

THE DEVELOPMENT OF A COURSE WHICH WOULD
FOCUS BASIC SCIENCE LEARNINGS TOWARD
CONSUMER SCIENCE IN EVERYDAY LIFE

by

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ABSTRACT

Due to the small number of students enrolled in the upper division science classes at Twin Bridges High School, this researcher chose to address the issue of adding an applied consumer science course to the school curriculum.

The procedure involved surveying Twin Bridges High School students regarding science attitudes. A second procedure involved surveying community residents using a sampling method. Community size and community residence were considered in the development of the sample. Data was tabulated using frequency counts and converted to percentages.

Results were compiled. In the student surveys, responses were studied to see how students felt about the study of science, specifically about science at Twin Bridges High School, and what should be included in science. In the community survey, responses were compiled to determine acceptance of, additions to, and/or deletions from the proposed consumer science course outline.

The data showed that a high percentage of Twin Bridges High School students like science and find it interesting. Students are motivated to take more science classes that have interesting subject matter and relate to their plans for college major areas. Students also prefer science that has more hands-on lab activities and that relates to everyday life. The data further showed that the community sample accepts the course outline for a consumer science course and is not opposed to a team-teaching approach for such a course. The conclusion drawn by this researcher following this study is that there is both need and acceptance for a consumer science class at Twin Bridges High School.

CHAPTER 1

INTRODUCTION

After twenty years of teaching family and consumer science in high schools of the state of Montana, the investigator finds there are content area overlaps between curriculum taught in high school science and family and consumer science. This apparent integration of curriculum, coupled with a concern regarding enrollment in elective science courses at Twin Bridges High School, has stimulated interest in the development of a consumer science course that would integrate basic science learnings into everyday life.

As an educator of many years, this researcher has seen new trends in education. One of the educational trends today is a move toward integration in academic teaching areas. Integration is encouraged to make education not only more accountable in the individual academic areas, but also accountable as a unified effort in educating students to succeed in the adult world. Another trend seen by this investigator is a revolution in the science curricula. The science area is being challenged to make science more applicable. As a high school counselor, this researcher has been actively involved with students at Twin Bridges High School in yearly class registration. Part of the initial interest in the topic for the following research paper came from noticing that Twin Bridges High School students were not generally choosing to take any sciences beyond those classes which were required for graduation. As a family and consumer sciences teacher, this investigator has also seen the need to revitalize and adjust courses in the family and consumer sciences program at Twin Bridges High School to meet present-day

needs. This need to revitalize and adjust in order to stay current in family and consumer sciences curricula is a factor which has influenced this professional paper.

I. The Problem

The problem of the study is three-fold:

1. Why are students not selecting science courses as elective choice at Twin Bridges High School?
2. What is the student-recognized motivation to take a science elective course at Twin Bridges High School?
3. What topics should be included in a Consumer Science course which (a) can be used within the family and consumer science curricula at Twin Bridges High School and which (b) can be accepted by the local curriculum committee and Administration as a consumer science elective course.

II. Rationale

The rationale for this project is based on three factors. First, the local Twin Bridges curriculum committee and administration have verbalized a concern about the low enrollment numbers in present elective science courses and are accepting suggestions for improving this situation. Second, high school enrollment statistics reveal the fact that few students are choosing science courses as electives. And, third, a survey

of students at Twin Bridges High School indicates a high interest, but low choice percentage for science courses beyond required courses.

In an age when education is being questioned for outcome and relevance, curriculum seems to be under constant scrutiny. Johnson, Holcombe, Kean, Woodward, Tweeten, & Hafer (1987) report that curriculum in the family and consumer science area is undergoing drastic change in order to meet the needs of the continually changing family structure and the changing American consumer. As a life science, family and consumer science offers an appropriate arena to address the need for a science which applies basic science learnings to everyday living situations.

III. Objectives

The objective for this professional paper is: **to develop a consumer science course at Twin Bridges High School that would (1) integrate science learnings into daily living; (2) increase the present elective science enrollment; (3) meet state and local curriculum guidelines; (4) and receive approval of local community, administration and school board.**

With the present knowledge and technology explosion, there is more information to be covered in each curricular area than is possible to handle during the academic year. The Twin Bridges High School Science department has one full-time teacher. According to the Twin Bridges High School Curriculum Handbook, (1995) the philosophy adopted by our science department is to present science courses at a challenging college-prep level to prepare students for an easy entry into college level science courses and majors. There are 70 students in the high School during the 1995-1996 school year. Grades 9 and

10 students are in compulsory science courses dictated by state education guidelines. Elective sciences for the 1995-1996 school year and their enrollment include Physics (4 students), Chemistry (7 students), and Computer Science (4 students). Although the total number of students choosing elective sciences is 15, it should be noted that much of this total is repeat students in each class, making the actual number of individuals involved in the electives sciences only 7 students. Sixteen grade 9 students and 23 grade 10 students are not eligible to take these elective classes, as students at these levels are required to take biology and physical science and have no class periods available for elective sciences. This research paper will question the high school students to find out why they are not choosing science courses for elective classes. Using this information as a guide, a proposal for an elective consumer science course will be designed and presented for implementation at Twin Bridges High School. Input from community students and adults will be utilized in preparing a course outline. Information will be gathered from the community to compare topic areas that are viewed as suggested additions and deletions for a consumer science course that prepares students for daily adult life. Input from high school students will also be used to determine if students feel that the course information is academic, stimulating and appealing as a family and consumer science course at Twin Bridges High School. Paramount in this research will be the question: What scientific knowledge and application is necessary to prepare youth for the adult world as single and family citizens and consumers?

CHAPTER 2

REVIEW OF LITERATURE

Curriculum Reform

Investigation by this researcher has shown that there has been comparatively little study of the subject of science as a course in the area of family and consumer sciences. Although thesis investigation by this researcher has shown no current studies which have been done on science as a course in the area of family and consumer sciences, reference by authors such as Merrill (1994), has been made to integrating sciences in curriculum research. According to Montana Family and Consumer Sciences specialist, Laurie Stelter, a small number of individually designed courses are in the process at this time in Montana and Wyoming.

