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**WPI**



**REACH**

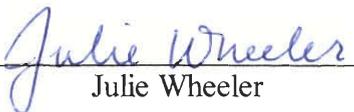
## **Evaluation of Camp REACH**

An Interactive Qualifying Project  
Submitted to the Faculty of

**WORCESTER POLYTECHNIC INSTITUTE**

In partial fulfillment of the requirements for the  
Degree of Bachelor of Science

By:

  
Julie Wheeler

Advisor:

\_\_\_\_\_  
Denise Nicoletti

## **ABSTRACT**

A Camp REACH Summer Reunion was planned to enhance the Camp REACH program at Worcester Polytechnic Institute. It was desired to evaluate the impact of the program through further contact with the participants. Similar programs have been reviewed and a pilot testing of possible activities has been carried out. This document expresses the activities that have been planned for this event and the processes by which they were chosen. An optimal plan for the Camp REACH Summer Reunion has been designed.

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## **1 Introduction**

When the general public thinks of the engineering workforce, male role models are most likely to be the vision that appears. This is parallel with the truth. There are distinctly fewer women associated with technical and engineering fields. In the year 2000, approximately 65% of all entry-level workers will be women, but this is not the case with higher math and science level occupations (Vermont Technical College, 1996). There are many factors that play into the underrepresentation of females in engineering fields.

A group of undergraduate students at WPI created Camp REACH, an intervention program, for an Interactive Qualifying Project in attempt to address this problem. Much preliminary research was conducted in order to make the program effective. Full details of the program are described within. The general goals of the program are to interest young girls in engineering at an early age, to raise their confidence level, and to do so in a fun and exciting way.

Now that the program has been run for a number of years, it is desired to know what impressions it is leaving with the girls. A Summer Reunion of Camp REACH alumna has been proposed for this reason. This will be an opportunity for the girls to reunite with old camp buddies and participate in activities that will further instill the goals of the camp. This IQP involves designing a Camp REACH Reunion. This document will provide a review of relevant literature along with possible activities to hold at the Reunion, and recommendations based upon experimentation that will satisfy the Summer Reunion goals, the goals of this project, and the long-term goals of Camp REACH.

The goals of this project are as follows:

- \*Review the Literature.
- \*Explain Camp REACH.
- \*Research other similar programs and their continuing contact with participants.
- \*Define the characteristics of a good follow-up program.
- \*Design a Camp REACH alumna Summer Reunion.
- \*Test run possible activities.
- \*Make recommendations based upon discoveries found during the trial of activities and through research of other programs

The design of the Reunion itself will have many goals, some of which include the following: Evaluate the long-term impact of the program, propose possible Reunion activities, evaluate these activities, and combine the activities to create an appropriate schedule. A more complete listing of the goals and objectives for the REACH Reunion may be found in section 5.0.

To further understand the goals of this project, extensive research of the literature was conducted. The literature review contains information regarding the underrepresentation of women in math, science and engineering, the psychology of the age group that will be dealt with, other follow-up programs and their highlights, and finally, how to evaluate the long term effects of the program. Information found within the literature review and the testing of possible activities will be considered to design the best possible Reunion for Camp REACH.

## **2 Literature Review**

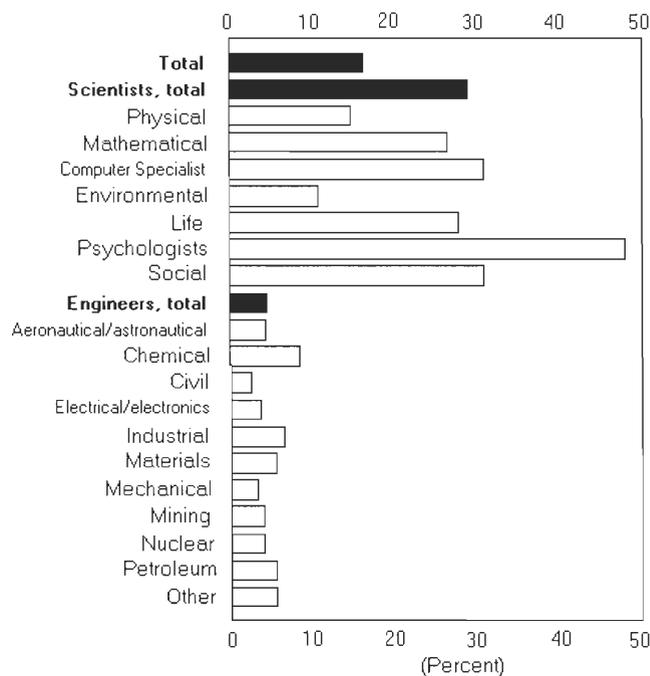
This literature review discusses the shortage of women in math, science, and engineering fields. It describes why camp REACH was created and the problems it needed to address. Other follow-up activities from similar programs are examined. This information will be used in the design of a Camp REACH reunion.

### **2.1 Underrepresentation of Women in Math, Science, and Engineering**

Flip through most any engineering history book today and what do you see? You see Thomas Edison, Eli Whitney and Albert Einstein, but did you ever see Catherine Littlefield Green, or Marie Curie, the respective inventor of the cotton gin and the woman responsible for the discovery of radium? Perhaps you have seen them, or even heard of them, but where are the rest of the famous women inventors?

Myra and David Sadker have challenged high school seniors around the country for the last twenty years with the following question, “In five minutes, name twenty famous U.S. women from past or present—no sports figures, no entertainers, and only presidents’ wives who are famous in their own right. Do you think you can do it?” On average students can list four or five women from throughout the entire history of the nation (AAUW, 1998). What does this reflect about schools and how women have been included in our curriculum?

Women continue to be represented in very small percentages in the fields of engineering and physical sciences. In 1988, forty-five to fifty percent of the total U.S. professional work force was women. Women represent thirty percent of workers in scientific fields, and only four percent of the engineering work force (Committee on Women in Science and Engineering, 1991). See Figure 1 for the percentages of women in specific areas of science and engineering.



Source: National Science Foundation, Women and Minorities in Science and Engineering (NSF 90-301), Washington, D.C.: U.S. Government Printing Office, 1990.

Percentage of women among employed scientists and engineers by field, 1988.

**Figure 1**

Researchers speculate on the many possible reasons for today’s situation. Some consider the following reasons: early socialization, lower self-confidence, lower expectations from parents, teachers, and others, or less “tinkering” experience ([www.dartmouth.edu/~wisp/home.html](http://www.dartmouth.edu/~wisp/home.html), 2000). Evidence can be found to prove all of

these ideas, and many more reasons can also be attributed for the lack of women in engineering fields.

In previous years science and technology related fields were considered inappropriate for women. This has been society's belief until recently (National Research Council, 1979). Throughout history, all phases of a woman's battle toward a career as a scientist, the assumption that science is a masculine endeavor constantly appears. For example, in 1968, Executive order 11246 amended The Civil Rights Act of 1964 to include prohibiting discrimination among higher educational institutions. It was not until 1968 that people began to realize the difficulties faced by women and do something about it.

From young childhood through adolescence, it has been shown that there are minimal mathematical skill differences between the genders (National Research Council, 1979). Research done by Maccoby and Jacklin (1974) shows that girls excel at verbal skills while boys excel in visual-spatial ability. Since solving mathematical problems requires both verbal and visual skills, the overall analytical abilities of boys and girls are the same (National Research Council, 1979). Mathematical ability does not seem to be the difference until about age twelve. Girls regularly receive higher grades and superior achievement at this level (National Research Council, 1979). As a young lady grows she feels more of the pressures of society and the number of women enrolled in higher-level math and science classes decreases (National Research Council, 1979).

Boys and girls are motivated by different means (National Research Council, 1979). For example, boys are extremely competitive, always wanting to appear better than their peers. Girls, on the other hand, are less competitive and are motivated simply

by their achievements. Closely related to achievement and motivation are self-confidence and self-esteem. Males will show a significant amount of confidence when approaching new tasks, while girls will not predict that they will do as well (National Research Council, 1979). This lack in confidence leads many girls to shy away from an engineering field where one must use their imagination to create a totally new idea and approach this new situation.

Less women than men aspire to become scientists (Sonnert,1995), but women are on the move in science and technology and the demand for developmental research is expected to increase. Women scientists will become instrumental to the progress of science not only for improving the ratio, but also for female-related research. The demand is expected to increase the number of women entering such science and technology related fields (Stolte-Heiskanen, 1991).

## **2.2 Psychology of Adolescents**

The years just before the teenage years can be critical. Children can be very influenced by parents, peers and role models while they still have not felt the pressures of society. It is truly the years of pre-teen through adolescence that will influence a child for the rest of their life.

In the pre-teen years children are relatively free from society's influences, but as the teen years approach, the pressures to fit in become apparent. Early teenagers are just realizing their abilities, likes and dislikes, and their opportunity to think cognitively for themselves. They are learning about the world and wanting to think for themselves while holding on to parental guidance.

It is during this time of pre-teen through adolescence when many girls discover the challenges of being a woman who desires to enter an engineering field. Adolescence is the age from 13 to 17. Because these years are extremely influential times for young women, it is an ideal age to inform them of the many wonderful engineering opportunities that await them. There are, indeed, currently fewer women than men in engineering careers. This may be partially attributed to the lack of support and enthusiasm towards women at this age desiring to enter such a field. Therefore, programs such as Camp REACH provide an important and valuable role in our society by opening the minds and eyes of these influential young women to engineering possibilities.

It used to be that the children were taught the trades of their family to hold up the family business. But nowadays children go to school and are given the choice of a career. As industry continues to grow, the range of available jobs expands, and this can be very confusing, if not overwhelming to a teenager trying to think about their future. Many children do not even know what their parents do outside of the family. This is unfortunate since much positive influence can be received from parents.

During the teen years, feelings of competence, confidence, and strength are as erratic as hormone production. Teens can be overconfident and cower in fear almost simultaneously. Overpowering feelings of losing control, helplessness, or failure can be quite frightening. A few words that Chess and Whitbread (1978) used to describe adolescents are impulsive, impetuous, moody, disagreeable, overdemanding, and underappreciative. They certainly do not need the responsibility of choosing a career on top of all of these, yet it is done every day.

Feelings of fitting in and being accepted are critical to a child, especially females, during these years. Chess and Whitbread (1978) put it best when they said, “They have to live by the law of their generation.” Teens are *extremely* influenced by their peers. Studies done by AAUW Educational Foundation have shown that teen's responses to questions on current issues often include stereotypes and include words such as “cliques, popular/not popular, pretty, ugly, high class, etc.” Teens act as to impress their peers and to try to fall into the category of a desirable stereotype. A fourteen year-old girl was asked the question, “What do you wish you could change about your school related to important issues/struggles facing girls today?” She responded with:

“I would probably change the issue of grouping people and labeling them.

Because of this, it’s hard to make new friends because you’re labeled” (Haag, 1999).

Similar to this girl finding it hard to make new friends once she is labeled, it is difficult for females, automatically labeled women, to stray from the norm and pursue a future in a technical or engineering field. Women even as they mature tend to shy away from out of the ordinary careers as can be seen by the statistics of women in an engineering career (Figure 1).

Girls have the first advantage in adolescence. They mature at an earlier age than boys and this gives them a head start in the development skills that help in learning (Chess and Whitbread, 1978). Paying attention, listening to directions, and focusing on work until it is complete is easier for girls. Programs such as Camp REACH take advantage of this opportunity to give girls a head start.

Adolescence is a time to discover one's self. Boys are encouraged to be bold, have courage, imagination, and assertiveness. These very same qualities girls are implicitly told to repress (Chess and Whitbread, 1978). While boys are learning to find themselves during this age, girls are encouraged to find a man. "Finding a man and finding yourself are incompatible goals, so lots of girls stop growing" claims Chess and Whitbread. This could be reason for the academic decline in adolescent girls. Science and math have a sense of masculinity attached to them, and require dedication, determination, and competition. Girls shy away from these characteristics for fear of not succeeding. Although girls begin to develop sooner than boys do, they stop sooner than boys do also.

Society places many mountains in females quest to a career. Discouragement of any type to young women at this confusing, yet influential age will almost certainly interfere with their desire to become a great engineer. Camp REACH and Reunion events must do its part through all ages of girl's adolescence by continuing to give engineering a positive image.

### **2.3 The Evaluation of a Program**

A program evaluation is a determination of its quality or worth, and it shows whether or not a program has met its goals and objectives. It is difficult to evaluate a program without having direct contact with the participants. Activities sometimes look more effective on paper than they are in real life. A careful combination of relevant data collecting and interpreting yields an evaluation that can be used continually to adjust and improve a program (Bond, 1997).

A general overview of the evaluation process contains four main parts: framing the evaluation, defining the goals and objectives, finding the evidence, and making sense of the evidence (Bond, 1997). Each part is equally as important as the others.

Before attempting to evaluate a program, the initial goals and objectives must be clearly stated. These goals and objectives must address the needs of the program. Appropriate evaluation questions must be generated, referring to the goals and objectives. Selecting appropriate questions requires consideration of the age group to be questioned.

There are many different ways of finding the evidence for an evaluation. This requires a bit of research by the evaluator. The available resources must be established. Records and documentation exist or can be created that can show information about the participants before and after the program, and can be used to determine if the program was actually run as planned. Documents such as transcripts, journals, and essays can fall into this category. Simply observing program activities is a good way to get a feel for how the program is run and what evidence there is to prove it. Interviewing people and conducting surveys are also effective ways to generate evidence.

There are two kinds of evaluation. Summative evaluation is based on gathered information and compiled into a final report. This is the technique commonly used in the past. In more recent years evaluators have realized the value in ongoing evaluation conducted while a program is in progress, called formative evaluations. These are certainly useful in pinpointing problems before it is too late. Formative evaluations are also helpful in identifying areas of interest that the planners or evaluators of the program might not have thought about.

During the planning stage of the evaluation, the people involved with the program should be consulted as often as possible. A key to a good evaluation is to let the participants know that their opinions are important (Bond, 1997). The program should provide opportunities for the participants to share their views and ideas. The more input the program receives, the more likely it is to achieve positive results in the future.

One of the most common reasons for program evaluation is to demonstrate the impact of the program to people or organizations that donate funds and offer support. They look for reasons why they should continue to fund and or support the program. The evaluation has to prove that the program is progressing towards its goals and convince the funding agencies that it is worth their money. People who run the program and the evaluators should document the quality of the program and describe the effects on the participants. As well as hearing from the staff and evaluators, the participants can hold the vital information about a program. Funding agencies also look for the amount of change experienced by program participants.

Interviewing participants, program staff, parents, classroom teachers, and others is an excellent way to get information about the impact of a program. There are so many possible questions that an interviewer can ask, but who really wants to sit around and answer questions all day? It is the responsibility of the interviewer to come up with specific questions that will keep the interview focused on the goals.

Working with children for an interview is a lot different than speaking with adults. The questions should be short, specific, and structured so they respond with desired information. It is a lot harder to hold the attention of a child during an interview. The evaluator must make the interview interesting and also be prepared to prompt the child

with memories of activities. If the information is not specific enough for the desired evaluation, keep asking questions.

People are sometimes timid in sharing their ideas in a one-on-one interview. Children often feel as though they should give the program all positive responses, especially if program staff does the interview. Either assuring confidentiality during the interview or conducting small group interviews are both effective ways of interviewing. Sometimes group interviews generate more discussion. The focus group leader must be careful to keep the discussion on track. It is a good idea to limit the group to 8-10 participants and to mix those who have similar experiences (Bond, 1997). The interviewer must make sure that all people are participating in the conversation. People will want to participate in the conversation if questions are asked in a natural, non-formal, manner so the participants feel comfortable, as if they were simply carrying on a conversation. The interview should always provide people with a chance to add miscellaneous comments.

Questionnaires require a great deal of thought, but are also a great way of gathering presentable data. There are a few things to keep in mind while developing a questionnaire. While surveys are a good way of collecting data, people generally do not have much patience, especially kids. The questionnaire should be short, not only for the people who have to fill it out, but to keep the workload low for the person who has to analyze it! If possible, the questionnaires should be anonymous. People tend to be more honest if they don't have to attach their name to their opinion. The questions should be appropriately directed toward the audience level. The whole idea is that they provide clear answers to clearly stated questions.

Both quantitative and qualitative questions should be asked in a survey. One should make sure the open-ended questions do not imply a simple yes or no answer. The purpose of the discussion questions is to force the person being asked to supply new ideas and suggestions.

Observing program activities is a super way to get a second opinion of what is going on during the program. Observers must have good listening and attention skills. They should be able to not only write down what is heard, but also to describe what is going on, and the feelings and participation level involved. The observer should be carefully chosen so that the children do not respond differently when he/she is observing. Staff should also allot a small amount of time to document observations of their own.

In the analysis of the data there are several things to keep in mind. Be aware of patterns that reoccur throughout the data that has been collected. Once again, the goals of the program and of the evaluation should be reviewed so the desired information can be presented. It is important to be flexible with the data collected because things may not always turn out the way they were expected. Questions could be interpreted incorrectly or key issues may be discovered that were not originally intended. Surveys can always be adjusted for the future.

After collecting a sufficient amount of data, making sense of the evidence is the most important part of the evaluation. The evaluator must put everything together and try to look for common themes. This must be done carefully, not to include bias in the interpretation of data.

