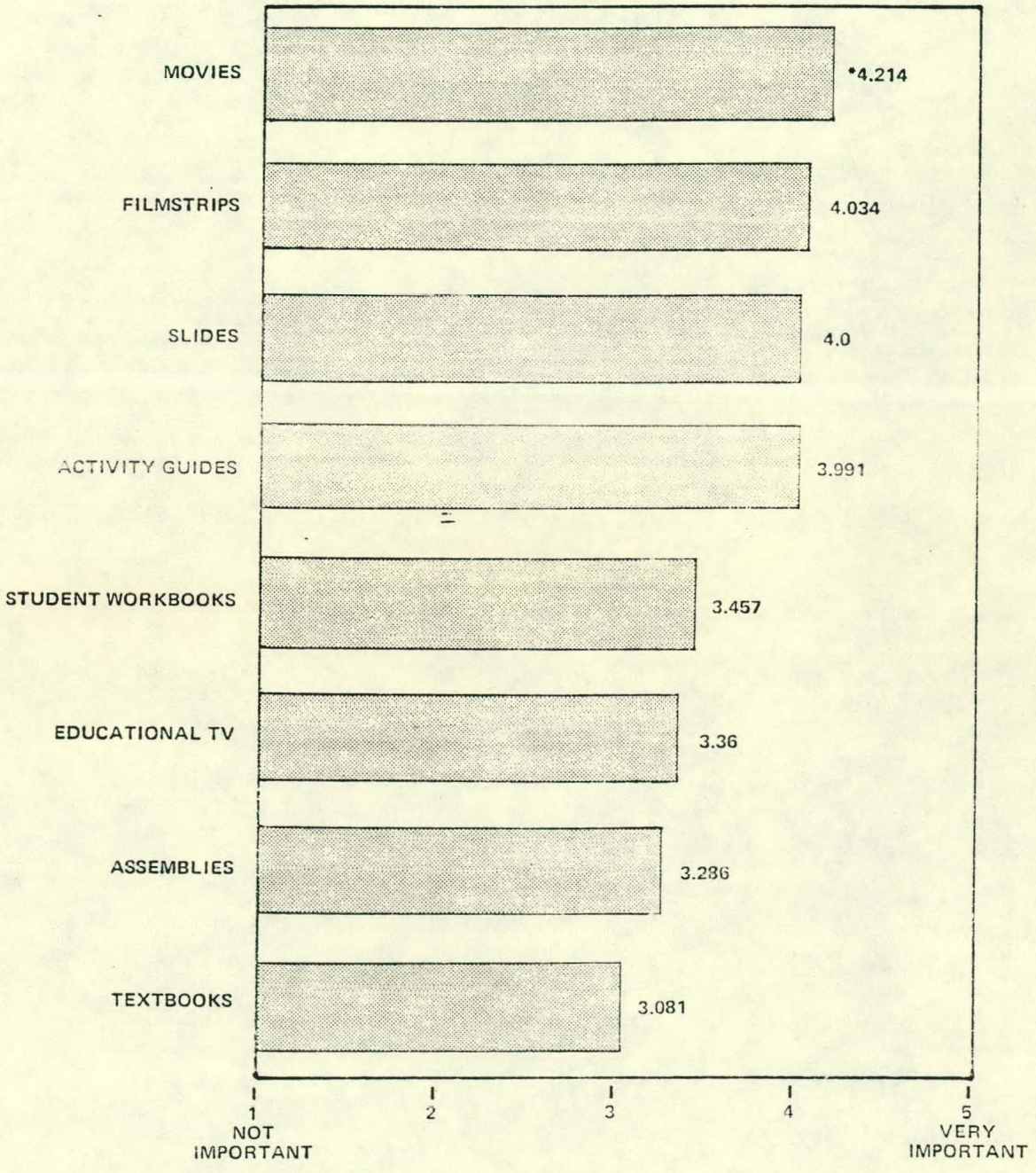
*Note+ This particular list may be somewhat misleading. It actually represents workshops, courses and resource people. It does not necessarily represent on-going course offerings.