One point that is brought out in curricular research is that school programs should be designed to meet the needs of the community. This concern for meeting community need was reported in a project carried out at O'Farrell Community School where Webster (1991) brought out that there is no one ideal model. "Each school is part of a community that must have the courage to create what it needs." Webster goes on to stress the importance of schools taking "active responsibility for meeting their student's real needs--today and for the future" (p. 32.).

William Bennett (1986) focuses a critical look at curriculum goals in science by stressing the need for revolution in methods of teaching in the science subject areas.

"We have come to think of science as a grab-bag of esoteric facts and stunts--the periodic table, the innards of frogs, the way to make little hot plates out of tin cans and wire. Worse, we have also given students the impression that science is dry and arcane matter gleaned solely from the pages of a textbook" (pp. 12-13).

Bennett (1986) emphasizes that science reform should stress hands-on learning in an environment where students can see that science should be for everyone and about everyday life.

Critics of current curricula in science contend that teaching students by past methods merely because students might need it someday is no longer an adequate justification. Dale Parnell (1996) points out that "aside from an occasional laboratory experience, workbook exercise or 'story problem,' the element of hands-on, interactive experience is absent, and little attempt is made to connect what students are learning with the world in which they will be expected to spend their lives" (p. 18).

New concepts are constantly being presented in an attempt to bridge the gaps in educational reform. One such concept is outcome-based education, (OBE) created by William G. Spady (1994). According to a report by Zlatos (1993) outcome-based education responds to concern that curricula in America is ineffective and is leaving students lagging behind those of other countries, and also responds to a concern from American corporations eager for better-trained workers. Other programs such as Goals 2000 are an attempt to construct a reform strategy based on the alignment of curriculum, assessment, textbooks, and teacher education. (Shanker 1994) Curriculum critics such as Carol Wicker (1989) speak out loudly that "the day when textbook publishers and standardized test writers dictate school curriculum should be behind us (Wicker 1989, p. 10). Traditional school programs tend to be subject centered with basic academic

courses which include very structured science curriculum within its disciplinary boundaries, having its own definite sequence and becoming more technical and abstract through the succeeding years. Reformers seek a more interdisciplinary approach--a more student-centered learning approach. Ellis and Fouts (1993) state that by placing the learner rather than the subject matter at the center, projects and activities take precedence over academic disciplines and make learning easier. Such an approach to science could be successful when placing science in its natural "consumer" arena using the interdisciplinary approach. This investigator's research reports the continued discussion regarding curriculum change, the need to make curriculum challenging and at the same time relevant and interesting. The Montana Council on Vocational Education (1995), reported that there are abundant sources and types of programs which can prepare young people to enter and perform successfully in the adult world. Appraising the performance of all of these programs is well beyond the scope of this research project, but only helps to verify the need for this project.

Science and Family & Consumer Science Trends

There is considerable written material on curriculum reform in science. One author goes so far as to suggest the need for a complete revolution in school science in order to correct the image given to students that science is dry and composed of mysterious theories studied from textbooks and charts. "Seen only as a laundry list of theorems in a workbook, science can be a bore" (Bennett, 1986 p. 13). Parnell (1996) advocates the need to go beyond requiring students to commit to memory bits and pieces of knowledge in specific academic areas, and suggests helping students use brain power

to connect learnings with general application. Parnell (1996) describes the need to make the connections between:

- * knowing and doing
- * academic and vocational education
- * school and other life experiences
- * knowledge and application of knowledge
- * one subject-matter discipline and another
- * subject-matter content and the context of use (p. 18)

The whole issue of connectedness runs through our educational process and there seems to be a push to break down the separation between subject areas.. One way is to eliminate the distinction between vocational education and academic education programs as they typically exist in separate worlds within the educational arena. As reported by the Montana Council on Vocational Education (1995), the ultimate goal should result in a consistent, integrated and coordinated educational process that better prepares students for the adult world.

The Preliminary Student Assessment Testing (PSAT) Summary Report (1996) shows that across the nation **one** of the most favored areas for future study/career choice for males and **the** most favored for females is in the area of health sciences and services. With the description for science being so broadly interpreted and covering an area of such depth, there appears to be no need for territorial dispute. However, Smith (1995) writes that school curriculum does rely on both science and family and consumer science areas working toward a coherent and adequate framework of what the two sciences will focus on for purposes of accountability.

Due to the consequential ramifications for personal, family and societal well-being, sciences such as biotechnology certainly merit emphasis in the family and consumer sciences curriculum. Students need to examine, analyze and investigate in

order to make informed decisions. Without an applied knowledge, they may unknowingly make decisions and selections, use products and procedures, and practice behaviors that are detrimental to the well-being of themselves, their family and the people of the world. Merrill (1994) feels that biotechnology science within family and consumer science will enable students to make reasoned decisions. And, through critical thinking, hands-on and cooperative learning activities, students can be motivated and active participants in the consumer science process.

Direction for Family and Consumer Sciences Image

In the review of literature on family and consumer sciences in regard to suggested curriculum change, image is a common issue. With the increased emphasis on strong academic demands for graduation requirements for high school students, family and consumer sciences courses have become less desired as elective choices, as reported by Wendland and Torrie, (1993). A study by Johnson, Holcombe, Kean, Woodward, Tweeten, & Hafer (1987) shows that the family and consumer sciences teaching profession battles long-held misconceptions of what it is, what it teaches, and what family and consumer sciences professionals do. There are those outside the field that believe that skills in food preparation and clothing construction are still the dominant curricular themes and do not believe these skills to be relevant to today's lifestyles. Today's curricular emphasis has shifted to family relations, parenting, resource management, and nutrition and health. Inana (1984) states a lack of respect for family and consumer science may be based on the public view that the curriculum is not academic coursework. Authors such as Rollins, in 1981 were already promoting the

incorporation of chemistry and math skills into the nutrition and textiles classes in order to reinforce family and consumer science courses and increase enrollment.