In the final program evaluation write-up, there are a number of factors that must be considered. How will the data be presented? The right combination of quantitative

and qualitative data can be displayed in many effective ways. The real question here is who would you like it to appeal to. The data should be clear and easy to understand for the reader. Possible ways of presenting results to the audience include visual representations of data in such forms as tables and graphs, usage of aesthetically pleasing shapes and colors, utilization of number or percentage rating systems or open-ended questions. The final step of an evaluation is to write up all of the discoveries made into a final report. This should include clearly stated reasons why the evaluator chooses to analyze the data the way he/she did.

A few more things to keep in mind for the final report: The data collected will be much more credible if both the strengths and weaknesses are shown (Bond, 1997). Keep the final report as simple as possible. Quotes that apply to statistical data can strengthen the meaning of a chart or graph. It is important not to neglect the target audience to whom the final evaluation will be presented and what they will be looking for. Including a brief description of the activity next to a chart will enhance its value tremendously (Bond, 1997). An interesting evaluation effectively illustrates the impact of a program.

### **3 Camp REACH**

Camp REACH, Reinventing Engineering and Creating new Horizons, is a summer camp designed to introduce adolescent girls to the fields of math, science and engineering (Gagne, 1996). In a growing world of technology it is important to look at problems from many different angles, and hence to have a diverse group of engineers. Since there is presently a fewer number of females in the engineering field, this program

is specifically created for, but not limited to, girls<sup>1</sup>. Through hands-on experience, the girls not only learn more about what engineers do, but they also gain personal development and essential skills.

### **3.1 Camp REACH**

Camp REACH is a two-week program for girls in Massachusetts (with exceptions<sup>2</sup>) who enter the seventh grade in the fall after the session. Thirty girls are accepted to the program. They are chosen at first by an essay. After review of the essay, the girls are selected at random. Neither previous math and science grades, nor teacher or guidance counselor recommendations are considered as a part of the application.

The girls get a taste of college life living in the dorms and eating in a WPI campus cafeteria during their stay. Easy computer access is given to the girls for use in their free time. During the day, a plethora of educational activities are planned. In the evening WPI's recreational facilities are available.

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<sup>1</sup> Since NSF sponsored the camp in the first year, it was a requirement that the program had to be open to both boys and girls.

<sup>2</sup> The 1999 program allowed students from Connecticut to apply to keep up good relations with United Technologies Corporation, based in Connecticut, who helped fund the program.

The girls are led through a number of educational seminars and participate in



workshops.

They are exposed to and

taught how to use modern technological equipment. Speakers from local engineering firms are brought in to talk about what engineers do and why it is important and fun.

Local organizations willing to support Camp REACH have selected problems that they would like the students to address. The campers work in groups to develop a solution to the problem. Part of the process is taking a field trip to the site so that the group can actually see what they will be working with.

A weekend field trip to Cape Cod is part of the curriculum. The Sandcastle Building Workshop takes place on a beach at the Cape. They stay overnight in a Falmouth Church Hall. The girls spend the following day at Woods Hole Oceanographic Institution, viewing its Aquarium and Endeavor House Exhibits.

REACH was designed and created by a group of undergraduate students doing their Interactive Qualifying Project (Gagne, 1996). Time was taken to research the appropriate age group the program desires to influence and to discover influential factors in their life at this time. Other Interactive Qualifying Projects done by WPI students were to create workshops for Camp REACH (for example, Mix, 1997).

The workshops and activities are geared towards raising their self-confidence, interest, and engineering skills. The goals of Camp REACH are to stimulate adolescent girls' interest in engineering and technology, motivate them toward education, and encourage their self-esteem. Other goals include keeping the participants involved during the school year through follow-up programs involving the school systems, their math and science teachers, and the girls' parents. A future goal is to continue to follow the girls' progress through high school and beyond (Casper Associates, 1996).

In the summer of 1997, Camp REACH was put into action for the first time. The camp has been extremely successful working with the students and has been run once every summer since its introduction. As with any program, the staff learns as they go along. They have taken action to improve their original plan and make necessary changes. Camp REACH is providing female students with a fun, exciting, and educational introduction to math, science and engineering.

### **3.2 Current Follow-up Activities at Camp REACH**

Denise Nicoletti, Director for Camp REACH 1997-2000, organizes alumni relations. The participants, community businesses, staff and parents currently receive a REACH Newsletter twice a year. REACH tries to keep in contact with all of its campers and associated people to continue the relationships and the connection with engineering (Nicoletti, 2000).

About thirty alumni and a few staff members attended a Winter Reunion on February 20, 1999. The Reunion was for '97 and '98 campers. The Winter Reunion is scheduled to give the campers and staff a chance to reunite. There are no formal

activities planned for this event. The campers are invited back to WPI for an hour to swim in the pool and talk with the friends and the staff they met during camp (Nicoletti, 2000).

A Summer Reunion for the alumni campers took place on July 27, 1999. They attended a self-defense workshop led by WPI's Society of Martial Arts. The 1999 campers had a chance to meet alumni and talk with them during dinner. About thirty-five people attended (Nicoletti, 2000).

Other alumni activities are held. For example, February 27, 1999 was REACH day at WPI. About fifteen REACH alumni and staff cheered on the WPI girls' basketball team in a game against Babson.

The campers are also asked to participate in a REACH T-shirt design contest. This is a good way to keep up the girls' creativity and to keep them connected to the program. Advertisement is also promoted when the t-shirts are worn (Nicoletti, 2000).

In the REACH Newsletter, the campers are asked to inform Denise Nicoletti about any address, phone number or email changes. REACH has most of the alumni's updated information, but not for everyone.

Denise Nicoletti would like to encourage all of the students to attend Massachusetts Academy for Mathematics and Science (MassAcademy). MassAcademy is a public high school for 11<sup>th</sup> and 12<sup>th</sup> graders. WPI works closely with MassAcademy to prepare their students for college level classes in engineering by allowing students to take classes at WPI while in 12<sup>th</sup> grade. This is not only beneficial to the student for college credit, but also promotes WPI as a possible college of attendance. Denise

Nicoletti arranged for interested students to visit the facility and learn about the program in April, 2000.

Thus far, all of the reunion activities available to the students have been socially oriented with exception of the MassAcademy visit. The events have been activities planned to reunite the students with friends they made during the Camp. None of the activities have looked at the lasting effects of Camp REACH, nor have they further encouraged engineering with educational activities.

### **3.3 Current Evaluation of Camp REACH**

Camp REACH currently has a few methods of evaluation. This is one of the reasons for the research done in this IQP. It is desired to know much about the outcome of the program, but the activities done to date have not provided evaluation opportunities.

In the application students are asked about their computer skills and about a few general educational skills. Among these skills are group work, observation skills, organizational abilities, problem solving, listening, direction following, recording information, decision making, research skills, building things, oral presentations, and report writing (Nicoletti, 2000). The Camp REACH Self-assessment tool used in the application is included in Appendix 3 Camp REACH Confidence Self-Assessment (before & after). The information gathered in the application is used for creating project groups and for later data comparison, not for acceptance decisions.

Questionnaires are distributed on both the first and last days of the Camp. These help to establish whether the camp is meeting its short-term goals. In these surveys the girls are asked about their career goals, self-esteem, and impressions of the Camp

(Nicoletti, 2000). The initial Student Survey is included in Appendix 4 REACH Student Survey.

The final questionnaire inquires about more specific areas of the Camp itself. They are asked if they enjoyed each workshop, demonstration, and activity, and how much they learned. Campers are asked to list their most and least liked camp experiences. Recommendations for the future are encouraged. Participants also evaluate their personal skills and self-esteem. A copy of Camp REACH's Final Student Survey is included in Appendix 5 Camp REACH Final Student Survey.

Teachers and parents assess the girls' development during and after the program. A follow up assessment of the girls self esteem is also performed. This is the same one that was given previously. See the follow up assessment in Appendix 13 Marie Curie hand out. The results of these questionnaires are then analyzed and considered during planning for future years of Camp REACH.

The middle school teachers and staff make evaluations of the campers at the beginning and end of the Camp. These are made by observation of the students throughout the program. Each person is assigned a few students to watch. The Student Observation Feedback assessment tool they fill out is in Appendix 6 REACH Student Observation Feedback.

The faculty and CITs are given surveys. They are asked to explain their roles for Camp REACH, comment on any successes that were a result of implementing Camp REACH, discuss any specific refinements that they feel could be implemented at Camp REACH. They are also asked to comment on how the Camp REACH Project worked. The faculty surveys were not given every year.

After the end of the Camp, parents are sent a survey. This survey is included in Appendix 7 REACH 1997 Parent Survey. It covers their daughters' experiences that they have heard about, their confidence, their opinion of Camp REACH, and any recommendations.

In 1997 (the first year of Camp REACH) the program looked to an external organization for evaluation. Dr. Cheryl Phillips Casper of Casper Associates observed program operations, held focus groups with students, conducted interviews with adults, and organized meetings between the evaluator and program administrators, (Casper Associates, 1996). Her evaluations include a review of documentation, forms, and records, distribution and collection of surveys and questionnaires, interviews, structured presentation of formal and informal data (Casper Associates, 1996).

In 1997, the girls were asked to write journals each night to reflect on their day. Journals were not written in every year of the Camp. They were asked to write at least 15 minutes a day and were given a few guideline questions about what happened that day to spark ideas. With exception of the journals and the faculty survey all evaluation methods described above have been performed every year of the Camp.

### **3.4 Funding for Camp REACH**

Camp REACH has been funded by different organizations each year. In the first year of existence (1997) the National Science Foundation funded the program. Camp REACH would not be possible without the support of local businesses. Quantum Corporation, Edison Electric, Greater Worcester Community Foundation, and AAUW were among the agencies that donated to the program in its second year (1998).

United Technologies Corporation, Quantum Corporation, Mercury Computer, USFilter, and Paine Webber donated to the 1999 program.

Fundraising is in progress for this summer's program. So far Massachusetts Academy for Mathematics and Science, United Technologies Corporation, and Mercury Computer have made donations. Camp REACH continues to search for more funding.

#### **4 Other Camps**

There are presently many programs across the country which attempt to address the lack of women in engineering, but only a handful continue to have contact with its participants after completion of the program. A few programs that are similar to Camp REACH have been briefly reviewed below. Not many programs document specific details about follow-up activities. The ones chosen had the most information available.

##### **4.1 Other Camps and their Follow-up Activities**

###### Pennsylvania Governor's School for the Sciences

Pennsylvania Governor's School for the Sciences (PGSS) is a five-week program for high school students ([www-pgss.mcs.cmu.edu/](http://www-pgss.mcs.cmu.edu/), 2000). All information included in this section regarding Pennsylvania Governor's School for the Sciences was found at [www-pgss.mcs.cmu.edu/](http://www-pgss.mcs.cmu.edu/), 2000. The students live in the dorms at Carnegie Mellon University. An evaluation is an important aspect of the program. The faculty and staff evaluate the students, plus the students evaluate the program. The staff writes up regular reports, which are kept in the students' personal achievement portfolios. The evaluation of students provides self-esteem, reinforcement towards a career in engineering, and heightens their enthusiasm. Credit is not available for transcripts, nor are students graded

competitively. Within three months after completion of the program, students receive a personalized letter of evaluation. Students find it helpful to include this letter with their college application. These evaluations are used to improve the PGSS courses and the program every year.

### SummerMath

SummerMath is a four-week residential program for girls in the eighth through twelfth grades (Morrow, Charlene and James, 2000). All information about this program was found from [www.mtholyoke.edu/proj/summermath](http://www.mtholyoke.edu/proj/summermath), 2000. The girls live in the dorms at Mount Holyoke College while taking three 90-minute math classes a day. Students work in pairs in an untraditional classroom setting. The students participate in hands on workshops, learn SuperLogo, a computer programming language, and focus on understanding math problems, not just memorization. This program was introduced in 1982, so it has been around long enough to realize the importance of evaluation. This program has comparatively strong follow-up and evaluation activities.

In the application the applicants are asked not only to provide background information, but also information used to help evaluate the program. They are asked to list the math classes that they have taken to date and when they took them. They are asked to rate their confidence level about math on a scale of 1 to 9. The applicants are required to write a one-page essay describing the experience that most influenced the way they feel about mathematics. They are also asked how they heard about the SummerMath program. This information is used for research purposes only.

Towards the end of the program, the students are asked to fill out a variety of questionnaires prepared by the staff. See Appendix 1 SummerMath Participant Survey

for an example of the surveys. They inform the participants that their feedback is very important and that the information they provide *will* be used. Students are asked to write positive and negative words about each of the areas covered. A comparison of various math and computer related feelings before and after participation in the program are asked. They also inquired about each of the workshops. Not only do they want feedback on the educational parts of the program, but they ask about the residential and recreational parts too. Finally, they ask directly what they liked and disliked about the SummerMath program and the participants' suggestions.

Three months after the end of the program, participants receive a letter informing them that they are preparing for the following year's program. Included are two questionnaires, one for the participant (Appendix 1 SummerMath Participant Survey) and one for the parent/guardian (Appendix 2 SummerMath Parent/Guardian Survey). Questionnaires involve topics such as math, science, or computer courses the student is taking, the students' career interests, and confidence level about math before and after SummerMath, and beliefs about mathematics. The students are asked to discuss how SummerMath has affected them in school this year. Also asked are their feelings on their experience with SummerMath, and if they would consider going to Mount Holyoke College in the future. On the parent/guardian follow-up questionnaire are ratings of how worthwhile the parts of SummerMath were. They are asked if they feel that their daughter has used her experience at SummerMath in school. Additional information and suggestions are encouraged on both questionnaires.

In addition to the multiple questionnaires given, the program organizers keep in contact with the participants. The directors speak with alumni by phone and email and

constantly update the list. They keep track of their progress and where the students' endeavors take them.

The results of the questionnaires were not available for this report, although it is possible to request that data for further statistical studies. Perhaps through contact with the program director the program and REACH could combine results and ideas to improve programs.

### Women in Science Project

The Women in Science Project (WISP) at Dartmouth College addresses the underrepresentation of women in science, mathematics, and engineering. The program provides female undergraduate and graduate students with mentors and role models, information on educational and career opportunities in science, and academic support (Dartmouth College, 2000). This project is not similar to the nature of Camp REACH, but it provides much information on keeping women inspired. WISP is not similar to Camp REACH because it is not a formal program that women may attend; it is however an organization designed for women to answer their questions, and to help them through their educational endeavors. WISP also conducts female related research. The goal of the project is to promote widespread, systematic improvements to the education of women in science (Dartmouth College, 2000).

WISP put together a major research report of Dartmouth Science Alumnae from 1973-96. Communications were done by electronic survey. 1300 women who majored in science, math or engineering were asked to participate. An amazing 55% responded.

There were three major areas of focus in this report. The three main questions asked were (Dartmouth College, 2000):

1. Did these women persist in science after graduation?
2. What factors in their college experience encourage or discourage them?
3. What recommendations do alumnae have to best prepare women in science?

Researchers collected a lot of helpful information about how to improve their program in the future. Here are some of the important and relevant findings of their study (Dartmouth College, 2000).

80% responded reporting that their current job was in the sciences.

(30% health care medicine, 17% mathematical and computer sciences, and 13% life sciences).

45% felt that their current job related to their undergraduate training in the sciences.

28% offered reasons why they did not pursue careers in the sciences or were strongly considering leaving the field. Reasons included advantages of non-science careers, concerns with science careers, sense of one's own interests and abilities, and the formative experiences in college graduate school or the workplace.

Areas receiving less positive ratings included Dartmouth College's introductory science course content and instruction, lab work, colloquia and speakers, major advising, academic skills support, and WISP electronic Newsletter. A few of the positive areas were providing research opportunities and pre-major advising (Dartmouth College, 2000). Although the needs of the college undergraduate age group are far different from the age group of interest to this IQP, the ideas generated by the alumni will be helpful.

WISP had received funding from many organizations. Grants from the College, donations from alumni/ae, foundations, corporations, and federal sources have all contributed to the financial capabilities of the project. WISP continually searches for further external financial support (Dartmouth College, 2000).

### Women in Technology

Ted Boudria and Robert Brown developed the Women in Technology (WIT) program in 1996. The program was created to get women involved and interested in project-based learning in the technical field. Four Attleboro-area high schools are involved in this program. The group meets twice a month for three months. Eleven students participated in the 1997 program and five of them are now pursuing a college career because of this experience.

This program involves team building activities and brainstorming about a problem in a real working environment. The participants go on tours through industrial companies. They view prototypes and assess the process to come up with better solutions. Once a better solution is discovered, they have to actually make it and then present it. Some of their ideas were actually implemented and Texas Instrument's WIT program has since been regarded as an international benchmark for other companies seeking to develop similar programs. Other companies have requested presentations of the programs' work involving the students.

## **4.2 Characteristics of Effective Follow-ups**

The best ideas can be combined to create a good follow-up for Camp REACH by taking a look at what other similar organizations do as follow-up activities. Programs

that have been around longer have a more structured sequence of events after the program is finished. For example, SummerMath has been around for eighteen years and has an organized process for continuing their SummerMath experience.

SummerMath has someone keep track of alumni's contact information (Morrow, 2000). This is the most important thing if it is desired to communicate with participants again. It would be impossible to bring people back together without it! SummerMath advertises to their alumni about future programs. These programs become increasingly challenging, as the students get older.