Appendix M

Question 6

KINDS OF INSTRUCTIONAL RESOURCES NEEDED TO TEACH ABOUT ENERGY

For All Grades, K-12
(Listed in order of importance)



*NOTE: Numbers indicate median response

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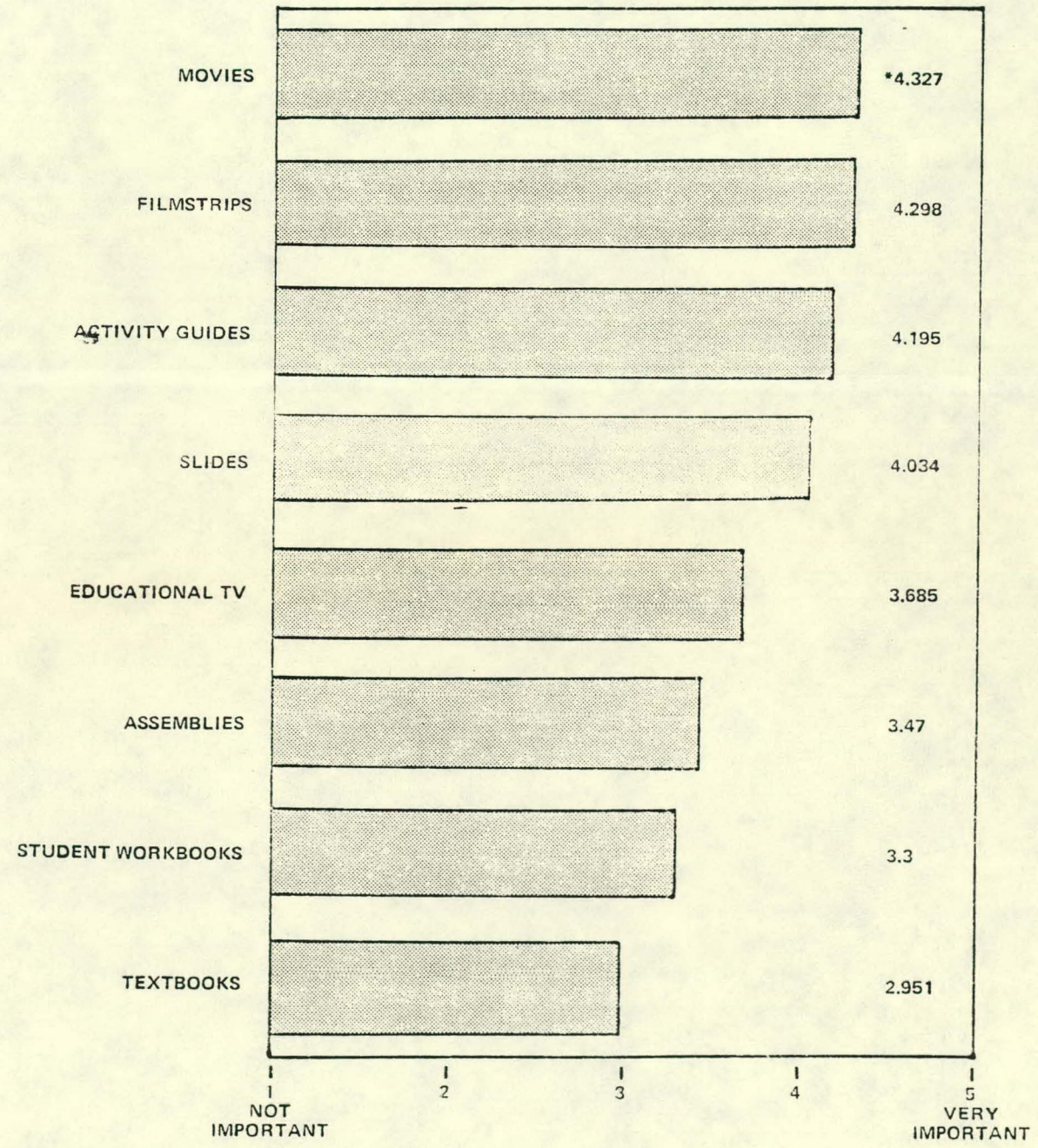
Question 6

KINDS OF INSTRUCTIONAL RESOURCES NEEDED TO TEACH ABOUT ENERGY

For Grades K-6
(Listed in order of importance)