Image and curriculum change are being piloted in schools such as Central Decatur Community High School in Iowa, where students have taken the study of food processing and expanded it with the concentration on microbes, biotechnology, and how DNA manipulation can affect plants and animals. Scott (1995) claims that students at Central Decatur are receiving hands-on experiences when applying academic science to the consumer world.

Investigation for this professional paper by the researcher found that specific research literature regarding the joining of academic sciences and family and consumer sciences appears to be very limited. The researcher was unsuccessful in finding any research that has been done on evaluating results of integrating academic science with family and consumer science.

From the previous literature review, one can speculate that curriculum integration between academic sciences and family and consumer sciences can be pursued at Twin Bridges High School. It is also projected that community acceptance of an applied consumer science course for Twin Bridges High School will be positive. The following chapter will outline methods and results will be reported in a later chapter.

CHAPTER 3

METHODS

In order to ascertain the curriculum needed to enhance student education in the sciences at Twin Bridges High School, the researcher selected to look first at the students in relation to the sciences. The purpose of the study is to identify and explain reasons why students at this high school are not choosing to take advanced level classes, and to determine motivators for taking elective science classes. This information forms the framework for justification in proposing a consumer science class for community approval. Analysis of community response aids in determining the possibility for presentation to school officials for acceptance for the 1996-1997 school year at Twin Bridges High School. The specific problem to be addressed in this chapter on methods is centered on the following questions:

1. Why are students at Twin Bridges High School not selecting science courses as elective choices?
2. What motivates students at Twin Bridges High School to take a science elective course?
3. What should be included in a consumer science course which can be used within the Family and Consumer Sciences program at Twin Bridges High School which will be accepted by the community, curriculum committee and administration?

The methods for this professional paper are directed toward the following project objective: To develop a consumer science course at Twin Bridges High School that would (1) integrate science learnings into daily living; (2) increase the present elective

science enrollment; (3) meet state and local curriculum guidelines; (4) and receive approval of students, local community, administration and school board.

Research Design

The research instruments utilized for this professional paper were two surveys. The first surveyed students, and the second surveyed a community grouping. Many factors influence a student's choice of a particular class. In reviewing the literature there appear to be no studies regarding students' reasons for selecting particular classes or subject areas. To better understand the feelings, perceptions, and attitudes behind those reasons, a combination of quantitative and qualitative research questions was selected to collect data to answer the questions identified for this study. The first of the surveys for this research is being used as a verification or pilot tool for the rationale of this project. It also serves as a justification for a consumer science class. The survey was designed for students at Twin Bridges High School and surveyed the students's personal perception of science courses presently being offered. It also surveyed the student's recognized motivation to take science courses. Its aim was to determine if present enrollment figures are an accurate indication of student interest and motivation to take science courses and to determine if there is a need for a consumer science elective course. The survey was constructed with both partially closed-ended questions with structured responses which utilized a check-list format and space for comments, as well as open-ended questions. The assumptions underlying this selection of the research design were that this combination can create an environment where students are free to:

- * express their reasons, attitudes and feeling about science.
- * express their own reasons for choices.
- * respond truthfully about their selections of one response over another.

The second survey was designed to collect community input to the proposed consumer science course outline. The survey included a structured choice survey to determine whether community members see the course as a viable science elective option. Also included are open-ended questions to provide opportunity for individual community input into the consumer science course topics.

Data Collection

The pilot verification survey and the course outline survey were administered one month apart, the first during the week prior to the date for the next school year's preregistration of high school students. Surveys were administered over a 2-day period in order to cover absences and were given during the daily media periods which include all 70 Twin Bridges High School students. Students at Twin Bridges High School all have a daily opportunity to use the media center facility. Each student checks in with the supervisor in the media center. The center supervisor, as an impartial party, administered the survey, noting which students were absent and needed to be contacted the second day.

Instrument Development

The superintendent and science teacher at Twin Bridges High School were consulted on the type of information to assess in order to determine need for another science class at the high school. The Family and Consumer Sciences Specialist at the Montana Office of Public Instruction, and the local science teacher were consulted for input on the consumer science course outline. The Family and Consumer Sciences Teacher Educator at Montana State University was consulted on input for both surveys and the consumer science course outline.

Survey results were examined for project go-ahead and then for project approval. Positive findings on the second survey will result in the course proposal being presented to local administration--as is, or in revised format--for the 1996-1997 school year as a consumer science course.

The cost for this research was less than \$25 for paper and copies. Proposed length of time for the entire research project was six month; the actual time was seven months.

CHAPTER 4

RESULTS

Student Survey

The data from the first survey of Twin Bridges High School students was compiled in order to obtain proof of need for the researcher to propose a consumer science course as an additional Family & Consumer Sciences elective at Twin Bridges High School. The following chart illustrates the number of surveys issued and returned.

STUDENT SURVEYS		
<u># Issued</u>	<u># Returned</u>	<u>% Returned</u>
70	61	87

The data from the 61 student surveys that were completed and returned was compiled and data exploration was employed. Frequency counts were converted to percentages. Percentage figures used in this report of results have been rounded to the nearest percent. Raw data from the student surveys can be found in Appendix C. The first question on the student survey seeks basic motivation for taking a science class.

Table 1. Choice of Science Class When Not Required

<u>Response</u>	<u># Response</u>	<u>% Response</u>
Yes	42	69
No	18	30
No Response	1	1

Only 30% of the students indicate they would not choose to take a science class if the requirement was removed. Since 69% of the students indicate they would take a science class, even if not required to do so, this verifies that more than 2/3 of the students still show a basic interest in the science area. The 1% that did not respond does not provide sufficient evidence to indicate whether the student actually had no opinion or just missed the question. The student did, however, continue with the survey.

