Retaining Girls in Science: Exploring the Effects of a Junior High Intervention Program across Educational Sectors

2005-2007 Evaluation

The Alberta Women's Science Network
Athabasca University
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Project Overview

Driven by concerns over junior high girls losing interest in science, the Operation Minerva Program was established to provide girls with hands-on experience in various fields of science and engineering. This project, now in its 17th year in Calgary, has also expanded to urban and rural areas across Alberta (e.g. Red Deer, Medicine Hat, Fort McMurray, Athabasca, Grand Prairie and Pincher Creek). Approximately 90 girls and 90 female science mentors participate in the one-day Calgary Operation Minerva Program in May of each year.

Student participants job-shadow their mentor and participate in hand-on activities that bring out special aspects of the job. For example, a mentor in the oil and gas industry demonstrated how one can drill for oil by removing chocolate from a cake "round". Students have also utilized three-dimensional software for generating geological models and examined mutations in fruit flies through the use of a specialized microscope.

This 3 year study entitled, Retaining Girls in Science: Exploring the Effects of a Junior High Intervention Program Across Educational Sectors, is funded by the National Sciences and Engineering Research Council of Canada (NSERC) with ethics approval from Athabasca University, the Calgary Board of Education, and the Calgary Catholic School District.

The purpose of this study is to explore the effects of the Operation Minerva Program across educational sectors (public, catholic, alternative) with respect to the intervention experience, course and career plans, and attitudes and factors influencing female science retention. The experiences of both students and science mentors are explored. Recommendations are provided for intervention program organizers, educators, women scientists, parents, and stakeholders from community, industry and government.

Literature Review

Retaining Girls in Science

Literature outlining gender differences in science achievement, enrollment, and employment reinforce the need to focus efforts on attracting and retaining females in science. At the elementary and junior high levels, girls perform as well as their male counterparts until age 13, when they begin to slip behind in science achievement (Connolly, Hatchette & McMaster, 1999). This gap increases each year until senior high, when females select few relevant electives, exhibit more negative attitudes and, by the end of high school, score considerably lower than boys in math and science (Oakes, 1990).

Enrollment patterns at the secondary, post-secondary and graduate levels reveal a similar trend. Compared to males, females enroll disproportionately more in senior high biology courses while avoiding other sciences, especially physics (Johnson, 1987). By university, women comprised only 22% of full-time students in engineering and applied sciences in 1997-98, up from 3% in 1972-73. Enrollment in mathematics and physical sciences rose from 19% in 1972-73 to 29% in 1997-98. By graduate school, the gender gap in science enrollment increases with women comprising only 23% of doctoral mathematics and physical science students, and only 16% of those in engineering and applied sciences (Statistics Canada, 2000, 87).

Recent statistics indicate that women remain the minority, representing 21% of engineering, mathematics and natural science professionals. Post-secondary enrollment statistics also indicate that females continue to be under-represented in engineering, mathematics and science (Statistics Canada, 2003, 10). Regardless of educational attainment across all disciplines, female university graduates employed full-time earned 73% of what men made in 1997 (Statistics Canada, 2000, 141).

Attrition: Biological, Sociological and Educational Influences

Females decide not to pursue science courses and careers due to a combination of factors. Biological influences alone do not exclude girls from science; sociological and educational influences represent spheres that have a significant influence on attrition. Nevertheless, some scholars continue to use biology, and more specifically brain measurement (Moir & Jessel, 1991; Klekamp, Riedel, Harper, & Kretschmann, 1991), to justify girls' under-participation in science. Feminist scholars have critiqued these studies by highlighting the ways in which biological determinism has driven and ultimately distorted findings. As Kaplan and Rogers (1994) note, a desire to prove gender and race differences in brain functioning is an attempt to provide an apparent scientific rationale for the existing social order. Recent research exploring cognitive abilities suggests that gender is not a sufficient explanation for the under-participation of females in science. Following a review of twenty-three studies involving over 7,600 clinical interviews, McArthur and Wellner (1996) discover minimal gender differences in visual-spatial abilities. In their meta-analysis, Hyde and Linn (2006) considered more

than 5000 studies based on the testing of approximately 7 million people and found girls and boys to have similar cognitive abilities although significant gender differences were identified in the areas of physical aggression and activity level. These findings support the assertion that biology is not a sufficient explanation for female science attrition. Regardless, not all females, or males for that matter, are destined to be scientists. Of concern however, are those females who have science aptitude but leave science due to limited opportunity and a lack of necessary supports.

A number of scholars highlight the influence of factors other than biology on the attrition of females from science. Research on early childhood play reveals that boys are more competitive, confrontational and individualistic, while girls are more cooperative, accepting, sociable, and intimate (Grugeon, 1993). As children mature, more boys than girls report having participated in science-related activities. Although girls desired more involvement with science activities, they lacked previous experience (Kahle & Lakes, 1983). This lack of experience may be correlated to gender differences with respect to interest in science. Jones, Howe and Rua (2000) discovered significant gender differences in sixth grade students' attitudes and experiences related to science. While boys were most likely to have engaged in extracurricular experiences with a variety of tools such as electric toys, fuses, batteries and microscopes, girls reported experiences with bread-making, knitting, sewing and planting seeds. And while boys were more interested in atomic bombs, atoms, cars, computers, x-rays, and technology, girls reported interest in animal communication, rainbows, healthy eating, weather, and AIDS. Students' perceptions of science revealed significantly more females than males reported that science was difficult to understand, whereas more males reported that science was destructive and dangerous, as well as more 'suitable' for boys.

Differences in psychological development help to explain girls' focus on relationships as opposed to competition (Gilligan, 1982). Girls are particularly vulnerable during adolescence due to a strong relationship orientation, coupled with low autonomy and self confidence. This susceptibility greatly impacts a girl's construction of herself and significantly impacts her life choices. Science experiences that do not nurture these aspects of girls' psychological development can be enough to deter her from selecting science courses in high school and in turn, narrow her science course and career options in the future. Psychological differences and different access to science-related activities highlight the importance of providing girls with meaningful science experiences starting at an early age, especially at the junior high level.

A number of recent studies point to the role of parents in providing encouragement and access to out-of-school science experiences. In a study of naturally occurring family conversation, Crowley, Callanan, Tenenbaum and Allen (2001) found parents to be three times more likely to explain science to their pre-school boys than girls. Simpkins, Davis-Kean and Eccles (2005) discovered parents' behaviours to be powerful positive predictors of elementary school children's participation in computer, math, and science activities. In a study of parent-adolescent conversations about science Tenenbaum and Leaper (2003) discovered parents were more likely to believe that science was less interesting and more difficult for daughters than sons. They also found that parents'

beliefs significantly predicted children's interest and self-efficacy in science. When parents' teaching language was explored, fathers tended to use more cognitively demanding speech with sons than daughters. The above studies point to parental influence as an important factor in science retention. Parents should be aware of how their beliefs, behaviours and language can work to encourage or discourage their child's interest in science.

Teaching approach, classroom / school culture, student-teacher interaction, and peer influences each have significant educational influences on science attrition. In terms of teaching approach, gender inclusive strategies including an emphasis on relationships resonate with girls' interest in the connections to life, ownership of learning and a feeling of efficacy. In addition, facilitating learning through relational knowing does not deter male students from liking science (Hutchinson, 1996). Classroom culture also influences science attrition. An inquiry into graphic representations of scientists in classrooms revealed males made up 93% of images (Jones & Wheatly, 1989). In addition, science textbooks may contain subtle forms of sexism in the selection of language, images, and curricular content (Potter & Rosser, 1992). Research on student-teacher interaction in science classrooms revealed that females are at a disadvantage in terms of teacher time, (Haggerty, 1991) opportunities to carry out demonstrations, (Jones & Wheatly, 1989), and engagement in higher order questioning (Shakeshaft, 1986). Recent debates have focused on single-sex schooling in order to counter adolescent boys' dominant participation in the science classroom. However, findings from Dreves and Jovanovic (1998) clarify that girls with higher ability perceptions at the beginning of the school year were likely to remain confident throughout the year, actively engage in hands-on activities, and not perceive boys as the dominant participants in the classroom. While their findings suggest that the process by which girls come to view themselves as less able in science than boys is more complex than simply implicating dominance in the classroom, girls with lower confidence levels remain susceptible to classroom influences. Kessels (2003) further illuminates the impact of peer influence on science attitudes and interest. In a study of 8th and 9th graders, she discovered that girls perceived physics to be a masculine subject, and girls whose favourite subject was physics were perceived as more masculine than feminine. Both boys and girls held negative stereotypes (e.g. unattractive) of girls who liked or did well in science. Girls with good grades in physics considered themselves to be particularly unpopular with boys.

For girls with science aptitude, a number of interrelated influences can work to either encourage or discourage their continued participation in science. Future retention efforts should ensure that learning materials and hands-on science activities relate to girls' interests. Parents should be reminded that their beliefs, behaviours, and language have a significant impact on girls' science choices. Educators should be aware of gender bias in learning materials, classroom examples, and student engagement, and provide extra support and encouragement to promising female and male students. Parents and educators could also help to counter negative stereotypes associated with girls who do well in science by highlighting the exciting career options available to both girls and boys who decide to continue with science pursuits.

Project Methodology

A total of 295 junior high girls participated in the Operation Minerva Program from 2005 to 2007, with 265 girls completing the survey (response rate 90%). Of the 265 respondents, 100 were from the public sector, 83 were from the catholic sector, and 82 were from the alternative sector (drawn from public, catholic, charter and independent schools). An estimated total of 90 mentors participated each year of the program with 77 completing the mentor survey over three years (response rate of 29%).

Table 1. Participation by Educational Sectors

Sector	2005	2006	2007	Total
Public	27	41	32	100
Catholic	29	31	23	83
Alternative	26	20	36	82
Mentors	29	21	27	77

Survey questions related to the Operation Minerva experience were imported from the Operation Minerva 2004 formative evaluation survey. One question was added to the mentor questionnaire: "what attracted you to becoming a mentor". Questions related to plans for science studies and career choices were imported from MacDonald (2000). The exception is a question exploring senior high science course enrollment plans. This question was revised to gather more specific information on science course choice in the Alberta context.

Questions relating to attitudes influencing science retention were taken from Smith & Erb's (1986) Women in Science Scale (WiSS), a tool used to measure attitudes of adolescents toward women in science careers. Five attitudinal questions from the twenty-seven item questionnaire were chosen for inclusion in the current research as a follow-up to a retrospective study of 1991 Operation Minerva program participants (MacDonald, 2000). While former Operation Minerva participants (six years following their participation in the program) were found to possess very positive attitudes toward women and science according to Likert scores, five of the twenty-seven questions revealed less positive attitudes. These five questions are included in both the student and mentor questionnaires in order to further explore these controversial statements. While these controversial questions do not relate specifically to science careers, they do focus mainly on statements related to family – career balance from the female perspective. Questions related to factors influencing science pursuits were generated from a literature review and included qualitative findings from MacDonald (2000, 2004). Quantitative data from questionnaires was analyzed according to descriptive statistics. Qualitative data from questionnaires was analyzed according to grounded theory (Strauss & Corbin, 1990) and presented according to the percentage of respondents indicating each theme.

The Operation Minerva Experience

Participants indicated the most enjoyable and interesting features of their job shadowing experience were *hands on activities and exposure to applied examples (67%), exposure to female science role models and career options (29%), lectures, presentations and meetings (5%),* and *other (5%). 'Other'* responses focused primarily on enjoying lunch with mentors.

Table 2. Most Enjoyable Features of the Operation Minerva Program

Most enjoyable features	Public	Catholic	Alternative	Total
hands on / applied experiences	77%	77%	45%	67%
exposure to female scientists & career options	32%	31%	23%	29%
lectures, meetings & presentations	3%	6%	4%	4%
other	7%	4%	2%	5%

The least enjoyable aspects of the job-shadowing experience included: *lectures, meetings & presentations (26%), amount / type of information (14%), not enough hand-on / applied science activities (7%), length of experience (4%), student groupings (2%),* and *other (9%).* A number of respondents also commented that all aspects of the experience were enjoyable (14%). Comments related to amount / type of information suggested comprehension of some material was an issue. In addition, respondents recommended more time with mentors, and specifically more one-on-one time with mentors.

Table 2. Least Enjoyable Features of the Operation Minerva Program

Least enjoyable features	Public	Catholic	Alternative	Total
lectures, meetings, presentations	31%	17%	28%	26%
all enjoyable	17%	13%	11%	14%
amount / type of information	8%	27%	9%	14%
not enough hands on / applied experiences	7%	7%	6%	7%
length of OM experience	3%	5%	5%	4%
student grouping	2%	0%	5%	2%
other	10%	6%	11%	9%

Participants recommended the following improvements to the Operation Minerva Program*: more hands-on / applied science activities (23%), lengthen the experience (11%), student preferences for types of job shadowing experience (10%), smaller participant groups (10%), more time spent with mentors (7%),* and *'other'(10%)* mainly related to coordination of transportation.

Table 3. Recommendations for Improvements to the Operation Minerva Program

Recommendations for OM Improvements	Public	Catholic	Alternative	Total
more hands on / applied experiences	18%	27%	24%	23%
lengthen / expand the experience	13%	8%	10%	11%
all positive / no recommendations	17%	10%	5%	11%
preferences for job shadowing experiences	7%	10%	13%	10%
smaller participant groupings	9%	7%	13%	10%
more time spent with mentors	6%	8%	6%	7%
other	6%	6%	20%	10%

Mentors were also presented with a series of open-ended questions related to their experience with the Operation Minerva Program. When asked "what attracted you to becoming a mentor" respondents indicated: *opportunity to encourage girls / promote science (68%), recruited through friend / workplace (18%), similar personal experience (17%), rewarding / opportunity to volunteer (9%),* and *opportunity to network with other mentors (3%).* When asked if they enjoyed having the students for the time period given mentors commented on *the enjoyment of their time spent with student participants (38%), amount of time including 'too much' and 'too little' (14%), challenges / recommendations related to effectively engaging students (10%), effective student / mentor grouping (6%),* and *'other' focused mainly on details of the experience (6%).* Mentors were also asked what they gained from the Operation Minerva experience. Comments included *self reflection / rewarding experience (36%), interaction with students (32%), opportunity to inspire / potential impact (32%),* and *networking with other mentors (4%).* When asked for recommendations on how to improve the Operation Minerva experience, mentors focused comments on *improved mentor / student preparation (19%), expanding / lengthening the program (10%), improved selection of students (ensure interest) (9%), match student occupational preferences (5%),* and *'other' (5%).* Commentary related to improved preparation focused on students as opposed to mentors and comments on the selection of students related to grade level, ensuring interest level, and targeting 'at risk' students.

Science Course Enrollment and Career Plans

60% of Operation Minerva participants reported plans to pursue at least three senior high math and science courses. As outlined in Table 4, 71% Operation Minerva participants planed to enroll in pure math 30, 64% planned to enroll in biology 30, 60% planned to enroll in chemistry 30, and 48% planned to enroll in physics 30. This finding suggests that Operation Minerva is somewhat effective at encouraging girls to enroll in senior high school science courses. Level 30 science and math courses are a requirement for most post-secondary science programs and as such are critical to the pursuit of a career in science. The lower percentage of students planning to enroll in physics 30 is consistent with Johnson's (1987) finding that girls enroll disproportionately more in senior high biology courses while avoiding other sciences, especially physics. (Johnson, 1987)

Mentors, intervention program organizers, parents and teachers should emphasize the importance of continued science and math course enrollment in senior high.

Table 4. Planned Senior High Courses by Sector (%)

Senior High Courses	Public	Catholic	Alternative	All Sector Total
pure math 30	70%	73%	68%	71%
chemistry 30	60%	58%	61%	60%
biology 30	67%	52%	73%	64%
physics 30	46%	43%	54%	48%

According to educational sector representation, the highest percentage of Operation Minerva participants planning to enroll in chemistry 30 (61%), biology 30 (73%), and physics 30 (54%) were from the alternative sector, and the highest number of participants planning to enroll in math 30 were from the catholic sector. It is also interesting to note that only 52% of catholic sector participants reported plans to pursue senior biology in comparison to 67% of public sector and 73% of alternative sector participants. This finding contradicts previous research that suggests girls are most likely to enroll in senior high biology courses. (Johnson, 1987)

As outlined in Table 5, 68% of Operation Minerva participants reported plans to pursue a post-secondary science degree or diploma, 23% of participants planned to pursue at least one post-secondary science course, 3% planned *not* to take a post-secondary science course, and 6% were unsure of post-secondary plans. A comparison of educational sectors reveals a high percentage of alternative (76%) and public (70%) sector participants planned to pursue a post-secondary science degree as opposed to only 59% of catholic sector participants. Considering 91% of participants plan to pursue a science degree / diploma or at least one post-secondary course the Operation Minerva Program is effective at encouraging girls to continue science course enrollment at the post-secondary level.

Table 5. Planned Post-Secondary Science Pursuits by Sector (%)

Post-Secondary Science Courses	Public	Catholic	Alternative	All Sector Total
post-secondary science degree	70%	59%	76%	68%
at least one post-secondary science courses	21%	33%	16%	23%
no post secondary science	3%	0%	5%	3%
unsure	5%	8%	4%	6%

It is interesting to note that while 91% of respondents reported plans to pursue science at the post-secondary level (either a degree or at least one course), only 60% of respondents reported plans to pursue at least three senior high science / math courses. This finding points to a disjoint between planned senior science and post-secondary science

enrollment. As stated above, mentors, intervention program organizers, parents and teachers should continue to stress the importance of senior science and math course enrollment as a prerequisite to most post-secondary science programs.

Table 6. Consideration of a Science Career by Sector (%)

Career Plans	Public	Catholic	Alternative	All Sector Total
science career	86%	90%	91%	89%
non science career	11%	10%	7%	9%

89% of Operation Minerva participants reported plans to pursue a science-related career. This finding suggests that the Operation Minerva Program is effective at encouraging girls to consider a career in science. Sector comparisons reveal minimal deviation. Themes from qualitative comments included *preferred occupations (52%), the influence of interest on science & career choices (25%), uncertainty over career choice (12%),* and *preference for non-science occupations (7%).*

Attitudes Influencing Science Choices

As stated in the methodology, questions relating to attitudes influencing science retention were taken from Smith & Erb's (1986) Women in Science Scale (WiSS), a tool used to measure attitudes of adolescents toward women in science careers. Five attitudinal statements from the twenty-seven item scale were chosen for inclusion in the current research as a follow-up to a retrospective study of 1991 Operation Minerva Program participants. (MacDonald, 2000) A 6-point Likert scale was used for each statement (strongly disagree to strongly agree; 1 - 6). While these statements do not relate specifically to science careers, they do focus on attitudes related to family – career balance from the female perspective. In addition, while these statements were described by participants (students and mentors) as outdated and archaic, it is a useful exercise to explore controversial attitudes related to gender, career choice, and family-career balance.

Table 7 presents levels of agreement (including somewhat to strongly agree) for each statement. 13% of Operation Minerva participants across all sectors agreed that for a woman it is more important to be a successful wife and mother than it is to be successful in a career. 8% of participants agreed that getting married is the most important thing in a woman's life. 5% of participants agreed it was better for a woman to study home economics than chemistry, 4% agreed a woman's basic responsibility is raising children, and 3% agreed that careers are good for women as long as they are not the boss.

Comparisons across educational sectors reveal that public sector and catholic sector participants were more likely to agree with controversial attitudinal statements than alternative sector participants. Of particular interest, 19% of public sector and 12% of catholic sector participants agreed that being a wife and mother was more important than career success, and 10% of catholic sector and 8% of public sector participants agreed that marriage was the most important thing in a woman's life. These findings suggest

that career – family balance continues to be an area of concern (with family identified as the priority) for girls especially those from pubic and catholic schools.