*NOTE: Numbers indicate median response

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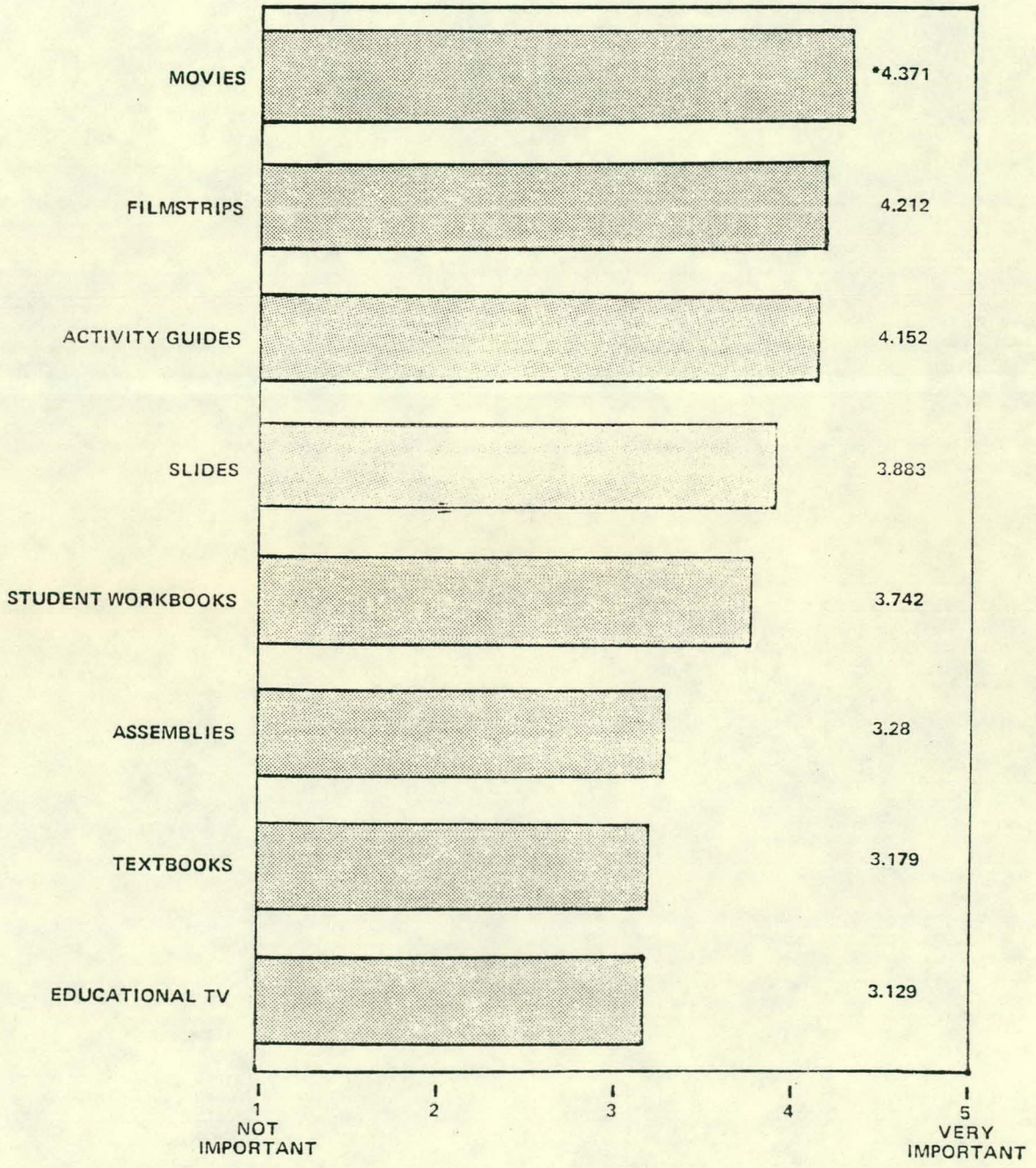
Question 6

KINDS OF INSTRUCTIONAL RESOURCES NEEDED TO TEACH ABOUT ENERGY

For Grades 7-8
(Listed in order of importance)