Newsletters are an effective way of keeping people informed of upcoming events. This is especially useful if it is geared towards the age of the participants. An example where this attention getting method is used effectively can be seen in the January, 2000 REACH Reunion newsletter written by Denise Nicoletti. They would be more likely to read and enjoy it if they saw something that they personally did, said or wrote. Nicoletti included specific quotes from many girls throughout the entire letter.

Pennsylvania Governor's School for the Sciences sends its participants a personalized letter of evaluation within three months after completion of the program. Not only are these letters wonderful to display with a college application, but they are also a major confidence booster for the recipients.

A follow-up activity is almost as important as the camp itself. Robert Brown Jr., Texas Instruments Employee Relations Manager, coordinated the Women in Technology (WIT) program connecting four Attleboro-area high schools. He has driven his program to national recognition with the students' presentations after the completion of the program. The positive learning experience must be continued well after the camp has

ended. In order for the camp to leave lasting impressions with the student, it should be both interesting and educational. The camp needs to make the girls feel good about themselves. If the Camp succeeds at instilling a positive image of engineering unto the girls, then this may lead to their choice to pursue a form of engineering as a career. If the experience is enjoyable and fun, it will be a substantially memorable one.

The assessment part of the program may be conducted in a number of fashions. A good evaluator lets the people know that their ideas and responses *do* get used and are important (Bond, 1997). In the application for SummerMath the applicants are asked to provide information that will be used to help evaluate the program in the future. Participants can see that SummerMath coordinators are serious about making their program a positive experience because they ask for information at the first contact with the potential participants.

## **5 Goals and Objectives for REACH Reunion**

In order to know what the goals and objectives for the REACH reunion are, the original goals and objectives for the camp must be stated. The goals and objectives for Camp REACH stated directly in the original IQP report are as follows (Gagne, 1996):

1. To build confidence in the areas of mathematics and science
2. To introduce the field of engineering as a possible career option.
3. To promote role models for the girls to understand the reality of females in the society of engineers.
4. To demonstrate the characteristics girls possess for the fields of engineering.

5. To stimulate the girls' interest during the program, through projects and activities, and also include a follow-up program to sustain their interests, through partnership with various community groups.
6. To express the positive aspects of a team-based collaborative learning environment.
7. To encourage the active involvement of both parents and teachers in the future of the girls.

The purpose of a Reunion is to see if the program has met its goals and objectives and how successful it was at doing so. The goals for the Reunion are as follows:

1. To evaluate the long term impact of the Camp REACH program
2. To track the confidence level of the girls in mathematics and science from before the program to the present.

Since goal number one of the Camp was to build confidence, the coordinators would like to know if they were successful. The same confidence-testing tool that was used in the Camp will be reused in the Reunion so that the results will be comparable.

3. To ask about the participants' present career goals.

Goal number two of the original Camp REACH goals stated that the Camp was going to introduce the field of engineering as a career option. Now it is desired to know if the participants are considering engineering as a career possibility. This will also help determine the long-term impact of the program (goal one).

4. To continue to raise the girls interest level towards engineering.

If the Camp was successful in carrying out its goals, it would have stimulated the girls interest in engineering as so stated in goal 5 of the original Camp goals. The Reunion will try to further their interest in engineering or any related field. Camp REACH would like to see all of its participants go on to succeed in college and through life.

5. To improve the quality of this Camp REACH experience.

Camp REACH would like to optimize the program experience; this goal goes almost without saying.

6. To generate evidence that this program deserves funding.

Perhaps the most difficult of the goals is number 6, to prove that Camp REACH deserves funding. By compiling the information found in the Reunion, Camp REACH should be able to put together a report of its accomplishments. The key is to show this report to the right people. Organizations who have the desire and the ability to fund a program like Camp REACH.

7. To track the girls through out high school and their future.

It is one of Camp REACH's desires to continue to track the students through the remainder of their education. The camp director, Denise Nicoletti, will be collecting the transcript information in the future. She has not done this to date because she does not know which high school some of the participants attend. She would also like to have their transcripts through high school, and these students have not completed high school yet.

## 5.1 Reunion Design

Each part of the reunion design will be directed towards the goals. Research done in the literature review showed ideas from other similar camps, which will be incorporated into the design of this Reunion. The other background established in the literature review will also be considered during the design. Planning for the camp will be broken down into the following five sections: schedule, activities, staff, budget, and advertising.

The date selected for the Reunion was Saturday, June 24 through Sunday, June 25, 2000. Other possible dates were dismissed because of holiday weekends, interference with Frontiers, and school still being in session.

It has been seen from attendance on May 13<sup>th</sup>, that even if people RSVP that they are coming, it does not always mean that they will show up. Thirty campers are invited back, but unfortunately because of previous engagements only 10 to fifteen campers are expected to return.

Tracey Cree at WPI's Office of Residential Services was spoken to about the possibilities of these girls staying in campus dormitories. She was told the number of girls that may need housing for one night and she gave available dates. Which dorm the girls will stay in is still unknown because it is not sure if an overnight stay is an ideal plan.

WPI campus maps have been photocopied so that the girls will be able to find their way around. There were enough copies made assuming that every girl attends.

## **5.2 Activities**

The activities planned for the reunion must be geared towards the appropriate age group. These girls are dealing with social issues of a high school student and therefore activities must be geared towards relevant issues.

Hands-on activities are crucial to developing teen's creativity. Activities have been designed to provide an opportunity for the girls to use their creativity to solve an engineering problem.

### **5.2.1 Egg Drop**

The goal of this activity is to design a structure to protect an egg from cracking when dropped on cement. The activity will promote group work and artistic design skills.

This activity will require minimal materials. Old newspapers, scissors, eggs, craft sticks, and tape have been placed in a box in preparation for this activity. In case of the egg cracking, paper towels and a trash bag have been included in the box for clean up. Since the materials required for the activity are relatively inexpensive, it is a desirable activity to hold at the Reunion.

Groups of threes need to be formed. It is most convenient to work in groups of threes for this activity. The girls will be allowed to choose their own groups. The Reunion should be a fun activity for everyone and the girls will probably prefer to work with their closer friends.

A trial run has been done in order to find the proper time frame. It took about thirty-five minutes to create the structure. Forty-five minutes have been allotted for this activity allowing for instructions to be given and time to design and build the structure.

Once everyone has finished building, they will take a walk over to the footbridge. One group member will drop the eggs from the top of the footbridge while the others wait below. The structure must be taken apart to see if the egg survived the fall.

### **5.2.2 Physics Demonstration**

A spinning platform is set flat on the floor. Someone has to hold the platform from spinning while the participant steps onto it. The participant holds the bicycle wheel straight out in front of them. An assistant spins the wheel. The participant is then asked to tilt the wheel to the side. The platform and the participant should spin due to the spinning wheel. They will turn faster or slower depending on the angle at which the wheel is held. The wheel is stopped and handed to an assistant. Again, the platform should be held still when the participant is getting down.

Another demonstration involves the spinning platform and two weights. The participant stands on the platform and is handed the two weights. An assistant spins the platform to make it initially moving. The participant holds the weights out to the side at different distances away from their body. The closer they hold the weights, the faster they will spin.

### **5.2.3 Career and College Finding**

It might be a nice opportunity for the girls to use a college or career finding computer program. High School guidance counselors assisted in finding such programs. Although no computer programs could be given without copyright privileges, two web

sites were suggested. These web sites were [www.collegeboard.org](http://www.collegeboard.org) and [www.petersons.com](http://www.petersons.com).

After investigation of these web sites, it was decided that this would not be an easily carried out activity to hold at the Reunion. A computer lab on campus would need to be reserved. It is more difficult to gain access to and reserve a computer lab for such an event being an undergraduate student as seen from questioning by campus police when attempting to enter a classroom in Atwater Kent. A professor would have more success reserving a computer lab.

Other reasons were also considered in the decision not to include this activity in the Reunion. It might be difficult for the girls to follow what they were supposed to do and individual attention would be hard to give. Some girls may not want to provide some of the information requested to be able to use this site. Many further complications could arise.

This activity would be ideal to do during a Reunion in the future if it is further organized. Other web sites that might be worth consideration for use at the Reunion are [www.CollegeQuest.com](http://www.CollegeQuest.com), [www.CampFinder.com](http://www.CampFinder.com), [www.GreatSummerJobs.com](http://www.GreatSummerJobs.com), and [www.LifeLongLearning.com](http://www.LifeLongLearning.com). Carolyn Bosh, Office of Graduate Opportunities counselor at Attleboro High School was the person contacted for the information regarding web sites. She can be reached by phone for further information at (508) 222-5150 x223 weekdays between 8am and 2:00pm.

#### **5.2.4 Bubbles**

There are a few activities that can be done with bubbles. Bubbles can be a good way of getting all the girls to use their creativity or get them to do some physical activity by running around chasing them.

One activity would be to make huge bubbles. This activity would involve approximately five to ten large bubble wands, some bubbles and a lot of fun. It would be a great activity if it were a hot day outside during the Reunion. The girls would be able to get some fresh air and have some fun while doing it. Little bubble wands would be provided so that the girls who did not have the big wands would have something to do.

To make sure that science is involved in some way the girls could be asked to figure out what kind of chemicals are used in making bubbles.

Another activity that can be done with bubbles is a bubble tower. This would require a table that has at least three inches of edge around the top to be covered with Saran wrap. Bubbles would be poured into the area. The task would be to create a structure out of bubbles encouraging aspiring civil engineers.

A positive aspect of these activities is that the materials required are not extremely expensive and they can be purchased almost anywhere. On the other hand, if it is raining outside, this activity cannot take place and a back up activity must be prepared.

#### **5.2.5 Silly Sculpture**

Each girl would be given a long newspaper roll to add to the already begun structure. This activity would only require newspaper, but as found by trial, the newspaper was very difficult to roll. If the time was taken to roll many beams for the

structure, it might be a good extra activity. The structure would become more and more unsteady as it grew. It will teach them about civil engineering and stability of a structure without them even knowing that they are learning.

### **5.2.6 Paper Airplane Making**

Goal number five for the Reunion is to continue to raise the girls interest towards engineering. From observations made during the activity testing, the girls love to make something themselves and then try it out. This is a perfect example of an activity that will enrich the girls' enjoyment of the REACH program experience because they enjoy hands on learning.

The only material necessary for this activity is paper. Since the Reunion presently has no funding to pay for materials, this would be a good choice of activities. This program would like to generate evidence that it deserves funding so that the campers may participate in activities that require more expensive materials.

Designs for a few possible airplanes have been photocopied to hand out to the girls. The girls will have to make one design from the book first to give them ideas about paper airplane designs. Then will then be encouraged to use their creativity and make one of their own. This activity will encourage their enthusiasm towards engineering.

This activity could be made into a contest. As Denise Nicoletti pointed out, the girls respond well when there is a prize to be won or a reward at the end. While the literature review explains that the girls tend not to be competitive but more so motivated by their achievements. The girls will benefit from this feeling of achievement if a reward is given. Jennifer O'Neal, Assistant Director of Admissions at WPI has been spoken to

regarding prizes. They will be free coming from the Admissions Office. Rewards should be given for many categories such as: the highest flyer, the farthest flyer, the most loops done, and the longest flight.

### **5.2.7 Transcripts**

As a method for tracking the girls' success, it will be requested that they send a copy of their high school transcripts to Camp REACH. Jean O'Neal has a few items that may be given as rewards for returning their transcript. The program is more likely to see results if there is some kind of an incentive.

### **5.2.8 Fingernail Painting**

After seeing how interested the girls were in each other's fingernails on May 13<sup>th</sup>, the activity testing, it was decided that it would be enjoyable for the girls to take part in an activity involving their fingernails. The Reunion is supposed to be not only a learning experience, but also provide an opportunity for the girls to socialize with old friends made during the Camp.

To combine a little learning with this activity, the girls should first have to guess what chemicals are in nail polish and nail polish remover. A list of choices should be provided.

### **5.2.9 Every Day Chemicals**

This activity would be aimed at making the girls aware of how many chemicals they use every day and how they are surrounded with science. Every day items that are

found around the house should be set out on a table and then the girls should have to find chemicals that are similar between them. It would be interesting to know some of the stuff they put in their mouth. This would require some background research on the part of the coordinator. The only materials necessary for this activity are found around the house.

#### **5.2.10 Chemistry Demonstration**

For those interested in chemistry, this demonstration would be extremely interesting because of the effects of the reaction. If one mixes acetone and liquid nitrogen together much white steam will be formed. It is not harmful to onlookers, but the person doing the demonstration should take proper precautions.

Materials for this activity are way too expensive for the Reunion with its current funding. A laboratory in Goddard Hall, the Chemistry building would have to be reserved. The girls would need to wear safety goggles in the lab. The goggles would have to be borrowed from the Chemistry Department. There are too many safety risks involved in this activity that makes it undesirable to perform at the Reunion.

#### **5.2.11 Bridge Building**

This activity would involve Popsicle sticks just as the Egg Drop activity did. The girls would have to design a strong bridge that would have specific requirements such as length. The object of this activity is to see how much weight each structure could hold. The bridges would be glued together so they would have to be made one day and then tested the next. It is thought that this activity would not be as good as the Egg Drop

because it would require more than one day to allow the glue to dry. If the Reunion is only one day long it may not work.

### **5.2.12 Design Project Update**

Although it would be nice if they girls could see the progress on their Design Projects, it has been difficult for Denise Nicoletti to keep good contact with all of the sights. It would be unfair if some of the girls got to hear about their project and some others did not. This activity would require contacting the people that were worked with before to get information and possibly taking pictures of the sight.

### **5.2.13 Movie**

To display the importance in young creativity, a movie will be shown. The movie chosen is *October Sky*. It is a movie about three boys who enjoy making rockets and experimenting with them until they go higher, faster, further. They go through hardships and challenges of high school and life. These boys are in high school and therefore share common issues with the ones the girls might be presently facing. It is an appropriate movie to be shown during the Reunion. *October Sky* is rated PG. View the movie description in Appendix 20 Movie Description.

Other movies considered were *Armageddon*, *Apollo 13*, and *Good Will Hunting*. These movies were not chosen because of the rating. They were also not as relevant to the age group and the subject matter was not as meaningful as *October Sky*, the movie chosen.

#### **5.2.14 Questionnaire**

The girls will be asked to complete a questionnaire. This questionnaire has been designed to ask questions that will give Camp REACH coordinators feedback about their program. A copy of the questionnaire has been included in Appendix 21 Reunion Questionnaire. The questions have been modeled after SummerMath's feedback questionnaire.

#### **5.2.15 Discussion**

In addition to a questionnaire, a group discussion will be held to get further information. Discussions generate a different kind of feedback. A list of possible discussion questions is included in Appendix 22 Possible Discussion Questions. To help promote memories about Camp REACH, a list of activities that the girls did will be provided. This list can be seen in Appendix 23 Activities Previously done at Camp REACH. A poster board of pictures will also be in view of the girls during the discussion to promote discussion.

#### **5.2.16 Speaker**

Denise Nicoletti suggested that a speaker might be a possible way of relaying information to the girls. Speakers have been contacted by personal visit, phone calls and letters. See the letter written to possible speakers in Appendix 24 Letter to Possible Speakers. There are various topics in which the speakers specialize ranging from career and college choice, to nutrition, personal health and well-being. The decision of a speaker should be made based upon the best interest of the girls. A few speakers have

been considered; see a list of possible speakers in Appendix 25 List of Potential Speakers.

### 5.3 Schedule

When the campers arrive, they will be given a WPI campus map. The map is included in Appendix 18 WPI Campus Map. Shown below is a brief view of the Reunion schedule. A more detailed schedule may be found in Appendix 19 Reunion Schedule.

Time	Activity
9:30	Campers arrive
9:45	Move into dorms
10:35	Good byes to parents
11:00	View pictures/ Informal discussion
12:00	Lunch
12:45	
1:15	Snack break
1:30	Egg Drop activity
3:00	Bubbles
4:00	Physics Demonstration
5:00	Dinner
6:00	Movie

**Table 1 : Day 1 Reunion Schedule**

Time	Activity
8:00	Breakfast
9:00	Speaker
10:00	Snack
10:30	Fingernail painting
12:00	Lunch
12:45	Questionnaire
2:00	Break/ refreshments
2:30	Paper Airplane making
3:30	Pack
5:00	Pick up

**Table 2 : Day 2 Reunion Schedule**

Denise Nicoletti has suggested the time frame of two days. This is felt to be appropriate so that the girls may take part in the many activities planned and also find enough time to socialize with old friends. The negative side of having the girls stay overnight in the dorms is that it becomes slightly expensive because of the cost of the dorms and meals. It may be difficult for some parents to afford the money it will cost to stay overnight.

#### **5.4 Staff**

The same staff that was part of the camp should be invited to return for the Reunion. One adult per ten campers is reasonable, so if all thirty campers return, three staff members are necessary. For Camp REACH there were nine responsible adults attending to thirty girls.

Both Women on Women's Issues (WOWI) and Society of Women Engineers (SWE) should be contacted for volunteers. Because of the shortage of funds, it would be best if staff were voluntary. People interested should be interviewed for these positions. The following positions need to be filled:

##### Reunion Director

This person, most likely Denise Nicoletti, should understand the goals of the Reunion. Denise Nicoletti is mentioned because she has been the Camp Director for the previous three years. She knows about the Camp and how it was run, plus she was part of the 1997 Camp, so she knows the campers who will be returning for the Reunion.

