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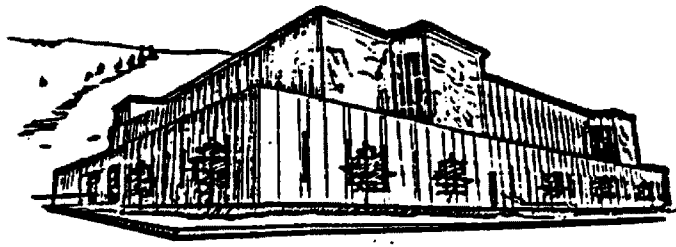
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University of
Montana

**WOLVES AND ECOLOGY:
EXPERIENTIAL LEARNING AND ATTITUDE CHANGE**

By

Roni K. Lett

Ph.D., California School of Professional Psychology, 1982


Presented in partial fulfillment of the
requirements for the degree of

Master of Science

UNIVERSITY OF MONTANA

1993

Approved by:



Chairman, Board of Examiners



Dean, Graduate School

June 10, 1993

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Lett, Roni K., M.S., August 1993

Environmental Studies

Wolves and Ecology: Experiential Learning and Attitude Change (37p.)

DHP

Director: Daniel Pletscher

Environmental education goals include teaching about the biophysical world and generating environmentally sensitive attitudes. The "Wolf Boxes" were developed with these goals in mind. The Wolf Boxes are self-contained learning modules that offer hands-on experiential learning activities that can be geared toward any K-12 grade. At the request of the program developer, this study evaluated changes in knowledge and attitudes toward wolves after 4th and 5th grade children were presented with information contained in the Boxes. I also measured whether prior teacher inservice training with the educational materials enhanced these changes.

Twenty-six teachers in the Missoula, Montana area were assigned to either a "Teacher Training", "No-Training" or Control group, and the 2 treatment groups had the "Wolf Boxes" in their classes for 1 week. Pre-, Post- and Follow-up measures on knowledge and attitudes were analyzed on 10 students in each class. All classes that used the Wolf Boxes showed significant changes in knowledge due to treatment, but students of teachers with the training showed no more improvement than the "no-training" group. Attitude changes were less clear. Attitudes towards wolves became more positive in all groups, including the control group. However, these changes were not statistically significant. Several possibilities may account for the lack of significance: a) attitudes towards wolves prior to treatment were already positive, leaving little room for change, b) students reside in a fairly liberal town, and media representation of wolves is generally balanced and accurate, and c) teachers who volunteered for this project also had very positive attitudes towards wolves which students may adopt even without formal wolf education.

I believe that attitude shifts in traditional rural communities would be more significant. This study provides support for this contention when I compared attitudes of students from livestock raising families with non-livestock raising families. These children showed significant positive changes in attitudes. I concluded that the Wolf Boxes are very effective wolf ecology curriculum. Their effectiveness as attitude change vehicles is still unclear. We need more studies with populations who hold less positive wolf attitudes.

Acknowledgements

This project is the result of inputs, assistance and support from many individuals. Credit for the successful completion of this study must be shared with them.

Dr. Dan Pletscher was my major advisor and I greatly appreciated his willingness to ignore his "Say NO" policy and accept this non-traditional wildlife-related project when he was already overextended with graduate projects. Patricia Tucker, of National Wildlife Federation, is primarily responsible for developing the "Wolf Boxes", and it was her request for an evaluation of these materials that triggered this study. She was an invaluable consultant and friend in all phases of this project. Dr.s Dan Doyle and Ron Erickson provided editorial and conceptual guidance throughout, while also providing me with different perspectives about wolves and people.

During this study I spent many hours talking with wildlife biologists in the USFWS, and I thank them for their time and patience with my questions, and opinions. Special thanks go to Mike Jimenez for participating in the teacher workshop. The teachers, and I, thought he was wonderful. I am also grateful for the financial support provided by the USFWS for this study. There are many unnamed people who assisted in logistical details, and these individuals were instrumental in the project's success.

A special place in my heart is reserved for my canine pack. Koani, my special wolf companion, constantly reminded me of what is truly at stake. She taught me more the importance of wildness than any academic experience ever did. Chauncey, my canine friend, was always at my side. He taught me that best friends come in many shapes.

Finally, I wish to thank two special people who inspired and supported me for many years. John's love helped me believe in myself. And Al, my soulmate and spiritual guide, encouraged my vision and love of animals that started me on this journey to Montana.

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INTRODUCTION

Numerous research efforts have investigated the role and goals of environmental education (EE) programs. While we still lack a unifying vision, many environmental educators agree that any environmental education program must accomplish three objectives: 1) Provide accurate information about the biophysical environment, 2) Develop environmental awareness attitudes, and 3) Engender responsible behavior through individual empowerment (Hendee 1972; Schwaab 1982; and Hungerford and Volk 1990).

Environmental Education Attitude and Behavior Change

If the ultimate goal of EE is to shape responsible citizenship behaviors, EE programs must include strategies that facilitate this goal (Hungerford and Volk 1990).

However, contradictions predominate 20 years of EE literature examining the correlates of changes in environmentally responsible attitudes and behavior (Hendee 1972). Educators initially believed that exposure to accurate information would change attitudes and behaviors. More recently, numerous researchers have challenged this assumption and have discovered that the relationships between knowledge, attitudes and behavior are more complex and variable (Hine et al. 1987; Hungerford and Volk 1990).