Table 7. Agreement with Women in Science Attitudinal Statements (%)

Science Attitudes	Public	Catholic	Alternative	All Sector Total	Mentors
Careers are good for women as long as they are not the boss.	5%	2%	2%	3%	0%
A woman's basic responsibility is raising children.	6%	2%	4%	4%	8%
Getting married is the most important thing in a woman's life.	8%	10%	6%	8%	4%
For a woman it is more important to be a successful wife and mother than it is to be successful in a career.	19%	12%	6%	13%	25%
It is better for a woman to study home economics than chemistry.	5%	6%	2%	5%	1%

Qualitative themes from participant's additional comments related to attitudinal statements further illuminate concerns related to characteristics, opportunity, and compatibility. 24% of respondents provided commentary on *characteristics* indicating girls have the aptitude to succeed in science, 15% indicated *equal opportunities* exist, and 13% of provided commentary related to *compatibility* with the majority indicating women can achieve both career and family success.

Mentors strongly disagreed with three out of the five attitudinal statements. However, a surprising 25% of mentors agreed that being a good wife and mother was more important than career success and 8% of mentors agreed that a woman's basic responsibility is raising children. 4% agreed that getting married is the most important thing in a woman's life, 1% agreed that it is better for a woman to study home economics than chemistry, and 0% agreed that careers are good for women as long as they are not the boss. Additional comments from mentors focused on *compatibility* (integrating a science career with family life) (47%), *equal opportunities* exist (8%), and *characteristics* (women have the aptitude to succeed in science) (3%). The majority of mentors clarified that family and career success is possible with balance. In addition, the majority of mentors indicated the priority is motherhood over career especially when children are young. 25% of mentors and 12% of student respondents also reacted to controversial attitudinal statements describing them as outdated and archaic.

Overall, only a small percentage of participants and mentors expressed a level of agreement to controversial attitudinal statements. Regardless, it is interesting to note that family-career balance continues to be a contentious issue. Mentors, parents, and teachers should be encouraged to discuss science career compatibility concerns with girls;

highlighting success in both spheres is possible with balance. Stakeholders from industry should attempt to accommodate employees through flexible hours and job sharing as men and women strive to achieve a healthy work-family balance.

Factors Influencing Science Retention

Potential factors influencing science pursuits were generated from a literature review and qualitative findings from MacDonald. (2000, 2004) Table 8 presents levels of agreement (including somewhat to strongly agree) for each factor across sectors and also includes mentor responses. Strongest reported influences reported by student respondents included: interest in science (90%), impact of female role models / mentors (85%), science ability (85%), and impact of classroom learning (77%). A high number of participants also reported parental influence (72%), impact of 'out of school' science experiences (66%), and impact of the peer network (63%). 38% of participants reported media and 16% of participants reported traditional stereotypes as factors influencing their decision to pursue (or not to pursue) science. Strongest influences reported by mentors included: interest (92%), ability (83%), parental influence (70%), out of school experiences (68%), classroom learning (62%), and role models / mentors (55%). Mentors also reported peer network (45%), media (26%), and traditional stereotypes (17%) influence science choices. It is interested to note differences between student and mentor responses related to role models / mentor and peer network suggesting mentors underestimate the influence of these retention factors. Results support findings from MacDonald's (2000, 2004) retrospective study of Operation Minerva participants that highlighted influences on science career choice including: parental influences, the positive impact of the Operation Minerva Program, the positive influence of interest and ability, and the positive influence of hands-on science learning.

Table 8. Factors Influencing Science Retention (%)

Retention Factors	Public	Catholic	Alternative	All Sector Total	Mentors
interest	89%	90%	91%	90%	92%
role models / mentors	82%	87%	87%	85%	55%
ability	84%	86%	87%	85%	83%
classroom learning	76%	73%	80%	77%	62%
parental influence	76%	61%	77%	72%	70%
out of school experiences	70%	64%	63%	66%	68%
peer network	57%	64%	70%	63%	45%
media	39%	40%	37%	38%	26%
traditional stereotypes	18%	18%	12%	16%	17%

Participant qualitative comments reinforce the impact of the following factors on science choices: *science interest and ability* (15%), *impact of the Operation Minerva Program* (5%), *social influences* (5%), and *hands on science learning (5%).* Mentor qualitative

comments focused on *recommendations for / the impact of intervention efforts (38%), hands on science learning (29%), societal influences (8%),* and *science interest and ability (5%).*

Participants were asked to provide recommendations on how best to retain girls in science. Student comments focused on *recommendations for / impact of Operation Minerva (30%), the positive influence of science interest and ability (17%), the positive influence of hands on science learning (13%),* and *social influences (12%).* Mentor comments focused on *recommendations for / impact of Operation Minerva (38%), the positive influence hands on science learning (29%), social influences (8%),* and *the positive influence of science interest and ability (5%).* Recommendations for future intervention efforts focused on continued exposure to science career options through classroom speakers, role model and job shadowing opportunities, and videos.

Additional comments provided by participants focused on the *positive impact of the Operation Minerva Program (43%), recommendations for the Operation Minerva Program (9%), social influences (2%),* and *interest and ability (1%).* Additional comments provided by mentors focused on *the positive impact of the Operation Minerva Program* (41%), *recommendations for Operation Minerva improvements (24%), social influences (20%),* and *the positive impact of hands-on science learning (14%).*

Conclusion and Recommendations

Findings from this three year study reveal minimal differences with respect to intervention experience, science course enrollment and career plans, science attitudes, and the impact of factors influencing attrition across educational sectors. Respondents across all sectors agreed that improvements to the intervention experience should focus on hands-on science activities, lengthening the experience, ensuring the provision of age-appropriate information, more one-on-one time with mentors, and matching occupational preferences. Mentors also recommended lengthening the experience and matching occupational preferences, and added improved student preparation and improved selection of students with interest in science as a prerequisite.

Planned senior science and math course enrollment revealed only 60% of respondents planned to enroll in at least three senior high science and math courses. This finding suggests that girls need additional encouragement to continue to enroll in science at the secondary level. In contrast, a high percentage (91%) of participants reported plans to pursue science at the post-secondary level (degree or at least one science course) and are considering a science career (89%). This finding highlights a disjoint between planned senior science and post-secondary enrollment and suggests that girls need to be reminded that senior math and science courses are prerequisites for post-secondary programs and science careers.

A few interesting differences were discovered across educational sectors. A comparatively low percentage of catholic sector participants reported plans to pursue senior high biology and a comparatively high percentage of alternative sector participants

planned to pursue senior high physics. In addition, a comparatively low number of catholic sector participants reported plans to pursue a post-secondary science degree. Educators, especially those from the catholic sector, should encourage girls with science aptitude to continue to enroll in senior science courses and consider post-secondary science degree programs.

A consideration of science attitudes influencing career choice revealed girls and mentors believe females have both the characteristics and equal opportunity to succeed in the scientific field. However, levels of agreement to attitudinal statements suggest concerns over family-career balance persist for both girls and mentors. While qualitative comments clarify respondents believe success in both spheres is possible with balance, future efforts should include continued discussion of this contentious issue. Mentors should be encouraged to discuss strategies used to achieve this balance in their everyday lives. A consideration of factors influencing science retention revealed interest and ability are powerful predictors of continued science pursuits. Role models, mentors, parents, peers and hands-on-science experiences were also reported to be influential science retention factors. Minimal differences across educational sectors appeared in relation to attitudes and factors influencing retention. The exception was a comparatively high percentage of public sector and low percentage of alternative sector respondents reporting concerns related to family-career balance.

Findings from this study are consistent with the literature review and suggest that the success of future retention efforts requires the understanding and contribution of a cross-section of stakeholders including educators, intervention program organizers, women scientists, and stakeholders from community, industry and government. Women scientists should make themselves available to intervention programs. Within these programs, role models should continue to address concerns related to family-career balance, engage girls in applied science experiences, and stress the importance of continued senior science course enrollment. Educators should continue to encourage girls in science through the use of hands-on, applied learning experiences, exposure to science career options, and the use of 'female friendly' examples and applications in order to connect to girls' interests. Parents should continue to encourage their daughters in science by engaging in 'out of school' applied science experiences, encouraging secondary and post-secondary science enrollment, and discussing science career options. Stakeholders from industry and government should continue to support science intervention programs through funding support, job shadowing opportunities, and encouraging employees to become mentors. While the Operation Minerva Program envisions a future full of possibilities for females in science, it is up parents, schools and science communities to work together to ensure that this vision becomes a reality.

Future Operation Minerva improvement efforts and other intervention programs should consider the following recommendations:

- mentor recruitment efforts should continue to tap into the networks of existing mentors, print and electronic advertising could also be improved

- consider lengthening and diversifying job shadowing experiences when possible

- mentor orientation should address:

    - the importance of engaging students with hands-on activities and limiting lectures, meetings and presentations
    - consider the comprehension level of students through a discussion of the junior high curriculum, mentors should be encouraged to link curriculum to the job-shadowing experience
    - ensuring one-on-one in addition to small group job shadowing experiences when possible
    - consider persistent concerns related to career – family balance, mentors to highlight success in both spheres is possible with balance
    - disjoint between planned senior high and post-secondary enrollment, mentors to stress the importance of senior high math and science enrollment as a prerequisite to post-secondary science courses and a variety of exciting career opportunities

- selection of participants should focus on students with identified aptitude in science in addition to an identified need for encouragement to sustain interest in the field

- provide mentors with a resource guide of possible hands on activities / demonstrations to accompany various professions

- consider an online registration process that also gathers student occupational and grouping preferences (occupational preferences should include a brief description), attempts should be made to match student preferences

- provide students with information on the mentor and / or company prior to the job-shadowing experience and ensure students are prepared to engage mentors with questions

- ensure mentors and students are informed of the SCIberMentor Program and other engaging science opportunities

Appendix A. References

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Appendix B. Qualitative Data Tables

Please note that numbers in brackets indicate the number of respondents.

Most Enjoyable and Interesting Features of Job Shadowing Experience

Themes	Public Sector Statements
hands on / applied experiences	**2005 (25)** Going outside and taking part in trying the tools; doing activities in a fun way; When we were outside coring the tree and inspecting the area; I really enjoyed helping colour the graphs. It was interesting, plus I got to colour; Seeing all of the hands on things that they brought in for us to touch, feel and smell; I really enjoyed the 3-D room and "drilling" our cake; I enjoyed burning the different chemicals and seeing what colour their flame was, and making ice cream; Hands on learning, trying out equipment enjoyed the ultrasound guided injections the most; I enjoyed seeing the hydrogen fuel cell system (small working model) and the room where people monitor and control the compressors; Learning about 3-Dimensional models and how engineers overcome certain problems with the help of science and technology; Learning about electricity and things that can go wrong; I liked it when some of my mentors explained to me how they find out where the oil is and drill it out; I enjoyed seeing the Stock Marketing area on another floor; I really liked interacting with the white-boards at Smart. It was cool to see how they worked; Being able to write on a Smart Board with my finger and it showed up as if I wrote with a pen; I most enjoyed working on a computer program with a Process Engineer where we built and filled out some of the information needed; The Oil Game; The Game because it was like you worked there and getting to know about other people; Also, the Oil Game and lunch; the Oil Game; When she showed us pictures and stuff; We went on a walk through downtown to look at all the different bridges that go over the Bow River and it was really nice outside which made it even more enjoyable; To see the viscosity of oils; Looking at the 3-D shapes with special glasses on
	2006 (25) separating DNA and extracting DNA; extracting DNA; I enjoyed the hands on activities especially the bird calls; I liked the hump yard. I got to drive a locomotive and I lived the clothes; When we did the archaeological exercise and the GPS mapping system where we made points and when we looked at insects down at the Bow River; I enjoyed the fossils the most; I liked the drilling oil/gas experience that we actually got to do with a cake. It was fun and exciting to act real processes out, meanwhile I learned a lot; I really enjoyed drilling for oil and gas inside a cake; finding where you'll drill, the maps that just show where possibly the most gas/oil is. Also the part where you see the rocks was cool; Learning how they pump gas and oil from the ground and how they claim their land to dig a well. And when we did Google Earth and found our house; Meeting all the new people and learning all the new information; I enjoyed the hands on time, when we went outside and used some tools of the trade; Also being able to do hands on work that the mentors do everyday; hands on experiments; going outside and listening to bird calls and measuring the height of a tree; Playing with the new, cool technology, making / brainstorming ideas as though we were actually working with SMART, designing new icons; Office pictionary, making pens, try out SMART boards, designing icons, signatures, project planner (it was all fun); playing pictionary, playing with the SMART board, eating lunch at the hotel; office pictionary, signing board, SMART board, designing pens, lunch; I liked going to the hump yard. It was really fun to go on the freight engine; We played a game called Thermal Wrestling, that was fun. Also they took apart a keyboard and cell phone. That was awesome!; Going into the Blue room was interesting and learning how breast cancer is detected; Getting toured around the waste water treatment plant, and being able to watch how water gets

	clean and what processes it goes through. Also learning how bridges are made and what materials are used too; Learning about the keyboards and the computer chips; seismographs
	2007 (27) I really enjoyed the experiments that we did; role play; Drilling for oil (whip cream) inside of a chocolate cake! It was really interesting; We did some hands on stuff (looking in a cake for oil and gas) and that was one of the must fun parts. The whole was enjoyable though!; The hands on stuff; Making models of a remote thing and trying some of their products; Going outside and bird watching and looking at bridges as well as testing water and other different types of liquids; Testing the DNA and learning about the buffers; The hands on experiments; experiments; When we went out and got to learn how to measure a tree and when we got to try some of the machines; The most enjoyable was doing all this mapping and seeing all the different possibilities where a communication tower could go; Building a pipeline model on the computer; Using the equipment; how SMART makes products; learning about math and science in the real world; geological mapping, geophysicists 3-d maps; The most enjoyable experience was learning about oil and gas wells; cool demonstrations; Studying coral samples; Learning about geology and how it works; Learning about the different types of products; Going to a meeting and learning about gas lifting; watching the echoes on the computer; We saw an x-ray of a dogs stomach that swallowed a spoon; Cake representation; Touching the coral
exposure to female scientists & career options	**2005 (7)** Finding out new jobs involving science; I liked learning about the different jobs you can have; Learning about why they like their jobs; The most enjoyable part was when I got to talk to engineers and learned a lot from them; The most enjoyable and interest features was the whole trip; Walking around talking to people; I thought that the groups were well thought out. I really liked meeting new people like me, and people who work for things that I am interested in
	2006 (17) I thought learning about the product engineers was interesting. You learned about how they get oil/gas out of the ground and the problems they face. I loved how all the mentors were so ice!; meeting the mentors and how different they all are and session with production engineer; learning all different aspects of oil and gas engineering; the most enjoyable and interesting features of my job-shadowing experience was being able to see how they worked around their office and what they did for their job; hearing about the different roles that are involved at ARC engineering; Learning about geologists, spending an afternoon downtown, meeting women who specialize in sciences and hearing their stories; Learning about the different job opportunities; The mentors and what they taught us and watching the company's drill meeting; Learning about what they do and knowing everyone was nice to me; When we're learning how a reservoir engineer works and learning about the stuff you do; The scientific lectures that explained some of the things that were involved in their careers; Learning about all of the careers in the environmental science field; I learned a lot of neat things about my mentor's job; I enjoyed getting introduced to women in science and math careers; eating lunch with all the people we had met; the lunch conversations and how they develop the ideas; getting to see what it is like on a regular day on the job and what to expect
	2007 (8) process of getting 1 on 1; We got to see how a project manager does her job; meeting Olympic skeleton racer, meeting smart women in the working world; I enjoyed seeing what my mentors did on everyday basis. Everyone seemed really friendly and nice. Also, I liked meeting new people; Pretty much everything. They made everything interesting. They described everything great; I really enjoyed talking to my mentors about things like how much they make, etc.; learning about different fields of work; talking to the doctors about optometry
lectures, meetings &	**2005 (1)** The slide show

presentations	**2006 (1)** I liked the presentation at the end
	2007 (1) I liked the different ways of how the people showed us their job by using different diagrams
other	**2005 (0)**
	2006 (0)
	2007 (7) We got to eat cake and candy; I enjoyed the whole day; Cake; presents, lunch; and the food provided was fun too; eating, everything else; eating lunch at Tandoori Hut.

Themes	**Catholic Sector Statements**
hands on / applied experiences	**2005 (21)** The cake drilling experiment and the 3-D room; The drilling in the cake and when we were in the Visualization room; Most enjoyable was getting to work hands-on with actual cells and performing the experiments with all the real equipment and materials; Being able to do hands-on things with the DNA; The most enjoyable features of my job-shadowing experience was being able to do some graph work; I got to work with human cells such as the liver cells. Being able to make gels; The most enjoyable and interesting feature was that I got to work on DNA experiments and microscopic work; We got to dissect the dog's heart and got to shove our finger down a dog's throat; We got to colour and learn about the layers of the earth; I really enjoyed the graph work. It was very different and very interesting; Seeing the animals especially the goslings, skunk fox pups. Learning about how they help the animals and about the animals; Seeing animals because they are cute, energetic, excited and cuddly; Learning about your feet, nails etc., as well as being able to see real problems, and to watch when three patients came in; Sitting in on the neutering of a dog; We got to watch a surgery being done and even help out during it. We got to observe them giving regular check-ups and soothing the animals; Testing one of us to see the muscles and in 3-D shape (figure); Learning all about the heart, dissecting a dog's heart and seeing a dog get surgery; and learning about seismographs; I had a lot of fun playing with the Smart Boards; The Panasonic white board that printed out what you wrote on it; We played a game for prizes;
	2006 (23) I liked the games and fun activities that they had planned for us; I liked being with my group, the "oil cake" was very fun and educational; experiencing what geologists and reservoir engineers do on a cake with candy; I really enjoyed the hands-on game at the end; I also liked making wells in the cakes; I enjoyed looking at the different forms of rocks and learning how you extract the oil from the rocks; learning about rocks and the earth; We got to see how the sewage water was cleaned and put into the Bow River; I thought the most enjoyable and interesting parts of the day were the hands on experiments, like feeling the composition of the soils and using the EN38; hands on stuff; going outside and seeing parts of the jobs in action; I really like separating the DNA and looking at it through the UV lights. Also, we looked at cells through a microscope. I liked how we got DNA from the T-cell; Playing office pictionary, making pens and lunch; Playing with all the tools and pictionary, signing the board, lunch, designing pens, designing icons, project planner, everything; office pictionary, brainstorming product ideas, smart boards, lunch; Riding the locomotive; The most enjoyable features of my job shadowing experience were learning how the thick crude oil is turned into a chemical that has a low viscosity using temperature catalysts and the ice cream making; thermal arm wrestling; Learning about how the team makes crates and what they do was very interesting; casting of the foot; making castings and observing; The visual room and seeing the things they do to dig up oil; looking at the computer programs that help you analyze good drilling locations and existing wells