### Resident Advisor

Residential advisors (RAs) live in the dormitories with the girls. They are responsible for assisting campers with any problems that arise in the dorms. These people address personal issues such as medications or special requests. These people will most likely be volunteer undergraduates from WPI.

### Activity Leaders

Activity leaders are in charge of understanding the goals of their specific activity. They are responsible for organizing the room where the workshop will be done and for organizing the materials to be used.

## **5.5 Budget**

The budget will be calculated assuming perfect attendance.

Tracy Cree from the WPI Office of Residential Life quoted room expenses.

These can be found in Appendix 26 Reunion Budget. These are based on an overnight stay in a double occupancy room.

Expenses for supplies, speakers, and activities can also be found in Appendix 26 Reunion Budget. Supplies were established comparing to prices found at various cost conscious stores.

Robert Wilder, DAKA Staff member, was contacted regarding the cost of meals in the cafeteria during the Reunion.

Because of the lack of funds, the campers will have to pay the entire cost of the Reunion themselves. This places a need to have voluntary staff.

## **5.6 Advertising**

Participants will be contacted via mail, and if possible, email. The Reunion will be strongly encouraged. The letter that could be sent to the alumni is included in Appendix 27 Reunion Invitation. The coordinators will need to know how many people they need to plan for and they will need some information about the girls. The information and RSVP forms have been included in Appendix 28 Camper Reunion RSVP Form.

## **6 Follow-up of 1999 Camp**

Part of the Follow up of Camp Reach is designed to inform the girls as to the status of their design project that they completed during the duration of the Camp. On May 13<sup>th</sup>, 2000 the Edward Street Daycare Center project group from the 1999 Camp was invited back for two hours. The Edward Street Daycare Center project involved the design of a safer playground for an age group younger than the one the playground was originally intended for. The project sponsor has had difficulty implementing the design, which has prolonged the start date and now leaves us with little progress to relay to the girls. Therefore, instead of an interim visit to their project site, this group was asked to come to campus and test run some of the activities planned for the Reunion. This was a perfect opportunity to try out some of the possible activities and get some feedback from the girls.

### **6.1 Follow up Design**

The goals of the 1999 Follow up were to inform the girls about the progress of their Design Project and to test out some of the activities to be done at the Summer

Reunion in order to gain some insight on their success. The sections below include planning for the schedule, activities, staff, budget and advertisement.

Denise Nicoletti proposed that two hours would be sufficient to address the issues at hand and complete the desired activities. This was felt to be appropriate because of the attention span of the age group and the length of the activities to be tested. Shorter than two hours would not be sufficient time to get everything done, but longer would be too much time and possibilities for the girls to get bored or distracted might arise.

Saturday, May 13, 2000 was chosen as the date to hold the Follow up. It obviously has to be before the Reunion is held so that the information may be used in the planning for the Reunion. Saturdays are more preferable to hold such an event than Fridays because the girls sit in school during the day on Friday. They would be more likely to pay attention and be interested on a day where they have not already been forced to pay attention for a great deal of time in school. Many families have family gatherings on Sundays or they go to church, etc. It would be best to avoid Sundays. There are no Holidays during the weekend of May 13, so this was the weekend chosen.

It is possible that all ten girls and the three assistants could be present for this event, but it is not likely. It is expected that people will have already made plans or not have transportation capabilities. At least one other assistant other than myself, and somewhere between five to seven girls are expected.

In planning for this Follow up event, a location had to be chosen. Since the girls became familiar with Atwater Kent during the Camp, it would be wisely chosen if these Follow up activities took place in the same building. A room in Atwater Kent (AK219) should be reserved for this event.

The Project team (ten girls, the middle school teacher, and the two high school student counselors) was invited to participate in the pilot testing follow up activities on May 13, 2000. They were informed via mail and email.

### **6.1.1 Activities**

These activities are a pilot run to test some of the activities planned for the Summer Reunion. The activities chosen were chosen so that the rough edges could be smoothed out before the Reunion.

#### **6.1.1.1 Arrival**

As the girls arrive, brain-stumping toys will be provided to occupy the girls' time while they wait for everyone else to arrive. Among the toys presented to the girls to play with will be a *Rubics* cube, a *Brick by Brick* puzzle, a *Yoshi's* puzzle, a pin impression toy, *Jenga* and a *Lights Out* game. The Readers Digest books *The Way Things Work* and *How in the World* are also going to be set on the tables.

#### **6.1.1.2 Design Project Update**

The games will be removed from the tables before anything begins to prevent distractions. The girls will then be informed about their design project. Jennifer Belanger will tell them about the circumstances at Edward Street Daycare Center. Denise Nicoletti has spoken with her and she has been informed of all the details that Denise wishes to convey to the group. This will take approximately 10 minutes.

### **6.1.1.3 Egg Drop**

The Egg Drop activity will take place in this same room. It is desired to know if this is an enjoyable activity for this age group. Although the Reunion group will be three years older than the test group, the results should be relatively similar. Materials for the Egg Drop activity were previously prepared in a box. As these items are placed out on the tables the activity will be explained. A handout and oral instructions were provided to inform the girls of the activity and what each girl will be doing. A full description of this activity may be found in Section 5.2.1 of this paper.

Approximately thirty to forty five minutes should be enough time for the girls to complete designing and building their structures. This allocation of time for this Egg Drop project was given at speculation, therefore, performing this project at the Follow-up will determine the correct amount of time needed to complete all the tasks involved. After all is complete, everyone will walk over to the footbridge together. In case of rain, Founders Stairway, Atwater Kent Stairway or Fuller Labs are all sufficient places to drop the eggs. These would require a key since all of these buildings will be locked.

### **6.1.1.4 Physics Demonstration**

Since the room in Atwater Kent (AK219) was previously reserved, the physics demonstration was scheduled to take place there instead of moving to Olin Hall, the physics building. It has been arranged with the physics department to use some of the equipment. Professor Thomas Keil, the Physics Department Head, has granted permission to borrow equipment. The equipment borrowed was the bicycle wheel with handles attached at the center, a rotating platform, and two weights.

The girls will first hear a brief word about torque and force describing what they are and why they are important in our world. They will then be able to take part in a hands-on demonstration. This demonstration is described in further detail in Section 5.2.2 of this paper. For this experience, a spinning platform and a bicycle wheel with handles on the sides is available. Each girl will get a chance to experience this for herself.

This activity is scheduled for the Follow-up to determine if it is interesting enough for the girls. A sufficient explanation of torque and force must be given to the girls in order for them to completely understand the phenomenon that occurs when they partake in this demonstration. Also, this explanation will have to be given in such a way that the girls will completely understand; the normal college physics explanation may be too advanced. It also must be brought into consideration that this activity may not be for everyone, some girls may be physically incapable of holding the heavy weights in their hands as they spin, or some of the girls may become dizzy from being on the rotating platform. Precautions must also be taken as to the possible dangers that could result from such a rotating platform as will be used. A girl could very possibly fall off the platform and get seriously injured.

#### **6.1.1.5 Questionnaire**

A short survey about the day's activities will be distributed and filled out before they leave. This will be used for ideas to improve the activities before the Camp REACH Reunion that will take place June 24, 2000. See the survey in Appendix 13 Marie Curie hand out. The survey is multiple-choice with minimal writing question since the girls

may be pressed for time at the end. Plus, this type of survey is easier to interpret for statistical data.

When the girls are asked if they enjoyed the activities, they are given a choice of five selections ranging from “not at all” to “a lot”. Five different choices are presented so that the girls have a choice of being neutral. Also provided is a space for the girls to write down any comments they may have about the activity.

### 6.1.2 Schedule

An appropriate schedule was designed to keep the girls busy and interested for the full two hours. The girls will want to know what they are going to be doing right away, so at the beginning the girls are told a brief schedule of the two-hour program. See the more detailed schedule that was handed to the girls in Appendix 8 Follow up Schedule.

Time	Activity
3:00	Arrival
3:05	Inform girls of the schedule
3:10	Update on design project
3:20	Explanation of Egg Drop activity
3:25	Design of structure
3:30	Building of structure
4:00	Walk over to footbridge
4:15	Dropping of the eggs
4:20	Walk back to Atwater Kent
4:30	Physics Demonstration
4:50	Questionnaire about Activities
5:00	Pick up

**Table 3 :May 13 Follow up Schedule**

The assistants were also given a plan of the scheduled activities. This schedule lists what the assistants should be doing also. See the Assistant Schedule in Appendix 9 Follow up Assistant Schedule.

### **6.1.3 Staff**

A middle school teacher, Jennifer Belanger, has been invited to inform them of the progress of their Design Project. Denise Nicoletti cannot be present at this event so the information regarding the Design Project has been passed on to Jennifer Belanger. Two high school students, Ananda Leininger, who attends Massachusetts Academy, and Relida Kosova, who attends Dority High School, have also been invited to help. These three assistants are ideal because they were Edward Street Daycare project team members at the 1999 Camp, so the girls knew them already.

### **6.1.4 Budget**

Since there is presently no funding for this follow up event, the supplies must be purchased carefully. One of the goals for the future is to have enough funding to pay for further Camp REACH activities such as this. Expenses for supplies used during the follow up may be found in Appendix 10 Follow up Budget.

## **6.2 Results**

Set up for the events began at 1:45 p.m. upon arrival to Atwater Kent. The building was locked. A visit to the Campus Police station was required in order to have Atwater Kent unlocked. Unfortunately, they had no record of this activity planned in their paperwork, even though a room (AK 219) had previously been reserved with Charles Kornik. Also, a personally dropped off letter explaining that the room was to be used had been provided to the police station. View the letter in Appendix 11 Letter to Campus Police. The woman at the front desk gave me a hard time and told me that she

was sorry that she had no record of this event being scheduled in Atwater Kent and that the event would just have to take place in the first floor of Morgan Hall (Wedge).

Finally, one of the police officers came in and asked what the problem was as he had overheard the conversation about the reservations. The email from Charles Kornik was then shown to the police officer proving that the event had been planned for that day and a room had in fact been reserved in Atwater Kent. Convinced by the email he happily unlocked the building.

Four girls attended the follow up activities on May 13, 2000. The first girl, Katelyn Moisan (Katie), arrived at 2:45pm, fifteen minutes early. She stood in the back of the room. After spoken to for a while she seemed to be more comfortable. She was asked if she would like to come and play with any of the games that were brought but she did not respond. Then, Phyllis Goodman (Lily) and Nicole Kunkel (Niki) arrived and they sat down at the back of the room to chat with Katie.

Three assistants then arrived setting the ration of assistants to girls to one on one. First to arrive was Ananda, and the girls all recognized her from the Camp in 1997. Talking with each other made the girls remember the Camp and begin to reminisce. Jennifer and Sadie Lopez then arrived together and immediately entered the girls conversations. The girls all seemed to get along well and everyone was included in the conversations.

Everyone was then invited to come down to the front rows where games and books were set out. Everyone instantly came down and settled into the front seats. No one read the books, but they took no hesitation in playing with the games.

A schedule of the afternoon events (found in

Appendix 8 Follow up Schedule) was passed out. The girls asked what they were going to be doing today, and it was explained briefly. The assistants were also told of the tasks they would be responsible of and showed a schedule of when these tasks and would have to take place. See the assistant schedule in Appendix 9 Follow up Assistant Schedule.

Jennifer Belanger began the afternoon by telling the girls about their Design Project. Niki said, "But we worked so hard on that." Overall, they were indifferent to the results. Since there was not much to tell them, this only lasted five minutes, not the scheduled ten minutes. We started the next activity right away so they did not get distracted.

The Egg Drop sheet was handed out. It is included in Appendix 12 Egg Drop. I explained briefly what they were going to be doing. Then they were told to read the handout. I went over what they would be doing again in a little more detail since they had a better idea after reading the handout. They instantly got excited. Someone exclaimed, "Oh, I saw this on TV, it was cool."

They were split into two groups of two. They discussed their ideas with their partner for a few minutes and then began building. One group saw what the other group was doing and changed their idea half way through the building process. One group finished their structure earlier than the other group, but they just talked and played with the games until the other group was done. They finished in exactly the allotted forty-five minutes.

Weather permitting, the two groups and assistants walked to the footbridge together. It was drizzling out, but it was not enough that the structures had to be dropped inside. One person from each group went up on top of the footbridge and the other went

down below and the structures were dropped. When disassembled it was discovered that both eggs had broken. Paper towels and a trash bag were used to clean up the mess and then everyone proceeded to return to the room.

The group returned to Atwater Kent and the refreshments were served. While they were eating their snacks, they were asked if they knew the trivia that was asked at the bottom of the Egg Drop hand out. One out of the four girls knew who Marie Curie was! A hand out about Marie Curie was provided, which they flipped through, but did not really read. The hand out can be found in Appendix 13 Marie Curie hand out.

While they were eating, the physics demonstration was set up. The girls were asked if they had ever heard of torque and since none of them had, it was explained briefly. The wheel that was used in the physics demonstration was tipped sideways and showed them how it makes you turn different ways depending on which direction you tilt it. The speed at which you spin also depends on the angle at which the wheel is held. They were asked if they wanted to try. A few, but not all, did try the demonstration.

The level of enthusiasm for this activity varied. One girl hopped up and really wanted to try it, and then one of the assistants tried it. The other two girls needed to be asked again if they wanted to try. The fourth girl was too embarrassed to try it. It probably was not something she considered to be *cool* to do in front of her friends. This is a perfect example of an adolescent girl trying to fit in by doing what she feels will be accepted by her friends. This is the type of attitude and behavior that Camp REACH is aiming to improve so that it will not interfere with a girls desire to experience and learn.

The second demonstration was using the weights. The demonstrator stood in the middle of the spinning platform and had someone spin them. It was then shown how the

speed of rotation varied depending on how far the weights were held out from the center of rotation. One girl tried, but decided that the weights were too heavy for her. The teacher also wanted to try. The spinning platform had to be carefully held as the girls stepped onto and off of it.

Two Tupperware containers of the same size but different weights were displayed on the table. The different weights were rocks wrapped in towels. The girls were asked which one would hit the ground first if they were both dropped at the same time from the same height. Various answers were given. The stairwell in Atwater Kent was used to drop the containers. A few people went to the bottom to see which one would hit first. The first time they were dropped two different girls participated and the two containers hit at different times. A second trial was performed with only one person dropping them, and indeed, they landed at the simultaneously. The girls asked why and they were given a reason. Newton's idea was explained.

The group walked back to the room and I asked both the girls and the assistants to fill out a questionnaire. The questionnaires and results can be seen in Appendix 13 Marie Curie hand outthrough Appendix 17 Results of Assistant Questionnaire.

Another one of the trivia questions was about one of the professors jumping off of the footbridge. I asked them if they knew how that was possible. I explained to them that it was done in the blizzard of 1978 into the snow. At the end I did a card trick on them. They were not very impressed. So we played Crazy 8's until it was time to go. The activities that were planned were done ahead of time. Next time there should be back up extra activities planned. They all helped clean up and carry things down stairs.

### **6.3 Conclusions and Recommendations for Reunion planning**

Difficulties were had when attempting to enter the building on the day of the activities. It should be double-checked with the campus police that they have the information necessary to unlock campus buildings during the weekend. Charles Kornik needs to fax or call campus police confirming the room reservations for such weekend activities.

The Egg Drop activity was a success as can be seen in the results from the questionnaires in Appendix 16. The appropriate amount of time was allotted for this activity and the girls seemed to enjoy it both from observation on May 13<sup>th</sup> and from reading their opinions on the survey.

The girls worked well together in groups of two's during the Egg Drop. They worked in groups of two's because only four girls were present and it was desired to make more than one groups so that everyone had a chance to participate. Although groups of two worked well, three is still the optimal number of people to have in a group. If, at the Reunion, there is an even number of people, a group of two would be better than a group of four. A group of four girls could get easily off track as observed during the May 13<sup>th</sup> pilot testing. Since one group finished before the other they played with the provided toys while they waited. These toys should also be available for this same reason during the Reunion.

One way of improving this activity for the Reunion would be to separate the groups. Placing each group at a separate table would force each group to come up with their own individual design. It was noticed during the testing that one group was not confident with their own design so they got a little curious as to what the other group was

doing. This activity will promote more learning if one group cannot be influenced by what another group is doing.

The girls felt that the trivia at the bottom of the Egg Drop handout was interesting. They showed a little interest when someone had already heard of Marie Curie. The handout that was given to them had a picture of Marie Curie on the front of it. Perhaps a few facts about Marie Curie should be pulled from the text and placed below her picture and then the full article attached for further reading if the individual is interested. The picture is what caught the girls' attention.

The Physics Demonstration was somewhat less of a success than the Egg Drop, yet still enjoyable for those who tried it. With some minor improvements it can still be made into a positive learning experience for the girls. While the girls learned something about what torque was, they were still slightly confused as to what made it happen as shown during the demonstration. As suggested by one of the assistants, a less mysterious and more easily understood phenomena could be chosen or this one could be more thoroughly explained.

The level of enthusiasm for this activity varied. One girl hopped up and really wanted to try it and then one of the assistants tried it. The other two girls needed to be asked again if they wanted to participate. The fourth girl was too embarrassed to try it. It probably was not something she considered to be *cool* to do in front of her friends. This is a perfect example of an adolescent girl trying to fit in by doing what she feels will be accepted by her friends. This is the type of attitude and behavior that Camp REACH is aiming to improve so that it will not interfere with a girls desire to experience and learn

So that everyone might want and be able to participate in this demonstration, a few alterations could be made. Lighter weights should be available so that everyone can lift weights comfortable to them. Also, a chair that sets safely on the rotating platform should be found so that the participants do not get the feeling that they are going to fall. This will help the participants who do not have the best balance or are afraid of getting dizzy.