Disinger (1985) summarized 27 EE studies that directly examined predictors of environmental behavior. Most studies

dealt with various combinations of interrelationships between knowledge, affect, attitudes, personality factors and behavior. The traditionally accepted linear model: knowledge > attitudes > behavior, was not substantiated by most studies.

Hines et al. (1987) performed a meta-analysis of 128 studies from which they developed a multi-level, linear model to predict environmental behaviors. Variables included in this model are: knowledge of issues, knowledge of action strategies, personality factors, intention to act and sense of responsibility. This model was supported strongly by Hungerford and Volk (1990) who concluded that knowledge of issues should be the focus of EE, but it must be combined with individual "ownership" and action strategies that lead to a sense of individual empowerment. Researchers agree that responsible environmental behavior can result from EE, but these programs will need to extend beyond just teaching environmental concepts and information. Individual psychological factors and personal values and lifestyles must also be considered. Empirical support for this model of environmental behavior is necessary.

While the relationships between knowledge and environmental behavior remain ambiguous, the relationship between knowledge of issues and environmentally sensitive attitudes is much clearer. Several researchers have shown a positive correlation between participation in structured EE

programs and changes in affective and cognitive components of attitudes (Burrus-Bammel 1978; Jaus 1984; Johnson et al. 1985).

Although earlier attitude change studies focused on adults, more recent studies have targeted young children. This change in experimental emphasis followed concern that adulthood may be too late to change environmental attitudes and still achieve timely improvement in the state of the environment. Since many attitudes are fixed by adolescence, most environmental educators desire to include younger children in EE programs (Jaus 1984; Westervelt and Llewellyn 1985).

Evaluation of Teaching Methodologies

Recent environmental education research has focused on how best to alter either behavior or attitudes. Educators want to know what teaching strategies work best. Stokes and Crawshaw (1986) believed the best strategies include experiential methods like role plays, simulations, and actual application of the values in real world situations. Empirical support for using non-traditional methods such as these exists in many outcome studies that compared the efficacy of various teaching methods (Schwaab 1982; Johnson et al. 1985; and Lubbers 1990). These studies consistently indicated higher teaching efficacy with non-traditional, student-directed approaches such as inquiry, cooperative

learning, and use of issues and controversy than with traditional teacher-directed methods such as lectures.

Teacher Training

Ham et al. (1988) commented that the inclusion of EE in public schools has progressed slowly given the abundance of available EE materials. They identified teachers' lack of familiarity and feelings of competence as primary barriers to teaching EE in classrooms, and developed an inservice workshop to reduce these barriers. After participation in the program, teachers including EE activities in their classrooms increased from 38% to 72%.

Similar results were obtained by Mayer and Fortner (1987). After an inservice program, 78% of their teacher participants reported using EE materials in their classes and sharing them with other teachers. Jaus (1978) found inservice training led to more positive teachers' attitudes towards EE. These results suggest that continuing education programs are an important component of environmental education.

Evaluation of EE Programs

There is a need to evaluate EE programs in addition to evaluating teaching strategies. Evaluation is critical because it provides feedback that can be used to assess, modify and improve existing curricula (O'Hearn 1988).

Despite this need, there is a paucity of empirical research that evaluates existing environmental education

programs. O'Hearn (1988) found that only 7% of 284 programs reported in the environmental education literature included formal evaluation. Pomerantz, an educational consultant for the U.S. Fish and Wildlife Service, reviewed existing programs that used educational strategies to meet wildlife conservation goals. Although she found many programs reported in the literature, few of them were formally or informally evaluated (pers. comm. 1992).

Wolf Recovery

Wolf recovery is a hotly debated political issue in Montana. It highlights differences between local economies and environmental interests groups. The issue also encompasses the clash between states' rights and federalism. Attitude surveys of Montana residents demonstrate that attitudes toward wolves are complex and ambivalent. Many individuals agree that wolves belong in Montana, but also express concerns over livestock depredation, depletion of game animals, and danger to humans (Tucker and Pletscher 1989). The current Endangered Species Act mandates implementation of a wolf recovery plan. Education and information programs have been developed to reduce local resistance to wolf recovery that is occurring while the politicians debate.

Wolf Boxes

Wolf Boxes are self-contained learning modules that provide information, activities, and physical items related

to wolves and their prey, such as pelts, skulls and scat. This environmental education program was designed to help change the still-flexible attitudes of children toward this endangered species. The National Wildlife Federation, U.S. Fish and Wildlife Service, and U.S. Forest Service collaborated on this educational project.

Wolf Boxes meet two related needs. First, the Boxes support teachers' needs for educational material about a species that interests students and has local political and ecological significance. Additionally, the Boxes provide objective biological information and multiple socio-political perspectives about wolves that may allow people to develop more informed attitudes than the polemical love/hate reactions often expressed. Informal evaluations by teachers indicate that the program is meeting these needs (P. Tucker, pers. comm. 1991). An overview of the literature revealed no evaluations of self-contained learning modules like the Wolf Box. As part of the expansion of this program, Wolf Box developers requested formal documentation of program effects. As they exist, the Wolf Boxes present an informal learning module with opportunities for hands-on, experiential learning about an immensely controversial endangered species whose conservation impinges on a rich variety of issues and values. I evaluated the ability of the NWF Wolf Boxes to transmit accurate information and engender more balanced attitudes about wolves and wolf

recovery. I also evaluated the effects of teacher training on the efficacy of the Wolf Box to reach these goals.