	2007 (20) We had to role play. We were trying to experience their job. We had a cake as our field. We were trying to discover 'gas' and 'oil'. We used straw to dig holes on the cake; Pretending cake was land and we had to drill for whipped cream. Doing the environmental scientist workshop; Using the tools at the park; Finding out how DNA was tested, making our own bacteria, testing out samples and pretty much the whole thing; doing demos; The most interesting thing was the experiments; I also enjoyed "drilling" into a cake; Hands on experiments (measuring the height of tall trees and using the GPS); I mainly enjoyed making the molds; We got to make slime, and ice cream from liquid nitrogen; Hands on activities; Role playing a real life job situation; While I was there I really liked seeing what happened to the DNA; Learning about the oil drills, looking at the different fossils and rock samples; I enjoyed learning about how to use some products; We got to learn about a lot of different things and got to go outside and see the equipment; Bridge knowledge, water testing; Looking at x-rays and watching a fish hook being removed from a dog; When I learned about how they find oil and natural gas; Also we got to learn about a new technology to detect breast cancer
exposure to female scientists & career options	**2005 (9)** The most enjoyable and interesting features of my job shadowing experience was getting to know the many careers there are; At the end we had extra time so a guy who specialized in Africa did a presentation for us; Learning the things that involve being an Electrical Engineer; Going out to lunch with my mentor; seeing what she does on a daily basis; learning/interacting with mentors and learning about what THEY actually do; All mentors were very friendly and encouraging; Also, all the great advice we got; All of the mentors were VERY nice! They bought our lunch for us
	2006 (13) I enjoyed the speakers and talks that the workers gave; I think that the most enjoyable thing was all the people you get to talk to and work with throughout your day; The mentors were really nice. I like listening to my mentors' stories; Also having lunch with my mentor and getting to know her; Just to hear / see about what sort of careers are needed to do just one thing. The jobs today seemed very interesting; The most interesting features of my day was the session with the geophysicist and geologist. They really enlightened me to how many occupations are necessary in the oil and gas industry; It was interesting hearing about their jobs; going out to see what my mentors did; I liked when they told about their profession; most importantly is to know things that can help you decide your career; learning all about their profession; I think that the most interesting features of this job shadowing experience is working on different things everyday and working with other people as a team; having to learn new things, meeting other students that are interested in the same things that I'm interested in
	2007 (4) To learn and observe from a professional about how they do their job; I liked it when the Olympian came in; socializing; Talking
lectures, meetings & presentations	**2005 (3)** Movies; The movies; I got to be in a staff meeting and learned a lot
	2006 (0)
	2007 (2) presentations; Learning about the job
other	**2005 (3)** I enjoyed everything. I don't believe in favoritism; Going out for lunch; We went to lunch and that was fun, the free stuff
	2006 (0)
	2007 (0)

Themes	Alternative Sector Statements
hands on / applied experiences	**2005 (19)** Using Cake to explain oil and gas drilling; I liked our hands on experiences; The most enjoyable/interesting features were doing experiments/testing things; The most enjoyable and interesting features were the presentations and the hands-on demonstrations; the project on a chocolate cake (used logic and Knowledge obtained during first part of the day to drill oil in the cake); The experiments and learning about DNA; Seismic graphing; The most enjoyable part was probably getting to do experiments; When we did experiments with compounds and saw the different coloured flames each of them made. It was really interesting!!; The hands-on stuff. WE got to bandage our feet and make foot casts, and see these things used on patients; The hands on stuff, like coring a tree and using a GPS. I liked the relaxed environment, doing lots of hands on work. I liked learning new things; Learning new things that I can use in everyday life; I think when they were training the sheep. I have never seen anything like it, so it was unique; We got to see the animals being tested on. We got to attend 1 weekly meeting. We saw an area with real brains and lungs and livers and hands/feet that were liquefied; Watching a polystyrene experiment; The Oil Game; The Game because it was like you worked there and getting to know about other people; Also, the Oil Game and lunch; the Oil Game
	2006 (18) drilling holes; The most enjoyable part was the hump yard, working the locomotives, and playing the board game. I also like wearing the sexy helmets and glasses; We got to make maps, and look at oil and gas logs. We also helped decide where is the best place to drill; We got to do this really cool drilling experiment and it was so much fun because all the drilling was in a cake; I enjoyed playing the drilling game with our mentor; The most enjoyable and interesting part of my job shadowing experience is when we looked at all the rocks and found out which ones oil / gas can flow through; The most enjoyable feature was when we drilled for oil in a cake; seeing the baby lamb, making catheters; Going outside to use the equipment that they use in the field; I enjoyed doing the seismics and learning about how they detect oil / gas and then how they retrieve it; office pictionary, project planning… it was all fun; Making the pens, office pictionary, learning the stuff; making ice cream and slime, also learning about catalysts; The breast cancer simulation and the camera's of traffic; Going outside, hearing the bird noises, hands on; Learning what they do hands on; I liked the small groups doing different activities; Blue room, seeing how engineering has changed, the evolution of technology
	2007 (0)
exposure to female scientists & career options	**2005 (9)** Learning about the different engineering careers; learning what everyone in the office did; I got to learn what different engineers do and what they are specialized in; Asking her questions about her job and what experiences I can get from it and what education I would need; Everything! I enjoyed learning about the different things which a Biomedical Engineer do; The most enjoyable features of this experience for me was seeing how women in today's society help in the world; All of the kind mentors; Meeting all of the different people and everything else about it; I got to meet people
	2006 (10) lunch, my mentor was really nice; I loved meeting the president of the company; Talking to the different engineers and listening to their jobs things; learning valuable information that could be used in the future; Geologist or geophysicists telling us about the reservoir; It was really interesting because she told us a lot of facts about the oil industry and how competitive it really is; the geologist part I learned was interesting; learning about new areas of environmental engineering; Learning what she does; meeting new people
	2007 (0)
lectures, meetings & presentations	**2005 (3)** 3-D videos shown; the presentations; The presentation in the visualization room at Conoco Phillips; I also enjoyed the 3-D presentation!!

	2006 (0)
	2007 (0)
other	**2005 (1)** Economics feature
	2006 (0)
	2007 (1) getting to know all the girls from different schools

Least Enjoyable and Interesting Features of Job Shadowing Experience

Themes	Public Sector Statements
not enough hands on / applied experiences	**2005 (1)** Being inside all day;
	2006 (5) I didn't think that we had enough time outside; sitting a lot; standing; The parts when we stand and discuss things, instead of the hands-on activities; standing
	2007 (1) Not doing anything
all positive	**2005 (0)**
	2006 (9) Well there isn't anything that I didn't like about this; I found it all really helpful and inspiring; I honestly don't have one. Every part was really exciting and interesting; I liked everything; It was all an equally enjoyable experience; The whole experience was excellent; end of the day; end of the day; end of the day
	2007 (8) I really liked everything!; Nothing wasn't enjoyable; All enjoyable; I didn't think that anything was more or least enjoyable in my job-shadowing experience because I enjoyed everything; It was all enjoyable; Actually nothing it was all good; I have none. It was a blast all day; I lived everything.
lectures, meetings & presentations	**2005 (9)** Having lectures about jobs; Listening to people talk for a VERY long time; Listening to long talks without hands on things; Discussing the process of building pipeline and what a project engineer dealt with for an hour; The staff meeting…it was kind of boring, but what can you do, every job has staff meetings; The least enjoyable features were when we were seeing the last 3-D presentation of rocks; Presentations where they read TOO MUCH!; Reading presentations; There was lots of sitting
	2006 (14) I got really tired from all the listening. Everything else was great; At the beginning there was a lot of talking; having to listen to the mentors for such a long period of time; Having to wait through the meeting; I think at times it was a bit boring and hard to understand; I think there were too many slide shows; the staff meeting; watching too many power points; When we just sat there listening to people talk while doing nothing; I did not really enjoy the part where they were telling us about the steps of evaluating things and the design; Sometimes I got a little bored. The power points were sort of boring, but for the most part they were good; Having to watch mentors go on computers and watching the slide show; There weren't any… it was a lot of fun except there was a lot of talking; When we were thinking about all of the stuff that happens
	2007 (8) Some was a bit boring, we had to sit for a while; I didn't like standing around so much while they talked; The least enjoyable feature was the rather long talk. Maybe if it were about a more interesting topic, it would've been more enjoyable; Nothing really. Just probably how many power points. In the end I like it all though; The talking; The power point slides and the long white hallways; The amount of power points got boring after a

	while; This group gathering. All the doctors get together and talk about the sick animals and what to do with them. A big professional discussion
amount / type of information	**2005 (1)** My mentors didn't seem to know what to do with us half the time
	2006 (4) The best would be seeing this one map where there are lines and then waves showing different colours, the one I just didn't really understand but it wasn't horrible because I was pretty much very into this; The long statistical evaluations that consisted solely of numbers which had little meaning; Not understanding what some of the things meant; learning about a geophysict's job
	2007 (3) Learning about seismographs; When they talked about Java Script; Trying to learn the math involved with being a product engineer
length of OM experience	**2005 (0)**
	2006 (3) It was early in the morning so it was very tiring; needed more time for the whole day; the day wasn't long enough
	2007 (0)
student grouping	**2005 (1)** I enjoyed most of it…but maybe we could have input on our mentors?
	2006 (0)
	2007 (1) I was the only kid my age (just me and my mentor) and I would have liked to be with other kids.
other	**2005 (5)** It was awkward when I saw people in their underwear; I didn't like walking/going up all the floors; Carrying around free stuff… or watching sweaty old men while I eat; Only sitting for long periods of time; There was confusion with conference rooms so we had to go back and forth, it wasn't that bad though
	2006 (2) getting lost; the smell of the waste treatment water plant
	2007 (3) The elevator in the building we were in made me nauseous whenever we were in it; the elevator; Going in elevators made me sick. Carrying so many bags.

Themes	**Catholic Sector Statements**
not enough hands on / applied experiences	**2005 (2)** We were not able to go outside and work with the tech; Not being able to leave the building to look at things like one of Alta Links sub-stations
	2006 (1) The least enjoyable part of my day was that there were a lot of lectures with no hands on work
	2007 (3) should be more hands-on experience; I liked the presentations, but maybe we could've done more things outside; There wasn't very many activities for us to do
all positive	**2005 (0)**
	2006 (9) It was all good!; Everything was good; I didn't find anything unenjoyable. I thought it was all very educating; the entire day was very enriching and enjoyable; it was all equally enjoyable; All of it was very enjoyable; When we all had to leave; The end of the day; The end of the day

	2007 (2) It was all good!; Everything was good
lectures, meetings & presentations	**2005 (5)** Too much talking; The lectures; Long speeches; Big long speeches and talks about jobs. Movies and games are helpful in learning; Sitting for long periods of time watching slide shows
	2006 (6) going to meetings because I couldn't understand what they were saying; listening in on a meeting for an hour and unable to understand anything; too many power points; There was a lot of talking so I got a little bored at times; sitting and just listening to them talk; I think that the least enjoyable part was being in the lab for 2 hours. It was still educational but we didn't really do much we just listened
	2007 (3) too much sitting and listening to power points; Too many power point presentations in a row; When we had to listen to maybe one other patient but it was really fun.
amount / type of information	**2005 (9)** Looking at the types of rocks, nothing else; Seeing half eaten, gory, bloody gophers and mice in the falcon pen examining room; Seeing dead mice, rodents, gophers being cut and ripped open for bigger animals to eat; Watching the lady getting her toenails cut; Least enjoyable was waiting for results to load and waiting for cell to heat/cool etc. (but hey, what can you do?; Watching them put in needles because I hate needles; Waiting for this (cells?) to dry and to keep washing the cells; The least enjoyable feature was working with and learning about mice; There was so much information to remember in so little time;
	2006 (7) It was kind of hard to understand some of the vocabulary they used during the explanations of their job; It was all very interesting to learn about all the types of jobs women can have in an oil and gas company. Fun activities we got to do; sometimes they used big words that I didn't know, and I got a bit bored; There really wasn't anything, but some things I didn't understand; some things I didn't understand; I didn't really enjoy looking at charts of seismo waves; some mentors talked about their jobs and mentioned some things that we, as grade 8s, don't have any idea what they're about
	2007 (6) The one part I didn't like was when they had the mice.; When the mentors were talking about computer stuff I didn't understand; The least enjoyable feature of my job shadowing experience was probably the structural engineer; the walking and seeing all the pollution in the water; Seeing the animals in pain; learning about the details of the company
length of OM experience	**2005 (1)** It was too short to get a real feel for it. It would be better as a 2 or 3 day thing
	2006 (0)
	2007 (3) We had to go when I was enjoying the story of an Olympic athlete; The least enjoyable features of my job shadowing experience was when it was time to leave; The fact that there wasn't enough time.
student grouping	**2005 (0)**
	2006 (0)
	2007 (0)
other	**2005 (5)** The least enjoyable features of my job-shadowing was taking the elevator; Having to read the reports; The least enjoyable thing was having to walk everywhere; The bus rides; Waiting a long time for the bus to come and pick us up
	2006 (2) the smell of the wastewater treatment plants; The smell of sewage
	2007 (3) Eating the pizza. I'm a vegetarian and there was no cheese pizza so I had to get

	vegetarian, but it had mushrooms and onions which I don't like; Geese hissing at me; The bus ride.
Themes	**Alternative Sector Statements**
not enough hands on / applied experiences	**2005 (0)**
	2006 (1) Some of the day was a little too much explanation and not enough 'hands on'
	2007 (4) Sitting and not having anything to do. We had to sit and learn how to work the smart board; More hands-on experience would be better; Sitting in a chair most of the day; Being inside all day
all positive	**2005 (0)**
	2006 (2) Having to leave; The end of the day
	2007 (7) I didn't dislike any of them. The mentors spiced them all up and made them fun; I enjoyed it all; I like everything about my job-shadowing experience; All interesting; I enjoyed all the activities, they were all fun; I enjoyed all of it!; I did not have one I thought it was all enjoyable
lectures, meetings & presentations	**2005 (7)** Lectures; 9:30am to 11:30am explaining what they do. Interesting yet long; I think the meetings. They were long, a bit boring; Lots of lectures, sat a lot; When we stood too long watching people talk, my legs got really sore!!; When the talking went long, but that was rare. I liked it all!; Watching a power point
	2006 (7) It was all fun but I didn't really like sitting and listening to the product design; the long, long sessions; listening to a discussion that I didn't understand; less power points; In the lab when the engineers in the lab were explaining things about engineering for 2 hours; The long talking presentations; The slideshows were interesting at first but then got boring; Sitting down and hearing them talk about it
	2007 (9) There was too much power point; Having to sit and listen. It needs to be more interactive; Too much sitting and listening to power points; The increasing amounts of power points; Having to sit and watch power points but it was still interesting; Not getting up to move after 2 hours straight; Sitting for a long time; the long lectures; Looking at power points.
amount / type of information	**2005 (2)** Watching Dr Purych clip someone's toenails; Listening to the lady explain how corrupt the world is
	2006 (4) There were a lot of things that I could not understand because of the funny acronyms and such; The least enjoyable was when we had to follow and calculate all the taxes and do economics; It was a bit long and sometimes I had trouble understanding because the two of them didn't speak fluent English; It sometimes was very dry, really dull sometimes
	2007 (1) Well they explained things with great detail and I got confused sometimes
length of OM experience	**2005 (1)** Not having a lot of time
	2006 (2) longer lime at Komex; Some of the activities were a little rushed due to time. At lunch we (my group of 3) were the last to the boardroom and all the food was almost gone
	2007 (1) Leaving the job shadowing earlier than expected was my least favourite part.
student	**2005 (0)**

grouping	**2006 (2)** The big group we were in; It would have been more fun to be one on one instead of in a big group
	2007 (2) Also would have liked being one-on-one with them so I could ask more direct questions; I think it was the fact that there were so many people in our group, I would kike it if there were a little less.
other	**2005 (3)** The paper work and reports; When we finished in a lab and had to decide what to do (we had some time to chat, but that was also enjoyable; Being hot and stuffy and waiting on the buses
	2006 (1) fewer bus rides
	2007 (5) long bus ride; The long bus rides; The wind; eating Chinese food; Going on the elevators too many times

Recommendations for Operation Minerva Improvements

Themes	Public Sector Statements
more hands-on or applied science experiences	**2005 (5)** I think there should be more hands on or off site experiences; I think that they should have more outside work and hands on; Maybe more hands on things; Make (it) more fun to learn about the job; Have more hands on experiences
	2006 (10) spend more time outside, but other than that it was really good; Maybe you could have the mentors and students play more games. It was hard to listen the whole day; I think that Operation Minerva could be improved by having more interactive things going on; Don't have the boring meeting or just don't bring us to the meeting, but other than that it was great and fun; Try to have more hands on activities; Keep us constantly busy, don't just make us sit and listen; no lectures and hands on activities; more activities and less presentations; Maybe just have something a little more exciting; More activities for the students
	2007 (3) More experimenting and doing, not all the talks; Don't use as many power points. Maybe some more hands-on things; Add more hands on activities.
all positive / no recommendations	**2005 (0)**
	2006 (9) it was awesome; I don't have any better suggestions to improve it. It was all really good; I wouldn't change anything; it was fun; I like it the way it is; I think today's experience was fun so I don't have any comments; nothing, it was awesome!; it was great as it was; No I think they have it all planned out very well
	2007 (8) No I don't have any suggestions the day was awesome!; No, it was really good!; I really enjoyed it and I'm just and energetic person, hence I couldn't stand still. I think its just great, don't change anything; No loved it; Nope I thought it was pretty good; It was all good; It's good enough (perfect); No, I think its awesome the way it is!
preferences for job shadowing experiences	**2005 (3)** Allow people to make a request as to which jobs they'd like to shadow; if we got to choose what we want to learn about; Pick a field of work you are interested in
	2006 (2) You might want to try pairing girls up with the people they want to job shadow; For the students to be able to have a say in where they want to go; I think it should be that we have a choice as to what profession we see

	2007 (2) It would be nice if we could choose the place we were going to ensure that we would go somewhere that interests us; We should be able to choose what job we shadow.
lengthen/ expand the experience	**2005 (4)** Have a longer trip if possible; I might suggest a longer trip. Everything was cramped into the day; I found Operation Minerva very interesting. It might be more enjoyable if it was a little longer; I also think that the job shadowing should go for 5 days (with) a different job each day
	2006 (8) Probably make the day longer so we can do more stuff; make it a full day instead of just school hours; More time because there is just so much to do, yet so little time to learn, but I know it can't be longer; a slightly longer day; Give more time for job shadowing; the time was a bit rushed; maybe a longer day and more hands on activities; longer period of time
	2007 (1) Start earlier because we reached our sites very late
other	**2005 (0)**
	2006 (1) organize buses better
	2007 (5) cookies; Presents, we should get gift bags next time; Tell people to go; Provide transportation to the pick up malls; Start a little later.
participant grouping	**2005 (3)** give time to do one-on-one job shadowing; There should be less people in our groups; I think you should split the mentors up into groups of 2-3 with one mentor and rotate
	2006 (5) Go see your mentor with the other girl from your school so your not so nervous; Instead of groups with the mentor, make it just an individual with the mentor; keep the groups small; Keep the groups all a descent size; Keep the groups small
	2007 (1) I think they should let people have at least one friend with them because then they're not as nervous
time spent with mentors	**2005 (4)** Maybe more time with mentors, if possible; we should be with our mentors for longer; I think if we spent more time with the mentors it would be more fun; Make the times spent with 1 person about half an hour so we stay interested
	2006 (1) having women and men mentors
	2007 (1) One-on-one job shadowing would be so fun!