NOTE: Numbers indicate median response

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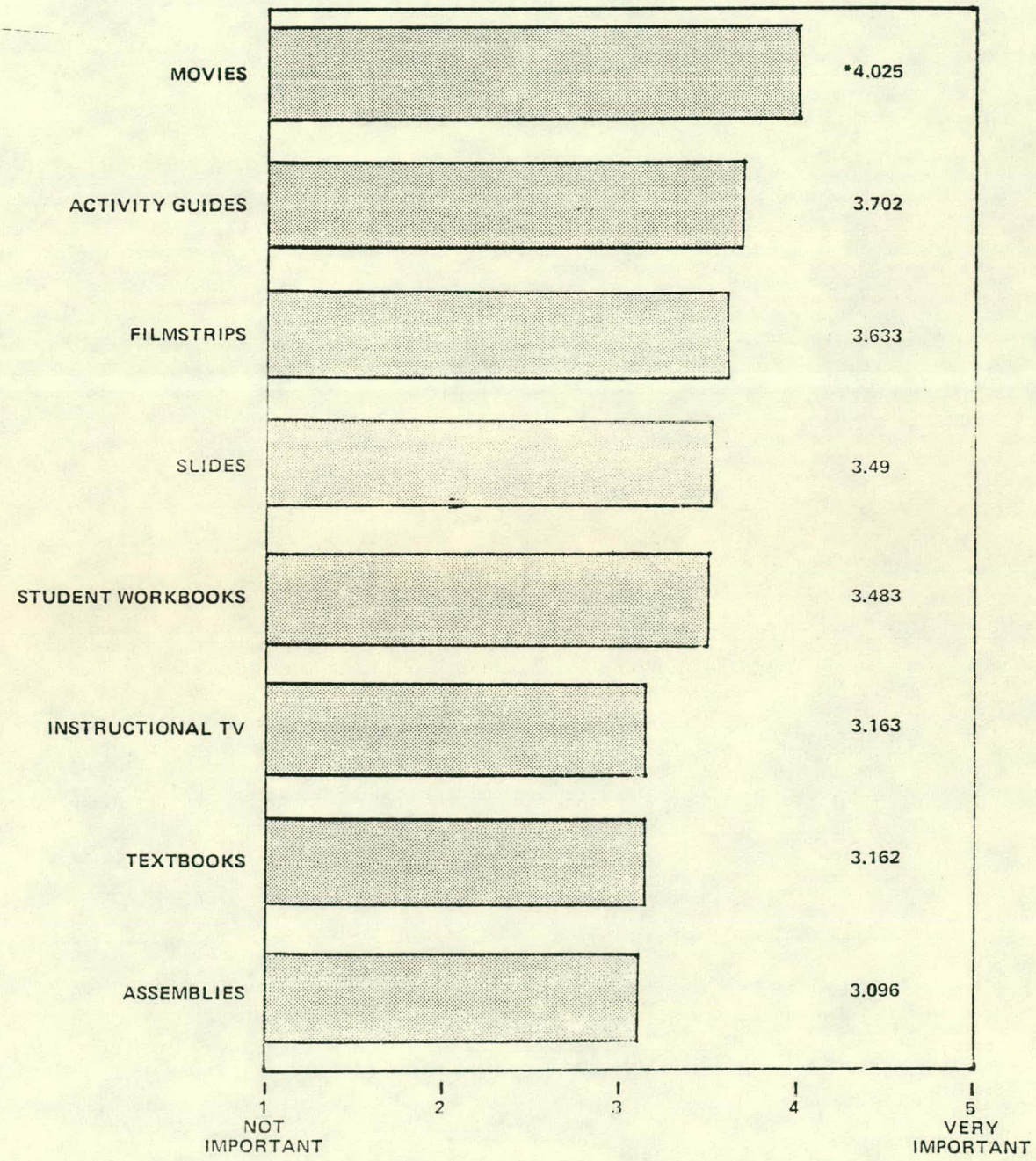
Question 6

KINDS OF INSTRUCTIONAL RESOURCES NEEDED TO TEACH ABOUT ENERGY

For Grades 9-12
(Listed in order of importance)