Although research exists that evaluates:

1) information/attitude relationships, 2) value of teacher training, and 3) different teaching strategies, no one has comprehensively evaluated an EE program that concomitantly looks at all these factors.

Study Objectives

My study had three objectives:

1. Evaluate the effectiveness of Wolf Boxes as a tool for teaching children information about wolves and the place they hold in the natural world.

2. Evaluate the effect of the Wolf Box program on attitudes about wolves and related issues.

3. Compare the attitude changes in classes of teachers who participate in a Wolf Box inservice training with students whose teachers have no prior training in the instructional program.

METHODS

Brochures describing the project were mailed to all 4th and 5th grade teachers in Missoula and nearby rural schools (Frenchtown, Lolo and Hamilton). The program offered 1 continuing education credit and a \$50.00 stipend as incentives to participate. Interested teachers attended a 3-hour meeting that provided information and logistics about the program. From the approximately 100 4th and 5th grade teachers solicited, 29 teachers with approximately 600 students agreed to participate in the study. These teachers were randomly assigned to one of the following groups. Three teachers were not included in the analysis because they incorrectly collected data or were reassigned to a different grade level.

Group 1 (Training): The 9 teachers assigned to this treatment participated in a 7-hour teacher training workshop. The workshop had two primary objectives: 1) to provide biological, historical and socio-political information about wolves and related issues so teachers could teach from a personally informed base, and 2) to provide teachers with a standardized set of lesson plans (Appendix A) developed from Wolf Box materials. Teachers used the Wolf Box for 1 week and spent 1 hour per day implementing the lesson plans presented in the workshop. Each day's lesson contained

two parts: 1) objective information about wolves, and 2) activities intended to provoke attitude exploration and appreciation of multiple value systems toward wolves.

Group 2 (No-training): This condition represented current use of the Wolf Boxes. Seven teachers in this treatment had the Wolf Box in their classrooms for 1 week and used the information, materials and activities in any manner they wished. They received no training in use of the Boxes other than the general instructions and suggestions that accompany each Box.

Group 3 (No-Treatment Control): Teachers and students in this condition received no formal instruction on wolves. These 10 classes provided a control for any attitude shifts that might occur due to wolf-related news or entertainment that reached the population during the study.

Because the subjects were minors, the UM Human Subjects Committee required that parents give written consent (Appendix B) for their children to participate in the study. Less than 2% of the students did not get parental consent to participate.

The Wolf Boxes were used in the classrooms during 2 weeks in February, 1992. With only 10 boxes available, half of each treatment group received a Box during the first week and half used them 2 weeks later.

Changes in attitudes and knowledge about wolves were measured by a self-report questionnaire (Appendix C). It was administered as a pre-test to 50 fourth and fifth graders who were not part of this study. Revisions were made to eliminate problems with content, vocabulary or format. There were 2 parts to the questionnaire: 20 attitude questions measured on a 5-point Likert scale, and 20 true/false questions measuring knowledge about wolves.

Teachers and students in all groups took the questionnaire 3 times. A standardized test presentation format was used by all teachers. Results were anonymous and had no effect on student's grades. Pre-testing (Time 1) of teachers was done at the informational meeting. Students took the pretest (Time 1) on day 1 of treatment, prior to exposure to the Wolf Boxes. Students and teachers were given post-tests 1 week after treatment (Time 2) and approximately 3 months later (Time 3). Each subject obtained an attitude score and knowledge score by adding the 20 questions in each section.

Significant treatment effects on knowledge and attitude scores were tested by analysis of variance (ANOVA) for randomized blocks design with repeated measures (Kirk 1968). Knowledge and attitude scores were the dependent variables measured, and type of treatment was the independent variable. Post-hoc comparisons between groups were done with Tukey tests (Kirk 1968). Three additional ANOVAs were

computed with the following demographic variables added to treatment as independent variables: a) gender of student, b) whether student lives with hunters, and c) whether student's family raises livestock. Only students who were present for all 3 testing times were used in the analysis. Equal sample sizes of 10 students were randomly selected from each of the 26 classes.

RESULTS

Attitude and knowledge means differed only slightly between the 3 treatment groups (Table 1), but both variables clearly changed in the expected direction with treatment. Knowledge scores increased most in the 2 groups that participated in an educational program, and they retained their knowledge 3 months later. Attitude scores are less clearcut. The increases in attitude scores are proportionally smaller than increases in knowledge scores. All 3 groups had more positive (increased) attitude scores at Time 2. However, on the third questionnaire, attitude scores remained stable for group 1 and became slightly more negative for groups 2 and 3.

ANOVA on Knowledge Scores.

Changes in knowledge scores over time differed significantly among the 3 treatments ($P=0.017$, Appendix D). Post-hoc comparisons revealed that knowledge scores increased significantly more in the treatment groups (training and no-training) than the control group ($P=0.005$). However, comparisons of the 2 treatments (training and no-training) showed no differences in student's knowledge scores ($P=0.927$).