Themes	**Catholic Sector Statements**
More Hands-On or Applied Science Experiences	**2005 (4)** Less sitting stuff, even more examples and hands-on /real life looking at stuff; Let girls explore and even try something from certain professions. Let girls sample activities that involve the profession; More movies and examples; More outside work
	2006 (12) more hands-on projects; Perhaps more hands on things, or visual aids instead of just listening; More hands on, games, etc; Have more jobs that let you be hands on; More hands on things; more hands on stuff; More hands on; Walk around and experience; more hands on stuff; there could be a little bit more interactive stuff; more hands on stuff; more hands on experience
	2007 (6) more hands on stuff; Do more things outside; More activities; more hands on to let the

	kids actually do what they do; More projects, demonstrations or hands-on experiments; Give the kids more opportunities to do things
All Positive / No Recommendations	**2005 (0)**
	2006 (3) I had a lot of fun and I like it the way it is now. I don't suggest to change something or anything because it's perfectly fine the way it is; I had a great time today with my friends and mentor; I think that everything went very well
	2007 (5) No. I thought it was good the way it was; It was great; No, I loved everything!; No it was great; No, the set up was amazing and I enjoyed every part
Preferences for Job Shadowing Experiences	**2005 (4)** Give us a choice of who we job shadow; More of an option of what you would like to shadow; Maybe you can pick which 'operation' you want to do, and your group; Maybe next time be able to choose the option/career you are interested in
	2006 (1) more different professions
	2007 (3) To have more job options to experience. Let us chose where we are going; People pick where to go, first come first serve; more options for careers
Lengthen/ Expand the experience	**2005 (5)** Having more time; I think the day should be longer; Make it longer so it can be more informative; Longer; Stay in office longer
	2006 (2) It would have been nice to have more time especially since there is so much to absorb in a short period of time; make it a little longer.
	2007 (0)
Other	**2005 (2)** Better food, better buses; Make sure that the bus comes in time because we could have gone to the next section in the time we waited for the bus
	2006 (2) I'd like to be a marine biologist; too many bus rides
	2007 (1) If more specific information was given before the day, you could be more prepared
Participant Grouping	**2005 (1)** Maybe send at least 2 people to each place so no one is alone
	2006 (5) Go see your mentor with the other girl from your school so your not so nervous; Instead of groups with the mentor, make it just an individual with the mentor; keep the groups small; Keep the groups all a descent size; Keep the groups small
	2007 (0)
Time Spent with Mentors	**2005 (3)** Give us more time with the mentor. We only had about 3 hours!; The only thing I can think of is maybe letting us know about how their system works, as well as letting us know how flexible their job is; and maybe in the letter tell us WHO we are shadowing and tell us WHAT the company does
	2006 (2) more time with your mentor; I think Operation Minerva could be even better if the planned activities involved the mentees more
	2007 (2) more time with your mentor; More one on one time.

Themes	Alternative Sector Statements
More Hands-On or Applied Science Experiences	**2005 (4)** More activities that mentors can do; Games !!; don't get as many lectures or go to many meetings; Do more hands on stuff and try to keep us on our toes
	2006 (0)
	2007 (16) Maybe less power points; More hands on activities would make it more fun; more hands on activities; More hands-on experience; Less power points, more hands on; Go outside more but other than that I love it!; Maybe have more activities that use examples for what objects / materials they use; more hands on stuff, more moving around; Going outside more; Maybe if you could get involved in something it would be more fun; To plan more activities because we finished early; more hands on stuff; Doing a little more hands on activities and a little less watching presentations and taking notes; Have a little more hands-on instead of long experiments (using proper chemicals); To not go on any elevators and to do more activities; To do more activities, more hands on activities, and move around more
All Positive / No Recommendations	**2005 (0)**
	2006 (0)
	2007 (4) I think everything went well; no, it was perfect; It was pretty well done; No. I was completely satisfied with my experience shadowing an audiologist and it excited a new interest.
Preferences for Job Shadowing Experiences	**2005 (3)** Put more on the mentors individual day. Maybe on the request forms you could 3 ideas the participant would like to do; If you could put in a request for the job you want; pick more diverse studies
	2006 (4) Also I would have enjoyed picking the career I'd get to go see; You could make it on a first come first serve basis so that the girls could pick their jobs; You choose your top 3 jobs to go to so you don't get bored and driven away from science; offer more jobs like in the medical areas (coroners / surgeons)
	2007 (4) what are some of the other engineers?; Give students a choice of jobs they could shadow; Try and pair students with mentors who are in the same interest / field; more choice of mentor
Lengthen/ Expand the experience	**2005 (1)** Probably making the experience a 2 or 3 day long process so there is more time to absorb all the info
	2006 (2) Give the groups more time; Maybe some more time
	2007 (5) I think our mentor did great with the day but I thought we could have spent more time at the sessions; I think that it would be nice to have a little bit more time provided at the place; Maybe a bit more actual job shadowing; Having more than one day of job shadowing; I think that it should be longer
Other	**2005 (3)** Give the participants time at the end of the day to discuss the day's events; I also wouldn't mind if the buses could be more efficiently coordinated, but I realize that that may not be possible; I think the buses should be more on time, but that's ok
	2006 (2) not as early; I want to be a medial scientist or a lawyer
	2007 (1)

	No not really except maybe a little more information at the start.
Participant Grouping	**2005 (6)** Smaller groups, more one on one; Everyone get their own mentor; Keep the girls from the same school together so they don't feel so lonely. You can still put more than 1 group/pair of people together though; Have two girls each from two different schools go with the same mentor(s); To keep the students from the same school together. This way we have at least each other at the beginning and you do not feel as shy; Try to keep students from the same schools together or make groups larger than 2
	2006 (4) I think if more than one person goes they should be from the same school; Maybe get people into smaller groups; Keep the group size the same… nothing else; Smaller group, more one-on-one
	2007 (1) If the person from your school stayed with you
Time Spent with Mentors	**2005 (2)** I wouldn't mind if I spent a little more time with a mentor, the day seemed to fly by; I would suggest that even though my mentor and her team tried to explain it for us and help us understand, that they should go over it in more detail;
	2006 (3) longer time with mentors, offer it to more grades; If some of the mentors talked slower and less acronyms; make sure that you can easily understand the women
	2007 (0)

Themes	**Mentor Statements**
mentor / student preparation	**2005 (7)** Encourage students to be a little more prepared and to have some questions ready; Meetings held before the actual mentor day should be just one meeting that goes over - what presentation needs to be given, how much time is needed and play or go over the rules for the game; This is, I think, impossible but it would be wonderful if the students could be encouraged to show some enthusiasm. All the mentors involved with our assigned students I think, felt a little discouraged; Prepare students with some questions to ask, have students set an objective for the day to share with their mentors; The girls knew the name of our company but not any info on what type of business etc. Some basic background info to them ahead of the day may be helpful; Perhaps give them a template for suggested questions; I'm not sure…I think feedback from the girls would be most helpful. For me, I had enough support from the organizing committee and felt things went smoothly
	2006 (4) Have the students learn about us before they arrive (e.g. search our websites); Girls may wish to contact the mentor asking science questions or other interests. Mentor should be aware of how much the girls learned in school; Give better guidelines on the level of knowledge of the attendees; Perhaps the girls could come with a list of questions in hand so we know we covered the items they were wondering about before they arrived
	2007 (4) Perhaps have the girls come with some questions prepared. This may help them to engage in conversation; Ensure students know where they are going ahead of time, and contact mentors with student information early; It would be great if they could learn about us, our jobs before they came and be encouraged to have some questions for us; Better understanding of 8th graders' interests
matching student preferences	**2005 (1)** Take the time to watch the girls with people who are in a profession that they are interested in
	2006 (0)

	2007 (3) Would be ideal to be able to match girls who had interest in the earth and geology; Imagine that this would be hard to do but would it be possible to match interests of the girls with a mentor? We had someone who clearly would have preferred to be matched with an engineer (although they still seemed to enjoy the experience); Try to match students with the field of interest.
selection of students	**2005 (5)** Have a variety of age groups; Be sure to pick a student interested in a science career/future; I wonder if Grade 9's would get a little more out of it since they might have a little more science background. However, I think it is important to show the mentees what a career is science is about before they need to choose science classes essential for applying for university science programs; This seems to be geared to the top end students who would probably stay in science. What about expanding to those that could go either way?; I think that a better selection process is called for – more girls who really like science
	2006 (1) Teacher recommendation in association with request from students in order to qualify
	2007 (1) The girls should be selected by teachers with thought put into it rather than the teachers doing random draws for the positions.
all positive	**2005 (0)**
	2006 (2) By sticking to a similar routine each year, you help us improve how we do it; it is very organized
	2007 (4) Nope - the girls seemed to love our presentation and enjoyed the learning; No. Length of time and time of year were good; It was organized very well; I think the students enjoyed themselves; they had some hands-on experience and were mentored by a number of individuals in the lab which made the day go fast. I have nothing negative to say.
expand / lengthen the program	**2005 (2)** An extra half hour would have been helpful; There needs to be fewer presenters. There should be time allocated for one-on-one time with the students so that they have the opportunity to ask us questions informally. The presentations need to be facilitated and kept on schedule. More direction needs to be given to the presenters on what needs to be presented. More interaction time after the presentations is needed
	2006 (5) Perhaps recruit more mentors; I will add a few other learning experiences next year; Longer sessions perhaps. It would also be neat to take the girls to nearby facilities; Interactive presentations are great!, I think it might be interesting for the girls to have a trip to the field; It was unfortunate we didn't have more time with the girls (more than 5 hours) as we had to rush through some activities
	2007 (1) Include more girls
other	**2005 (3)** Groups of students with groups of mentors. One-on-one for a whole day doesn't always work, depending on the personalities of the students and mentors e.g. shy students benefit from other students in the group asking questions; Next year a new coordinator should be appointed. There was a lack of leadership and time management. In addition, the location of the lunch was not great. The girls did not enjoy the menu selection (Bow Valley Club) and the squash courts were distracting and noisy – which did not leave room for good conversation and informal interaction with the girls; Diversity is always key. To continue to provide a diverse group of mentors is important. Also, improve on mentor advertisement to get more mentors involved

	2006 (0)
	2007 (1) My time was more as a tour guide and the girls' time was focused on the 4 planned sessions. Some time to discuss / show engineering would be better for me and for girls this time since none of the 4 activities was engineering related

Considering a Science-Related Career?

Themes	Public Sector Statements
preferred science occupations	**2005 (16)** I want to be a Pharmacist; I want to be a doctor; being some kind of surgical doctor; I am interested in a science career, perhaps being a Veterinarian; I am thinking about being a doctor; I am considering pursuing a career in forensic science. I am also considering a career in Anthropology; I plan to become an Archaeologist and study ancient civilizations and prehistoric humans; I'm planning to get into a science career that includes math; Something in forensic sciences; I plan to either be some type of engineer or someone who works with chemicals and reactions; Forensic Scientist; I am thinking of being a surgeon; I want to be a Zoologist or a Pet Veterinarian; Either an astronaut (or something related to space) or a Forensic Scientist (CSI); Marine Biologist; I'd like to be either an architectural engineer or a sports physician type of profession
	2006 (22) maybe a biologist in forensic investigations; I would enjoy having a job as a paediatrician. It deals with medicine and human bodies; I would love to become a vet; vet – medical science; I want to do something that has biology because I like plants and cells; doctor; I want to become a doctor in the future because I want to be able to help people but at the same time explore what things are causing health problems; I wanted to study medical studies or become an engineer so I want to take science-related courses; Something in biology like maybe marine biology; I want to be a veterinarian, or a marine biologist; I want to be a paediatrician which I think is science related; I'm planning to take vet medicine and have done research already on what I would need to do; I want to be a biologist because you study all the things in the micro world; I want to be a paediatrician; psychiatrist, medical school for sure; I would love to be a paediatrician. I love science and kids; I'm interested in engineering and architecture; I would like to become an architect and I understand that is a career based on math and artistic abilities; I want to be a vet; I would like to be a teacher or a surgeon which involves science; I'm going to be a CSI; I have always loved science and math, it is fascinating and it provides useful information that we can use in everyday life
	2007 (19) Chemist, want to work with chemicals; I want to be a doctor or have a profession in medicine such as researcher or animal tracker / marine biologist; I don't know. Probably, I haven't really thought about it but geology is interesting to me and I'd probably like to be a geologist; I would like to go to UBC with a dance scholarship and become a marine biologist; CSI; dentist; I would like to do either physiotherapy or environmental scientist; paediatrician; engineer, chemistry or physics; Being a dentist would involve science and equipment; I'd probably want to be a paediatrician when I grow up. If not then maybe an engineer because that involves math as well; I am interested in being a chemical engineer and this day has helped show me the things I might do as a chemical engineer; One of the careers I'm considering is becoming a paediatrician; Vet; I want to become a physician, and work at the Alberta's Children's hospital. I haven't decided what kind of physician; A science related career appeals to me because I am interested in a lot of surgery type things; I would like to do something related with math and science; I would like to find cures for different diseases; I would like to learn more about the oil and gas companies
non-science occupations	**2005 (2)** I think I'll probably find a job in social-sciences…I like the outdoors and art too, though; I'm not into science careers, more into interior design or art stuff

	2006 (6) I'm looking in international affairs; I'd rather entertain others with my unique talents; I am more into home design; It was interesting but I want to do other things to help the world. I plan to be a lawyer or a job relating to criminals; I like science but prefer language arts; I don't think so. I find it all really confusing. It seems really hard
	2007 (2) I want to do photography; I think I want to do something involving the outdoors.
interest & ability	**2005 (12)** Science is interesting for me; I have always loved science and wanted a job in it: I am very interested in medicine; There are a lot of interesting career opportunities in science that I would like to experience; Almost all of hands-on fields have science; I don't really know what I'm going to do, I'm only 13, I don't have to decide now do I? But I think it's possible that I will embark on a career in science; I'm interested in science and math-related careers; Because I want to learn about how to better our medicine; I really like science and especially the human body… I like all the things that are in our body; It is something that I like and am good at. I also have a strong interest. With that combination it doesn't seem like such a chore. It's fun!!; I'm planning to get into a science career that includes math; Because I sometimes find science difficult to understand
	2006 (6) I love all sciences. I like to know how things work; I would like to have a career in science because there are so many interesting careers and you make a lot of money; I enjoy science and it could use more women; It was very interesting and there were lots of benefits of a science career; I enjoy science a lot, I think its very interesting; I really do enjoy science-related activities, and the type of jobs to do with science would be great
	2007 (6) Maybe, it seems fun and exciting; I always love science and I'm amazed at all the combinations that come out of it; Yes, I am considering science related career because I like science!; because I like science and it's one of my best subjects; Possibly, it depends on my experience in science throughout high school; Because I really do like arts & history
unsure / non-science careers	**2005 (3)** I'm not really sure what I want to do. Maybe I will; Yes maybe but I'm not sure. I might because of this program being a reservoir engineer. I'm just not sure because science isn't my best interest but it is o.k.; unsure – science has a lot of different branches (P28); I might but I haven't quite decided
	2006 (0)
	2007 (5) I'm not sure what I want to do but I know I want to keep science in my life; I don't know what I want as a career yet; I don't know. I'm not ready to decide what I want to do for the rest of my life; Maybe. Depends on my state of mind and where I decide to go with my life; I'm not sure and I don't really think of anything yet.
other	**2005 (1)** I think more women should have more science-related careers
	2006 (0)
	2007 (0)

Themes	**Catholic Sector Statements**
Preferred Science Occupations	**2005 (12)** Lawyer, use forensics and such; I would like to be a Psychiatrist when I am older; Teaching Elementary science; I want to study the criminal mind when I am older; Marine biologist or Architect; I would really like to become a forensic scientist, analyzing evidence and hands-on crime scene work; Doctor; Either a doctor or an environmental

	engineer; I want to work with child therapy; Medical examiner; I want to become an Obstetrician; Veterinarian of domestic animals; I am planning on becoming a vet. This profession has a lot of science involved in it; I would like to be a vet
	2006 (10) orthodontist; I am considering animal behaviourism as a career choice. Some anatomy and brain structure science would be useful and applicable in this career; I would like to be a vet, specializing in horses / farm animals; maybe something like a forensic scientist; I think that being an environmental engineer, an engineer or a hydro geologist / geologist would be fun; pharmacologist, bio-pharmacologist; I might be an engineer; I am considering becoming a veterinarian or a crime scene investigator. After today, a wildlife biologist also sounds fun; I was thinking about taking marine biology; zoologist because I love animals
	2007 (12) I always wanted to be an engineer; I have been considering a job like a doctor or geologist; I want to be a vet. After today though I will now consider environmental scientist; Maybe geology or astronomy; I would like to work in the oil and gas business; I want to either be an architect or structural engineer or both!; Something in the veterinary area; I want to become a dentist or doctor; Marine biologist or a lawyer; I would like to be a dentist and learn chemistry and biology; I would like to get into marine biology; I would like to be a vet because I like to work with animals
Non-science occupations	**2005 (0)**
	2006 (3) Because I really want to be a lawyer but being 'smart technologies' would be awesome too; I'm interested in becoming a banking / investment manager; I won't take engineering
	2007 (3) My dream is to become a business woman. I want to produce make-up and creams. so I had to know about human's skin; I want to be a lawyer but I still want a degree in all of my core subjects; Maybe an architect
Interest & Ability	**2005 (10)** Because science is important and basically the jobs I am interested in are science-related; I'm keeping an open mind until I make a decision, some components of science are appealing to me; I have an interest in the area of matter/particles, as well as in the environment. I'm not sure which profession, however; I really enjoy nature and helping others and solving problems; The opportunities in a science-related career are very good; Because you can see if you want to help out with disease like cancer. Going in to science would be a great experience because your day job would be different every day, meaning the things you do; I find science interesting; Today got me very interested in working at a place like Smart Technologies; The job I shadowed did not interest me so much; I'm considering a science-related career because of Operation Minerva; Yes, because after the experience at Petro-Canada it looked really interesting
	2006 (6) it is an exciting career to have. Lots of different kinds of work; I like numbers better; I am really interested in engineering in the oil business and also there is a lot of money that comes with it; Science is an interesting thing. It almost relates to everything. Having to do science-related things is really fun; I love learning about particles and how things are made; I love all the hands on things you do
	2007 (5) I really enjoy both science and math classes; I think it might be really fun and interesting to do experiments and other stuff; Because science is interesting and the other careers are fun too. Plus I'm a hands on person so I might; Science is most enjoyable; I like science / math
Unsure / Non-Science Careers	**2005 (5)** I will keep my mind open but I am not sure I will do something science related; My interest is in designing house interiors; Most likely. I'm not sure why, just wherever life takes me; I really want to become a lawyer, that is my dream but it might change; I don't know yet, it seems too far away

	2006 (7) I am keeping many fields open as options for a career; Because I feel that the money is very good and I enjoy math / science so I would be happy at my job. Maybe a geologist? I am not sure yet; I am not sure yet, but I would like to get a post-secondary science degree; I don't know yet; Not sure, because I enjoy what I learned and have been influenced but my main thing I want to do is in art; Kind of yes and no because I would like to be either a diplomat or something to do with international law or I would like to be an engineer so I don't know; I'm still not 100% sure about what I want to do, but somewhere from nursing, astronomy or perhaps geology are my interests
	2007 (4) Well I don't really know because I'm interested in a lot of subjects including science, so I really don't know; I don't' know because the job I want to do is related in one way and also not related in another; I don't' know what I want to do; unknown, still probably
Other	**2005 (0)**
	2006 (0)
	2007 (0)

Themes	**Alternative Sector Statements**
Preferred Science Occupations	**2005 (11)** I would eventually like to be a mechanical engineer; I plan (for the moment), to become a Forensic scientist or Criminologist; I want to be an Environmental Scientist; I am considering going into the medical field; Forensic scientist; I want to become a doctor. To be a doctor you need science and math; I would like to become a Pediatric nurse and work at a children's hospital because I love children and I don't want to be a doctor or a surgeon (too much blood!); I really like being outside and helping my environment so I'm thinking about becoming an environmental engineer; I want to go into medical school, then specialize in something (which I haven't decided yet), maybe Pathology; I would still like to go into Pediatrics; I would like to go into the medical field and become an ER doctor; I would like to be a cancer researcher
	2006 (11) Because I love science and I'm hoping to be a doctor or engineer; I would like to be a doctor; pediatrician; paleontology or archaeology; I am considering going into medical school or dentistry; I would like to be a doctor, but I'm not sure in what field; I want to be a veterinarian; I am interested in pursuing a career in engineering or environmental engineering (especially after today); I would like to be a coroner and perform autopsies. I would need medical / anatomy training; I would like to be an engineer or doctor of some type, I have also considered a lawyer; I plan to go into medicine
	2007 (24) I'd love to either help with the environment or work with space; I think I might like to be a mechanical engineer; I want to have a career in medicine, preferably a surgeon; I would like to become a criminologist when I'm older; engineer, architecture, physicist; I plan to be a doctor; optometry; I want to be a vet. I have since I was three. I just love animals; I want to be a vet; I would love to do something involving science. I really want to be creative and be an architect which relates to some oil and gas, etc. (designer engineer); environmental science; Being a paramedic involves knowing about science; Physics is my passion within the realism of science as medicine. I want to be a jet fighter plane pilot or a maxilla facial surgeon; I want to be a vet or something that I checked off on the other page; I have thought about going to school to become some kind of doctor or go to school to become a dentist; I would like to be a vet or a hydro geologist; I would like to become a veterinarian or an animal scientist; Maybe something in zoology because I love animals; My second career choice is as a geologist; doctor; I plan on being involved in medicine; I want to become a vet that specializes in cats, dogs and horses; I'm thinking of becoming a biochemist; I want to be a pharmacist