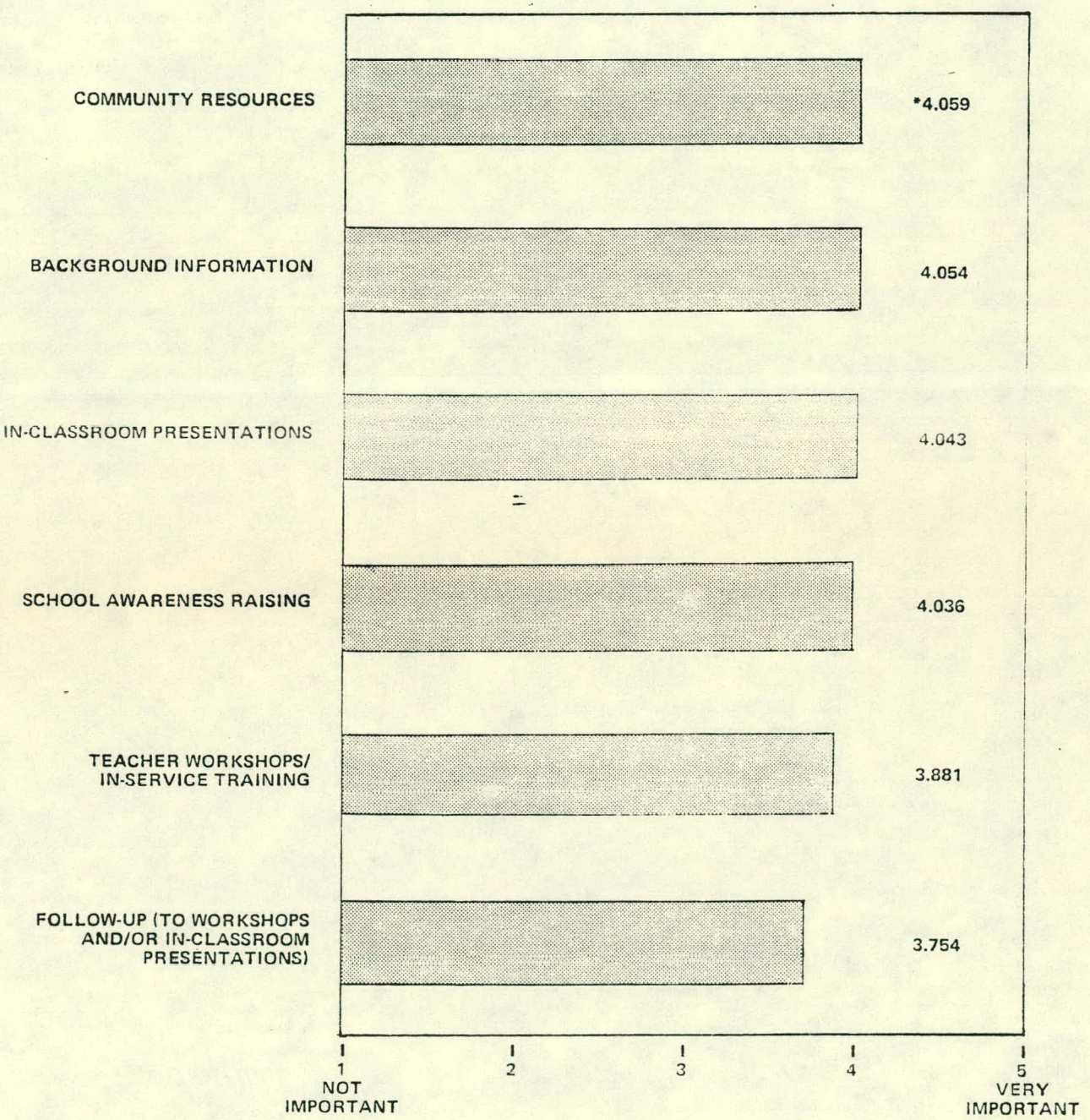
*NOTE: Numbers indicate median response

Ap Q

Question 7

KINDS OF TEACHER RESOURCES NEEDED TO TEACH ABOUT ENERGY

For All Grades, K-12
(Listed in order of importance)