In addition to significant differences between the treatments, classes receiving the same treatment also differed significantly over time ($P=0.001$). Treatment

Table 1. Means and Standard Deviations for Knowledge and Attitude Scores.

		Group 1 Training N=90		Group 2 No Training N=70		Group 3 Control N=100	
Dependent Variable	Test Time	Mean	SD	Mean	SD	Mean	SD
Knowledge	1	13.28	2.36	13.59	2.45	13.73	2.52
Knowledge	2	16.18	2.24	16.69	2.21	14.34	2.61
Knowledge	3	16.60	2.29	16.55	2.26	14.36	2.82
Attitude	1	79.18	7.67	78.46	9.54	77.79	9.97
Attitude	2	82.34	8.36	83.53	8.46	80.57	9.34
Attitude	3	82.49	8.39	82.74	6.76	78.90	10.71

effects don't completely explain why some classes within a treatment group benefitted significantly more than others. To determine if school location accounted for these differences, schools were rank ordered by initial attitude means and identified as urban or rural. A Mann-Whitney test on these groups was not significant.

ANOVA on Attitude Scores

The training given to teachers did not result in a significant change in student attitudes towards wolves ($P=0.959$, Appendix E). However, classes receiving the same treatments did differ significantly ($P=0.008$). This indicates that some classes had consistently more positive attitudes than other classes, irrespective of treatment or passage of time. In addition, significance is approached ($P=0.062$) when all students' attitude scores are viewed over time. Students' attitudes toward wolves became more positive, but treatment did not account for this change.

ANOVA with Demographic Variables

Follow-up ANOVAs with demographic variables were performed, controlling for treatment and time. Neither attitudes ($P=0.646$) nor knowledge ($P=0.948$) was influenced by student gender. Living with hunters also failed to influence the treatment effects on attitudes ($P=0.305$) and knowledge ($P=0.402$). However, attitudes of children whose families raise livestock did become more favorable due to treatment when compared to non-livestock-raising families

($P=0.015$). This variable did not affect knowledge scores ($p=0.756$).

A closer comparison of the means of livestock raising families (Table 2) clearly shows more positive attitude scores for the 2 treatment groups at Time 2. Even the control group became slightly more favorable. However, the pattern changed at Time 3. Groups 1 and 3 became slightly more negative, while attitudes in group 2 became more positive. It is interesting to note that initially Group 2 had the most negative and widest range of attitudes towards wolves and wound up with the most favorable and least variable attitudes.

Correlations between Attitudes and Knowledge

Pearson correlations between knowledge and attitude scores revealed that increased knowledge about wolves did not notably affect attitudes. The results reflect a statistically significant, but weak, relationship between measured knowledge and attitudes. Correlations for all students combined at each testing time were: Time 1, $r=0.28$, $P<0.001$; Time 2, $r=0.31$, $P<0.001$; and Time 3, $r=0.26$, $P<0.001$. Knowledge explains less than 10% of the variance in attitudes.

Table 2. Livestock Raising Experience and Student Attitudes Toward Wolves.

		Group 1 Training N=7 (Raise) N=83 (No-Raise)	Group 2 No Training N=9 N=61		Group 3 Control N=7 N=93		
Variable	Test Time	Mean	SD	Mean	SD	Mean	SD
Attitude	1						
*Raise		79.71	4.92	67.89	15.44	73.71	8.40
No Raise		79.13	7.88	79.51	8.17	78.24	10.08
Attitude	2						
*Raise		83.43	11.63	79.78	14.90	77.00	9.09
No Raise		82.25	8.11	83.90	7.58	80.90	9.35
Attitude	3						
*Raise		79.71	8.05	82.00	5.61	75.57	9.18
No Raise		82.72	8.42	82.81	6.88	79.27	10.87

*Raise: These subjects answered "yes" to the question:
"Does your family raise livestock?"

DISCUSSION

The Wolf Boxes are clearly effective educational materials for increasing knowledge about wolf biology. Both treatment groups were significantly more knowledgeable about wolves than the control group and there was very little relapse after several months. However, the Wolf Boxes did not significantly alter children's attitudes about wolves. There were positive changes in attitudes towards wolves over time, but these occurred in all groups. These results support the general contention in the EE literature that increased knowledge, by itself, does not lead to attitude change (Hines et al. 1987).

Attitude change was expected in the teacher training group because the basic Wolf Box materials were supplemented with activities that focused on attitude exploration and empowerment skills. Children participated in citizenship-oriented actions and values-related activities. Hungerford et al. (1980) contended that EE programs should meet 4 goals in order to change attitudes and behaviors. These goals include knowledge foundation, issue awareness, issue evaluation and issue resolution. The Wolf Box program presented to the teachers in the training group was designed with these goals in mind. These skills, in addition to accurate information, were expected to lead to attitude change (Hungerford and Volk 1990).

The lack of attitude differences between the 2 treatment groups could be due to several factors: a) the supplementary exercises were not powerful enough to produce change, b) the amount of time (5 hours) was insufficient to produce change, c) the "untrained" teachers also provided additional skills when they used the Wolf Box, creating little difference between the treatment groups, or d) the pre-existence of positive attitudes in the sample.