Non-science occupations	**2005 (0)**
	2006 (1) I want to be a photographer and I would have to digitally enhance some stuff
	2007 (1) I enjoy finding out new things (science) however, my passion lies in the performing arts
Interest & Ability	**2005 (10)** Because there are so many different opportunities; I am considering a science-related career because they really interest me and the Operation Minerva really opened up my options; I enjoy science class and there is a challenge met in every job, new discoveries to be found, and science definitely helps society!; I really love science no matter how boring the teacher or subject is. Actually, science is never boring. I just love knowing how and why things work. I want to continue having fun with science my whole life and what better way is there for doing that than with a career; I'm not quite sure where my life will take me yet, but I would consider a career in science; I have always liked science and I really enjoy it. I also like to have a variety of choices that deal with different fields; I have always liked science, so I thought that a career which is science-related would be fun to do; I'd like to look into more science related careers, and learn more about them; After what I learned today and learned the benefits and fun of it; After everything that happened today, I know am thinking about science. Their jobs sound really interesting
	2006 (3) It really depends, I enjoy science but there's so much more that I could be doing so really I classify my 'yes' as a maybe; I don't' really like labs and experiments; I like research
	2007 (9) It is very interesting learning about our world and finding out how we can preserve it; I've always been interested in science and I love to build new things and find how things work; Well today really opened my eyes and I wanted to always do something that helps the environment; This experience really opened my eyes; Maybe it looks like a lot of fun; I enjoy computers and petroleum engineering; I like the environment, so I want to be in biology or something; It seems to be fun and hands on and so that best describes me; science seems to be more hands on, and it seems to be interesting.
Unsure / Non-Science Careers	**2005 (0)**
	2006 (4) I don't know because I like to keep my options open; Well I'm not quite sure what I want when I grow up but science is very interesting so it is definitely a possibility; I'm not sure what type of career I want to pursue yet; I'm not sure what I want to do
	2007 (4) Well I don't really know because I'm interested in a lot of subjects including science, so I really don't know; I don't' know because the job I want to do is related in one way and also not related in another; I don't' know what I want to do; unknown, still probably
Other	**2005 (1)** I didn't get a health science job shadowing
	2006 (0)
	2007 (0)

Women in Science Attitudes

Themes	Public Sector Statements
compatibility (integration of a	**2005 (5)** I think a woman shouldn't have a hectic career if she has small kids. The kids should come

science career with family life)	first; I think it depends on the women because some may not want to get married but may want a successful career; Women can do anything but it depends on that woman if she wants to build up her career; They also have to be very involved in their family and raise their kids; I think family is very important, but that's not all that women are good for
	2006 (8) I think it is fine for women to go out and get great careers but my religion really advises women to stay home and raise children. I think being a mom is just as important as being a successful career woman; women usually / sometimes raise a family and have a career and men are more intone with their work; Women have equal rights to men. They can have a successful career and be successful as a mom; It's good to be both a successful mother and wife, and a successful business woman; I think a woman should be good in raising a family AND good in a career too; I think it is important to be married and stuff, but your education is good too; Careers are important, but so is home life… we should split 50/50; I think a balance of home knowledge and work knowledge are good
	2007 (4) I think women should have equal responsibility as men in the work world. I do not think they should be expected to stay home and be a 'house wife'. Power to women!; A woman can be a mother and a wife but can also study chemistry and other science-related things; Women do not only raise children we are just as equal as men; Women have the ability to maintain high, successful jobs, and be good wife / mothers.
equal opportunity (equal access to science careers)	**2005 (9)** Things have changed over the years, and women are becoming a bigger part of the business world; I think that women are equal to men, and should have equal opportunities. Women should be able to choose any career that we like; I think a woman has as much right to a successful career as a man, and that raising a family/getting married are not the most important things in life; I think women should be treated the same as men; I believe that women do not have to marry or have children to be considered successful. Women deserve the same opportunities as men; I think women can do whatever career they want to do; A woman can be a home maker or a business woman; None…though – women deserve everything men have; Women should be allowed to do whatever job they want;
	2006 (9) I just wanted to say that women can do science related jobs and many other things; I think women should have a career as well and not just men. Women shouldn't be thought of as 'home career' but should have choices just like men; women are equal to men, they should have equal opportunity; I think that women should do whatever they want, if they want to be an engineer they have every right to; women should be allowed to do whatever they want in terms of a career; I do not believe that women should be in the home. They are individual people who can do whatever they want; Women have a right to do whatever they want, whether or not it involves raising a family is up to them; Women are not robots, and their lives should not revolve around basic chores around the house. Women can have / do just as good of a job as men, if not better; women can do anything they set their minds to
	2007 (2) I think that women should be concerned about their career and choose one they like not one that's considered 'feminine'; I believe women are sometimes discouraged and discriminated in the science field. I believe this is wrong.
characteristics (science interest & aptitude)	**2005 (3)** Women can do anything men can do; Women can do anything they want; I think a woman can do anything a man can do (profession wise)
	2006 (4) women can do as much as we want, when we want and we're just as good as guys; women can do anything men can do; women should do what they want when they want; It all depends on the person. Different people = different aspirations
	2007 (10) They can do anything men can do; Women can do anything; Women have power; Women have

	just as many rights as anyone else so she should be allowed to do anything she wants; Women can do anything men can do but better; Women should do what they want and achieve their goal to make the world a better place; Women can do everything that men are also possible of. Men can also do housework. And women can pursue careers if they want to; I think women should be free to do whatever they want; I think it depends on what the woman actually wants or thinks the priority is; I think women can do anything they want
reaction to outdated statements	**2005 (3)** The above statements are outdated!; Those are so sexist!; All that is Bull Crap and is asked by sexist pigs
	2006 (6) Those are kind of sexist statements. If boys can do anything, girls can do it better; Those are very chauvinistic approaches to women's roles in society. Some may choose that course in life but it is a rash general statement; I think that the above statements are very sexist; don't live in the past; women are not tools; these type of statements are sexist
	2007 (5) I think that these questions are ridiculous! I strongly disagree to all of them; These statements are all ubur sexist. We're in the 21st century; They're very discriminatory and stereotypical to women; It's really sexist; I think it is not right to think that
impact of female science role models	**2005 (0)**
	2006 (0)
	2007 (3) I really enjoyed this experience. I won't ever forget this; I believe that if more women were scientists (or science related), it would make more girls want to be scientists; I think this opportunity to meet women who are successful in the scientific field was very inspiring
persistent stereotypes	**2005 (1)** I find some men are stereotypical about women, we have to change that, even though there is nothing wrong with being a mother; Sexist, even though that's how society sees women sometimes
	2006 (2) stereotypes are wrong!; Just because they are women doesn't mean they can't do anything. We need to get rid of all those stereotypes
	2007 (1) People should stop thinking that women are supposed to stay at home all their life and work, they have work to do too. They have goals and dreams too.

Themes	**Catholic Sector Statements**
Compatibility (integration of a science career with family life)	**2005 (4)** Both are important: family and career; For some of them raising an awesome family is important, too. But a job is important, too; I believe women in today's society have the ability to have both a successful career and get married and have children; A man can look after children as well as a woman does. We as women deserve a chance at anything we dream of
	2006 (1) Its kind of true but you can have a career and a family at the same time
	2007 (3) A woman should choose what she wants to be good at. Being a mother or taking up a science related career; Women also have dreams and not being stay home moms; I think that a woman's family and career are equally important when it comes to certain things
Equal Opportunity (equal access to science careers)	**2005 (4)** Women in modern society have the OPTION to choose what they want to do with their lives. I believe that women are as capable as men in scientific careers, and should not feel restricted to homemaking because of their gender; Everyone is different and I think that if you want to do something, whether it be a stay at home mum, or working full time, you should do it if it's

	what you want to do; I believe that women have the right to do any job career they want. Just because it is more likely for men to do science jobs, women can also do them; I believe that women can do just as good a job or better than men at any career
	2006 (1) That women can do some "men" jobs better than the men but someone just needs to step up to the plate and show it
	2007 (3) Woman should be treated equally; I think a woman can have a career in anything she wants; Women have just as much of a right to work as men do.
Characteristics (science interest & aptitude)	**2005 (5)** Women can excel better than males. They are usually more organized and determined; Women are just as good as guys. We don't get enough credit for what we do; Women are equal to men; Every woman has different beliefs; I think that whatever the woman wants should be her priority
	2006 (12) I believe women are equal with men on a job standpoint and have just as many capabilities; girls can do just as much as guys and even more; women can do anything they want, no matter what it is; I think that careers for women are very important because of the way that men and women are different it is good to combine strategies and ideas; A lot of people think that guys are better than girls. That's not true, there are things that girls can do and that guys can't; women are smart, capable and able to do anything; I believe women are just as capable at doing anything as well as men. men in turn are also just as capable doing the things women do-ex-dishes, cooking, raising kids; Girls can do anything they want; Women can do a lot of things besides house keeping; Women can do just as much as men; I think that it is necessary for a woman to do what's in her heart. If that means marriage and raising children, then that is what is important in her life. However, a woman should never be pressured to take home economics instead of physics if her mind, heart and soul wants a career in science; It depends on what women want to do with their lives
	2007 (5) Women could do some things that men can do; Women can do anything; Women are just as good as men, not just theoretically. A study was done at the University of Calgary proving it; I think it all depends on the kind of future that you want for yourself; They all depend on that particular person's priorities
Reaction to Outdated Statements	**2005 (2)** Some of these statements are so stereotypical and sexist; Why are they all negative?
	2006 (5) These comments are based on old-fashioned ideas but there is nothing wrong with someone wanting them; They are all saying girls should stay home and clean. I don't like it; they are sexist; This is unfair; they're sexist
	2007 (4) Sexist; very sexist; These are all sexist comments; They are completely wrong
impact of female science role models	**2005 (0)**
	2006 (0)
	2007 (0)
Persistent Stereotypes	**2005 (1)** People should not judge women
	2006 (0)
	2007 (1) Girls should be less discriminated

Themes	Alternative Sector Statements
Compatibility (integration of a science career with family life)	**2005 (5)** I think that it is important for a woman to have a successful job and be a successful wife; I think that both women and men should be able to do what they want with their life. Women do not have to get married and have children, but even if they do, sometimes it is the husband taking care of the home and children; Sure having a family is important; Women should have good careers but also have a family life, too. Their family life shouldn't prevent anything in their career life; Women shouldn't be controlled by marriage and other "women" things; Mothers should have jobs too, even if they are part time
	2006 (2) Women need to chose between the 2. Having both would be really unfair to a family because let's face it, a stay-at-home dad doesn't have the same intuition; If being a wife is important or having a career is important that is what they should do
	2007 (4) A woman should choose what she wants to be good at. Being a mother or taking up a science related career; Women also have dreams and not being stay home moms; I think that a woman's family and career are equally important when it comes to certain things; I think it is only as important for women to have successful careers as it is for me. If they decide to marry have kids and not work then that's fine too - as long as they're happy
Equal Opportunity (equal access to science careers)	**2005 (7)** It should be a woman's choice whether or not she would like to participate in a career. If she chooses to or not is up to her; Women have as many choices as men. It is up to their decisions that make up their lives and futures; I believe that science isn't strictly for men. Women could make amazing contributions in the scientific world; Women can do whatever men can do from a job related point of view; Women are to be treated fairly. OF COURSE we can be a boss!; I think women should have more say in jobs because women can do whatever men can do. They just have to put their minds to it; A woman SHOULD be the boss if that is what she wants to be; I believe careers are good for women, but I do not believe the second part; Women should have all the same opportunities as men
	2006 (3) Women should be able to do any job they want; I find that women should have as many rights as men but usually don't; Women have had to fight for their rights and right now, the world is at a point where women are almost equals. It's not fair
	2007 (3) Women can do the same things as men for jobs; Clearly we're being convinced to go into science. I agree; I think that women should be able to do whatever they want whether it's in a kitchen or a lab
Characteristics (science interest & aptitude)	**2005 (4)** Women are equal to men, it doesn't make a difference; but we are not inferior to men; Every woman has different beliefs; I think that whatever the woman wants should be her priority
	2006 (9) Women should do anything they want and can do. It's not true that women are not as good as men; Women should be considered equal to men; I find that women should have as many rights as men but usually don't; Women can do anything!; I think that women can do what they want to do; Women can do what they want; Family isn't all that women do or household; It depends on what the woman wants, they should be able to do what they want and to have a balanced lifestyle; A person should be what they want to be
	2007 (11) Women can do anything men can!; Women can do anything men can do; I think women and men are 100% equal; Women are as good as men!; I think that a woman should be able to do anything she wants to do in her life; I think women can do just as much as men can; I think women should be able to do whatever they want to with their life; I think women should have the right to choose which road life takes them down and that a woman can do anything a man can!; Women can do anything they want to do; Yes, you don't have to

	be a woman to work at home and women can do anything no matter what it is; Women can do anything men can do and better
Reaction to Outdated Statements	**2005 (1)** Most of those are biased against women and are false, Sexist
	2006 (3) they are all stupid; I think the statements are very one-sided. There really isn't a choice that can be 2 sided, it is all very black and white; Women are not tools. We don't live in the 18th Century or something. That is the worst stereotype I've heard
	2007 (3) these were very unethical questions; They all have a statement saying a woman should have just one role and stick with it; Why do you ask these questions?
impact of female science role models	**2005 (0)**
	2006 (0)
	2007 (0)
Persistent Stereotypes	**2005 (1)** People should not judge women;
	2006 (2) stereotypes are wrong!; Just because they are women doesn't mean they can't do anything. We need to get rid of all those stereotypes
	2007 (0)

Themes	**Mentor Statements**
equal opportunity (equal access to science careers)	**2005 (4)** Careers are good. Women can be bosses; Every woman is different and should be able to explore any field that they desire; In today's workforce, as younger people populate, the line between woman and man is becoming very vague. I don't believe the majority of younger than 35 people hold these views. At least not any of those I've worked for/with; D - it depends on what the woman wants. The most important thing is for her to have choices and pick the path for herself
	2006 (1) Women need to understand the extent of possibilities before making life altering choices
	2007 (2) I think the key to being successful as a woman in the science field (as in any other field) is drive, commitment and determination. You can do everything! Time management is key!!!; There's nothing wrong with girls not pursuing science, however the opportunities in science are not as clearly visible and therefore may be overlooked when compared with other careers. That's why this program is so great!
compatibility (integration of a science career with family life)	**2005 (21)** Success in a career is sometimes dictated by personal happiness and a balanced life. A career shouldn't exclude the joy of motherhood/marriage and vice versa; A successful, fulfilling career is only one aspect of a well balanced, happy life. Being a wife and mother is equally fulfilling and challenging. I think they are both important aspects of my life; I believe a healthy balance of career and family is best. Lean too much either way and something suffers; I think it is very important to have family, but a balance needs to be obtained between home life and work life; If women want to stay home that's great but they should have equal opportunities as men to do anything else; I believe that a BALANCE must exist between raising children and a "traditional women's role" and a career for both MEN and WOMEN who CHOOSE to take both roles; It's not a matter of what a woman should and shouldn't do. The point is that we should have a choice (and I think we do). If getting married is the most important thing in a woman's life, I don't think there is anything wrong with that. It is important for young girls to realize that they can often have it all (marriage, kids and a successful career); Both home

	life and work life are important. Balance is the key; Home and family life is VERY important, but not only for a woman. Households benefit from 2 working parents (career models) to raise the children; I do believe raising children is a FUNDAMENTAL responsibility and a woman has a big part in it, It is purely their choice. Being a success at either or both is hard work and a personal choice; I currently have no children, but would eventually want a family, my boyfriend believes I should stay at home to take care of the children until they are able to go to school, he believes that is my role and his responsibility is to support the family. For some reason, he doesn't think it is appropriate for him to stay home with children; A parent's responsibility is to children first over work … not necessarily the woman's (responsibility); We must not undermine that women should give up their responsibilities completely toward their children. Sometimes we find more joy in being mothers than having successful careers; I believe family is important and if you decide to have a family, unfortunately your career will suffer depending on how long away you are from work. If I end up staying home with the children (not put them in daycare) this could easily put me out of work for 4-5years which obviously has serious effects on my career as an engineer. Five years of not practicing engineering and then going back is almost unheard of!; In the family structure, women remain the primary care givers and I believe they are best at it. If a woman chooses to have children they need to follow through with that commitment, just like any other commitment; I feel very strongly that if a woman chooses to be a mother and have a career that the children are the main priority, no matter what. Children do not come second to a career, but I do not feel that getting married and having kids is "more important"; B - very misleading question; If women/men decide to have children, they should not put career over children. However, if career and children can be accommodated GREAT! If a woman chooses to marry and have children, a career should come secondary…. The workforce can always find a worker, but the children cannot find a replacement mummy or daddy. However, women/men who delay marriage or children only because they feel they need a career are making poor choices. Motherhood/fatherhood are the MOST rewarding careers in the world, with the most eternal rewards; There need to be more science careers available that are amenable to shorter work weeks (20-40 hrs/wk); It is necessary for women to be independent and therefore not be left in a position of being a single parent living on or below the poverty line
	2006 (12) Getting married is a choice which cannot be quantified in importance. Women need spouse support in family and work duties; I don't' strongly disagree with B and D because I think home life is very important. If the same questions were asked with the genders switched I'd answer the same way; Women have fought long and hard to get where they are today. We now have choices. If a woman chooses to stay home and raise kids or if a woman chooses to pursue a professional career – it is her choice and should be respected by both men and women; Yes, I also believe that for a man, his basic responsibility is helping raise children, and it is more important for a man to be a successful husband and father than it is to be successful in a career; They are quite individual choices. Although traditions tell women to stay at home, it might not be the choice of every single woman; I find listening to some of the lyrics of the songs on the radio that the role of women seem to be defined by serving her man and I find that disturbing; Statements B, C, D are relative to a specific time in a woman's life and are not black and white, all encompassing ideas. Right now I do not have a family, and the most important thing I have to contribute are my skills and abilities. My basic responsibilities are to support myself and my society, and it is important that I can be successful in my career to do so. When I get married and have a family – which I certainly hope to do – then for me it will be most important to look after my children. I don't believe this applies to all women. Each woman will decide for herself whether to pursue a career or pursue a family or do both; I want it all – to be good at my job, and enjoy lots of time with, and caring for, my family. I never want to have to choose between them; D – I think they're both very important (wife / mother and career); Women can do anything they set out to do and still excel at it. Families are very important but so is a woman's career; I feel balance is important. Leaning too strongly toward career versus family or vice versa could be detrimental; Pertaining to D, I feel that a mother who is financially sound should spend more