Question 1 continues to ask the student to clarify the previous choice with a checklist of REASONS WHY the student would or would not take a science class if it was not required. Students may check as many items as they wish. The following data was reported:

Table 2. Reasons Involved in Science Class Choice

<u>Responses</u>	<u># Responses</u>	<u>% Responses</u>
I like science	32	52
I don't like science	18	30
Science is easy	13	21
Science is hard	25	41
Science is interesting	35	57
Science is boring	19	31
Science deals with everyday life	23	38
I'll never use what we study in science	12	20
Some science teachers (elementary or high school) have discouraged my interest in science	16	26
I can get good grades in science	27	44
I get poor grades in science	10	16
My parents would make me take it	14	23
Other reasons	9	15

Since 52% of the students report that they like science and 57% indicate science is interesting, this data shows that more than half of the students surveyed have a positive attitude about the area of science. However, less than half the surveyed students believe

they can get good grades in science (44%), which could mean that although students like science and find science interesting, they do not feel that they are achieving what they personally interpret to be adequate grades in that area. Although 38% of those surveyed indicated that science deals with everyday life, a surprisingly high 20% feel they will never use what is studied in science. The difference here does not appear to be enough to merit more than notice. In 26% of the surveyed results, students perceived that a negative teacher experience was the reason they would not take a science class. This number appears to be understandable since all four high school grades were surveyed and the human maturation process involves moving from projecting blame for one's performance to taking responsibility for one's own performance. Also to be considered here is the fact that approximately half of the high school student body is required to take science, and there is only one science teacher in the department. Along this same line could be the fact that 23% of the students rely on parent input enough to take a class based on parent approval. In spite of the fact that 41% of the students surveyed find science is hard and 31% find it boring, a surprisingly low number of students, only 16%, perceive themselves as getting poor grades. This could be interpreted to mean that in spite of any positive and negative attitudes about the area of science, a low percentage of students feel they are achieving poor grades in that subject. The most common responses in the OTHER category include 5% of the students surveyed indicating the need for more labs and hands-on activities, and 5% of those surveyed indicating their motivation is that science is a necessary area for their college plans. See Appendix C for the specific raw data for this area.

Question 2 was designed in open-end format to allow students to express their own perceptions about what would make the area of science more interesting. Data from the

61 students responding to the survey is varied. Table 3 below shows the perceptions that were expressed by more than one student.

Table 3. What would help students like science

<u>Response</u>	<u>#Responses</u>	<u>%Responses</u>
No Response	7	11
More hands on stuff	7	11
More labs	11	18
Less note taking	6	10
A good teacher	5	8
It wasn't as boring	2	3
It was easier	3	5
More interesting	7	11
It related to my life	3	5
It was more fun	3	5
If I got better grades	2	4

The responses from Question 2 were varied. Only a partial list of common responses are included in Table 3. Refer to Appendix C for the entire list of responses used in the report of results. The first 2 responses, although worded differently both relate to the need for student involvement in the learning environment, with 29% of the students expressing a desire for more labs and hands-on activities. Also expressed in a similar framework, 24% of the students are seeking a course that is less boring, more interesting, related to personal life, and more fun. A variety of responses regarding class presentation process show that 20% of the students would like to see less note taking, shorter class periods, projects outside, easier tests, more fieldtrips, a study time every day and less textbook work. From the viewpoint of class difficulty, nine responses or 15% of the students are seeking better grades, easier work, and more understanding of the

subject matter. In addition to the summarized Table 3 information, the raw data also addressed such items as learning styles when students expressed the need for lessons to be presented in a manner that would make it easier for them to learn.

Question 3 seeks student perception of the science classes they have taken while a student at Twin Bridges School. In order to restrict the descriptive terminology which could be used for this type of request, the question was presented in a controlled-response format. Students could make multiple choices. All 61 students responded to this question with the following data:

Table 4. Student Description of Science Classes at Twin Bridges High School

<u>Response</u>	<u># Responses</u>	<u>% Responses</u>
Exciting	5	8
Challenging	30	49
Fast-paced	16	26
Academically stimulating	16	26
Fairly good	24	39
OK	17	28
Uninteresting	11	18
Not relevant	7	11
Poor	5	8
Boring	12	20
No Response	0	0

Less than 10% of the students at Twin Bridges School are willing to go so far as to say that their science classes have been exciting; however, nearly half have found science classes to be challenging and more than one-fourth find science classes to be both fast-paced and academically stimulating. The data shows that a notable number of students express positive perceptions about the school's science classes. From one-

fourth to one-half of the students respond on the variety of descriptors with positive perceptions. Only 20% rated science classes as boring. Although this speaks well for the curriculum and personnel, it still does not explain why students do not elect to take additional science classes. A considerable number of responses, 39%, are describing the courses as better than OK, even though they have either finished taking or are presently taking required science courses.

Question 4 is intended to research the motivating force behind student choice to take an additional science class. Students were offered six motivators for taking another science class and the option of writing their own motivating force. Below in Table 5 are the results of this research.

Table 5. Motivation to Take Another Science Class

<u>Response</u>	<u># Responses</u>	<u>% Responses</u>
An interesting subject matter	46	75
Need more for college major	29	48
Being in the College Prep Program	18	30
Parents	16	26
Peers	5	8
Other motivations	7	11
No Response	2	3

An interesting subject matter will interest students to take additional science classes at Twin Bridges High School. It is noteworthy that a high percentage of students hold an active interest in science as a school subject. Seventy-five percent of the high school student responses show this positive and open attitude about the area of science, even though numbers do not show this interest being carried out in enrollment figures for upper division classes. Nearly half of the students respond that future plans call for

additional knowledge provided by science classes and a closely related 30% are thinking about science classes as the requirement for the college prep track to graduation. As in Question 1, student responses to Question 4 show the similar percentage of parent influence on class choices with 26% indicating parents as the reason for taking another science class. The 11% of responses in the category of other motivations included the chance to explore in areas of personal interest, an easier course, less studying, a different teacher, and additional science as a requirement. Two students did not respond to this question. See Appendix C for the specific raw data for Question 4.

The reported number of responses for interesting subject matter may be interpreted to mean that students at Twin Bridges High School have maintained a desire to learn more in the area of science and are willing to continue taking science classes that students perceive as "interesting."

The last question on the survey, Question 5, was an open-ended question which would allow students to verbalize their opinions on what they would like to see being taught in a science class. Table 6 below shows the most frequently stated comments.