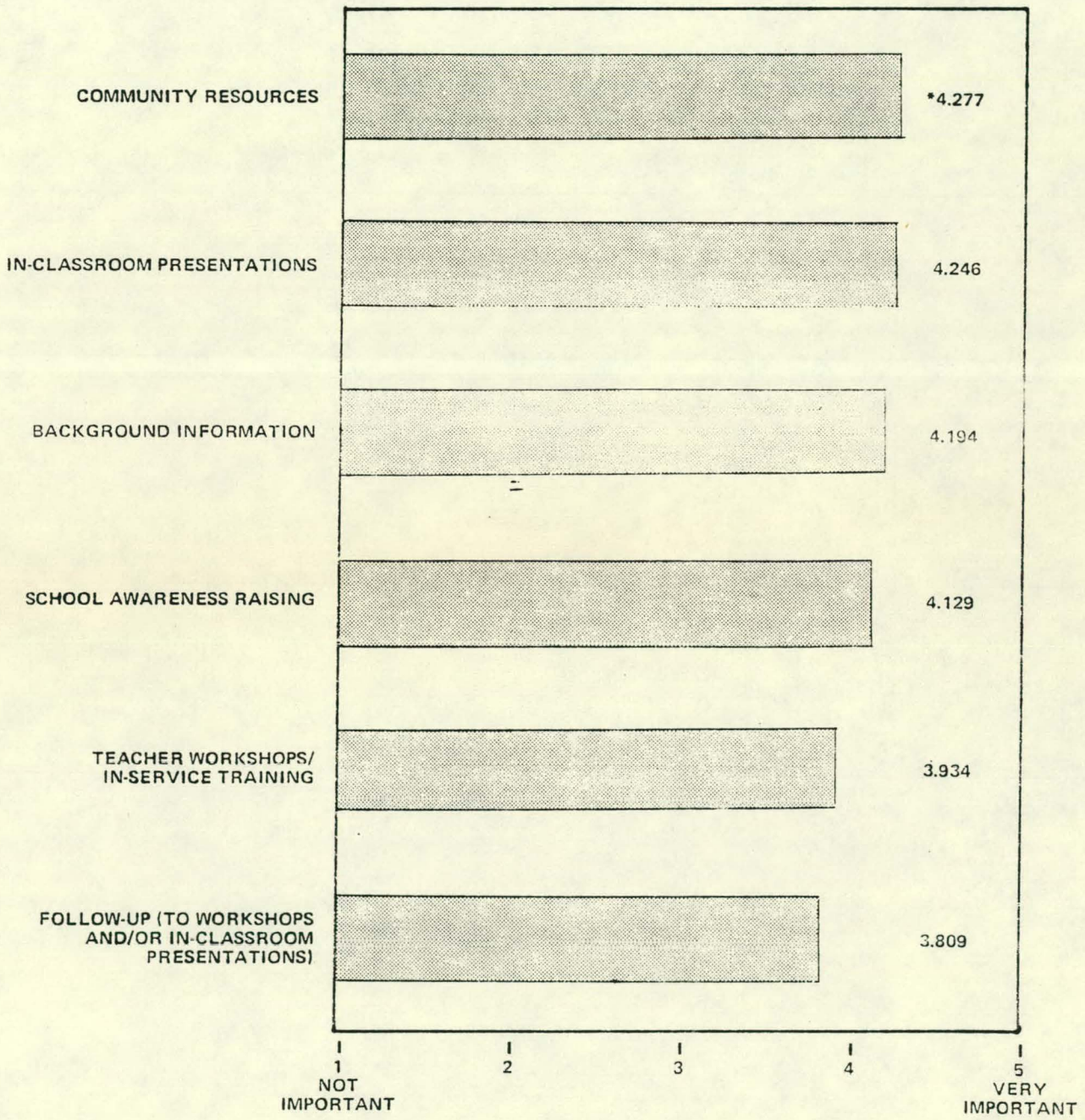
*NOTE: Numbers indicate median response

Ap R

Question 7

KINDS OF TEACHER RESOURCES NEEDED TO TEACH ABOUT ENERGY

For Grades K-6
(Listed in order of importance)