This age group also responds well to visual demonstrations. The group will be shown interesting physical phenomena by means of demonstration and then allowed to participate. This way the girls will first learn a little about what is physically happening and then they will get a chance to try it out and learn for themselves. This activity will promote interest and learning about engineering, which will satisfy Reunion goal number five. WPI's Physics department will provide the equipment necessary for these demonstrations. Thomas Keil as already agreed to allowing equipment to be borrowed again, he must be reminded of the date. The equipment to be borrowed for this demonstration is a rotating platform, a bicycle wheel with handles attached to the center, and weights. These pieces of equipment can be borrowed for free, so it is a good candidate to be one of the activities done during the Reunion since the Camp has no funding for this event.

Much was learned when the two objects of different weight were dropped at the same time. At first they did not land at the same time so the girls did not believe that they should land at the same time. This was found to be because two different girls dropped them. At the Reunion, one girl should be chosen to do the dropping so that the containers will be dropped at the same time, the first time. As soon as they discovered

that they did indeed land at the same time, a multitude of questions arose. It would be a good idea to have prepared some information about the reason for this phenomenon. They seemed interested to know why they landed at the same time. Perhaps a handout with a visual illustration and some written information would aid their understanding of what just happened.

It should be noted that the girls began to reminisce about Camp REACH as soon as they saw staff members that they recognized. This may be a good indication that the discussion should be held at the very beginning of the Reunion when the girls naturally have the craving to reminisce about memories they share

Chocolate chip cookies and fruit punch were the refreshments that were served. They ate the entire package of chocolate chip cookies and one and a half bottles of juice. When planning for the Reunion it should be noted that one package of cookies was perfect for eight people and that more than one bottle of juice was necessary, with the understanding that this was not a hot day. If this was a hot sultry summer day, as it may be during the Reunion, the girls might have wanted more to drink.

The activities that were planned for May 13<sup>th</sup> were done ahead of the scheduled time. So that there is no dead time where the girls are given nothing to do. There should be back up additional activities planned. Especially since the girls will be paying to go to this Reunion, it is optimal that there be something to do at all times.

## **7 Conclusions and Recommendations**

Through careful analysis of other camps closely related to Camp REACH such as SummerMath, WIT (Women in Technology), WISP (Women in Science Project), Pennsylvania Governors School for the Sciences and commencement of pilot testing

Follow-up activities performed on campus, a plan of action has been developed for the Reunion gathering of the girls from Camp REACH 1997. Various post camp surveys have been given and gathered to determine the most optimal set of activities for the Reunion. Activities related to the girls interests specific to their age group deemed most enjoyable to the young women and therefore will be implemented into the Reunion on June 24, 2000.

Assessment of Camp REACH's funding vs. cost breakdown for supplies, activities, food, entertainment, and housing has deemed the Camp cost inefficient. The girls that will be attending the camp will be required to pay a nominal fee that may be too expensive for many families. Therefore, it is recommended that some sort of sponsor be found or that the camp length be shortened to compensate for the abundant cost.

The girls attending the Camp would surely benefit more if there were an overnight stay but due to the funding constraints that an overnight stay in the WPI dorms would infringe on the girls' families, it is not optimal unless some sort of sponsorship is obtained.

In conclusion it can be shown that through the review of various Follow-up surveys taken by the girls and through observations of a Follow-up gathering that if the predetermined course of action is followed and carried out correctly, the Camp REACH 1997 Reunion will be a success on June 24<sup>th</sup>, 2000.

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## Appendix 1 SummerMath Participant Survey

October 28, 1999

Dear SummerMath Family,

Greetings from South Hadley!

As we turn to a new season and make plans for SummerMath '00, we are also looking back to learn from last year's experience. We have already gained a wealth of information from the SummerMath '99 participants, but we would like to know what you think now. We want to document the successes of the Program, as well as address any problems the Program might have. We are asked by many people what SummerMath students do and think, especially about mathematics, when they return to school.

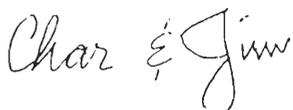
As part of our assessment, we are enclosing two brief questionnaires, one to be completed by the SummerMath '99 participant, and one to be completed by her parent/ guardian. Soon, you should be receiving a 2000 SummerMath brochure.

\*\*\*In addition to getting your current thoughts about the program, we are collecting messages that SummerMath 99ers have for each other or for the staff. Place messages on the back of the student questionnaire. These messages will become part of the SummerMath Newsletter, which should appear in late Spring.

Please return this questionnaire by November 25, so that messages may be included in the newsletter.

Best wishes to all of you, and thank you very much for the time and energy to complete the questionnaire! To those of you who have already written to us, your letters are really appreciated . . . and we will write back to you soon!

Sincerely,

A handwritten signature in cursive script that reads "Char & Jim". The ampersand is stylized, and the names are written in a fluid, connected style.

Char and Jim Morrow

<b>1999 SUMMERMATH STUDENT FOLLOW-UP QUESTIONNAIRE</b>
--

**NAME** \_\_\_\_\_

**YEAR IN SCHOOL** \_\_\_\_\_

The purpose of this questionnaire is to ask you about your changing views of SummerMath. We thank you in advance for your thoughtful effort in giving us feedback as we continue to assess the Program's impact.

**COURSES YOU ARE NOW TAKING:**

MATHEMATICS \_\_\_\_\_

COMPUTERS \_\_\_\_\_

SCIENCE \_\_\_\_\_

**CAREER INTERESTS:** \_\_\_\_\_

**USING YOUR EXPERIENCE AT SUMMERMATH.** How has SummerMath affected you in school this year? Please talk about anything ...your confidence, ...your ability to approach problems, your grades in school, how you feel about your classes whether you work with other students,....etc.

**CONFIDENCE.** We have asked you at other points in time about your confidence in mathematics, we do so again to continue to track this important indicator. My level of confidence in mathematics is:

BEFORE SUMMERMATH:	Least Confident	1 2 3 4 5 6 7 8 9	Most Confident
AFTER SUMMERMATH:	Least Confident	1 2 3 4 5 6 7 8 9	Most Confident
AT THE PRESENT TIME:	Least Confident	1 2 3 4 5 6 7 8 9	Most Confident

**BELIEFS.** Another vital and changing indicator that we need to keep track of, is your beliefs about mathematics. Please circle your responses, ranging from strong agreement to strong disagreement to the statements below.

*Mathematics is a worthwhile and necessary subject.*  
 Strongly Agree 1 2 3 4 5 Strongly Disagree

*How you get an answer is as important as whether the answer is right or wrong.*  
 Strongly Agree 1 2 3 4 5 Strongly Disagree

*There is only one way to get a right answer in mathematics.*  
 Strongly Agree 1 2 3 4 5 Strongly Disagree

*If I can't solve a math problem quickly, I quit trying.*  
 Strongly Agree 1 2 3 4 5 Strongly Disagree



**1999 SUMMERMATH PARENT/GUARDIAN  
FOLLOW-UP QUESTIONNAIRE**

Student's name: \_\_\_\_\_

We would like your assessment of SummerMath, based on both what your daughter has told you and what you have observed since the end of SummerMath. Thanks for your time and thought!

**RATINGS OF SUMMERMATH:**

FUNDAMENTAL MATHEMATICAL CONCEPTS

Very Worthwhile    1 2 3 4 5    Not At All Worthwhile

COMPUTING WITH LOGO

Very Worthwhile    1 2 3 4 5    Not At All Worthwhile

TWO-WEEK WORKSHOPS

Very Worthwhile    1 2 3 4 5    Not At All Worthwhile

RESIDENTIAL LIFE

Very Worthwhile    1 2 3 4 5    Not At All Worthwhile

WEEK-END TRIPS

Very Worthwhile    1 2 3 4 5    Not At All Worthwhile

WEDNESDAY NIGHT SPEAKER SERIES

Very Worthwhile    1 2 3 4 5    Not At All Worthwhile

**HOW YOUR DAUGHTER HAS USED HER EXPERIENCE AT SUMMERMATH:**

How has SummerMath affected you daughter in school this year? Please talk about anything...her confidence, her ability to approach problems, her grades in school, how she feels about her classes, whether she works with other students,....any changes you have noticed that you think might be related to her experience at SummerMath. (Please use additional space, if necessary.)

**YOUR FEELINGS ABOUT SUMMERMATH:** Please tell us anything else that you think we should know about your daughter's experience at SummerMath and your thoughts and feelings about the Program. (Please use additional space, if necessary.)

Appendix 3 Camp REACH Confidence Self-Assessment (before & after)

STUDENT NAME \_\_\_\_\_

DATE \_\_\_\_\_

### HOW I FEEL ABOUT MYSELF

For each item, place a checkmark in the spot that describes how you feel about yourself. Read each item carefully.

	Very	Only A	In	Only A	Very	
		Bit	Between	Bit		
smart	_____	_____	_____	_____	_____	not smart
weak	_____	_____	_____	_____	_____	powerful
believable	_____	_____	_____	_____	_____	not believable
careless	_____	_____	_____	_____	_____	careful
liked	_____	_____	_____	_____	_____	not liked
not funny	_____	_____	_____	_____	_____	funny
neat	_____	_____	_____	_____	_____	sloppy
indecisive	_____	_____	_____	_____	_____	decisive
friendly	_____	_____	_____	_____	_____	not friendly
bad team member	_____	_____	_____	_____	_____	good team member
in control	_____	_____	_____	_____	_____	not in control

STUDENT NAME \_\_\_\_\_

DATE \_\_\_\_\_

## HOW I WOULD LIKE TO BE

For each item, place a checkmark in the spot that describes how you would like to be. Read each item carefully.

	Very	Only A	In	Only A	Very	
		Bit	Between	Bit		
smart	_____	_____	_____	_____	_____	not smart
weak	_____	_____	_____	_____	_____	powerful
believable	_____	_____	_____	_____	_____	not believable
careless	_____	_____	_____	_____	_____	careful
liked	_____	_____	_____	_____	_____	not liked
not funny	_____	_____	_____	_____	_____	funny
neat	_____	_____	_____	_____	_____	sloppy
indecisive	_____	_____	_____	_____	_____	decisive
friendly	_____	_____	_____	_____	_____	not friendly
bad team member	_____	_____	_____	_____	_____	good team member
in control	_____	_____	_____	_____	_____	not in control

**STUDENT SURVEY**

STUDENT NAME \_\_\_\_\_

DATE \_\_\_\_\_

<b>1 = Excellent</b>	<b>2 = Good</b>	<b>3 = Fair</b>	<b>4 = Poor</b>
----------------------	-----------------	-----------------	-----------------

Using the above scale, please rate yourself in the following areas. Pick one number that best describes your comfort and confidence level as you see yourself now.

1. Building Things \_\_\_\_\_
2. Taking things apart \_\_\_\_\_
3. Making decisions \_\_\_\_\_
4. Making measurements \_\_\_\_\_
5. Working with computers \_\_\_\_\_
6. Making Oral Presentations \_\_\_\_\_
7. Writing \_\_\_\_\_
8. Problem Solving \_\_\_\_\_
9. Relating to people different than me \_\_\_\_\_
10. Working on cars \_\_\_\_\_
11. Working with Others \_\_\_\_\_
12. Observation Skills \_\_\_\_\_
13. Ability to Organize Information \_\_\_\_\_
14. Listening \_\_\_\_\_
15. Following Directions \_\_\_\_\_
16. Recording Information \_\_\_\_\_
17. Making Decisions \_\_\_\_\_
18. Research Skills \_\_\_\_\_
19. Writing Reports \_\_\_\_\_
20. Understanding the way things work \_\_\_\_\_
21. Using tools \_\_\_\_\_
22. Planning a schedule \_\_\_\_\_
23. Talking with someone I don't know on the phone \_\_\_\_\_
24. Conducting an interview \_\_\_\_\_
25. Making new friends \_\_\_\_\_

26. Describe what engineering is in your own words.

<b>1 = High Degree</b>	<b>2 = Moderate Degree</b>	<b>3 = Minimal Degree</b>	<b>4 = Not at All</b>
------------------------	----------------------------	---------------------------	-----------------------

Choose one of the above responses.

27. How much thought have you given to your future career? \_\_\_\_\_

28. How interested are you in engineering as a career? \_\_\_\_\_

29. If you know what you want to do as a career, write it here. \_\_\_\_\_

**CAMP REACH  
FINAL STUDENT SURVEY**

The purpose of this survey is to gather reactions and perceptions about CAMP REACH. The information will serve as a guide for future planning. **Your participation is very important to this evaluation effort.** Please take a few minutes to complete this survey.

**1. In general, how would you rate your satisfaction with CAMP REACH?**

- \_\_\_\_\_ (a) Outstanding, excellent
- \_\_\_\_\_ (b) Good, above average
- \_\_\_\_\_ (c) Fair, average
- \_\_\_\_\_ (d) Poor, below average
- \_\_\_\_\_ (e) Very Poor

Please **CIRCLE** whether you mostly **disagree** or **agree**, or **don't know**. Please report your overall agreement with the statements for each workshop that you took. If you did not take a workshop, leave the questions relating to that workshop blank.

**Overall, I enjoyed this workshop.**

2. "Who Durnit" Forensics	MOSTLY AGREE	MOSTLY DISAGREE	DON'T KNOW
3. Home Heating	MOSTLY AGREE	MOSTLY DISAGREE	DON'T KNOW
4. Mobility for the Disabled	MOSTLY AGREE	MOSTLY DISAGREE	DON'T KNOW
5. Sandcastle Building	MOSTLY AGREE	MOSTLY DISAGREE	DON'T KNOW
6. Bracing of Grids	MOSTLY AGREE	MOSTLY DISAGREE	DON'T KNOW
7. Motor and Fan Building	MOSTLY AGREE	MOSTLY DISAGREE	DON'T KNOW

**I learned a great deal in this workshop.**

9. "Who Durnit" Forensics	MOSTLY AGREE	MOSTLY DISAGREE	DON'T KNOW
10. Home Heating	MOSTLY AGREE	MOSTLY DISAGREE	DON'T KNOW
11. Mobility for the Disabled	MOSTLY AGREE	MOSTLY DISAGREE	DON'T KNOW
12. Sandcastle Building	MOSTLY AGREE	MOSTLY DISAGREE	DON'T KNOW
13. Bracing of Grids	MOSTLY AGREE	MOSTLY DISAGREE	DON'T KNOW
14. Motor and Fan Building	MOSTLY AGREE	MOSTLY DISAGREE	DON'T KNOW

**In terms of the design project...**

16. Enough for each team member to do	MOSTLY AGREE	MOSTLY DISAGREE	DON'T KNOW
17. Customer valued our ideas	MOSTLY AGREE	MOSTLY DISAGREE	DON'T KNOW
18. Team had good ideas to solve problem	MOSTLY AGREE	MOSTLY DISAGREE	DON'T KNOW
19. Solved customers problem	MOSTLY AGREE	MOSTLY DISAGREE	DON'T KNOW

**I had a great deal of interest in each of these field trips or tours.**

20. Bose Corp.	MOSTLY AGREE	MOSTLY DISAGREE
21. Worcester Water Filtration Facility	MOSTLY AGREE	MOSTLY DISAGREE
22. Marine Fisheries Aquarium, Woods Hole	MOSTLY AGREE	MOSTLY DISAGREE
23. Endcavor House, Woods Hole Oceanographic Inst.	MOSTLY AGREE	MOSTLY DISAGREE
24. UMass Medical Center, Life Flight Helicopter Fac.	MOSTLY AGREE	MOSTLY DISAGREE
25. UMass Medical Center, Understanding the Brain	MOSTLY AGREE	MOSTLY DISAGREE
26. Scanning Electron Microscope, WPI	MOSTLY AGREE	MOSTLY DISAGREE
27. Biomedical Engineering Labs, WPI	MOSTLY AGREE	MOSTLY DISAGREE
28. Wind Tunnel, WPI	MOSTLY AGREE	MOSTLY DISAGREE

29. **What did you like most about the camp experience?**

30. **What did you like least about the camp experience?**

31. **Describe what you learned from the design project.**

32. **What recommendations do you have to improve the camp for next year?'**

33. **Would you recommend this camp to a younger girl who will be eligible for the camp next year?**

34. **Comment on the food, living arrangements, recreational activities, helpfulness of the Ras, CITs and teachers.**

35. Do you have a computer at home that is available for you to use?

YES      NO

36. What is your parents' occupation?

father \_\_\_\_\_

mother \_\_\_\_\_

If they work at home or are not presently working, or you don't know their occupation, you can leave it blank.

Appendix 6 REACH Student Observation Feedback

**STUDENT OBSERVATION FEEDBACK**

**STUDENT NAME** \_\_\_\_\_  
**FACULTY NAME** \_\_\_\_\_

For each of your assigned students, please fill out a separate form at the end of the CAMP REACH experience.