	time with their children rather than their career if the husband can not. Raising children is an extremely important job and is very time consuming. My mother was home for me when I was young and I appreciate it immensely. However, I understand many women must work to feed their children and do not have the privilege of staying home
	2007 (15) Would be great if everybody - male and female - could find life / career balance; If people (women) strongly want to have children, they should try to consider a career that allows them to achieve a balance between work and family life. For example a job that requires 60-70 work weeks is difficult to balance with raising a family. I have many colleagues in veterinary medicine who are able to balance this aspect because of the ability to work part-time when their children are younger; feel a woman can accomplish both a career and a family life; Balance is most important. Opportunity and choices so girls can decide; There is a time and place for everything. I put family first while my kids are small, but as they get older and move out of the house, my career should take on a life of its own; Although having a family / marriage is important, being successful in your own right is equally important. Balance key; I think it is equally important to be successful in both!; Success in a career and as a mother runs parallel not in competition with one another; If a person chooses to have a spouse or children I believe that choice should be taken seriously and sometimes is more important than career; I think a mother has a responsibility to make a newborn their first priority to ensure the health of the baby and herself (i.e. breast feeding). In other words - take all the maternity leave that you can get!; Each women has a different calling for their life. Some women are driven to be more career oriented while others feel it in their hearts to become a mother and make that more important. Women are capable of doing anything that we have a passion for doing. I do believe, that if you have a career and are a mother, your children should be a priority (you are raising the next generation); I think that if you choose to have children or get married then that has to be the most important. That is a difficult question because the answer is 'it depends'. Women should not be expected to be wives or mothers but if they, chose to be a parent then that must be the number 1 priority; A woman should not be limited in any decisions throughout their life. If they choose not to have children - it is o.k. But, if they choose to have children, then ultimately they should be more important than your career; I still believe a successful career is important for a woman's esteem and personal satisfaction but when it comes right down to it, family will always be more important than career. This set of values should be the same for men and women; I think family is more important than career; only if you are married and have children do I agree with this statement
reactions to outdated statements	**2005 (10)** They all reflect “old-fashioned” prejudices towards women’s roles. These perceptions are still prevalent in some circles today; All these statements are one-sided; The questions are out-dated and ridiculous for 2005. I cannot imagine a modern woman or man in Canada responding differently than I have, so nothing new can be learned; These are the most obnoxious statements! I agree in part with parts of each; These statements are pretty loaded. I would assume that ALL mentors would disagree with these. Will these be compared against non-mentors?; The above comments are a little extreme; I think many professional women would have a hard time determining why the above mentioned comments are pertinent, myself included; These questions are very extreme; I think these questions may be a little dated; These questions are misleading and the results difficult to analyze; The above statements are archaic; Ridiculous! We can have it all!
	2006 (4) They are a little out-of-date with today’s current professional climate of 2 working parents on average per household; Does anyone agree with them?; They are a bit ridiculous! As an engineer and mentor, I find these degrading to women; really is the best you can do to determine attitudes
	2007 (9) Very retro questions, why?; Drastic statements; Are these questions necessary, since I have pursued a career in science, obviously career is important. Question E is an obvious strongly disagree; I think we have moved past this era; I believe it is unfortunate that these

	stereotypes even exist; Very old fashioned statements there!; These statements seem to come from a previous generation; These attitudes may not necessarily be relevant to modern society but as a woman in science and a wife / mother. I do think that the opposite is also not accurate; Are the answers to the above comments used to selectively 'eliminate' mentors in the future (if deemed inappropriate)
characteristics (science interest & aptitude)	**2005 (1)** depends on her interests
	2006 (0)
	2007 (1) some women make excellent bosses. But women need to learn how to manage personal issues they face when becoming / are in a position of leadership and separate than factual, appropriate decision making
other	**2005 (0)**
	2006 (1) Perhaps mentors could be informed that an 'ice breaker' activity would be worthwhile as a start
	2007 (0)

Factors Influencing Science Retention

Themes	**Public Sector Statements**
science interest & ability	**2005 (2)** I like science; You can do whatever you want
	2006 (4) I do what I feel is right for me; I will do what my instinct tells me to do, not what other people want me to do; science is fun and you get to learn about so many different things; I'll become a vet because I want to, no one's going to tell me not to
	2007 (3) I enjoy science; I believe that I want to get a science-related career because sciences affect the world a lot such as health, space, etc.; I want to help animals some way and marine biology seems to me the most interesting
impact of / recommendations for intervention efforts	**2005 (3)** My day with my mentor helped me very much on what kind of a career I want to have; Having a mentor really helped; There also should be more activities/programs to expose girls to different kinds of science
	2006 (1) Operation Minerva encouraged me to pursue science
	2007 (3) I enjoyed this experience; I think that this experience made me appreciate science more; Mentors would really help you decide what job you want.
societal influences (stereotypes, media, peer group)	**2005 (1)** I don't care what my friends want to do. If I want to have a science career, I will
	2006 (1) If I were not shown sciences in the media I would probably pursue them anyway. I'm not that concerned about what other people think I should do and like
	2007 (4) I believe that if my friends try to hold me back from doing a scientific job, they need to consider that it's something I am interested in not them; I think one of the major factors that influences decisions are friends. People get into peer pressure and choose things they don't want to do; No. I think you should do what you are passionate about no matter what people say; I think that the stereotype that 'men can only be scientists' has motivated me to pursue a

	career in science.
science learning (hands on, applied)	**2005 (3)** I think that the science teachers you have, and your experiences involving science greatly influence your decision; Girls need more encouragement both in and out of school; Science has to be interesting and a lot of hands on work which I like
	2006 (0)
	2007 (1) Your teacher (whether or not class is interesting).
parental / family influence	**2005 (1)** My Dad did very well in science when he was going and (he) teaches me some stuff, too
	2006 (0)
	2007 (0)
other	**2005 (0)**
	2006 (3) money; I think scientists get a lot of respect so I want to study science; science jobs / careers do not have to be for just men / or people who have never studied or experienced it often
	2007 (1) I'm not sure what I want to do as a career

Themes	**Catholic Sector Statements**
science interest & ability	**2005 (3)** Just do what you want to do in the future; My decision to pursue science is founded on my natural interest in science and school; Even though many things can influence my decision to pursue a career in science, I am my strongest influence
	2006 (7) personal interest and ability in science influence my dream to pursue science; Science plays a huge role in my life, science is involved in everyday things not just science class; be yourself and follow your own words and not others; Science is great; It depends on what your good at and what you like; I do what I want to; Science is a lot of fun you just have to give it a chance
	2007 (4) What I would have fun with; I'll do what I'm good at, and what makes me happy; I just like to work with animals; How much I enjoy science
impact of / recommendations for intervention efforts	**2005 (1)** I think these mentoring opportunities help encourage a decision to pursue science
	2006 (0)
	2007 (2) Encourage there should be more programs like this for camps and schools; I enjoyed this experience.
societal influences (stereotypes, media, peer group)	**2005 (3)** No, not unless people don't believe you can do it; The media shouldn't help you decide if you like a job or not because most of the time the media changes things i.e. lab rooms in media make it look all clean and sterilized (whereas) in real life it is not the way; Peers influence discouragingly to pursue science
	2006 (1) I feel strongly compelled to fight traditional sexist stereotypes
	2007 (0)
science learning (hands on, applied)	**2005 (0)**
	2006 (0)
	2007 (0)
Parental / Family	**2005 (0)**

Influence	**2006 (0)**
	2007 (0)
other	**2005 (0)**
	2006 (0)
	2007 (0)

Themes	**Alternative Sector Statements**
science interest & ability	**2005 (7)** There are many different reasons why I have chosen to have a career in science; Choose what YOU want; No one should be able to make my decisions for me; I just love science and find it very interesting; I think being interested in science; The more you like science the more likely you are to get a career in science; Nothing could persuade me not to do a science career
	2006 (4) It is mostly my interest in science; The biggest influence is myself; I like a challenge and will always rise to the occasion no matter how high the bar is set; personal principals
	2007 (5) No one will discourage me and talk me out of being a vet; I would say my decision to pursue science is my own. I'm influenced by my interest in science and my exposure to scientific related activities / material; I want to be successful in something interesting; It depends on what kind of person you are; It depends on how interested you are.
impact of / recommendations for intervention efforts	**2005 (0)**
	2006 (2) Role models have an enormous amount of influence on young teens today; Join a club of girls in science
	2007 (0)
societal influences (stereotypes, media, peer group)	**2005 (2)** People often tell me that I would do well in science, so that also affects my decision; Peers influence discouragingly to pursue science
	2006 (1) People who tell you that you will never make it because you are a girl. Don't let it discourage, make it your motivation
	2007 (0)
science learning (hands on, applied)	**2005 (2)** having mentors/teachers that make learning science fun is a factor that encourages the pursuit of science; I don't plan to pursue science very far but I do get support from teachers
	2006 (0)
	2007 (1) Again on E it depends on your teacher, right now my teacher can't answer any of my questions for science. Last year I loved my teacher and learnt a lot about science.
Parental / Family Influence	**2005 (0)**
	2006 (0)
	2007 (0)
other	**2005 (1)** Basically anything that relates to a good science career is a strong influence
	2006 (1) I think that lifestyle is a choice in any career
	2007 (1) On most of these factors there isn't really a strong or weak impact. I'm treated like a person by everyone I know and I've never been discouraged because of my gender.

Themes	Mentor Statements
science learning (hands on / applied)	**2005 (5)** Another factor is having support and encouragement from teachers, parents and peers. This is probably the most important factor: people believing in you and having confidence in your abilities; Guidance counsellors could have been influential, but they were not; Science experiments at home/in school that are hands-on at a young age (3-8yrs); I can remember 2 math teachers in Junior High who helped foster that ability (note: Junior High was 30+ years ago); I believe the main reason I became initially interested in a science career was due to its hands-on classroom participation in particular science projects/experiments
	2006 (6) discouraged: high school guidance counsellors; I had several science teachers that helped guide me; I was encouraged at my high school by a culture that respected academic achievement; I had a fantastic chemistry teacher in high school who believed in me which is probably why I chose chemical engineering; Not having to focus all my time on English and Social Studies classes; I graduated high school in 1975 and it was more of a struggle to take courses in Industrial Arts (highly discouraged), although math and biology were okay
	2007 (4) My grade 12 teacher made all the difference - prior to taking his geology class I was going to be a history major and perhaps join the RCMP; My guidance counsellor in high school encouraged me to pursue sciences because of my grades in math and science; Unfortunately I had no female science role model or any 'out of school' science experience. I see more opportunities for that today and I think its great. My influence came mostly from in class experiences with science, parents and my circle of friends; Help them relate their studies to everyday things.
parental / family influence	**2005 (7)** My father was an engineer technologist and got me super jobs within the field. I was closest to my father more than any one of my 3 brothers so naturally when someone suggested it to me it made sense, since I had exposure to it, especially within the family; My parents never guided me in a certain direction but my mother being a nurse did influence me towards medicine as a career; As before, it took me a while to decide. I worked at an Environmental Consulting firm for a year (break from university/school) and while there, I decided to be a Civil/Environmental Engineer. My father is also a civil engineer, so I had been exposed to what they do through him as well; I really enjoyed math and found it very easy. My parents thought that a career in engineering would be a good fit and directed me to people that I could talk to at their work who were engineers; My parents raised me with the belief I could do whatever I set my mind to, and to be all that I could be. Education was a priority in our household. My mom was a stay-at-home mum as we grew up, but when we were old enough, she returned to the teaching profession. I stayed home with my kids for 11 years and would never change my choice. I have been blessed to be able to return to an engineering career, and would encourage anyone not to trade off parenthood for a career; Sibling influence! Encouraged me to pursue biosciences; My father pursued a career in science and made an excellent role model;
	2006 (4) My parents and career counsellor discouraged me from taking engineering as they felt it would be too hard; Parents always supported and encouraged my interests, many of which they introduced to me (mainly through excellent science and nature documentaries); I think the influence from the families especially from my parents, is very important to me; Went into engineering mainly because he [father] was an engineer technologist and he was approving of my choice to go into engineering, my mother had little influence
	2007 (4) I grew up in a family of medial professionals (not veterinary thought), so I was encouraged

	to challenge myself with my career choice. University was an expectation - it was more of a question of "what" am I going to take at university; I think that more than your parents (i.e. your home environment) is a very large influence; Not sure how my parents managed this, but for some reason it didn't even occur to me that engineering would be a male dominated profession, or if it did, it did not bother me!; My parents did not encourage me to have a career in science but were very adamant on being successful. I was also around a lot of construction (working with my father). As a child and had 3 brothers and therefore felt more comfortable around guys than girls
science ability & interest	**2005 (9)** Serendipity and keeping an open mind are important when searching for the right career; A lot of scientific careers are not known/explained to high school students. I grew into my career by choosing to keep science as an option when I went to university, and only then decided to major in it; My decision to enter into sciences was based on an aptitude I had discovered. I excelled in these types of classes and became interested the more I learned; I had a natural aptitude for math and science; It was 100% interest that made me pursue my career. I had to work very hard in university. Nothing discouraged me; When I went to college (1983-86), I was the only female to graduate from our Process Control/Instrumentation Technologist Program. This was a motivator for me at that age – to be able to succeed as well as the guys in my class; I liked science and knew it; I am particularly interested and involved in science education and that is what drew me to my position; I was not out to prove anything but to do my job and this is why I am successful and have peer respect in my job
	2006 (2) encouraged: love of math; interest / passion in the environment
	2007 (6) I liked science, I was good at it and I appreciated the fact that it was all around; I think I was just born with a science personality; Science tends to be the career of choice for people or an inquisitive nature - and I would describe myself as being of that particular brand of people; I also had a natural desire to build / create and was very good at math, which a guidance counselor pointed out that I 'may like engineering'; Science and math are fun and build positive analytical skills that help one through life as well; Love for the outdoors - camping, hiking, wildlife. Hoping to make a difference.
impact of / recommendations of intervention efforts	**2005 (0)**
	2006 (1) A strong encouragement for me was taking part in a women in engineering day in grade 11. It really opened up my eyes to the possibilities.
	2007 (5) I think girls in grade 11 would benefit from something on these lines as they are right about to make their choice for post secondary; I did not have any women when I was growing up that I knew were in a career. Most of the moms stayed at home (farming community); I think showing girls that science is fun and exciting and not everyone involved in that type of career is a socially awkward nerd that spends all their time in a lab; I didn't really have a science / female mentor. I think a mentor would have had a strong influence if they would have been available to me; The desire to be strongly independent. Wanting a career that paid well and where grey area was not so popular. 'STARS' program convinced me to go into engineering and my mentor was excellent.
societal influences	**2005 (3)** Farley Mowat's books influence me to think of science as rewarding and fun!; A lot of people inspired me over the years, and it was more to do with people I knew or got to know than any media based influence; Times have changed even in the 10 years I've been working and there are much more powerful influences today than when I was in high school. Teens have a lot more to deal with – sex, drugs etc. and choosing a career can be the last thing on their mind
	2006 (2) Intimidating working environment: most of my male colleagues have a strong inner

	"matchoism" of which they are not aware of. Administration people in work places are usually discouraging if women have young children and tough work demands. At the U of C the working standards are set by men who do not devote much time and effort to help their wives; I grew up in Iran, and I feed the culture there is totally different. There if you know science and math you are cool
	2007 (0)
other	**2005 (1)** When I chose to obtain a PhD in organic chemistry, I thought that I would have a career where I made a high salary
	2006 (0)
	2007 (1) Expected it to be o.k. career and lifestyle and good compensation.

Recommendations for Science Retention Efforts

Themes	Public Sector Statements
recommendations for / impact of intervention efforts	**2005 (9)** Maybe show them the many fields of work related to science: Operation Minerva is a terrific program! Continue with it; Allow as many girls as possible to experience fun things that have to do with science and to let them meet women who genuinely enjoy their career in science; I would try to let more girls have a chance to be part of this; I would try to get even more students involved and our schools as well; More field trips like this one; This program helps! Career days and more shadowing opportunities help; More things like Operation Minerva. Emphasize it, show people what happens; Have more programs such as this one, to inform girls
	2006 (0)
	2007 (14) Operation Minerva, mentorship, learning about career opportunities; Continue such programs and get mentors from almost each field of cases; Keep doing this; You should keep doing the Operation Minerva program; Komex did a great job; Role models, show them what they can do in life; Give examples of famous women involved in scientific fields; They should do this more often. It will inspire more girls; I think you should keep doing what you're doing, its a good eventful day full of a lot of science; Continue Operation Minerva, it really helps; We should have a day like today every year starting in grade 8; Show them that science can be fun and that there are lots of women that have careers in science. It's not just men; show them the benefits of going into science careers; maybe explain verbally why it's so important
societal influences (stereotypes, media, peer group)	**2005 (1)** Commercials
	2006 (7) Don't follow what your peers are doing, do your own thing; Just do what you're interested in and what you're good at. If you love and are good at science, take a career in it; Keep a positive attitude and always try to succeed; Now a days its not just men as scientists but women as well. Its important to study science to show the guys that girls can do it too, even better; Follow what you believe in and don't let anybody stop you; Maybe make a commercial about girls getting good jobs as scientists; Give them opportunities. Kill sexist media shows. Show women they can do it
	2007 (4) Just encourage girls to forget about or break the stereotypes. Don't let people tell them what they can or can't do; I would tell them to listen to who they are and not get discouraged easily; Stop stereotyping, and let women be embraced; Show them through media
science learning (hands on, applied)	**2005 (4)** Give them more of a chance, an opportunity to experience what science can be like; I think that if science interests girls then we should give more opportunities for them to learn and

	participate more; Show them how much fun it can be; Create opportunities like camps on science
	2006 (5) hands on learning and experiments; Teach them about science. Explain to them how science is used in a daily life; I suggest that girls should take more science courses and try as many things as possible; To make science a more enjoyable classroom learning experience; show more interesting things and explain more
	2007 (4) experiment, figure out science in the world around you; Perhaps make science more interesting for girls and having it appeal more to earlier generations; I think if we relate it to everyday life it will interest girls more. This is the reason why I am interested; Make the school curriculum more interesting
science interest & ability	**2005 (6)** To just go for what you want and get it; Just keep trying; Follow your dreams; That not only guys can do things with science; Girls can do just as much as men can; I think girls could fill out a survey to show what they're interested in
	2006 (7) One with no interest in science must not be forced to study against their will. It may work to show them practical applications of scientific theories; not really, girls can pursue anything they want; They should chose science courses that they are good at and that they enjoy learning; I think girls should do whatever they're interested in; If you want to go into science, go ahead, but if you don't, don't. It's your decision; If you want to do something in science, do it. Don't let others stop you. But you have to love and enjoy what you are doing and remember to keep your options open; It's like any other thing out there. It's a lot of mindset as well
	2007 (2) Do the best you can all through school!; Women have power
other	**2005 (0)**
	2006 (1) I think if you keep supplying the jobs we will keep filling them
	2007 (0)

Themes	Catholic Sector Statements
recommendation for / impact of intervention efforts	**2005 (9)** Maybe have a presentation like a video showing all the jobs women do today; Expose more girls to the idea that scientific jobs aren't just for men; Mentors should be successful and happy with their job, show them all career possibilities, make it interesting; I think that mentoring opportunities should be available; Programs like these are very encouraging and the promotion of them is very important; I think it is a great experience. I think to continue this program would greatly encourage girls with science pursuits; Go to Operation Minerva; Keep up the great experiences with Operation Minerva; To be interested in going into Operation Minerva; Do more things like Operation Minerva
	2006 (10) No just keep doing what this program is doing. Because I found it very educating. I had a lot more fun than I thought I would; Offering out of class experiences (i.e. Operation Minerva) would I believe encourage many girls to continue pursuing science; Offer many different options to learn about scientific careers; Money is very good in science industries. There are also many opportunities for a career, not just a job. Science is a life time job; Keep doing this awesome program; explain how much fun some science related jobs are and that you get a good pay from it; I think seminars like Operation Minerva are very good for encouraging this pursuit, and also discouraging stereotypes about women in science; more trips like this; this sort of thing was good, introducing us to real life situations; Get them to be a scientist for a day