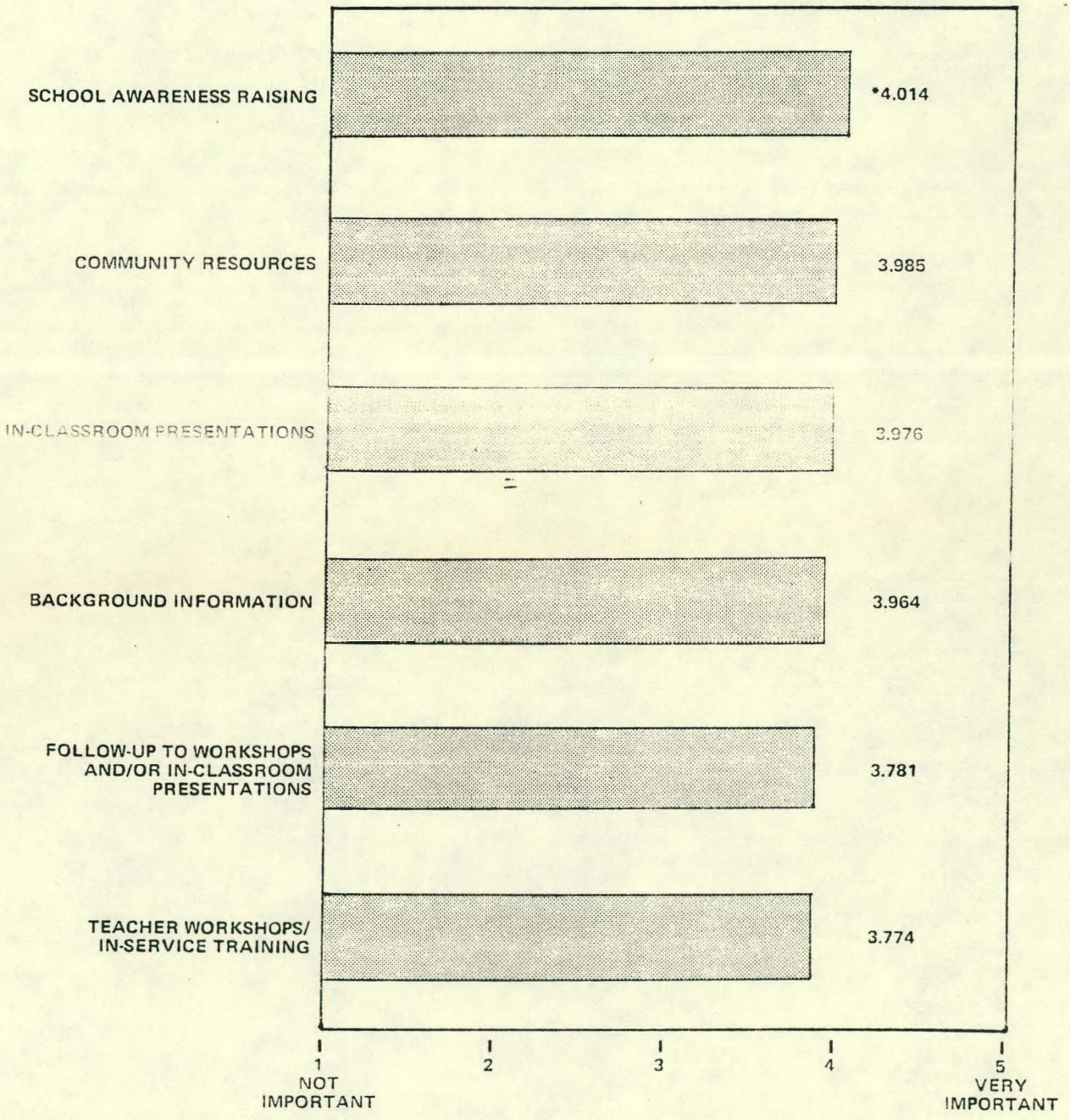
*NOTE: Numbers indicate median response

Ap 5

Question 7

KINDS OF TEACHER RESOURCES NEEDED TO TEACH ABOUT ENERGY

For Grades 7-8
(Listed in order of importance)