**1=High Degree 2=Moderate Degree 3=Minimal Degree 4=Not at All 5= Not Applicable 6=Don't Know**

For this particular student you served, to what degree, did/do you observe **positive changes** in:

- 5. Student's self-esteem \_\_\_\_\_
- 6. Student's motivation \_\_\_\_\_
- 7. Student's peer interaction \_\_\_\_\_
- 8. Student's learning \_\_\_\_\_
- 9. Classroom behaviors (e.g., attendance, participation) \_\_\_\_\_
- 10. Attitude toward engineering \_\_\_\_\_

**1=High Degree 2=Moderate Degree 3=Minimal Degree 4=Not at All 5= Not Applicable 6=Don't Know**

Using the above scale, please report your overall observations of this particular student by indicating the **extent of improvement** that has resulted from implementing the CAMP REACH Project:

- 11. \_\_\_\_\_ Working with Others
- 12. \_\_\_\_\_ Observation Skills
- 13. \_\_\_\_\_ Ability to Organize Information
- 14. \_\_\_\_\_ Problem-Solving
- 15. \_\_\_\_\_ Listening
- 16. \_\_\_\_\_ Following Directions
- 17. \_\_\_\_\_ Recording Information
- 18. \_\_\_\_\_ Making Decisions
- 19. \_\_\_\_\_ Research Skills
- 20. \_\_\_\_\_ Building Things
- 21. \_\_\_\_\_ Making Oral Presentations
- 22. \_\_\_\_\_ Writing Reports

**THANK YOU FOR YOUR TIME AND PARTICIPATION!**

Appendix 7 REACH 1997 Parent Survey

**REACH 1997 Parent Survey**

This survey should be completed by the camper's parent(s) or guardian(s). Please return it in the enclosed envelope by September 19, 1997 -- but feel free to submit it after this deadline!

Your name(s): \_\_\_\_\_

Camper's name: \_\_\_\_\_

Relationship(s) to camper: \_\_\_\_\_

Today's date: \_\_\_\_\_

1) **Since the end of the camp**, approximately how many times has your camper brought up something *positive* that happened at camp? \_\_\_\_\_

2) **Since the end of the camp**, approximately how many times has your camper brought up something *negative* that happened at camp? \_\_\_\_\_

3) This year's camp tuition was \$150. On a scale from 1 (very much) to 4 (not at all), how well do you feel that the quality of the camp compares with its tuition? \_\_\_\_\_

4) What do you think others would expect to pay for the program such as Camp REACH?  
\_\_\_\_\_

On a scale from 1 (very much) to 4 (not at all),

5) how useful were the opening day activities? \_\_\_\_\_

6) how useful was the closing day parents' session? \_\_\_\_\_

7) do you think that allowing the campers to make nonemergency phone calls was good? \_\_\_\_\_

8) do you think that a parents' visit midway through the camp would have helped with homesickness? \_\_\_\_\_

9) What suggestions do you have for improving the camp from your perspective as parent or guardian?

*Please see other side of form*

9) Please check off the box that most closely matches your situation:

- I understood what engineers do in their careers *before the camp*
- I do not understand what engineers do in their careers
- I understand a little bit what engineers do in their careers
- I understand fairly well what engineers do in their careers
- I understand very well what engineers do in their careers

10) What do you think the effects of the camp have been on your camper? List both positive and negative effects.

11) Please give an overall score for the camp from 1 (Excellent) to 4 (Poor). \_\_\_\_\_

**Please feel free to add any other comments -- and THANK YOU for taking the time to fill out this survey!**

## Appendix 8 Follow up Schedule

3:10 Update on design project

Jennifer Belanger will be talking to you about your Design Project and telling you where it stands.

3:20 Explanation of Egg Drop activity

You will get a handout telling you more about the Egg Drop and we will give you a brief explanation.

3:25 Design of structure

You and your group members will brainstorm out loud to come up with possible ideas.

3:30 Building of structure

Create your idea out of Popsicle sticks and newspaper.

4:00 Walk over to footbridge

4:15 Dropping of the eggs

Here is your opportunity to test out your design.

4:20 Walk back to Atwater Kent

4:25 Refreshments

Chocolate chip cookies and juice

4:35 Physics Demonstrations

You will learn about torque and get to participate in a hands-on demonstration.

4:50 Small questionnaire about Activities

5:00 Pick up

## Appendix 9 Follow up Assistant Schedule

3:00 Arrival

We will greet the girls and be available both inside the classroom and outside the building so that the parents know where to drop the kids off if they forgot. Make sure we let the parents know that pick up time is at 5pm.

3:05 Inform girls what they will be doing today

I have made copies of this schedule to hand the girls telling them what they will be doing today. We will hand them out.

3:10 Update on design project

Jennifer Belanger will handle this part. Denise Nicoletti has spoken to you about what to tell them.

3:20 Explanation of Egg Drop activity

We need to hand out the Egg Drop activity worksheets. I will explain to them what they are supposed to be doing and then we will let them go to work. We will let them choose their own groups.

3:25 Design of structure

We will walk around and see if they have any questions.

3:30 Building of structure

We can ask them some trivia questions while they are building. I have some trivia questions we can ask them. We can help them out with anything they need help with. They should be able to pretty much build on their own.

4:00 Walk over to footbridge

We might have to go to Fuller Labs if it is raining.

4:15 Dropping of the eggs

Make sure that there are no cars coming up the street. We do not want them dropping eggs onto cars!

4:20 Walk back to Atwater Kent

4:25 Refreshments

We will need to have the food set out for when they come back to the classroom.

4:35 Physics Demonstrations

One of us will talk a little bit about torque. I will have a paragraph already prepared. Then we will show them the demonstration and let them try it. We will help them. We have to be sure to let them know it is dangerous and they have to be careful!!

4:50 Small questionnaire about Activity

I have prepared some questions that I would like them to answer so that I can get feedback for my IQP. We need to hand out the questionnaire and collect it from them too. I also have a short questionnaire that I would like you to fill out.

5:00 Pick up

## Appendix 10 Follow up Budget

### Snack

Hawaiian Punch (2)	\$1.99/bottle
Chocolate chip cookies	\$2.69/package

### Supplies

Popsicle Sticks (3)	\$1.49/1000 Sticks @ Michaels Craft Store
Old newspapers (2)	\$0.50/newspaper
Tape	\$5.00/10 Rolls @ Family Dollar
Eggs	\$1.19/Dozen

### Photocopies

Questionnaire	\$0.10/copy/15 copies
Schedule	\$0.10/copy/15 copies
Assistant Questionnaire	\$0.05/copy/5 copies
Assistant Schedule	\$0.05/copy/10 copies
Marie Curie Handout	\$0.05/copy/8 copies
Egg Drop Handout	\$0.05/copy/15 copies

### Staff

Director	Volunteer
Middle school teacher	Volunteer
Assistants (2)	Volunteer

---

Total \$23.23

## Appendix 11 Letter to Campus Police

Julie Wheeler  
Worcester Polytechnic Institute  
Box # 767  
100 Institute Road  
Worcester, MA 01609

WPI Police

5/9/00

To Whom It May Concern:

I am presently an undergraduate student at Worcester Polytechnic Institute working on an Interactive Qualifying Project (IQP). Part of my IQP will be bringing some of the girls from Camp REACH back for the afternoon. I wanted to let you know that I, along with ten seventh graders and three helpers will be on campus on Saturday, May 13, 2000 from 3:00 to 5:00pm. We will mostly be in Atwater Kent and around the footbridge. This is simply to inform you so that you know we are not strangers who broke into the building! Also, I do not have access to this building, so can you please make sure that it is unlocked during this time.

Sincerely,

Julie Wheeler

## Appendix 12 Egg Drop

### Egg Drop

Humpty Dumpty sat on a wall,  
Humpty Dumpty had a great fall...

On the table in front of you, you'll find newspaper, scissors, Popsicle sticks, and tape. Your job is to protect Humpty Dumpty's cousin, Marie Curie, from the fall. Using only the materials found on the table, you must create a structure that will save Marie Curie from a fall of 19 feet.

You will be working in groups of threes. You may want to take a few minutes to discuss your ideas as a group before you actually begin to build your structure. You may use as many Popsicle sticks and as much newspaper as you need, but I warn you, the more materials you use, the heavier it will be and the more momentum it will have when it hits the ground!

You will have 45 minutes to complete your design.

Please *wrap the egg in at least one sheet of newspaper* before you place it inside your structure. Your egg MAY or MAY NOT break so do yourself a favor to lessen the mess and clean up easier if it does break.

Once everyone has finished making their design we will take a walk over to the footbridge together. If it's raining, we'll go to Fuller Labs.

You must choose one person from your group to be the "dropper". This person will go up on top of the footbridge and drop Marie Curie. The other people in the group will be underneath the bridge to pick up Marie Curie and see if she plunged to her death or if your design saved her life!

Good luck.

#### Trivia:

If two objects of different weight but the same size and shape are dropped off the footbridge, which one will hit the ground first? The heavier or the lighter one?

Marie Curie is actually a real person in science. Do YOU know who she is?

One of the professors at WPI actually jumped off of the footbridge in 1978. He was completely unharmed. Do you know how this is possible?

## Appendix 13 Marie Curie hand out

### Marie Curie



Marie Curie

Source: [Marie Curie](#). Micheal Webb

Though she died many years ago, Marie Curie is still one of the greatest names of science to this date. She made her mark in 1898 when she, and her husband Pierre, announced the discovery of two new elements, polonium and radium. Five years later they shared the Nobel Prize in physics. Marie Curie was the first female recipient of a Nobel Prize.

Manya Sklodowska, later to be known as Marie Curie, was born in a small apartment in Warsaw, Poland on November 7, 1867. She was the youngest of five children, and had an infinite love for her mother who was a teacher. Manya's father was also a teacher who taught physics and mathematics. However, being Polish in Russian Poland, Manya's father was poorly paid, and to make matters worse, Manya's mother fell ill to tuberculosis. When Manya was only eleven, her mother died.

Manya learned to respect education at an early age and by the age of four, Manya could read. She was an excellent student who could remember things easy and concentrate well. At the age of 15, Manya graduated high school at the top of her class. That same year, Manya left for the countryside in order to relax.

A year later, Manya returned home ready to return to school. Since girls were not permitted to attend university in Russian Poland, Manya and her sister Bronya, decided to study at the Sorbonne University in Paris, France. However, they face one major problem, they had no money. In order to save money, the sisters decided to give private lessons, business was poor, so they made little money. Manya, wanting to keep up her

education attended a "floating" university. The floating university helped Manya decide to be a physics teacher, like her father (Webb, 1991).

Manya and Bronya decided on a new plan, seeing their old one wasn't working. Manya soon had a job as a governess, with a salary and free room and board, to help send Bronya to the Sorbonne. In October of 1885, Bronya moved to Paris; Manya still had a long time to wait - six years, in fact.

After three years in the country, Manya was back in Warsaw where she did her first experiments. On evenings and weekends, Manya worked in a laboratory that her cousin found for her.

Finally, in 1891, Bronya sent good news. She was now a medical doctor in Paris and could help her sister. Manya was almost 24 when she started at the Sorbonne on November 3, 1891. There, she began to use the French version of her name, "Marie" (Webb, 1991).

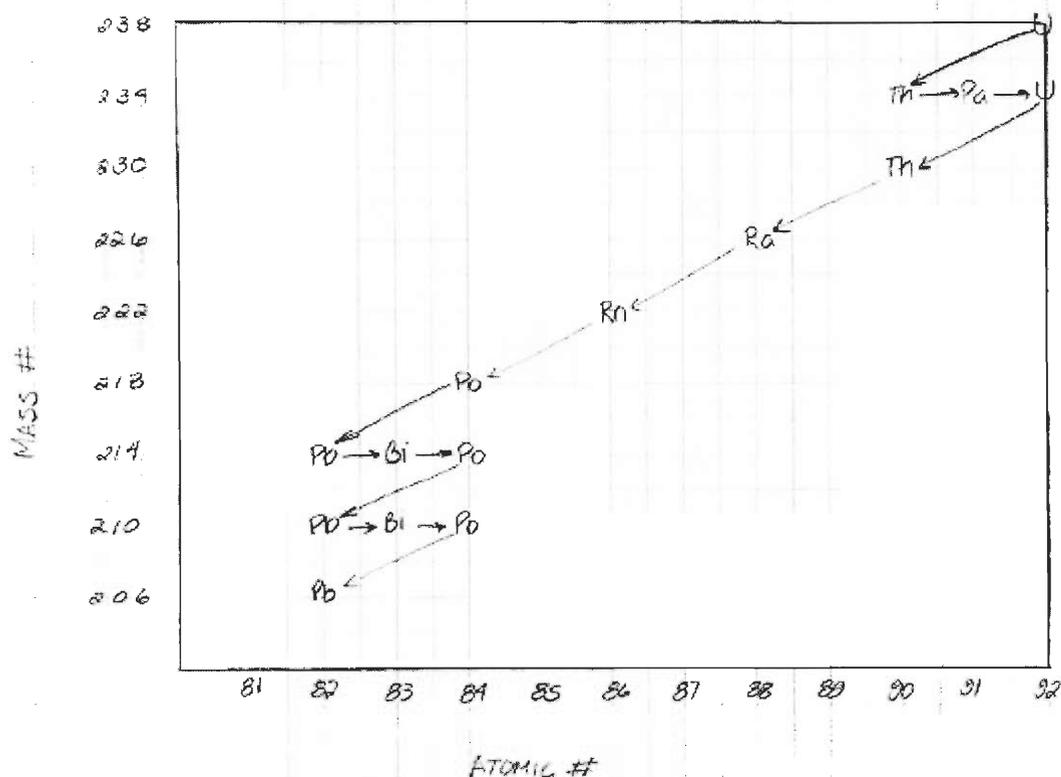
Marie worked very hard and for hours at a time; finally in the spring of 1893, Marie got her degree in physics.

While resting in Warsaw, Marie was given a scholarship to return for more studying in Paris. The following spring, Marie completed a mathematical degree.

In 1894, while working on a research project, Marie was introduced to Pierre Curie. He turned out to be the most important person in Marie's life. On July 26, 1895, Marie and Pierre married.

Their first daughter, Irene, was born in 1897; around that time, Marie decided to work towards her doctorate in science. Needing a subject to study, Marie chose Henri Becquerel, a French scientist who discovered that the element uranium gave off invisible rays during its decay.

## THE URANIUM-238 DECAY SERIES

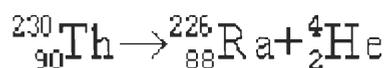


Source: Chemistry: The Study of Matter. Prentice Hall

Thus, Marie began studying uranium radiations. She carefully measured the radiations of pitchblende, a radioactive mineral compound of the mineral uraninite (UO<sub>2</sub>), using piezoelectric techniques devised by her husband and his brother Jacques in 1880.

The piezoelectric effect is the appearance of an electric potential across certain faces of a crystal when it is subjected to mechanical pressure. Conversely, when an electric field is applied on certain faces of the crystal, the crystal undergoes mechanical distortion. (Microsoft Encarta, 1993)

While measuring pitchblende, Marie realized that the radiations from the ore were more intense than those from uranium itself. She realized that there were unknown elements present in pitchblende that were even more radioactive than uranium. These unknown, radioactive elements turned out to be polonium and radium. Marie Curie was the first to use the term radioactive to describe elements that give off radiation as their nuclei break down (Funk & Wagnall's Corporation [F&WC], 19, 1993). An example of a radioactive element and its break down is Thorium - 230 :



In 1898 Marie and Pierre announced their discovery of polonium and radium; and in 1903 they shared the Nobel Prize in Physics with Becquerel for the discovery of radioactive elements.



Henri Becquerel

Source: [Marie Curie](#). Micheal Webb

Unfortunately in 1906 Pierre Curie's life was taken in an accident. Marie took over his classes and continued her research. In 1911 she received an unprecedented second Nobel Prize, this time in chemistry, for her work on radium and radium compounds (F&WC,1993). In the year 1914, Marie became the head of the Paris Institute of Radium and also helped found The Curie Institute. As the years passed, Marie's health worsened. Ever since her kidney operation in 1911, she often felt a loud drumming in her ears, and her eye sight was failing. On July 4, 1934, in Haute Savoie, Marie Curie died; she was 67. Her post-mortem report by Dr. Tobe stated that the disease was an aplastic pernicious anemia of rapid, feverish development. The bone marrow did not react, probably because it had been injured by a long accumulation of radiations (Eve Curie, 1937)

At first the dangers of radium were not realized, and many workers died from radiation effects. Today workers who work with radium are protected by thick shield of lead or concrete. Marie Curie's findings also lead to the unfortunate invention of nuclear weapons; Marie knew this might happen, but she had hoped that it wouldn't. Some good did come out of Marie's research; for example nuclear reactors use the heat produced by the change of the atoms to make electricity. Canada has many of these reactors, better known as CANDU reactors. The most well known field that Marie Curie's research has helped is in the field of medicine. Its primary use is in cancer treatment. The cancer cells are highly sensitive to radiation, and therefore the cells may be killed without seriously injuring healthy tissue. Being expensive, radium is now replaced with a cheaper radioactive element, cobalt-60.

Marie Curie's research has had many negative results, these negative results are such things as the previously stated, nuclear weapons. However, I believe that the positive

results cancel out the negative. Curie's research has saved numerous lives from such diseases as cancer. Also her discovery of radium has aided scientific research and in geophysical prospecting for petroleum by the use of a mixture of radium and beryllium.