Table 6. Preferred Science Course Focus

<u>Responses</u>	<u># Responses</u>	<u>% Responses</u>
No Response	18	30
Interesting things	6	10
More daily application	5	8
Study of animals	4	7
Astronomy & Archeology	4	7
Animals in the forest	2	3
More outdoors	2	3
Hands-on	2	3
Human anatomy	2	3

Answers to this question showed the unique interests of the respondents. However, the largest number of students chose not to respond to the question. There does not appear to be a substantially similar response by the students, and included were areas such as: medicine, marine biology, environment, geography, explosives, botany, the science of kids, and astronomy and archeology. Although the data from this question does not provide specific direction for a consumer science curriculum, it does present the individual perceptions that high school students at Twin Bridges have about what science might encompass. It could also be valuable data for designing enrichment activities for science classes. See Appendix C for the specific raw data for Question 5.

The student survey shows that respondents at Twin Bridges High School like science, find science challenging and fast-paced, and are looking for interesting subject matter in order to continue their personal interest in science. Those responding to the survey like a variety of science topics and like to learn in a laboratory and hands-on environment. The research data presented here, along with the low enrollment figures for upper-division science classes at Twin Bridges High School, serve as a strong basis for development of the course proposal for Consumer Science as an elective science option through the Family & Consumer Sciences Department at Twin Bridges High School.

Curriculum Sampling Questionnaire

The data from the second survey was gathered from the Twin Bridges community. A list of community people by residence was available through the Twin Bridges school district. The researcher grouped the residences into five categories. Ten names were obtained from each of the five categories using a systematic process starting with the third name and selecting every fifth name. These fifty individuals formed the Twin Bridges community sample. Different colored questionnaires were used to designate the following five selected population groupings: post-parenting/retired; parenting high school students; parenting elementary/preschool children; teachers; students. Individuals were contacted by phone or in person and asked to participate. They were instructed to look over the proposed consumer science curriculum and to respond on a one-page questionnaire. Respondents were asked to review the materials, respond to the questions asked, and return the form within one week.

The first question asked how each individual felt about offering the proposed consumer science course at the high school level. It gave the survey participants the opportunity to react in favor of or in opposition to the idea. Table 7 shows how each community grouping reacted.

Table 7. Rank of Positive/Negative Reaction to Consumer Science Course Outline

<u>Response Rankings</u>	<u>% Responses</u>
<u>Post Parenting/ Retired</u>	
10	60
9	10
8	10
7	10
6	10

Parents: High School Students

10	40
9	20
8	30
7	10

Parents: Elementary/Preschool

10	50
9	40
8	10

Teachers

10	60
9	10
8	30

Students

10	20
9	20
8	20
7	10
6	10
5	10
3	10

Answers to this question show a trend in which individuals with no current experience with having children who are students in high school classes generally ranked the proposal higher than the groups with involvement at the high school level. Students showed the most varied reaction ranging from 10 to 3. However, this might be expected since students are reacting to a plan where THEY THEMSELVES are most affected. Reactions from all groups do indicate a favorable response to the proposal being offered at the high school level.

Question 2 asked what would be the appropriate grade level to offer such an applied consumer science course. This question offered a 9 through 12 selection and

space for other responses. Questionnaire responses were very individual and seemed to span several grade levels in most cases. Table 8 shows the survey data for this question.

Table 8. Appropriate Grade Level for Proposed Consumer Science Course

<u>Grade Responses</u>	<u>% Responses</u>
<u>Post Parenting/Retired</u>	
11	20
10-11	10
10	20
9	40
9-10	10
Other	10
<u>Parents: High School Students</u>	
11	20
10	20
9-11	20
9-10	40
Other	20
<u>Parents: Elementary/Preschool</u>	
12	10
11-12	10
11	20
10-11	10
10	10
9-10	10
9-12	20
9-11	1
<u>Teachers</u>	
12	30
11	10
10-11	10
9-10	30
9-12	10
9	10

<u>Students</u>	
12	10
11	50
10-11	20
10	20

There is a wide range of answers to the above question, with some groups so evenly spread out that no strong preference is evident. The numbers appear to indicate some preference to the consumer science course being a lower division course which might also be open to grade 11 students. A better indicator than this survey might be preregistration in the spring when students actually solidify their class choices. This researcher found it worth noting that the student group did not indicate a grade 9 choice at all and seemed to see it as a more advanced level course.

Question 3 asked if the course should be offered as a class which would satisfy the required science credit rather than as an elective science. Table 9 shows the results of this question.

Table 9. Approval/Disapproval for Required Science Credit

<u>Response</u>	<u>% Yes</u>	<u>% No</u>
Post Parenting/Retired	90	10
Parents: High School Students	90	10
Parents: Elementary/Preschool	90	10
Teachers	80	20
Students	90	10

Survey responses to Question 3 form a very similar pattern with most believing that the proposed course should be accepted as science credit toward the graduation requirement for science. Teachers showed the most resistance to this concept, but still

strongly favor the idea. The researcher found it interesting that not a single group was 100% in favor of the proposal as a science credit.

Question 4 asked respondents to specifically list any topics or areas which should be added to the course proposal. This was an opportunity to make comments or express personal opinions on content. Table 10 lists the responses to Question 4

Table 10. Topic Additions for Proposed Consumer Science Course

Responses

Post Parenting/Retired

- * Genetics and physiology should be required for all
- * Cost of food prepared at home versus. pre-prepared
- * Sexual Harassment
- * Direction: Compass and Maps
- * Pollution Ecology
- * Looks good!