	2007 (10) More programs like Operation Minerva; today was fun! Taught me a lot of things!; More job shadowing experiences; More opportunities like Operation Minerva; I think there should be more opportunities like this one that girls can take part in; I think Operation Minerva is doing a great job; I believe that Operation Minerva is a great way of introducing and encouraging girls to the science / scientific area of careers; More mentoring programs; Listen to people who have science-related jobs; Show them that there are lots of different careers in science
societal influences (stereotypes, media, peer group)	**2005 (4)** Do things you want to do, follow your dreams and heart, don't be influenced by others; Follow your heart and do what you want to do, not what someone else says you can do; Never let guys put you down; Let girls know that they can do whatever they want. They don't have to follow anyone
	2006 (1) follow your dreams and don't let stereotypes affect what you want to do as a career in sciences
	2007 (8) Don't think that men are the only people that are smart; Be your own person and don't just go with the flow, however, going against it isn't the best choice either; Girls / women are all able just put your mind to it; Just because they're a girl doesn't mean they have to do something 'girly'; Let them know that not only men can do science related stuff; Stop with the stereotypes; Yes, men aren't the only people that can be involved in science careers; Media doesn't show just men in these jobs
science learning (hands on, applied)	**2005 (1)** do more hands-on stuff
	2006 (4) encourage girls by making science classes more fun; To show them that it's not all boring, you can have fun if that's what you make it out to be; That it's a great thing to learn; study more
	2007 (2) more activities related to the subject; Teach students that science is fun
science interest & ability	**2005 (5)** Believe in yourself, do what you've got to do, never give up on your dreams and desires no matter what!; If you love it and are good at it try it out and see if it is truly what you wish to do; Follow your dreams; Try hard, work hard; See what interests girls in science (mine is the human body)
	2006 (12) Know girls can do anything they set their mind to; girls can do anything they put their mind to no matter what; you may find a job that your really like; follow your dreams, and stick with the things that influence you or you like; make sure you enjoy it. And if there are things you don't understand, trying something new won't kill you; Just follow your dreams. Do something that your interested in and don't do things that you can't do; always give something a try before you say you don't like it; follow your mind; Science is so much fun. Always be open for more ideas; Just follow your heart and follow what you want. Do what's best, science is for anyone; I think that all people should be happy with what they are going to do everyday; science is fun
	2007 (8) Do what you dream to do!; Don't give up!; Go with your dream!; There are so many science opportunities for girls - just go for it; Don't depend on other people, and go with whatever you feel comfortable with; If girls are really interested in science people should give them a chance to show it and make something out of it; If you like science, then you should do something related; How about doing a survey on what girls want to do
other	**2005 (0)**
	2006 (0)
	2007 (0)

Themes	Alternative Sector Statements
recommendation for / impact of intervention efforts	**2005 (7)** My school would love to get a volunteer from Operation Minerva to talk to our class; Offer science teachers that are female or team up students with a university student that takes science; I believe that if girls watch other women do these scientific pursuits, then it encourages other girls to do these pursuits; Keep Operation Minerva ALIVE!; More programs like Operation Minerva; More of these kind of programs everywhere; Go to this program and if you're not in to science, apprentice to someone who is in it, you'll most likely change your mind; Hold more opportunities like this to show girls out there what opportunities science holds for them Keep doing programs like Operation Minerva
	2006 (0)
	2007 (0)
societal influences (stereotypes, media, peer group)	**2005 (5)** Follow your dreams and don't listen to stereotypes; If you enjoy science then find a career in it; If you do a good job in science then go for the top; All I can really say is tell them to reach for their dreams and that they can be anything that they want to do; Tell girls not to let guys bring them down; I also think television programs like CSI (Crime Scene Investigation) encourage pursuit in science because they show all the cool awesome things about science and what neat things you can do with a background in science
	2006 (0)
	2007 (0)
science learning (hands on, applied)	**2005 (6)** I think fun resources and fun-loving teachers encourage girls to continue in science. When things like science can be fun, people are normally interested in them; Introduce them to science with something they can relate to; Get them to develop an interest; If science is also made to be interesting, then it really encourages girls to look into scientific pursuits; If girls are given more opportunities to discover that science is interesting, not just a mandatory school subject, they would be more interested in science careers; make classes more fun and hands-on; Be more knowledgeable about the sciences and be encouraged more
	2006 (0)
	2007 (0)
science interest & ability	**2005 (3)** Any woman can become anything they want whether it's science-related or anything, they just have to put their minds to it; If they like it, it's a good way to go; Be more knowledgeable about the sciences and be encouraged more
	2006 (0)
	2007 (0)
other	**2005 (0)**
	2006 (0)
	2007 (0)

Themes	Mentor Statements
recommendations / impact of intervention efforts	**2005 (10)** Find a female mentor. Visit them regularly; Have presentations at school by women in science-related fields - what they do day to day, schooling required, rewards of their job etc. I also think it would be helpful for these girls to realize careers and family are not exclusive of each other. You can do both successfully. My biggest role model as a teenager was an environmentalist who was a wonderful mother and wife. My career makes me feel smart and valued, my family makes me feel loved and cared for, both of these are essential to my well-being and balance out a healthy me; If there was a way to tone down the "geek" factor associated with science and math; I think exposing them to the variety of interesting careers out there is the best way. For example, it seems nowadays there are a lot of girls who want to be forensic scientists and this is because

	they've heard of it on shows like CSI etc. If there was a way to showcase more careers like this it would likely stimulate their interest;; Having science clubs or groups helps create a support network; Educate them about the non-traditional science careers as well e.g. wildlife ecologists, soil scientists. They should also be encouraged to take a break and do something after school for a bit; Role modeling to very young (<5) girls AND boys, improve image of women in science (fun, fashionable, modern career women vs. science fair geeks – girls seem to mind being geeks more than boys; Exposure to the possibility like with OM is great; educating educators so that girls or boys aren't discouraged; perhaps encourage more younger people to be mentors – maybe kids would relate better; I think that having the ability to job shadow a woman in science is an excellent way; Emphasize the different opportunities that the sciences open up. For example, as a chemical engineer, there are various roles one could take on i.e. research, technical, management; I think that the best influence is whether the mentor enjoys their job. Kids pick up on that right away. It is also good to challenge them. I get them thinking on their own. Also, to tap into the aspects of the mentors job that are interesting and exciting. The mundane stuff like data entry is a part of almost any job, but it is the exciting stuff that inspires all of us;
	2006 (11) Find a mentor to grow with; I believe programs like Operation Minerva, Sciber Mentor, summer camps, and the many other outreach initiatives which expose girls to women already in these scientific / technical fields is a great way to encourage the girls. Role models and mentors go a long way in giving a person a sense of what is 'normal'; Support groups among students and professionals and push for opportunities for part time positions which permit work-life balance so women don't feel faced with an "either / or" scenario; Role models and mentors statistically have a large (huge) influence on children; I think programs like Minerva and maybe having females from industry go to the schools to show young girls that there are lots of opportunities out there; Keep them connected through mentoring program like this. Exposure to different speakers and access to different mentoring networks, inspiring and innovative teachers and mentors; Operation Minerva is a very good idea; I think we should start from when the girls are very young (pre-school); To encourage schools to identify the middle-range students. Sometimes we mentor those that will definitely go to university where others are missed. We need to get information to more mentors too, through Apegga maybe; I think we need to encourage all young people to consider science. I worry that only selecting girls will create a negative impression. On the other hand, this type of mentoring is the way to encourage them – the message does get through; The more aware they are of the many options out there for them, the easier it will be to find something they enjoy and excel in
	2007 (8) Continue to give girls the opportunity to see real jobs in science and make it fun; More activities like this where more girls are able to attend; Things like Operation Minerva are great because they open the door to girls to at least see the range of possibilities that are open to them; Positive role models; Any career has to do with ability and hard work as well as dedication. Girls should be encouraged to think that they can succeed in anything based on these abilities rather than gender; Continue with programs like this. Although my career is more 'math' focused. A strong background in science has taught me a way to approach problems that I use every day. Girls need to realize through interaction and demonstration that science doesn't necessarily mean 'scientist', further it means a whole host of opportunities; Mentor programs throughout school. We just need to catch them at a time when they are listening and interested; I have done this for 3 years in a row. I find that many of the girls who participate in the class are chosen because they have good grades. Additionally, a few girls have parents that are both in high-level science related careers. I feel the girls who have parents with a high status job (and therefore more income per household) are much more likely to get better post-secondary education and be pushed more to have a good career. My only comment is, perhaps it should be girls who are less fortunate who should be participating in Operation Minerva. I find that, generally speaking, it is the people who have the better grades and come from 'better'

	families who get the most attention from their teachers because it is easier to talk / deal with them
science learning (hands on, applied)	**2005 (6)** Exposure to other careers through restoring strong science programs in schools with lots of hands-on and enrichment pursuits, visits to work places; Continue to expose women/girls to science. Ensure quality science and math teachers; Positive encouragement in the classroom; Look into various methods of teaching math and science. Not one method works for everyone. Highly discourage Junior High teachers from making discouraging comments that kids take with them for a lifetime; School curriculum could do a better job of identifying careers. Most kids can identify with a doctor but have no idea that engineers exist; Hands-on experiments/projects in the classroom make it more fun to learn science and therefore, makes it a fun subject. Divided school systems boys/girls make it easier to learn i.e. there are less distractions. As well, by dividing sexes during early education (Junior High) it makes it easier for girls in particular to express themselves in ways they might not if there were boys present;
	2006 (7) Vivid curiosity: ask many questions and once these questions are answered, apply these answers and try to understand phenomena and process based on your own logic; field trips to a well site, science centre, and Calaway Park (many physics problems to be solved); Hands on, more excitement re: experiments, real life scenarios where science plays a key role – medicine, construction, etc – to see it in action; Encourage them to pursue their interests: focus on the interesting factors rather than basic tools. A program to help eliminate mathphobia might be useful; First they should know what science is, it is boring to work with theories and labs if you have no interest at all. Second, they should know whether they have proper intellectual abilities to do some work with science; Keep demonstrating that creativity, varied interests and non math/science skills still are valued / vital in the pursuit of science careers; Utilize the resources you have in your backyard, rural schools as well
	2007 (9) Encourage them to take all of their sciences at high school, so they have more choices when they are in university. As you mature, you find yourself being interested in different things. I think more co-op type programs at the undergraduate level will allow for more hands on experiences. Encouraging girls to volunteer and increasing the number of volunteer positions available for high school students; Good teachers, exposure to industry; Do anything you can to stay engaged in the parts of science that you enjoy (e.g. read books, magazines, do science fairs, etc.); Let girls do what they like. Science is challenging just as any other field but it has impacts on everything you do everyday. Hands on learning; Ongoing exposure to science, improved quality of teaching; including teachers that are enthusiastic; Help them relate their studies to everyday things. Help them realize that science and engineering is going on around them right now even though they may not realize it; Relate academia to life and help individuals recognize the impact science has towards society in past, present and future' in-school professional days with coached professionals
societal influences	**2005 (6)** Let them know that science/engineering are not only roles for men. I believe that in some families, they treat their children (girls) as if their main goal is to find a man who can support them monetarily and emotionally. Girls need to know how to be independent and not depend on their husbands. Even I admit that having a man who is smarter and more ambitious is important to me, this is because I was raised to believe this. Even though I am a successful woman, there is a part of me that feels somewhat dependent on him (also a learned behaviour). I can even remember in high school (and probably still now) hiding my intelligence because "girls aren't supposed to be smarter than guys". I guess what I am trying to say is everything a girl learns is environmental i.e. the way they were raised and how society treats girls; Let them know that they are perfectly capable of being

	successful and that they can have a career and a family; Show them that continuing with science does not mean choosing against being a wife and mother; show them the feminine side; do not make it a "boy vs. girl" issue, but a career choice issue; More TV shows, movies etc… cool magazines etc that show women in these roles and exciting scientific developments. I think the media is a huge influence – need more visible examples of science/math in "real life"; Don't let anyone tell you that you can't do anything; don't pursue a position with a chip on your shoulder, do your job because you are good at it; They can be successful at science and still have families, pursue artistic talents etc.., women bring a much needed perspective to science (the null hypothesis has shades of grey!)
	2006 (0)
	2007 (0)
science interest & ability	**2005 (1)** Follow what you enjoy doing. You'll never know if like something unless you try it;
	2006 (0)
	2007 (3) Show them the end result. They need to know what they are working towards in order to be focused; As mentioned before, allow more girls the opportunity to see what's out there, if they can't try it out themselves, the program could adapt to bring people to the girls; If possible, try to get involved (volunteer) in a lab (even during high school)... even if it may be washing some beakers or some other routine task... you are being exposed to a science environment.

Additional Comments

Themes	Public Sector Statements
positive impact of Operation Minerva experience	**2005 (8)** Thanks for letting me take part in this awesome opportunity; Operation Minerva is a very helpful program. I think it really helps to motivate girls to show interest in scientific careers. It is also a fun way to experience new things and to meet some very interesting careers; I had a wonderful time today. It was an amazing experience; Operation Minerva was a great experience. Thank you; I had fun; I would like to have another opportunity to participate in these types of activities. I really enjoyed experiencing this job shadowing day; None… except… it was great!; It was a really great experience overall. Thank you Good experience. Well planned; Thank you for a great day. I know that I learned a lot about my future and am planning now
	2006 (17) It was an incredible day, the food was good, our mentors were awesome, we got lots of stuff, and we learned a lot. It was so much fun!; thank you for creating Operation Minerva; lots of fun! I would do it again if I had the chance. Thank you very much; Maybe do this program in other grades rather than 8; Overall I feel that the Operation Minerva program was organized very well; Operation Minerva is an amazing idea. I trying encouraged me to follow what I want to be when I grow up; This event was such an awesome experience to me and I thank Operation Minerva for this awesome opportunity that allowed me to open my choices to different kinds of scientific jobs. I enjoyed it A LOT!; I loved Operation Minerva and I think it has helped me a lot. It has opened up many new doors for me. Thank you!; It was great!; Operation Minerva has helped me to pursue a science career; This program rocks! I hope to see a program like this again; this was fun; The Operation Minerva experience did encourage me to think more about science; it was an awesome once in a lifetime experience; Operation Minerva was fun!; Operation Minerva was a great experience. I made new friends and learned about scientific jobs. It was lots of fun and I recommend it to all girls. Thank you!; I had a lot of fun learning all this new stuff

	2007 (14) I liked my mentors and their jobs; Thanks a lot! I loved it! The lunch was excellent; I had a great time. And this here and now starts my journey to become what I really want to be. Thank you; It was a great experience; Operation Minerva is fun and educational; This is great and I hope this program goes on; Very fun, friendly, nice ways of teaching; Today was an awesome day!! I enjoyed almost every moment. The mentors were really nice; Operation Minerva is really beneficial and a fun experience and also helps to show people that women can do everything!; My mentors were great and I had fun. I will encourage more girls from my school to join; I had tons of fun even though I was by myself; it was a lot of fun; Thank you for everything Operation Minerva. I had a wonderful time. Thanks a lot again I hope I get another chance of doing this next year; That way the best day ever!
recommendations for Operation Minerva improvements	**2005 (1)** I would like it more hands on, and make some of our groups smaller; It could be longer
	2006 (0)
	2007 (0)
societal influences	**2005 (0)**
	2006 (0)
	2007 (0)
science learning (hands on, applied)	**2005 (0)**
	2006 (0)
	2007 (0)
science interest & ability	**2005 (0)**
	2006 (1) I think that it's not 'nerdy' to learn science or be smart in a subject.
	2007 (0)
other	**2005 (0)**
	2006 (0)
	2007 (0)

Themes	**Catholic Sector Statements**
positive impact of Operation Minerva experience	**2005 (12)** I really enjoyed my Minerva experience and recommend it to younger girls; This for me was a once-in-a-lifetime opportunity and I'm grateful that I got to participate. I had a great learning experience; I enjoyed finding out that so many women have scientific careers in such a male-oriented world; This is a great program!!! And I wish more girls would/could experience it because a lot of times they don't want to because science isn't considered "cool". Getting to know mentors really helps; I had an EXTREMELY wonderful time here and I have to say today made a HUGE impact on my opinions on careers in science for women, and what I may think about doing when I grow up; No, everything was great and fun; Thank you for the experience; I really liked the entire experience. It gave me a whole range of ideas for my later job. I am considering science even more now; The mentors were awesome; I had a great time, today; I think it was a good experience to be in and I recommend to girls that they can do anything boys can do, especially in science; It was fun and informative; It was fun. I would LOVE to do it again
	2006 (14) Thank you to Operation Minerva for offering me a day of inspiration and enlightenment; Thank you for the experience. I thought that my mentors where helpful and educational. I am definitely considering a science-field job more seriously now; I had a lot of fun, please keep this program; I thought that this experience was great, everyone that has the chance should take it. I learned so much and it really opened my eyes to more science jobs; I had a lot of fun, an unforgettable experience; this was a great experience and it

	gave me a lot of insight for a possible future career; I thought this was a great experience and recommend it to anyone; I thought Operation Minerva was very successful and enjoyable. Thank you to all the planners as this day must have been a lot of work. I appreciate it!; so much fun!! great opportunity; This was an amazing experience. Thank you for everything; This was an amazing experience; The day was fun; I had lots of fun; This is was a good day and very educational. I might be interested in that kind of thing when I grow up
	2007 (9) I think that Operation Minerva is great because it gives girls a chance to know more about different careers; I love this program! I wish I could take it again next year. In the same group though but if it isn't, I would love to try new groups to learn more things; I had fun and would want to do it again; It was a great experience; I think Operation Minerva is a great idea and there should be more opportunities like it; Thank you for everything I had a great day; No, keep at what you're doing; I really enjoyed this program!; Overall, Operation Minerva was a very interesting and fun experience;
recommendations for Operation Minerva improvements	**2005 (3)** Could there be a Psychiatrist mentor?; I think Operation Minerva should be offered at older ages, too, like Grade 11; When girls are chosen to go with whomever their mentor is, they should have a say in who they want to go with
	2006 (2) you should try to put girls with mentors in fields they want to be in, not just random; if there were more hands on and actual work instead of just presentations. I think it would be far more enjoyable
	2007 (0)
societal influences	**2005 (0)**
	2006 (0)
	2007 (0)
science learning (hands on, applied)	**2005 (0)**
	2006 (0)
	2007 (0)
science interest & ability	**2005 (1)** Science is a great subject, everyone should partake in it!
	2006 (0)
	2007 (0)
other	**2005 (0)**
	2006 (0)
	2007 (0)

Themes	**Alternative Sector Statements**
positive impact of Operation Minerva experience	**2005 (15)** Today was very fun; Today was a really interesting day and I really enjoyed it. I am now more open minded to different types of careers because of Operation Minerva; I had a really great time; Operation Minerva is a good idea! Job shadowing is a great way for people to learn. It draws attention to the career possibilities in science; I enjoyed Operation Minerva; It was a really great experience. Thanks; I thought this was a very fun, interesting, thought provoking day. I hope you continue to organize days like these in the future; It was a great day; Julie Johnson from Burlington resources ROX MY SOX OFF; The experience was wonderful; had a lot of fun today and I hope that you keep this program going for many years to come; fun; This experience was very good for me, as it opened my range in seeing what I might do for a career. Because of this, I believe that this type of job shadowing should also be open in other subjects, such as Math or Social; It was lots of fun!!; Fantastic, a really good idea and I'm sad I could only do it once!; Today was a great opportunity! I wish I could do it again