I began this research paper not even knowing who Marie Curie was, let alone what she had accomplished in her life time. After completing the paper, I have learned that not only was she a determined woman but brave as well. Not many women back then could have done what she did; she was the first woman to ever go for a doctorate at the Sorbonne, the first woman to receive a Nobel Prize, and the most impressive, Marie Curie is one of only two people ever to receive two Nobel Prizes. Marie Curie is truly a woman to admired by all.

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Lisa Ford  
April 3, 1995

## Appendix 14 Follow up Camper Questionnaire

Name \_\_\_\_\_

Date \_\_\_\_\_

Please indicate your opinion.

- |   | Not at all |   |   |   | A lot |
|---|------------|---|---|---|-------|
| 1. Did you enjoy the Egg Drop?              | 1          | 2 | 3 | 4 | 5     |
| 2. Did you enjoy the physics demonstration? | 1          | 2 | 3 | 4 | 5     |
| 3. Did you like the games at the beginning? | 1          | 2 | 3 | 4 | 5     |

Please circle an answer and give an *explanation* of your choice.

4. Did you feel you had enough time to finish your design? (Yes \ No)  
(Not enough time or too much time)

5. Was today boring? (Yes \ No)

6. Did you learn anything interesting? (Yes \ No)

7. Would you change anything? (Yes \ No)

8. Comments:

Your answers are valuable to us. They will be used to improve future follow up activities and help plan for the Reunion. Thanks for your help.

# Appendix 15 Results of Camper Questionnaire

## Evaluation of Follow up Activities

Name Niki Kuntal

Date 5-13-00

Please indicate your opinion.

- |   | Not at all |   |   |   | A lot |
|---|------------|---|---|---|-------|
|   | 1          | 2 | 3 | 4 | 5     |
| 1. Did you enjoy the Egg Drop?              |            |   |   |   | (5)   |
| 2. Did you enjoy the physics demonstration? |            |   |   |   | (5)   |
| 3. Did you like the games at the beginning? |            |   |   |   | (5)   |

Please circle an answer and give an *explanation* of your choice.

4. Did you feel you had enough time to finish your design? (Yes \ No)  
(Not enough time or too much time)

we had plenty of time, even though we used ALOT of tape.

5. Was today boring? (Yes \ No)

I had alot of fun.

6. Did you learn anything interesting? (Yes \ No)

Yes, we learned about Newton's Apple.

7. Would you change anything? (Yes \ No)

It was cool.

8. Comments:

I'd do it again.

Your answers are valuable to us. They will be used to improve future follow up activities, thanks for your help.

## Evaluation of Follow up Activities

Name

Wynne Morrison

Date

5/3/00

Please indicate your opinion.

- |   | Not at all |   |   |   |   | A lot |
|---|------------|---|---|---|---|-------|
| 1. Did you enjoy the Egg Drop?              | 1          | 2 | 3 | 4 | 5 |       |
| 2. Did you enjoy the physics demonstration? | 1          | 2 | 3 | 4 | 5 |       |
| 3. Did you like the games at the beginning? | 1          | 2 | 3 | 4 | 5 |       |

Please circle an answer and give an *explanation* of your choice.

4. Did you feel you had enough time to finish your design? (Yes) ~~(No)~~  
(Not enough time or too much time)

I finished early.

5. Was today boring? (Yes) ~~(No)~~

It was exciting.

6. Did you learn anything interesting? (Yes) ~~(No)~~

I learned about torque

7. Would you change anything? (Yes) ~~(No)~~

get more snacks

8. Comments:

Exciting stuff

Your answers are valuable to us. They will be used to improve future follow up activities, thanks for your help.

## Evaluation of Follow up Activities

Name Sofia Lopez

Date 5-13-00

Please indicate your opinion.

- |   | Not at all |   |     |     | A lot |
|---|------------|---|-----|-----|-------|
|   | 1          | 2 | 3   | 4   | 5     |
| 1. Did you enjoy the Egg Drop?              |            |   |     |     | (5)   |
| 2. Did you enjoy the physics demonstration? |            |   | (3) |     | 5     |
| 3. Did you like the games at the beginning? |            |   |     | (4) | 5     |

Please circle an answer and give an *explanation* of your choice.

4. Did you feel you had enough time to finish your design? (Yes) No  
(Not enough time or too much time)

Just enough time

5. Was today boring? (Yes \ No)

because I had fun making the Egg covering

6. Did you learn anything interesting? (Yes \ No) Not really but yes because I didn't know about the ~~weight~~ weight but I knew about the wheel

7. Would you change anything? (Yes \ No)

8. Comments:

make sure more people come from the camp

Your answers are valuable to us. They will be used to improve future follow up activities, thanks for your help.

## Evaluation of Follow up Activities

Name Isily Gnanagan

Date 5/13/09

Please indicate your opinion.

- |   | Not at all |   |   |          | A lot    |
|---|------------|---|---|----------|----------|
| 1. Did you enjoy the Egg Drop?              | 1          | 2 | 3 | <u>4</u> | 5        |
| 2. Did you enjoy the physics demonstration? | 1          | 2 | 3 | <u>4</u> | 5        |
| 3. Did you like the games at the beginning? | 1          | 2 | 3 | 4        | <u>5</u> |

Please circle an answer and give an *explanation* of your choice.

4. Did you feel you had enough time to finish your design? (Yes \ No) Yes  
(Not enough time or too much time)

Just enough.

5. Was today boring? (Yes \ No) No

It was fun.

6. Did you learn anything interesting? (Yes \ No) Yes

I learned about torque.

7. Would you change anything? (Yes \ No) No

It was fun.

8. Comments:

I had a fun time.

Your answers are valuable to us. They will be used to improve future follow up activities, thanks for your help.



## Appendix 17 Results of Assistant Questionnaire

### Follow-up Assistant Questionnaire

Please answer each question with a sentence or two. The information provided in this questionnaire will be used to improve follow-up activities in the future.

1. Did you feel the girls enjoyed themselves?

Yes they got to talk about what happened at our camp over summer. They enjoyed working on the egg drop containers.

2. Did you hear anyone make any positive/negative comments about any particular activity?

They enjoyed the torque activities it was hard to see the physics in a camp.

3. Did it seem like they understood what they were supposed to be doing?

Yes, once they read the directions.

4. Would you suggest changing anything?

It was too bad more of the girls could've shown up. But the activities were great!

5. Did you know what you were supposed to be doing?

Yes. It was organized & easy to follow.

6. Any other comments.

It was good to see the girls again!

## Follow-up Assistant Questionnaire

Please answer each question with a sentence or two. The information provided in this questionnaire will be used to improve follow-up activities in the future.

1. Did you feel the girls enjoyed themselves?

yes they did.

2. Did you hear anyone make any positive/negative comments about any particular activity?

one laughed all the time. because they heard it.

3. Did it seem like they understood what they were supposed to be doing?

yes they were told what to do right away.

4. Would you suggest changing anything?

I don't think so.

5. Did you know what you were supposed to be doing?

yes

6. Any other comments.

It was fun being back here again.

## Follow-up Assistant Questionnaire

Please answer each question with a sentence or two. The information provided in this questionnaire will be used to improve follow-up activities in the future.

1. Did you feel the girls enjoyed themselves? The girls had fun. the demonstrations were visual and exciting.
2. Did you hear anyone make any positive/negative comments about any particular activity? no scissors for the egg drop - They liked the egg drop.
3. Did it seem like they understood what they were supposed to be doing? They definitely did. Everything but torque
4. Would you suggest changing anything? torque is interesting but maybe try to find a phenomenon that is more easily understood so it seems less like 'magic'
5. Did you know what you were supposed to be doing? yes. I didn't need to do much
6. Any other comments.

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numbered in original

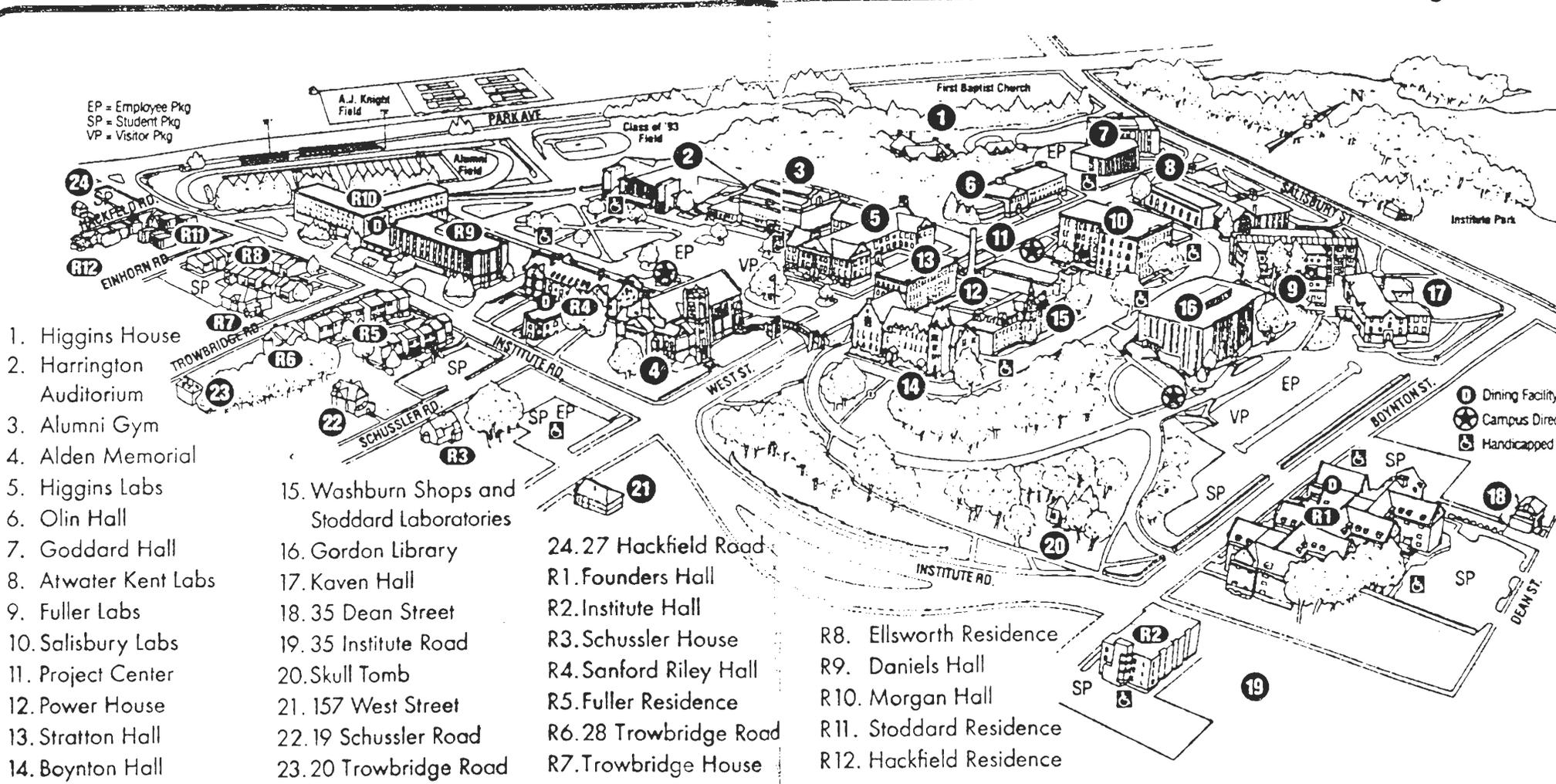
**IQP/MQP SCANNING PROJECT**



George C. Gordon Library  
**WORCESTER POLYTECHNIC INSTITUTE**

bathro  
esident  
eir owr  
ater. toi  
v WPI.  
OT req

adjacent to Alumni Field and Daniels Hall.



- 1. Higgins House
- 2. Harrington Auditorium
- 3. Alumni Gym
- 4. Alden Memorial
- 5. Higgins Labs
- 6. Olin Hall
- 7. Goddard Hall
- 8. Atwater Kent Labs
- 9. Fuller Labs
- 10. Salisbury Labs
- 11. Project Center
- 12. Power House
- 13. Stratton Hall
- 14. Boynton Hall

- 15. Washburn Shops and Stoddard Laboratories
- 16. Gordon Library
- 17. Kaven Hall
- 18. 35 Dean Street
- 19. 35 Institute Road
- 20. Skull Tomb
- 21. 157 West Street
- 22. 19 Schussler Road
- 23. 20 Trowbridge Road

- 24. 27 Hackfield Road
- R1. Founders Hall
- R2. Institute Hall
- R3. Schussler House
- R4. Sanford Riley Hall
- R5. Fuller Residence
- R6. 28 Trowbridge Road
- R7. Trowbridge House

- R8. Ellsworth Residence
- R9. Daniels Hall
- R10. Morgan Hall
- R11. Stoddard Residence
- R12. Hackfield Residence

- D Dining Facility
- CD Campus Director
- H Handicapped Pk

## Appendix 19 Reunion Schedule

### Day 1

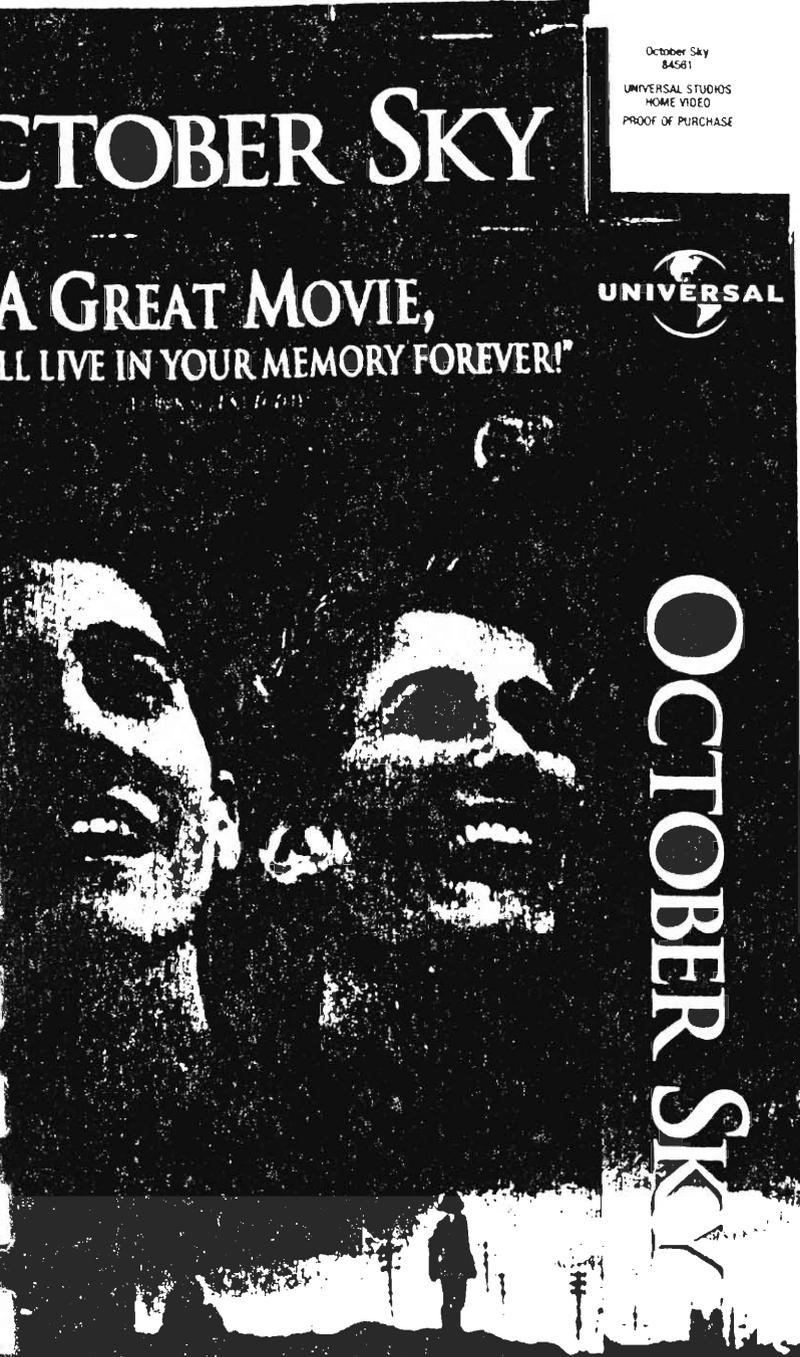
- 9:30 - 9:45: Campers arrive early Saturday morning. Everyone involved in the program should be available to greet the girls, especially the familiar faces. Old pictures of the camp should be displayed. A schedule of the weekends' events should be handed to the parents and the girls to look over while waiting.
- 9:45 - 10:30 The Resident Advisors should show the girls where they will be staying and help the girls get settled into their rooms. During this time, the parents will be taken into a separate room to listen to a speaker. A speech will be given reminding the parents how important they are to a child's' education. A brief survey will be given to the parents. Any questions that the parents have will be addressed here also.
- 10:35 - 11:00 Parents are brought to the girls' dorm rooms to see where they will be staying and to say their good-byes.
- 11:00 - 12:00 Schedules are distributed to the girls if they have not yet seen them. Everyone in the staff will be available for a large group discussion. Old projects and scrapbooks of pictures will be available to promote discussion and spark ideas. A staff member will be designated to record some of the thoughts and ideas mentioned.
- 12:00 - 12:45 Lunch at DAKA.
- 12:45 - 1:15 Campers will be split up into their old Design Project groups. A representative from each project site will update the girls on the present status of their projects.
- 1:15 - 1:30 Snack Break.
- 1:30 - 3:00 Groups of threes will be formed. Egg Cages are created and then brought to the footbridge to be tested.
- 3:00 - 4:00 Free time
- 4:00 - 5:00 The girls will be brought to the physics building classroom to be given a demonstration.
- 5:00 - 6:00 Dinner

- 6:00 - 8:00 Everyone will be brought to a room where a TV and VCR is all set up, and the movie *October Sky* will be shown.
- 8:30-9:00 Ice cream will be served.
- 9:30 The girls will be brought back to their rooms to go to bed.