Parents: High School Students

- * Is this an AP course?
- * Is textiles an applied science?
- * Fake food like fake fat
- * How does this differ from high school science?
- * Health food and food substitutes
- * A good broad science here
- * Genetics (i.e. AIDS and STD's)

Parents: Elementary/Preschool

- * Textiles, if anything
- * Keep quality up so don't attract science drop-outs
- * Prevention: mental disease and genetic disease
- * STD's and AIDS
- * None

Teachers

- * Where does this fit into the schedule?
- * The more the better in everyday living and required courses
- * Go for it!
- * It looks like it covers everything
- * Team teaching is a good idea
- * It looks like it gives good base knowledge
- * Appears very thorough

- * We liked it.
- * OK
- * None

Students

- * Social; family
- * Looks good
- * You've got it all
- * None

There were not as many responses to Question 4 as the researcher would have liked to receive. The responses were generally positive in nature. Comments about the course being offered as Advanced Placement and prevention of being a science drop-out course were valuable items to receive in order for the researcher to be well prepared to present the course to administration and school board. Other items regarding content are noted for inclusion when individual lessons for the class are prepared. Genetics, AIDS and STD's were mentioned as concerns by more than one group, as was food substitutes. The comment of concern from a teacher regarding where this course would fit into the schedule addresses the concern that staff be well informed about the course. In a small school, teachers of elective courses become concerned whether new classes will decrease their own class numbers.

Question 6 uses the same open format to seek comments on which topic area(s) should be deleted from the course proposal. There were even fewer responses to Question 6 than to the previous question as Table 11 shows.

Table 11. Topic Deletions for Proposed Consumer Science Course

<u>Responses</u>
<u>Post Parenting/Retired</u>
* Some parts could be taught in 8th grade * Reproduction process and genetics should be in 11 or 12 grade * Sex Education * Textile Technology * General Science Strategy
<u>Parents: High School Students</u>
* Careers maybe * OK * None
<u>Parents: Elementary/Preschool</u>
* Textiles ?? * What is resources for Presentation? * Hard to cover all this in one year * None
<u>Teachers</u>
* After teaching this for a year it would be easy to evaluate previous knowledge * None
<u>Students</u>
* Careers in textiles science technology * None * Fine * Looks good as is

Parents of high school students and the teachers had the least comments for this question. The topic of textiles came up on this question more than once which seems to indicate that it is a topic which people have more definite opinions on than some of the other areas. The post parenting/retired group expressed a concern about including sex education and reproduction. It appears that no single area or combined area is perceived as unsatisfactory or out of line by any of the groups surveyed.

Question 6 relates to teaching technique and asks for opinion on the idea of team teaching the course. Table 12 below summarizes the responses.

Table 12. A Problem If More Than One Teacher is Involved in the Course

<u>Response</u>	<u>Percentages</u>	
	<u>% Yes</u>	<u>% No</u>
Post Parenting/Retired	10	90
Comment: Might cost more		
Parents: High School Students	0	100
Comment: Sounds like a great course		
Parents: Elementary/Preschool	10	90
Teachers	0	100
Comment: Good idea!		
Students	20	60
Other: Kind of:	20%	

Parents of high school students and teachers are totally in favor of the team teaching approach. Students show the most concern about having to work with more than one teacher. For students this teaching technique requires additional adjustment based on individual teaching techniques used by various teachers. The response in all groups is positive. This question was stated in negative format, and the wording could have affected responses for individuals who may have read the survey question incorrectly.

CHAPTER 5

SUMMARY AND DISCUSSION

In summary, students at Twin Bridges High School like science and find it interesting. Students indicate that they are achieving good grades in science and feel that the present science curriculum is challenging and fairly good. Twin Bridges students would take more science if it was interesting and a part of their college plans. Survey results show that students want a class with labs and hands-on experiences that relate to everyday life.

The proposed Consumer Science course received indirect approval as a course offering from the survey group. This approval corresponds directly with the expressed want of the researcher in this project. A greater difference is reported in the grade level for the course offering. This may suggest the need to pilot the course or parts of the course to determine grade-appropriate level. The survey reports approval for offering the course as a science credit and survey groups approve the team teaching format. Realistic concerns were presented on the survey that need to be addressed. One concern was whether the class can be taught as an Advanced Placement course. Due to the fact that the class is new to Twin Bridges High School and the fact that the researcher has found little information on other schools using a similar science approach, it would appear wise to note for future reference the specific survey comment suggesting the course be taught for a year and then evaluated for consideration as a possibility for Advanced Placement status. A second concern was whether the course could be presented as an additional science course rather than as a replacement science course. This is a legitimate concern in order to insure that the course does not become a

gathering place for less motivated students who are looking for a way to avoid present science offerings at Twin Bridges High School. This concern could be alleviated by establishing a prerequisite requirement of the first 2 years of required science presently offered at Twin Bridges High School--9th grade Physical Science and 10th grade Biology. This prerequisite would allow students to take the class as an elective science which would satisfy the college preparatory requirement.

The community sampling group did, by coincidence, include two people from the Family and Consumer Sciences Advisory Board. No school board members or administrators were part of the sampling group. Both administrators and the science teacher were consulted regarding the course proposal and all provided input for this professional paper, including the course proposal.

The researcher recognizes the limitations on this professional paper. The Twin Bridges School Board operates as a separate governing group. The Board, however, does request administrator input for decisions to be made by the Board as a group. Acceptance of the proposed consumer science course needs the approval of the Twin Bridges curriculum committee, the Twin Bridges administration, and the Twin Bridges District No. 7 School Board. Presenting this proposal to each of the above groups will follow the completion of this research paper. The researcher also recognizes that the problem, as well as the survey study are limited to Twin Bridges. While this was a study based on community size and predetermined number, the investigator further notes that the study may not be representative of all schools or communities in Montana.

Science is a part of our everyday world of exploration and new experiences. Taking basic science knowledge to the daily application level is what this course proposal is all about. Research has shown a need for curriculum reform in science at Twin Bridges High School. The surveys which are a part of this professional paper have

shown both need and approval for a Consumer Science course offering at Twin Bridges High School in a format similar to the proposal for this professional paper..

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APPENDICES

APPENDIX A

STUDENT SURVEY AND COMMUNITY SURVEY

Attention Students:

Mrs. Denson is working on Masters Degree research in the area of school curriculum. Would you please take a few minutes to complete the following survey regarding the science portion of school curriculum.