This last variable is especially cogent as Missoula is a university town with a large number of highly educated citizens and many out-of-state residents with heterogenous values. We would likely find more conservative attitudes in other Montana cities, such as Dillon or Troy. The Wolf Box program could produce more change in students whose attitudes are less positive toward wolves at the start.

With such favorable initial attitude scores, there was little room for much positive change. This observation is further supported when I added "livestock raising" as an independent variable. Attitudes towards wolves were more negative among children of livestock raising families when compared to non-livestock raising families (Table 2). Livestock raising families are more likely to view wolves as a serious threat despite the lack of statistical support for this view from studies in areas with existing wolves (Weaver 1983). Giving students accurate information on wolves did produce more positive attitudes. Unfortunately these

conclusions must be viewed cautiously due to the small number of subjects from livestock-raising families. Treatment groups 1, 2, and 3 had respectively 7, 9, and 7, children who fit this category.

Another cautionary note must be added. Although "livestock-raising" students did become more positive towards wolves, there were notable pre-existing attitude differences between the treatment groups. Group 2 started with the most negative attitudes with the widest range of scores, and finished with the most positive attitudes and the narrowest range of scores. The most likely reason for these group differences is the small sample size.

Despite the small sample size of livestock-raising families, the results support the need for further studies with larger samples. For wolf recovery to succeed, accurate information must be provided to people who feel they may be adversely affected by wolf recovery, such as livestock producers. If these sub-groups showed positive attitude changes, wolf education programs could be tailored to specific areas and specific educational strategies. This evidence might encourage teachers who use the Wolf Box in rural areas to emphasize the "attitude-change" activities in the instructional materials.

The existence of significant differences in attitudes among classes receiving the same treatment is also curious. Geographic location (urban or rural) did not account for

these differences. This is not surprising given the close proximity of all the schools in this study. Class composition, instructors' skill levels, or a combination of these factors may have contributed to the within treatment differences.

I also believe that the attitude questionnaire needs much more refinement and validation against other measures. Despite "pre-testing" and revising the questionnaire several times, feedback from teachers indicates some questions were answered differently than the question was intended.

Although I expected the children's knowledge about wolves to increase, I also expected the teacher training to enhance that increase. Teacher training has had a positive effect on outcomes elsewhere (Peyton 1984; Mayer and Fortner 1987). The teacher training program used here did not result in greater student knowledge or altered student attitudes. The lack of treatment group differences could be due to sampling procedures or to the effectiveness of the educational materials.

The teachers who participated in the study were self-selected, highly motivated, environmentally conscious individuals. All had histories of providing their students with supplemental educational and environmental experiences. Teachers like these may not need the extra training because they are willing to take the time to obtain and use extra

educational materials that interest them. It is also possible that teachers in the training group shared some of their experiences with their colleagues in the other groups since many of them taught at the same schools. Students from classes in different treatments also had opportunities to interact and share information, which could have further blurred the boundaries between the treatment groups.

It may be that the instructional materials themselves are so clear and well-organized, that training doesn't appreciably enhance their effectiveness. Even without training, the instructional materials provided with the Wolf Boxes are designed for non-traditional methodologies. Many of the possible activities include role-playing, discussion, and "hands-on" experiential strategies. The primary differences between the two treatment groups were material familiarity, pre-selected lesson plans, and the addition of the "attitude-change" activities that are not part of the Box materials. The presentation strategies by teachers in both groups were probably similar, even if the content differed. This may account for the lack of differences in knowledge scores. Well-motivated teachers who are willing to select the specific topics from the abundance of information provided may need no extra preparation, even if they are naive regarding wolf biology.

Summary

Environmental education encompasses current and often controversial topics, such as wolf recovery. EE programs not only attempt to inform us about the biophysical world, but to sensitize us to environmental issues so that we engage in environmentally-sensitive and responsible behaviors. Despite 20 years of EE research, we have yet to discover efficient strategies to meet these goals and this study evaluated the ability of an existing wolf education program to do so. I also supplemented the program with activities designed to specifically address the attitude-change component of EE.

Neither the original or "improved" version had a significant effect on altering children's attitudes towards wolves, although both versions were effective at increasing knowledge about wolves. Although statistical significance was lacking, the data suggest that attitudes change in the desired direction. Despite the small sample size, there was significant change in attitudes among children whose families raise livestock. This trend is particularly encouraging, since this group may resist wolf recovery most strongly.

The attitudes of anti-wolf population groups critically affect wolf recovery in the United States. Although wolves received protection under the Endangered Species Act in

1973, no substantial wolf population growth has occurred in the west. Only an estimated 30-40 wolves live in Montana today. With one exception, all known wolf mortalities in 1991, in Montana and southeast British Columbia, were intentionally or accidentally human-caused (D. Pletscher, pers. comm. 1992). The issue is so polarized and emotionally charged that public meetings are ineffective forums for mediating the disparate views. We need educational programs that focus less exclusively on content, and increasingly on tolerance for and understanding of different viewpoints.

Attitude change is difficult to obtain in the time allotted to most experimental educational programs, and further studies are needed to discover and refine the strategies that work. Target populations for these programs should include both adults and children. The outcome of the current wolf recovery programs depends on today's adults, but the future of wolf recovery lies with today's children.

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APPENDIX A

WOLF BOX LESSON PLANS

DAY 1

Hang up wolf poster. Leave up all week.
 Hang up Body Language sheets, and leave up all week.
 Display photos around classroom.