## **Day 2**

- 8:00-8:40 Wake up
- 8:40-9:00 The girls will eat breakfast at DAKA.
- 9:00-10:00 A speaker will arrive and be already prepared to talk to them when they get to the classroom. The speaker will be able to answer any questions they might have.
- 10:00-10:30 Snack
- 10:30-12:00 A beautician will come to entertain the girls with Fingernail painting.
- 12:00-12:45 Lunch at DAKA.
- 12:45-1:30 Free time
- 1:30-2:00 To get feedback about Camp REACH a questionnaire will be filled out by every participant. Confidence sheets will also be filled out during this time.
- 2:00-2:30 Break time. Refreshments will be given outside if the weather permits.
- 2:30-3:30 Everyone will partake in Paper Airplane making. Then they will all go outside to test which ones will fly the best.
- 3:30-4:00 They will be brought back to their room to pack.
- 5:00 The girls will get picked up in the same place they were dropped off.

PG



October Sky  
84561  
UNIVERSAL STUDIOS  
HOME VIDEO  
PROOF OF PURCHASE



OCTOBER SKY

**"Thumbs Up!"**

- Roger Ebert and Guest Critic Tom Shales,  
SISKEL & EBERT

ISBN 0-7832-3466-X



0 9689-84561-3 5

In Coalwood, West Virginia, 1957, coal mining is king and no one can escape life underground. But when high schooler Homer Hickam, Jr. (**Jake Gyllenhaal**) sees the Soviet satellite Sputnik streak overhead, he aims for the stars and a new destiny in this incredible true story of hope, determination and triumph.

With the help of his teacher (**Laura Dern**) and three buddies, Homer sets out to build his own rocket. Despite his father's (**Chris Cooper**) disapproval, a limited education and a series of misfires that threaten to flatten his dreams and the town, Homer overcomes seemingly impossible odds to fulfill his vision in one of the most timeless, inspiring stories ever brought to the screen.

**OCTOBER SKY** is "A great moviegoing experience. It is hard to imagine anyone...who won't laugh with it, cry with it and go away absolutely loving it," says Robert W. Butler (Knight Ridder News Service). Enjoy this universally-acclaimed achievement filled with humor, superb performances and classic rock 'n' roll.



Color / 1 Hr. 48 Mins.



THE PRODUCER OF THE GODFATHERS  
**OCTOBER SKY**  
NOW AN INTERACTIVE DVD PLUS COPY

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www.universalstudios.com/home

## Appendix 21 Reunion Questionnaire

Name \_\_\_\_\_ Date \_\_\_\_\_

Camp REACH is constantly continuing to improve upon the program and evaluate its impact. Your thoughts and information are very helpful to us. Thanks!

Please list the math, computer, and science courses you have taken in high school:

---

---

---

---

---

Career Interests: \_\_\_\_\_

---

### Opinion

Please Circle one answer for each:

How important are engineers in America?

Not very important      Somewhat important      Very important

Women's abilities in math, science and engineering are:

Below average      The same as men's abilities      Above average

In math I rate myself as:

Below average      Average      Above average

In science I rate myself as:

Below average      Average      Above average

Working with others in groups is:

Not helpful      Neutral      Beneficial

I solve math problems:

With difficulty      ok      Easily

I find science related hands on experience:

Useless      Educational

I find teacher lectures:

Useless      Educational

I find guest speakers:

Useless      Educational

Mathematics is a worthwhile and necessary subject.

Strongly agree

1 2 3 4 5

Strongly disagree

How you get an answer is as important as whether the answer is right or wrong.

Strongly agree

1 2 3 4 5

Strongly disagree

There is only one way to get a right answer in mathematics.

Strongly agree

1 2 3 4 5

Strongly disagree

If I can't solve a math problem quickly, I quit trying.

Strongly agree

1 2 3 4 5

Strongly disagree

**Impact of your Camp REACH experience.**

Please talk about how Camp REACH has affected you in school this year. Write about anything... your confidence, your ability to approach problems, your grades, working in groups, how you feel about your classes

If you were going to tell a friend about your Camp REACH experience, what would you tell them about and why?

**Rate Camp REACH**

Looking back on my Camp REACH experience I would now rate it as:

Very worthwhile

1 2 3 4 5

Not at all worthwhile

**Worcester Polytechnic Institute**

Would you consider applying to WPI in the future?

Yes

No

## Appendix 22 Possible Discussion Questions

1. How did you hear about the Camp?
2. When you returned the application what did you expect the camp to be like?
3. When you first arrived, what was your first impression of WPI and the Staff?
4. What was your impression of WPI as a college?
5. Would you ever consider coming to WPI?
6. Is engineering one of your career choices? What is your career choice?
7. What was your favorite activity at Camp REACH? See list of activities to jog memory.
8. Were you interested in engineering before you came to Camp REACH? How about after?
9. Talk about your favorite memory of Camp REACH. /Worst.
10. Did you tell your friends about Camp REACH and what you did here?
11. Do you have any suggestions for future camps of this nature?
12. What was the part that you liked the best/ least?
13. What kind of jobs do engineers get into?
14. Do you feel that there were enough activities to keep you busy during the Camp, or were there too many?
15. Were the activities too hard/ too easy? Give examples
16. Are you more interested in math or science? Or neither!
17. What are your favorite classes in school?
18. Do you feel a step ahead of the other girls knowing what you learned during Camp REACH? Why? Give examples.

19. In your opinion, what was the most important thing that you learned at Camp?
20. Were the staff chosen appropriately? Were they the right age? Would you have preferred more students or teachers?
21. Did you share your knowledge with anyone? Who? What did you share with them?
22. Did you recommend Camp REACH to any younger girls?

## **Appendix 23 Activities Previously done at Camp REACH**

### **Discovery Workshops**

Mobility for the Disabled  
"Who Dunit" Forensics  
Car Maintenance  
Sandcastle Building  
Home Heating

### **Project**

Edward Street Daycare Center - Safer Playground Design  
NICU at Memorial Hospital  
Umass Medical - Toy storage

### **Activities**

Ice Cream Sundae Building  
Computer Orientation  
Optional Computer time  
Trip to Cape Cod  
Woods Hole Oceanographic Institution with its Aquarium and Endeavor House  
Exhibits  
Project Presentations  
Cafeteria  
Bose  
Newspaper Dressing  
Scanning Electron Microscope  
Wacky Olympics

## Appendix 24 Letter to Possible Speakers

Worcester Polytechnic Institute  
Box #  
100 Institute Road  
Worcester, MA 01609

(Speaker)

(Date)

Dear (Speaker),

I am presently an undergraduate student at Worcester Polytechnic Institute working on an Interactive Qualifying Project (IQP). My IQP is to design a Reunion for a summer camp. The summer camp itself took place in 1997 and its goal was to encourage seventh grade girls to be motivated about math, science and engineering.

This Reunion is not only going to further the girls experiences with engineering, but also address issues they are currently dealing with at this age. Some of the issues facing adolescent females are health and well being, peer pressure, stress, nutrition and facing the choice of a college and career. One way of sharing information with the girls would be through a guest speaker.

I would like to ask if you would be interested in becoming part of this program as a guest speaker. You would be speaking to about twenty girls and a few of the camp staff for approximately an hour and would have to answer any questions that the girls might have. The topics remain very open to what you want to talk about.

Please contact me if you are interested in learning more about the Reunion and this opportunity. I look forward to hearing from you. If you have any questions, feel free to contact Julie Wheeler at (508)222-0861 or by email at tc2317@wpi.edu. Thank you for your time and interest.

Sincerely,

Julie Wheeler

## Appendix 25 List of Potential Speakers

Fallon Women's Wellness Center (Mary)  
852-6110

Dolly Valesquez  
Weekly Spanish radio program on health issues  
798-1900

Thomas Casey and Michelle Laplume  
Nutritionists  
(508) 222-1260

Mimi Haajar  
Attleboro High School guidance counselor in Office of Graduate Opportunities  
(508) 222-5150

Carolyn Bosh  
Attleboro High School guidance counselor in Office of Graduate Opportunities  
(508) 222-5150 x223

Virginia Buchanan  
Retired school teacher  
Unlisted phone number available upon request.

Robert Brown  
Women in Technology coordinator and Texas Instruments Human Resources  
(508) 236-3800

Mary Walek  
Partnership Liason - A School-to-Career Partner Linking Local Schools, Businesses, and  
the Chamber of Commerce  
(508) 222-0801

## Appendix 26 Reunion Budget

Based on 30 attendees

### Living Expenses

Room and Board	\$35/night
Meals	
Breakfast	\$5.25/meal @ DAKA
Lunch	\$6.25/meal @ DAKA x2 meals
Dinner	<u>\$8.25/meal @ DAKA</u>
Total	\$61.00 per person

### Supplies

Snack	
Hawaiian Punch	\$1.99/bottle x14 bottles
Chocolate chip cookies	\$2.69/package x 9 packages
Activities	
Popsicle Sticks	\$1.49/1000 Sticks @ Michaels Craft Store
Old newspapers	\$0.50/newspaper x5 newspapers
Tape	\$5.00/10 Rolls @ Family Dollar
Eggs	\$1.53/dozen
Glue	\$1.49/bottle x10 bottles
Paper	\$3.55/package
Bubbles	\$0.99/container x15 containers
Saran Wrap	\$3.49/box x2 boxes
Large Bubble wands	\$5.79/wand x5 wands
Nail Polish	\$1.19/bottle x10 bottles
Speaker	Volunteer
Photocopies	
Questionnaire	\$0.10/copy x30 copies x2 pages
Schedule	\$0.10/copy x45 copies
Campus Map	\$0.05/copy x30 copies
Paper Airplane design	\$0.05/copy x30 copies
Movie Description	\$0.05/copy x30 copies
Staff	
Reunion Director	Volunteer
Resident Advisors	Volunteer
Activity Leaders	Volunteer
Movie Rental	\$4.19 for 5 day rental @ Blockbuster
Project board	<u>\$11.59/3 boards @ Staples</u>

**Total \$177.48**

## Appendix 27 Reunion Invitation

### Camp REACH would like to invite you back!

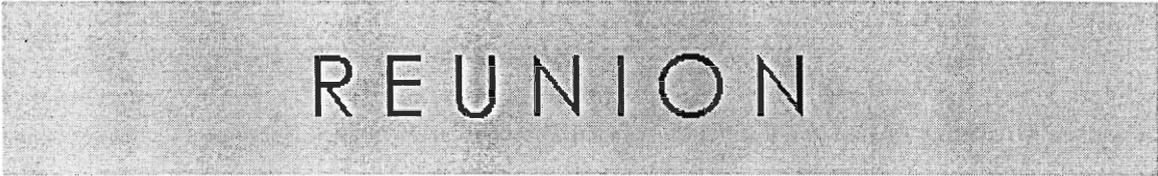
Do you remember...?

---

“The brain is a very remarkable thing to have. So, I think that we should treat it good. I knew that it was wrinkly but, not that wrinkly!”

--Julia Mooradian

---



# REUNION

Camp REACH would like to invite you back for a Reunion of the 1997 campers.

We are planning to have a Camp REACH Reunion on Saturday, June 24 through Sunday, June 25, 2000. You will be staying overnight in one of the dorms on the WPI campus. Linens will be provided. The cafeteria will be open and available for meals, but we may just order pizza for dinner. Meals will be included in the cost.

A full two-day schedule planned. We have invited a speaker, and a number of fun engineering oriented activities have been planned. We have also scheduled in social time for you to visit with the friends you made during camp.

We would like to take this opportunity not only to get feedback from you about the camp, but also to continue to encourage engineering and give you a chance to reunite with friends.

Please RSVP by \_\_\_\_\_ so we know how many to plan for!

It is very important that you do this so we know if you're coming!

If you have any questions, please contact name at number or by email, email.

Parents: Please drop your children off in front of Atwater Kent at 9am. If you need directions please contact me at (508) 831-????.

## **Possible quotes used to personalize the above letter**

Melissa Bermudez

ALVIN which was an ocean submersible, was named after Al Vine. ALVIN took pictures and found the Titanic.

Andrea Bianca

Thoughts about my career: I kinda wanna be a brain anything.

Joanna Bunker

Today we went to Woods Hole Oceanographic Institute; It was pretty cool with the seals and the fish. We learned about ALVIN, a really important submarine that led scientists to many new discoveries about the Titanic, and other forms of sea life in terms of how they survive.

Sara Burnham

It was really neat working with the disabled students because they understand why they are disabled. They do not care about what people think of them. They are very brave to stick up for themselves. They inspired me. I really liked the workshop. I am thinking of working with them when I get older.

Marangelly Cancel

This engineering person came to talk to us about engineering and her job, and we took apart a computer device. I hope I could come back next year.

Casey Chaffin

I learned that even bugs like beetles or flies can be very interesting maybe even more than a new species that has been discovered because they are unlike anything in the world.

Melissa Cortez

I learned that we can see out pulse rate and heart rate when you're hooked up to a computer. I think a bees head would be awesome to look at under a Scanning Electron Microscope.

Erin Dalianis

I found out that designing buildings is very hard, especially if you make them out of sand.

Mary Fitzpatrick

I was a structural engineer. I drew out the room diagram. I helped draw the final designs for the presentation.

Joslyn Foley

Biomedical engineers can be biologists, doctors, and engineers. They also design artificial limbs.

I learned that I love to be shocked. Just the thought of electricity going through me makes me happy.

Alicia Garcia

Today I really liked the Scanning Electron Microscope. I wish I could use that and look at other bugs and small creatures. How come it costs \$500,00.00 thousand to own one of those. Why is the machine so big and why does it have to be vacuum sealed.

Melissa Grant

I squeezed the sand in my hand to see if it was the same texture of biscuit dough.

Shauntay Griffin

(At the Woods Hole Oceanographic Institution) I saw a lobster, a starfish, a spider crab, a horseshoe crab, a shark, a jellyfish, and a blue lobster.

Aimee Hart

Brains are sheets of information crumpled up into your brain and genes make your brain cells at birth.

Heather Hussey

I think that I would like to see my hair under a microscope. I hope that they invite us back next summer.

Rachael Leary

I learned that tumors are big and disgusting. And that the wrinkles (of the brain) do not have anything to do with smartness. I like to know I am on my own for two weeks. It makes me feel independent.

Kelly McNally

It felt weird staying at a college, you have all this stuff to do all day and before bed time.

Emily Miranda

Going to the hospital and seeing all those people really wanted me to build them a new library.

Astronauts have to be prepared for everything because anything could happen. From things to explosions to a toilet overflow.

Julia Mooradian

The brain is a very remarkable thing to have. So, I think that we should treat it good. I knew that it was wrinkly but, not that wrinkly!

Monica Nydan

I think it would be fun to look at my finger under a microscope.

Kelly Peterson

From experiments in a wind tunnel you can learn “how strong wind needs to be to knock things over.”

I liked the survey, it gave me a chance to express myself. I’d like to come to another camp next year.

Erika Pominville

I think it would be really cool to look at a drop of blood (under a microscope) and see a cell in your blood.

Janelle Pope

It's fun to be staying at college. The food is great, the rooms are nice and people are friendly.

Adrienne Root

The field trip to Bose was very interesting. I learned that foam cushion wire tip things suck up sound.

Elizabeth Sicard

Well I got shocked. It felt so weird to be shocked. A cookie would look cool under a microscope.

Sarah-Neel Smith

To test the sand I squeezed it, and if it made the impression of my hand, that's the right sand.

Crystal Tolman

I think that the tour of the campus influenced me the most because it showed me the doors to one of my future hopes to a career and it also showed me many opportunities.

Antonia Vitalo

I think the trip to Bose was really cool. I liked it a lot. I thought the room that ate up the sound was interesting.

Sydney Woodford

You can learn what insects look like up close and what happens when we loosen and tighten our muscles.

Erin Young

We picked up some sand and squished it in our hands and it made the shape of our hand. It was good sand.

**Appendix 28 Camper Reunion RSVP Form**

**Worcester Polytechnic Institute  
REACH Summer Program**

Camper RSVP Form  
(please print clearly)

Camper's Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Telephone: ( \_\_\_\_\_ ) \_\_\_\_\_

Contact Person in Case of Emergency: \_\_\_\_\_

Phone: \_\_\_\_\_ Work Phone: \_\_\_\_\_

Camper's Present School: \_\_\_\_\_

Year of Graduation: \_\_\_\_\_

*Enclosed is my payment of ???. I understand that a PG movie will be shown. I give permission for my child to participate in all Camp Reunion activities, unless otherwise specified.*

Signature of Camper: \_\_\_\_\_

Signature of Parent: \_\_\_\_\_

Please enclose your payment along with this application. Make Checks Payable to ??.

Return address:

WPI Camp REACH Reunion

100 Institute Road

Worcester, Ma 01609