1. HOW DO YOU FEEL ABOUT SCIENCE?

If science was not a required class for you to take, would you take it? Y____N____

Why or why not? (Check all that apply)

- ☐ I like science
- ☐ I don't like science
- ☐ Science is easy
- ☐ Science is hard
- ☐ Science is interesting
- ☐ Science is boring
- ☐ Science deals with everyday life
- ☐ I'll never use what we study in science
- ☐ Some science teachers (elementary or high school)
have discouraged my interest in science
- ☐ I can get good grades in science
- ☐ I get poor grades in science
- ☐ My parents would make me take it
- ☐ Other reasons:
Explain: _____

2. Whether or not I like science, I would take science more if _____

3. The science offerings at Twin Bridges School are: (Check all that apply)

- ☐ Exciting
- ☐ Challenging
- ☐ Fast-paced
- ☐ Academically stimulating
- ☐ Fairly good
- ☐ OK
- ☐ Uninteresting
- ☐ Not relevant
- ☐ Poor
- ☐ Boring
- ☐ Not applicable to my career plans
- ☐ Other: _____

(Continued on Back)

4. What would motivate you to take another science class: (Check all that apply)

- ☐ An interesting subject matter
- ☐ Need more science courses in my college major area
- ☐ Being in the College Prep program
- ☐ Parents
- ☐ Peers
- ☐ Other motivations

Explain: _____

5. I would take a science class that teaches: _____

The following script was used when contacting members for the community survey on the proposed consumer science course outline:

"Hello. This is Janice Denson, Family & Consumer Sciences teacher here at the high school.

I am currently working on a proposal for a new consumer science course for Twin Bridges High School. Before presenting the course proposal to the school's Curriculum Committee, I would like to get some feed-back from members of the community on the plan. Would you be willing to participate in a survey which asks a few questions about the course outline I have prepared for the proposed course?

I will mail you a copy of the consumer science course outline and a one-page questionnaire. All you need to do is look over the consumer science course outline which briefly states information about the course. Then, respond to the one-page questionnaire attached to the front of the course outline. When you have finished, return the questionnaire to me at home or at school, or let me know, and I will come and pick it up. If you have any questions during the process, feel free to call me.

People in this community do such a nice job of supporting the education of Twin Bridges youth. I appreciate your participation with this proposal survey. Thanks."

Curriculum Sampling Questionnaire

After reviewing the attached curricular outline, please respond to the following questions.

1. How do you feel about an applied science class such as that outlined being offered at the high school level? (Circle a number response.)

Excellent Idea 10 9 8 7 6 5 4 3 2 1 Poor Idea

2. What is the appropriate grade level for an applied science course? (Circle a response.)

Grade: 12 11 10 9 Other _____

3. Should such an applied science course be acceptable as a regular science credit for graduation?

Circle: Yes No

4. What topic area(s) should be added to this applied science course outline?

5. What topic area(s) should be deleted from this applied science course outline?

6. As the course is outlined, several teachers might be involved in teaching it. Would you find it a problem if several teachers (such as P.E., Family & Consumer Sciences, Science) were to share in teaching various parts of the course?

Circle: Yes No

APPENDIX B
COURSE OUTLINE PROPOSAL
FOR
CONSUMER SCIENCE

PROPOSAL—CONSUMER SCIENCE COURSE

CLASS: Consumer Science

TIME: 36 Weeks

TEXTBOOKS: Modern Biology
Food Science & You

COMPOSITION: High School Students, grades 9-12

DESCRIPTION: An applied approach to science from the basis of implementing basic understanding the concepts of human development, food chemistry, and plant and animal technology for consumers. It includes decision-making skills, problem solving experience, and laboratory application of the scientific process. Work is evaluated on the basis of: 1/3 laboratory work, 1/3 project and textbook homework, and 1/3 tests.

RATIONALE: Whereas education should be aimed at preparing students for the adult world, and whereas Family and Consumer Science addresses life skills, this course proposes an applied life science approach, emphasizing science as it relates to the consumer.

TOPIC OUTLINE:

- I. General Science Strategy
- II. Human Development
- III. Human Physiology
- IV. Heredity
- V. Textile Technology
- VI. Nutrition and Food Science
- VII. Environmental Science

COURSE OUTLINE

- I. General Science Strategy**
 - A. Elements of Problem Solving**
 - B. Decision Making Process**
 - C. Scientific Process**

- II. Human Development**
 - A. Areas of Development**
 - 1. Physical**
 - 2. Intellectual**
 - 3. Social**
 - 4. Emotional**
 - B. Stages of Development**
 - 1. Infant**
 - 2. Toddler**
 - 3. Preschool**
 - 4. School Age**
 - 5. Adolescent**
 - 6. Adult**
 - C. Basic Human Needs**
 - D. Career Choices in Human Development**
 - E. Resources for presentation**

- III. Human Physiology**
 - A. Reproductive Anatomy**
 - 1. Function**
 - 2. Process**
 - a. Male**
 - b. Female**
 - B. Conception**
 - 1. Stages**
 - 2. Physiological Concerns**
 - C. Prenatal Development**
 - 1. Embryo**
 - 2. Fetus**
 - 3. Maternal Physiological Changes**

D. Reproductive Process

1. Labor
2. Delivery
3. Postpartum
4. Lactation

E. Careers in Human Physiology**F. Resources for Presentation****IV. Genetic Development****A. Genetic Basics****B. Genetic Counseling****C. Birth Defects****D. Environmental Influences****E. On-going Research****F. Careers in Genetic Development****G. Resources for Presentation****V. Textile Technology****A. Clothing Technology****1. Social/Psychological Aspects**

- a. History
- b. Influences

2. Principles & Elements of Design**B. Fibers**

1. Identification
2. Characteristics

C. Fabrics

1. Hang Tags and Labels
2. Uses in the sciences
3. Construction
4. Treatments
 - a. Chemicals
 - b. Finishes
 - c. Dyes
 - d. Embellishments
 - (1) Threads
 - (2) Dimensional Products

D. Careers in Textile Science Technology**E. Resources for Presentation**

VI. Food and Nutrition Science

A. Safety and Sanitation

- 1. Personal & Kitchen**
- 2. Food-Borne Illnesses**
 - a. Microorganisms
 - b. Types of Food Poisoning
 - c. Preservation Techniques
 - d. Government Regulations