Knowledge Objective: Students identify and describe physical characteristics of wolves and other canids.

Attitude Objective: Students become aware of different viewpoints about wolves, and identify their own attitudes and feelings about wolves.

Materials: Display pelts, skulls, & tracks in around classroom.

Information to present:

1. Have students examine pelts, skulls, etc. before you present information.
2. Telling wolves, dogs and coyotes apart II:10a-b
 - A. Whose Fur Coat is this? II:11a-b
 Do activities 1,2,5,6,7,& 8.
 Pass around the fur samples of wolf prey.
 Have students comment on differences between the species.

Attitude Activity:

1. Present "Evolution, History, & Current Status of Wolves". II:82
2. Present "Where did the Habitat Go?" II:66a-d
 Read story using felt story board as you read.
 Discuss habitat/development conflicts.
 Have students write a different ending to the story.
 Have them draw a picture to illustrate a scene in the story.

Homework:

Encourage students to discuss what they learn with their parents on a daily basis.

Announce that they will need to "interview" 1 adult, and 1 peer not in their classroom before Friday. The interviews can be 5-10 minutes, and they should write down what their interviewees say.
 Possible questions to ask are:

- "How do you feel about wolves?"
- "Why do you feel that way?"
- "What do you know about wolves?"
- "How do you feel about wolves living in Montana?"

DAY 2

Information Objective: Students will be able to explain the concept of the wolf pack and its underlying social structure.

Attitude Objective: Students will explore what they want to know about wolves, and what people with different viewpoints might want to know.

Materials: "White Wolf" video.

Information to present:

1. Why do Wolves Howl? II:19
2. Show 1st 35 minutes of video. This gives a good overview of pack structure, social behavior and verbal and non-verbal communication.
3. As a class, discuss the following:
 - A. Why and when do the wolves howl?
 - B. Discuss the behavior of the different ranking individuals within the pack.
 - C. Discuss the interactions between the wolves and humans. Why weren't the wolves afraid of the humans? Why weren't the humans afraid of the wolves?
 - D. Were students surprised by anything in the video? Did what they see match how they imagined wolves lived and acted among themselves and with people?

Attitude Activity:

1. Present "Whose Viewpoint is Right?". Use overhead projector. Make copies for students.
2. Have students form 4 groups for discussion of feelings and attitudes about wolves. Give them these instructions:

"Throughout this week, there will be times when you will discuss your feelings and attitudes about different topics. Attitudes and feelings are not right or wrong. Everyone is entitled to their own beliefs. When discussing these, it is important to treat others' opinions the way you would like yours to be treated. Listen respectfully. It is OK to disagree, but it is not OK to be mean or put other people down. It is OK to have strong feelings and express them, even if others disagree with you."

Give each group 2 photos to discuss. Which ones make them like wolves? dislike wolves? fear wolves? Have each group summarize their feelings about the pictures in front of the class.

DAY 3

Information Objective: Students will learn about pack structure and how it relates to raising young, wolf survival, and wolf vulnerability.

Attitude Objective: Students will explore the wolf/livestock issue and develop their own viewpoint on this issue.

Information to present:

- | | |
|------------------------|----------|
| 1. Family Ties | II:38 |
| 2. It's a Pack's World | II:39 |
| Do Activities: 1,2,3. | |
| 2. Raising a Family | II:41a-b |
| 3. Pups Join the Pack | II:42 |
| Do Activities: 2,3. | |

Attitude Activity:

1. Present "Livestock & Wolves" (Use overhead) II:59
 Make copies for students to refer to.

2. Write the following topics on the board. Form small groups and assign one of the topics to each group to discuss.
 - A. As a rancher, how would you feel about having wolves nearby? What should be done if a wolf kills one of your cows? Is there anything you can do to reduce the conflicts? Do you think ranching and wolves can coexist? How?

 - B. As a wolf conservationist, you are interested in having wolves in some areas in Montana. Why? What should be done to wolves who kill livestock? How should ranchers handle the situation? Do you think wolves and ranching can coexist? How?

3. After a short discussion, have groups presents their thoughts to the class. Record these on the blackboard.

4. Ask for a volunteer from each "side" to summarize the other side's point of view. Get feedback from the opposing group confirming whether the volunteer is representing their side accurately.

DAY 4

Information Objective: Student's will have an understanding of the interrelatedness of the natural world, and the role of predator-prey relationships.

Attitude Objective: Student's will explore their own feelings about wolf and human predators and the competition that can arise.

Materials: "White Wolf" video.

Information to present:

1. Show "White Wolf" video (remaining 15 min.)
2. "Making a Living." II:52
3. "What do Wolves Need to Survive?" II:64
4. Activity: "Where Does the Wolf Fit in Nature?" II:72a-d
5. Read "Koyukon Wolf Story." II:94
6. Form small groups to discuss the following topics:
 - A. How did you feel watching the calf being killed?
How do you feel when humans are called predators?
Are wolves being cruel when they wound an animal and wait for it to weaken? Are they "wasting" food when they don't eat all of what they kill?