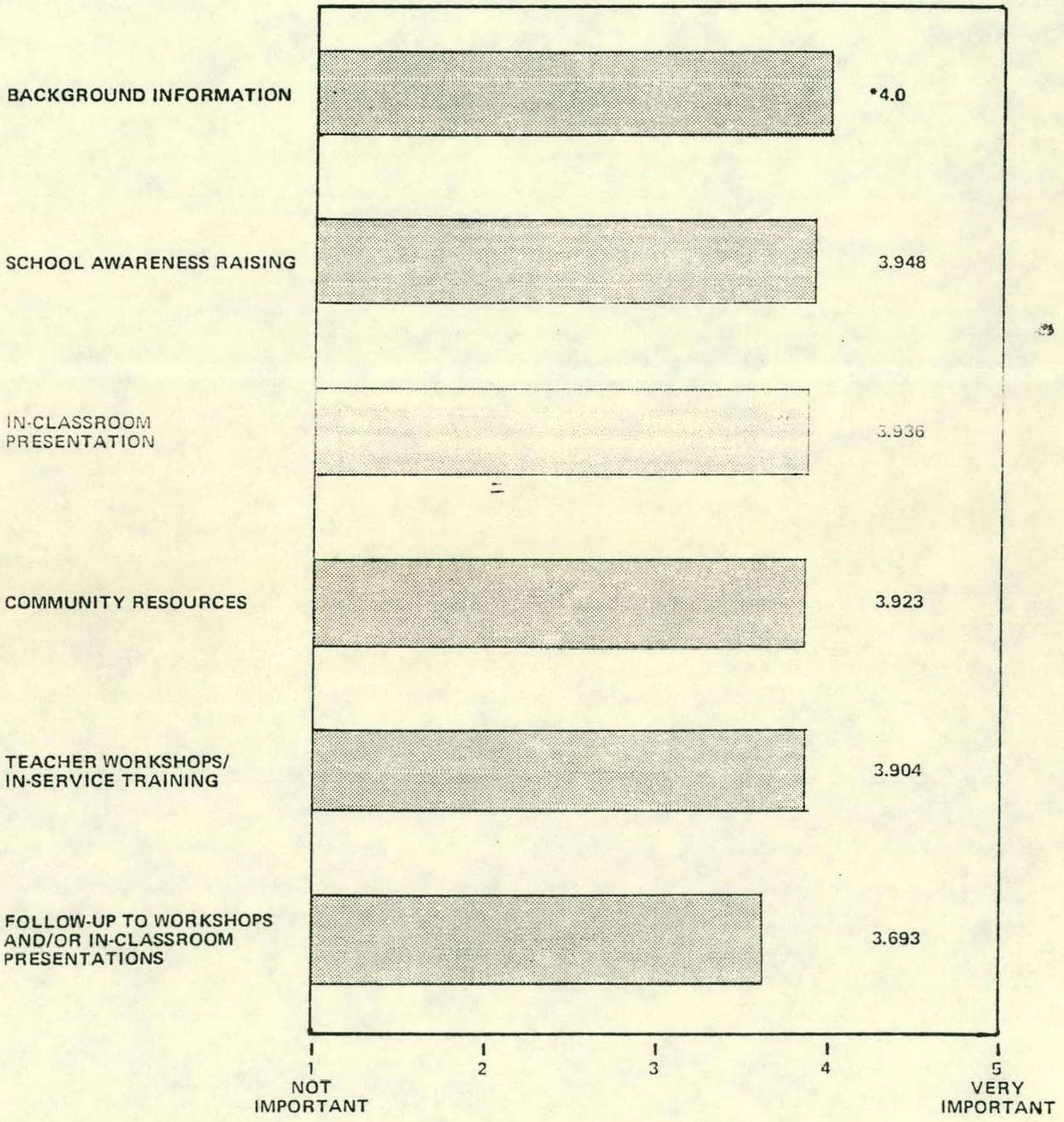
*NOTE: Numbers indicate median response

App I

Question 7

KINDS OF TEACHER RESOURCES NEEDED TO TEACH ABOUT ENERGY

For Grades 9-12
(Listed in order of importance)



*NOTE: Numbers indicate median response

APPENDIX B
ENERGY EDUCATION SURVEY

Name
Address

School
Address

Grade Level
Subject Area
Home Phone
Work Phone

1. How important do you feel it is to infuse the following energy topics into your teaching? Please rank as follows: 1=not important, 5= very important.

a. energy concepts	1	2	3	4	5
b. energy conservation	1	2	3	4	5
c. alternative energies	1	2	3	4	5
d. energy problems & issues	1	2	3	4	5
e. energy effects on careers	1	2	3	4	5

2. At what grade level do you feel the topics should be taught. Please check those which apply.

	K-2	3-5	6-8	9-12
a. energy concepts				
b. energy conservation				
c. alternative energies				
d. energy problems & issues				
e. energy effects on careers				

3. How would you assess the students' knowledge of these concept areas? (1=very poor, 5=excellent).

a. energy concepts	1	2	3	4	5
b. energy conservation	1	2	3	4	5
c. alternative energies	1	2	3	4	5
d. energy problems & issues	1	2	3	4	5
e. energy effects on careers	1	2	3	4	5

4. How important do you feel it is that students at your grade level should understand that: (1=not important, 5= very important).

a. future job choices will be affected by energy availability.	1	2	3	4	5
b. one's lifestyle affects energy consumption.	1	2	3	4	5
c. decisions need to be made related to	1	2	3	4	5