B. Nutrients

- 1. Sources**
- 2. Functions**
 - a. Water
 - b. Carbohydrates
 - c. Lipids
 - d. Proteins
 - e. Vitamins
 - f. Minerals
 - g. Enzymes

C. Digestion

- 1. Process of Metabolism**
- 2. Osmosis**
- 3. Kilocalories**
- 4. Nutrient Density**

D. Food Choices

- 1. Away From Home**
- 2. Snacking**
- 3. Choices for Wellness**
 - a. Allergies
 - b. Special Food Problems
- 4. Metabolism and Exercise**
- 5. Food Guidelines**
 - a. RDA
 - b. Food Pyramid
 - c. Nutritional Labeling

E. Food Effects

- 1. Psychological**
 - a. Peer Pressure
 - b. Advertising and Media

2. Food and Fitness

- a. Sports Nutrition
- b. Healthy Heart
- c. Weight Control
- d. Disorders
 - (1) Diabetes
 - (2) Eating
 - (3) Other Concerns

F. Food Technology

- 1. Additives
- 2. Organic Products
- 3. Preparation
- 4. Technology For the Future

VII. Environmental Science

A. Shelter History

B. Geographical Factors in Housing

C. Meeting Human Needs

- 1. Physical
- 2. Psychological
- 3. Social

D. Principles of Construction

- 1. Form
- 2. Function

E. Environmental Design

- 1. Types
- 2. Space
- 3. Structural Technology
 - a. Treatment Ecology
 - b. Lighting Ecology
 - c. Special Design

F. Home Care Technology

- 1. Products
- 2. Techniques & Equipment

G. Future Shelter Technology

- 1. Influences
- 2. Types

APPENDIX C

DATA FROM STUDENT SURVEY

DATA OBTAINED FROM STUDENT SURVEYS

TOTAL STUDENTS RESPONDING: 61(87%) STUDENTS

Question 1: If science was not a required class for you to take, would you take it?

Yes	42	69%
No	18	30%
No Response	1	1%

Why or Why Not? Student Responses:

I like science	32(52%)
I don't like science	18(30%)
Science is easy	13(21%)
Science is hard	25(41%)
Science is interesting	35(57%)
Science is boring	19(31%)
Science deals with everyday life	23(38%)
I'll never use what we study in science	12(20%)
Some science teachers have discouraged my interest in science	16(26%)
I can get good grades in science	27(44%)
I get poor grades in science	10(16%)
My parents would make me take it	14(23%)

Other reasons:	9(15%)
Need to get a good job	1(2%)
For career	2(3%)
Will help during life	1(2%)
Like to major in some sort of science	1(2%)
More hands-on and labs	3(5%)
Needed for college study	3(5%)
Hard but need it	1(2%)
Took because needed for college prep	1(2%)
Labs weren't exact and too much room for error	1(2%)
Too much lecture	2(3%)
To be prepared for college and Powell does an excellent job	1(2%)
Some areas easy; some hard	2(3%)
A lot of math and about nature	1(2%)

Question 2: Whether or not I like science, I would like science more if:

Students Responding	54(89%)
No Responses	7(11%)

Student Responses by Number and Percent by Students Surveyed:

I like earth & biology/dislike Chemistry,	
Adv. Bio and Physics	1(2%)
Can't say the word "sucks"	1(2%)
More hands on stuff	7(11%)
More labs made it easier	11(18%)
Less note taking	6(10%)
Class so long	1(2%)
A good teacher	5(8%)
Explain different kind of things	
there is on earth	1(2%)
It wasn't as boring sometimes	2(3%)
Teacher could explain it the way I learn	1(2%)
Able to have an AP Course	1(2%)
Projects outdoors	1(2%)
More plant and marine biology	1(2%)
It was easier	3(5%)
Some kids were not in the class	1(2%)
More interesting to me	7(11%)
I understood it	1(2%)
Related to my life	3(5%)
A beautiful blonde teaching it	1(2%)
More fun	3(5%)
More things having to do with explosions	1(2%)
Tests not so difficult	1(2%)
More fieldtrips	1(2%)
A different teacher	1(2%)
Easy to learn like math	1(2%)
Got better grades	1(2%)
More exciting	1(2%)
Presented a different way	1(2%)
A study hall every day	1(2%)
Not so much textbook	1(2%)

Question 4: What would motivate you to take another science class?

Students Responding	59(97%)
No Response	2(3%)
An interesting subject matter	46(75%)
Need for college major	29(48%)
College Prep program	18(30%)
Parents	16(26%)
Peers	5(8%)
Other motivations	7(11%)
Wasn't so hard	1(2%)
All the studying	3(5%)
A new teacher who didn't favor a few in class	1(2%)
Required	1(2%)
Could go exploring in areas that are interesting	1(2%)

Question 5: I would like to see a science class that teaches:

Student Responses	43(70%)
No Responses	18(30%)

Student Responses by Number and Percent by Students Surveyed:

Advanced earth science	1(2%)
Environment	2(3%)
Animals	4(7%)
More daily application	5(8%)
Astro-physics	1(2%)
Labs on environment and way we live	1(2%)
Animals in the forest itself	2(3%)
Interesting things	6(10%)
Geography	1(2%)
In a more related style	1(2%)
Medical studies	1(2%)
More biology	1(2%)
Hands-on projects	3(5%)

Student Responses - Continued

More outdoors	2(3%)
Can teach about marine biology	1(2%)
Class I want is offered next year	1(2%)
Things about what we do every day	1(2%)
How to make explosives	1(2%)
Fun and easy things	1(2%)
Lecture less	1(2%)
Other theories of earth's beginning	1(2%)
Teacher that gets involved with students	1(2%)
Science of kids	1(2%)
More stimulating subject	1(2%)
Teacher who makes it more fun	1(2%)
Computer programming	1(2%)
Botany	1(2%)
Astronomy and archeology	3(5%)
Human Anatomy	2(3%)