Attitude Activity:

1. Present the following information to students.

"Wolves and humans are both predators, and sometimes they compete for the same prey, although they don't always try for the same type of animal. Hunters have mixed feelings about wolves. Some of them believe having wolves would mean limiting or ending recreational hunting. Other hunters believe there are enough deer and elk for wolves and humans to share, especially since they don't always target the same animals. Some hunters illegally kill wolves, so there will be more deer. Other hunters enjoy the experience of sharing wilderness with another efficient predator. Imagine you are an anti-wolf hunter or a pro-wolf hunter and write a paragraph explaining your viewpoint and the reasons for it." Divide the class in half and assign the "pro" or "anti" position.

Have students draw a picture of a hunting scene with wolves and/or humans and prey.

Remind students that writing about an opposing point of view doesn't mean they believe that point of view.

DAY 5

Information Objective: Students will learn about some legal aspects of wolf recovery.

Attitude Objective: Student's will re-evaluate their attitudes towards wolves in light of what they have learned. They will demonstrate a better understanding of opposing viewpoints.

1. Form small discussion groups and have students report to each other the results of their "interviews". What did they find out? Were the opinions similar or different than their own? How did you feel when you heard different viewpoints? Were the other opinions based on accurate information?

2. Present "Wolves and the Law", & II:77
 "Why Should We Reestablish Wolves?" II:70
 Use overhead projector and make copies for students.

3. Have the small groups discuss pros and cons of wolf recovery. Make sure each group has 2 representatives of the ranching and hunting interests.

4. Discuss the importance of "action" as responsible citizens in a democracy. Have copies of the "Wolf People" list for each small group. Write these action ideas on the board and have each student write a contract with him/herself to write a letter to one group or agency. The contract should include:

a) who they are writing, b) what information they want to obtain, c) date when rough draft of letter will be done. Each student signs the contract and shows to teacher. This is an activity that can be started in class if time allows, or followed up in class the following week.

A. Write letters to people or agencies on the "Wolf People" list (page II:93), asking for information about their group and its position on wolf recovery.

B. Write letters to agencies or politicians telling them how you feel about wolves and recovery.

C. Write agencies or people and ask them to describe what they might do on a typical day that involves wolves, and what skills are helpful to them on their jobs.

APPENDIX B**CONSENT FORM**

Your child's teacher has volunteered to participate in a project that will evaluate educational materials about wolves developed by the National Wildlife Federation. The Wolf Boxes have been used in Montana for over a year with positive reactions from teachers and their students. We will be studying how these Boxes affect attitudes and knowledge about wolves.

With your consent, your child will be asked to answer some questionnaires about wolves. The paper-pencil questionnaires are similar to other worksheets children are given in school. Your child's name will not be requested and she/he will be given complete confidentiality. Teachers will not use these for any student evaluations.

Not all classrooms will use the Wolf Boxes at this time. If the teacher does use the Box, your child will have an opportunity to learn about biological, social and political aspects of wolves and develop informed opinions about an animal of local interest. Discussions of any controversial topics may be uncomfortable for some children. Participation in discussions will be voluntary, and students will be encouraged to talk to their teacher if they have any uncomfortable feelings.

You and/or your child are free to withdraw your consent and discontinue participation at any time.

If you have any questions about the project, the materials to be used or the results of the study, you may call Dr. Roni Lett or Dr. Lee Metzgar at 243-5122.

Parent's (or Guardian's) Signature

Date

APPENDIX C

HOW I FEEL ABOUT WOLVES

On this worksheet are sentences that talk about wolves and other animals. Read each sentence carefully and answer on the answer sheet provided. DO NOT WRITE ON THIS QUESTIONNAIRE. If you have any questions or don't understand a word, raise your hand so your teacher can help you.

1. It is silly for a hunter to be worried about wolves killing too many deer and elk.

Agree very much	Agree	Not Sure	Disagree	Disagree very much
--------------------	-------	----------	----------	-----------------------
2. I would be afraid if I heard a wolf howling while I was hiking or camping.

Agree very much	Agree	Not Sure	Disagree	Disagree very much
--------------------	-------	----------	----------	-----------------------
3. I think wolves should be allowed to live in some areas in Montana not close to people.

Agree very much	Agree	Not Sure	Disagree	Disagree very much
--------------------	-------	----------	----------	-----------------------
4. Wolves that kill cattle, sheep or other farm animals should be killed.

Agree very much	Agree	Not Sure	Disagree	Disagree very much
--------------------	-------	----------	----------	-----------------------
5. I would like to learn more about wolves.

Agree very much	Agree	Not Sure	Disagree	Disagree very much
--------------------	-------	----------	----------	-----------------------
6. It is silly to criticize a rancher for wanting to shoot a wolf that kills one of his cows.

Agree very much	Agree	Not Sure	Disagree	Disagree very much
--------------------	-------	----------	----------	-----------------------
7. I would like to hear wolves howl if I were camping.

Agree very much	Agree	Not Sure	Disagree	Disagree very much
--------------------	-------	----------	----------	-----------------------
8. Where there are lots of wolves, I think people should be allowed to hunt them for furs and trophies.

Agree very much	Agree	Not Sure	Disagree	Disagree very much
--------------------	-------	----------	----------	-----------------------
9. Wolves make good pets.

Agree very much	Agree	Not Sure	Disagree	Disagree very much
--------------------	-------	----------	----------	-----------------------
10. It is wrong when a wolf kills more than it can eat.

- | | Agree very
much | Agree | Not Sure | Disagree | Disagree very
much |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----------|----------|-----------------------|
| 11. | We should not replace wolves in the wild because they will kill cows and sheep. | | | | |
| | Agree very
much | Agree | Not Sure | Disagree | Disagree very
much |
| 12. | I believe wolves have a place in nature. | | | | |
| | Agree very
much | Agree | Not Sure | Disagree | Disagree very
much |
| 13. | In general, I like wolves. | | | | |
| | Agree very
much | Agree | Not Sure | Disagree | Disagree very
much |
| 14. | I would be afraid if wolves lived near my home. | | | | |
| | Agree very
much | Agree | Not Sure | Disagree | Disagree very
much |
| 15. | Wolves should not be allowed to live in Montana because they kill animals that people hunt. | | | | |
| | Agree very
much | Agree | Not Sure | Disagree | Disagree very
much |
| 16. | An animal that eats another animal is bad. | | | | |
| | Agree very
much | Agree | Not Sure | Disagree | Disagree very
much |
| 17. | People who think wolves are as important as people are a little silly. | | | | |
| | Agree very
much | Agree | Not Sure | Disagree | Disagree very
much |
| 18. | There is nothing wrong with a wolf killing a deer to feed itself or its family. | | | | |
| | Agree very
much | Agree | Not Sure | Disagree | Disagree very
much |
| 19. | Wild wolves in the woods are often dangerous to humans. | | | | |
| | Agree very
much | Agree | Not Sure | Disagree | Disagree very
much |
| 20. | People who want to save animals that are in danger of going extinct, are a little silly. (Extinct means we no longer have that animal on earth--like dinosaurs). | | | | |
| | Agree very
much | Agree | Not Sure | Disagree | Disagree very
much |

 Scoring: Agree very much=5, Agree=4, Not Sure=3, Disagree=2,
 Disagree very much=1.

Scoring was reversed for questions: 1-2,4,8-11,14-17,19-20.

WOLF FACTS

On this worksheet are sentences that talk about wolves. Read each sentence carefully. Decide if it is mostly True or mostly False and then circle TRUE or FALSE on the answer sheet provided. If you have any questions, ask your teacher for help.

- TRUE FALSE 21. Wolves usually eat large animals like deer, elk and moose.
- TRUE FALSE 22. A pack of wolves is a family group.
- TRUE FALSE 23. Early in this century, most wolves in Montana and other western states had been killed off.
- TRUE FALSE 24. Almost all wolves kill cattle and sheep.
- TRUE FALSE 25. Wolves are often bruised and their bones broken by kicks from animals they are trying to kill.
- TRUE FALSE 26. Most wolf packs have more than 15 wolves in them.
- TRUE FALSE 27. Wild, healthy wolves are known to have killed people in North America.
- TRUE FALSE 28. Wolves usually kill more than they can eat.
- TRUE FALSE 29. Wolves kill most of the deer they see.
- TRUE FALSE 30. Wolf packs defend their territories from other packs.
- TRUE FALSE 31. Wolves in a pack usually hunt together and share what they kill with other pack members.
- TRUE FALSE 32. One of the reasons wolves howl is to tell strange wolves to stay away.
- TRUE FALSE 33. Wolf pups are fed only by their parents.
- TRUE FALSE 34. Most wolves weigh about 80- 100 pounds.
- TRUE FALSE 35. Body language, such as how a wolf stands or holds its tail, are not important in wolf communication.
- TRUE FALSE 36. Within a wolf pack, all females will have babies each year.

- TRUE FALSE 37. Wolves often pick the youngest, oldest or sickest prey animals to eat because they are the easiest and safest for them to kill.
- TRUE FALSE 38. Wild wolves usually avoid people and are shy around people.
- TRUE FALSE 39. "Wolf" and "coyote" are just different names for the same animal.
- TRUE FALSE 40. Howling is one way wolves communicate with other members of their pack.
41. Does anyone in your family hunt? (This means family members you live with).
_____Yes _____No
42. Does your family raise animals for food?
_____Yes _____No
43. Please tell us if you are _____Female, or _____ Male.

APPENDIX D

ANOVA Summary of Student Knowledge Scores.

Source of variance	SS	DF	MS	F	P
Between Subjects					
Treatment	18.76	2	9.38	0.48	0.626
Class within Treatment	451.53	23	19.63	2.36	0.001
Subjects within Class	1944.47	234	8.31		
Within Subjects					
Time	138.29	2	69.14	18.60	0.000
Treatment by Time	93.24	4	23.31	3.36	0.017
Class within Treat.xTime	19.50	46	6.95	1.87	0.001
Subj. within					
Class x Time	1739.33	468	3.72		

APPENDIX E

ANOVA Summary of Student Attitude Scores.

Source of variance	SS	DF	MS	F	P
Between Subjects					
Treatment	138.76	2	69.38	0.27	0.769
Class within Treatment	6015.82	23	261.56	1.93	0.008
Subjects within Class	1744.87	234	135.66		
Within Subjects					
Time	234.96	2	117.48	2.80	0.062
Treatment by Time	23.44	4	5.86	0.16	0.959
Class within					
Treat. x Time	1722.56	46	37.45	0.89	0.674
Subj. within					
Class x Time	19638.93	468	41.96		