	2006 (12) This was a great experience; This was a great experience and I would love to do it again, It should be offered for more than just grade 8; This was an amazing experience and I think you should offer it again in another grade; It was a great day and lots of fun; If you allowed more girls to go they would realize what a wonderful opportunity this was; Very good; I enjoyed today. I think people participating in Operation Minerva should get more of a say in which mentor they shadow. I think that would be more beneficial; I had lots of fun; Today was really fun, I learned a lot of things that I didn't know before; I had a lot of fun! I would definitely do it again!; You really should keep up this program because I think it gave me the extra push it needed to consider a career in the field of science; I thought that this was a very interesting experience and I learned a lot
	2007 (15) Thank you for this wonderful opportunity; I really enjoyed myself and I think this has encouraged me to do what I want in life (science career); It was fun; This is a really wonderful program. I am very, very thankful that I could participate in this! Thank you to all the volunteers in making this possible!; This was a great day and I wish I could do it again; My experience today with an audiologist was very much enjoyed and appreciated. I was exposed to an area of science I once believed to be somewhat tedious to study. The audiologist I was with completely altered my options about set topic; I love it. Thank you!; It was fun; I loved it! Thank you so much; I loved it. Science will be good to take in college / university; Really enjoyed everything. Thanks a lot; Operation Minerva was a wonderful experience and I hope that the program continues for a long time; This was fun. Thank you; I really enjoyed doing this a lot and I learned a lot and enhanced my previous knowledge of science. I also liked all the free gifts we got; I'm very glad to have had this opportunity of working with all the amazing people. Thank you!
recommendations for Operation Minerva improvements	**2005 (3)** You guys should do a one week program and each day we go to a different place, that way we could have a choice. What if one girl went to a place she really didn't like, she could be turned off science. Maybe you could make girls write essays or put down what we won't do; I think that Operation Minerva should also be for boys. I do not know if there are any organizations like this for boys, so if Operation Minerva cannot open it to boys, try to make it known that there should be one. Boys have just as much right as girls have to enjoy this kind of experience; I think that more students should be able to try this experience and it should be offered to more ages. They should also try to encourage girls to take math classes and other fields. It is really fun, it should last longer
	2006 (1) You really should let the girls choose what career to job shadow. Otherwise you get really bored and it drives you away from science. If it's something you love, you'll keep at it
	2007 (0)
societal influences (stereotypes, media, peer group)	**2005 (2)** Women shouldn't do something because someone tells them they aren't good enough or can't handle it. I think that if you want to do something, you can!; I don't think the traditional "scientists are men" stereotype even exists anymore. I had never even heard of it before this questionnaire
	2006 (0)
	2007 (2) Women can do whatever men can do!; Yes, if you're a man or a woman, it doesn't really matter.
science learning (hands on, applied)	**2005 (0)**
	2006 (0)
	2007 (0)
science interest &	**2005 (0)**

ability	**2006 (1)** Science is an individual interest. If someone truly likes science, they will pursue a career in it. If not, then they shouldn't be pressured to do something in it
	2007 (0)
other	**2005 (0)**
	2006 (0)
	2007 (0)

Themes	**Mentor Statements**
science learning (hands on, applied)	**2005 (3)** Make science fun for kids. Science labs and demonstrations appeal to those of us who are more visual; My classmates have never made me feel like less of a scientist because I am a girl, and that is an important message for young girls, too. The mentality is definitely changing in younger generations about gender differences and limitations; Perhaps if classrooms held regular "career" days or "guest speaker" days at early years, it would give the children more to think about for options
	2006 (0)
	2007 (1) Involving the girls directly in activities was better and keeping their attention and interest then showing or talking to them.
positive impact of OM experience	**2005 (6)** I think this program is fantastic. It will work, as long as the girls have a good experience. I wish I had done this when I was their age. Perhaps I would have spent less time and money in university trying to figure out what I wanted to do; I think that the Minerva program is an excellent idea and I'm sure that it can be a great experience for the mentors and students; I think that the Operation Minerva program is a very good way to expose young women to science. My field has many women, so it may be interesting to them to see how many women choose a career in science; It was a great experience!; I think this program is great; This is a great program and I hope it continues long into the future;
	2006 (2) Operation Minerva should involve MORE girls as well as their teachers, male or female!; OM was great fun! The girls were very keen and intelligent and asked good questions. I'm a recent graduate and my classes were 50/50 male to female. Seems that we're doing something right
	2007 (3) I am glad this exists and I hope my daughter can participate in the future; This is the first time I ever heard of Operation Minerva and I think it's a wonderful program. I will definitely be volunteering again next year; Thanks for doing a great job
societal influences	**2005 (2)** Rampant feminism has done more to turn off girls in science. There is a belief that you need to choose either career or motherhood. Life is full of trade-offs. If one is motivated, one can find a way to fit all of the "important" things in! Also, some of the worst things for women in science have been to promote token women just to fill a quota. "Consider life as 5 balls….. You name them work, family, health, friends, God. You juggle them. Work is a rubber ball, and will always bounce if dropped. But family and friends are made of glass and will be irreparably damaged if dropped. Therefore, always seek a balance in your life" ; Unfortunately, I believe the majority of influence on career choice comes from the parents – this is somewhat unfortunate for some children.
	2006 (2) My father was an engineer, my mother a technician (until the kids came along), so although I knew there were not many women in engineering, it never occurred to me that it was a strange thing to do, or that girls were dissuaded because it wasn't 'normal' for girls to do; I really think schools can utilize their resources here to influence kids to pursue science and to stay in school. Let APEGGA take a role in making that happen as part of the

	professional development of their members
	2007 (1) Your literature suggested the girls would be concerns about balance in work-life. For the last 2 years I have heard more about immediate issues related to friends / social interactions / behaviours.
science interest & ability	**2005 (0)**
	2006 (0)
	2007 (0)
recommendations for OM improvements	**2005 (2)** However, I feel that there needs to be changes to the Petro-Canada program. If the program is set up the same way next year, then I would not be inclined to volunteer; My only other comment is that I think that all young scientists, both boys and girls, could benefit from seeing what kind of jobs there are out there. I understand that it may be a bit more of a struggle for girls, but for me, it was not a struggle.
	2006 (2) I am concerned that only one girl per school was chosen, most likely someone who was already on track to consider a career in science. If we open the opportunities up to the more 'at risk' students, we may have more of an impact; It's a great program, it is just little known. We had one woman in our company who knew of it, through her dentist of all people. There is no communication or advertising to companies (professionals) to get interest and have women volunteer as mentors
	2007 (2) Let the girls pick where they want to go for the day; Perhaps have girls who are not really interested in science participate in Operation Minerva. Maybe this will help to change their mind.
other	**2005 (3)** If you have any additional questions about the survey, I would be happy to answer more or if you would like help I would also be happy to do so, differences in gender has always been something that has interested me; I think it is important to do this research and gain further understanding of young women and science. We need to understand their obstacles, influences, pressures and daily life issues. It's important to help educate young people and help them develop confidence to make decisions in their lives; Although I am very positive when interacting with the 8th graders, it is becoming more difficult to be positive knowing that I have so much science education and I can't find a career in Calgary that can use my skills and be compensated accordingly;
	2006 (0)
	2007 (0)

Additional Mentor Comments

What attracted you to becoming a mentor?

Themes	Mentor Statements
opportunity to encourage girls / promote science	**2005 (20)** Having the ability to broaden these students' minds and the whole field of science; Feel there is a need to give young females exposure to sciences, some young girls may feel discouraged about educating themselves in science; Exposing young students to science; Being able to show girls that science careers can be fun; I believe it is important to show others, young people in particular, what basic research scientists do on a typical day; When I graduated from high school in my first three years of university, I didn't know what I wanted to be. I was presented with the main stream jobs (teacher, nurse, doctor) but had not been exposed to other types of jobs. I wanted to share my experience with other girls; I love spending time with children and promoting women and science. I want young

	girls to know that they are more than capable and I feel that I have the enthusiasm to convey this message; The opportunity to contribute and to support women interested in a career in science; I'd like to encourage all youth, regardless of gender to consider technical careers and to maximize their options; I love science and have been involved in promoting science since my undergraduate days. When I moved to Calgary and heard about OM it was natural to get involved; I like being a role model for young women and enjoy exposing them to a career in science; Introducing young women to scientific/medical fields; The opportunity to share experience with young women, which I would have appreciated at that stage; The opportunity to inspire others to enter into a career path that I love!; I truly believe girls in Junior High need to be aware of what is available when you stick with math and sciences; I want to ensure young girls know their options in choosing a career; I liked the idea of exposing young girls to new opportunities; The possibility of enriching a young woman's life and the chance to encourage her continued interest in science; I have three teenagers, two of them daughters; I became interested as I have a daughter in Grade 3 and talk to her about all kinds of future career opportunities. She excels in Math and is becoming keener about science
	2006 (16) Providing an example to junior girl; I am still shocked and often amazed at the experiences others have had, particularly as females, and want to do whatever I can to help women and girls with the confidence to overcome the ignorance and short-sightedness of some other people; The variety of wonderful things we make in our professional field, so little known by the community and the opportunity to meet grade 8 girls and share with them; Trying to help females finding the type of jobs they like; The desire to help educate young people and broaden their horizons; demand for positive influence for today's youth; It was a chance to teach and inspire hopefully (at least one) grade 8 girl; It's an excellent opportunity for the students; show kids the usefulness of science; I have a 10 year old daughter and hope to keep her enthusiasm for math and sciences ongoing and can see the need for other girls, who may not have a math/science based role model; The desire to share my love of geology; Introduce the girls that engineering is interesting, share with them my experience; The knowledge that I could influence somebody's decision to enter a science's field of study; I feel it is important that girls stick with science and math to have options later in life; The desire to give back to emerging young scientists. Participate in a manner to broaden their horizons and share enthusiasm; Feel that young women should be encouraged to join the engineering field and not be afraid
	2007 (16) Helping more girls get better paying and more rewarding careers; I am happy to volunteer my time to help educate young women on futures in science; Help a friend (organizer) and expose the young girls to the vet industry; I like the idea of women being in non-traditional roles; Provide girls with seeing other women in interesting, exciting careers; I attended an all girls school and I have always been involved with tutoring and mentoring younger girls. It was a no-brainer when I heard of this; I enjoy science and want to expose young girls to this fascinating area so that they know it is an option; Involvement of my office. My love of science and wanting to share that; I like helping people understand topics that I know. It is a nice change from regular activity; I like to help girls with opportunities that I never had; The opportunity to mentor young girls towards a career in science; want more women in the engineering and science related fields; I believe mentors can make a difference. I believe I have good qualities to pass on to others. I worry that women like Paris Hilton are influencing youth now; I love science / my professional of medicine and want to share my passion; Belief in encouraging further education in young women; outreach of professionals to students
exposure to similar opportunity	**2005 (8)** I was once an OM Mentee and it made a difference to my life!; Co-worker handed me info. Remember job shadowing when I was young; I thought it would be a fun way to give back since I have been mentored by many wonderful women; It was as a result of a teacher of mine in high school that I chose my profession; I decided I would like to have an

	opportunity to influence another life as mine was; I wish this opportunity had been available to me; I never had the option; when I was young I never had a similar opportunity and would have jumped at the chance
	2006 (3) I wish this program was available when I was in grade 8; Made up for the boring experience I had on my grade 8 job shadow; having a mentor while growing up would've been a great idea
	2007 (2) I wish this program was available when I was in junior high; I participated in Operation Minerva when I was in grade 8. So I thought it would be a good experience; I was a part of a similar type of thing in university and loved it; I had this wonderful opportunity as well and felt obliged to return the opportunity to someone. I think it's important for young ladies to realize they need not to depend on someone else.
network with other mentors	**2005 (0)**
	2006 (1) chance to network with other mentors
	2007 (1) Improve connections
recruited to participate	**2005 (6)** A friend told me about the program and I thought it would be good to do; I was asked by a co-worker; My supervisor suggested it; Our company was participating; I was asked; A co-worker asked if I was interested
	2006 (1) A colleague asked me if I would be interested
	2007 (7) I was specifically contacted and asked to participate, it seemed like a neat idea; Confirmed by organizing committee; I am a graduate student and was encouraged by post docs in the lab to help out as a mentor; I was approached by the coordinator in the office and it sounded like a great opportunity and a wonderful course; Rhonda Normore is a personal friend and I thought it sounded like a good project
rewarding / opportunity to volunteer	**2005 (0)**
	2006 (4) chance to give back; Helping girls to see sciences can be exiting; Opportunity to give back; Fun way to reach out to the community
	2007 (3) I have a daughter and I like to learn new ways to teach her and encourage her in life; I am trying to increase my volunteering hours and thought this was a great program to give a few hours to; Enjoy the feeling of contributing to especially

Did you enjoy having the students for the time period given?

Themes	**Mentor Statements**
enjoyed time with participants	**2005 (12)** I do believe that overall they enjoyed themselves. I was actually surprised how much one girl knew about reinforced concrete; The students enjoyed their day, which made me feel good; It was refreshing to see the interest as well as the innocence; They were lovely young women; They didn't talk much! Hard to get feedback from them – no questions, etc; The girls were nice and seemed to have a good time. I hope we challenged them enough. I noticed that they haven't quite developed their critical thinking. Early education should stress that more, I think; They seemed very interested and enjoyed their visit; It was interesting to look back on life at that young age. I was learning as they were; They had a couple of good questions but were a bit shy; Always! It's always a pleasure to meet these girls and find out what their dreams and aspirations are; I enjoyed

	it; It was a great experience
	2006 (10) The girls ask wonderful questions and help us realize how much they need to know about the part of life we specialize on and work for; Many of the girls were eager to learn and seemed quite excited to be with us; The girls were very engaged in the sessions and asked a lot of questions. It was fun to watch them learn and get excited about science; We had a group of 9 girls with 5 staff from our office – did role playing, etc.; Two engineers had two groups of three girls and we did a presentation on what engineers in the oil industry did, including pictures and real down hole equipment; We found the four girls to be inspiring, we appreciated their enthusiasm, interest, and appreciation; The girls I had were very outgoing and fun; Enlightening, stimulating, a feeling of giving and just plain fun; It was fun – the planning and the actual day itself. It's good to get in touch with issues kids deal with today; Mentors need to remember what attracted them to their science in the first place, the cool hands-on stuff
	2007 (7) I did not expect the girls to be so shy. I have minimal experience working / interacting with girls of this age group; Yes - the girls were so much fun. Extremely rewarding day; The four students were friendly and interested; It was lots of fun to show the girls there is so much available to them; I enjoy the challenge of presenting science to this audience; The students seemed very interested, friendly and a joy to talk to and tell them about what I do in the lab; Enjoyed spending time with her. Was fun trying to relate on her level.
amount of time	**2005 (2)** The time allotted was appropriate to participate in an average medical office work day; It makes for a long day for the youngsters. Should it be in fact a half-day?;
	2006 (2) Any longer would have been too much; Sometimes it seems way too short
	2007 (7) Time period was good. 9-9:30 is a good time to start. It gave us an opportunity in the morning to prepare for the girls arrival; We had rotations of 4 students every half an hour (for a total of 16 girls in two hours). I didn't think that was much time to get to know them; I noticed that some of the concepts that were introduced to the girls didn't sink in - more time needed perhaps or different topics; It was glad that a group of us took on the girls. That way we could all still go to required meetings and get our regular day routine completed (less disruption); This time was too short! They genuinely seem interested in geology and participated fully in the exercises; The length of time was appropriate for the age group (before they get too bored). It's always good to get this perspective of people outside the field (regardless of the age group); It is a good amount of time to include learning and informal discussions.
student / mentor grouping	**2005 (5)** We had 8 girls at our office and each mentor (6) gave a presentation about her area of expertise; We've arranged our program so students are only with individual mentors for 1 hour. A whole day with the same person makes it hard for either the student or mentor to find things to talk about; It's good to have two students so they can talk to each other and so they are comfortable; The time period was shared with a co-worker and perfect to let them learn about what we do without losing their attention span; My company keeps the 8 girls as a group and it works very well. The girls and mentors are much more comfortable as there is no pressure
	2006 (0)
	2007 (0)
challenges / recommendations for improvements	**2005 (6)** It was a little difficult to explain what a bridge engineer does; I found it very hard to gauge their enjoyment which makes it more difficult; They were quite shy so it made it a bit of a challenge to get them involved and engage them into a conversation; I do almost think they may get more out of presentation but they may tell you differently; The

	students did not seem very interested in my work; The event was NOT organized and was very frustrating for those involved. There were too many mentors for the number of students. The presentations were too long and not facilitated by the coordinator until it was too late. We were scrambling the entire time trying to fit all the events in because the G&G and land presentations were too long. The schedule was too optimistic and not enough time was allocated properly. We also did not have time for one-on-one with the children because the schedule was not followed. I think that there needs to be more coordination next year
	2006 (2) Tough crowd though; had five students – challenging to carry on with little feedback or perceived interest
	2007 (0)
other	**2005 (2)** Our program involved presentations with lots of props that helped explain what each different engineer did with drilling a well; They didn't have a lot of questions but could be drawn out when we did demonstrations and hands-on activities
	2006 (0)
	2007 (3) This setting was a bit overwhelming for them as we had a very busy clinic; All very shy girls must learn to network and develop positive social interaction with those they are unfamiliar with; I was the organizer of the event at Conoco Phillips.

What did you get out of participating as a mentor?

Themes	Statements
self reflection / rewarding experience	**2005 (7)** Made me really think about what I do and how I got there; The ability to crystallize what I do into layman's terms, and to remember again what excites me about my job; good practice to describe my research in very simple terms; Reminders that I've come a long way, how much I enjoy my career; Made me think about what parts of my job I enjoy most, and to reflect on how I got where I am today; A reminder that I actually do know a lot of stuff – when you work with people that do the same thing as you, you take your own knowledge base for granted; I remember why I do what I do, how much I enjoy my job by sharing with others
	2006 (12) I am reminded of what it was like at those ages, and what was in my head, what was influencing me, what I wish I would have known or had someone show / tell me.; an opportunity to see the fun in my job; my passion for the profession of electrical / computer/ software / biomedical engineering; Sense of pride, enjoyed sharing my experiences; Teaching is hard work but very rewarding. My job is more exciting than I realized!; Made me rediscover all the basic science principles I use day to day in my job and how important having a solid foundation in them is; Opportunity to think about how to present my job to a non-industry person; Reminded me why I like what I do!; Refreshing my memory again on why I love what I do; Communication skills. What others think electrical engineering is; Excited that I could show people what it is I do at work; Energy. It reinforces why you enjoy what you do and to contribute to the sharing of that knowledge and experience

	2007 (9) Its fulfilling. Makes me happy to help anyone who is interested in science; Fun day; Good karma!; Sometimes one forgets how fortunate they are to be involved in cutting edge research because it is our day to day reality. Seeing it through the eyes of a young girl renews the novelty and enhances the excitement; self fulfillment; At the end of the day I felt good and hoped that the students got something from this experience; It was very rewarding to spend time with these young girls and hope that maybe I made a small difference to them; Makes me remember why I got into engineering. Makes me think of my career on a broader level, sometimes get too caught up in the day to day. It's fun to share with people on different levels; Renewed interest of everyday pathology as seen from inquisitive students
interaction with students	**2005 (16)** To interact with young students who seem to have bright futures in science; Showing career possibilities as a scientist to two bright, young girls; It was good to be able to interact with the next generation of potential scientists; I enjoyed seeing the girls learn about something new, discover something they hadn't thought about before; The opportunity to understand the perspective of a Grade 8 student; I enjoy exposing them (the mentees) to new things and a different way of thinking. I think it is hard to imagine what laboratory life is like unless you are able to experience it, even if it is only for a day; Learning how Grade 8 students view problems, questions etc.; It's very refreshing to see their eyes open; I was very impressed with the level of knowledge the girls had. Not sure if I was at that level at their age; I enjoyed meeting the girls and enjoyed helping them explore possibilities for their future; insight as to what Grade 8 girls are like, today; Got to meet two really motivated young ladies. It was inspiring to see two kids who had a good idea of their interests and abilities; I realized it is more difficult to "grab" the girls' attention. Next time I would be more prepared; The challenge of presenting my science in an exciting way at an appropriate level; I had forgotten how quiet girls in Grade 8 can be when they don't know anyone and feel a little overwhelmed; I did not stay for the entire day because of time restraints with my work schedule, but I only missed the game. I did not get much out of being a mentor because we only had time to give a presentation and no time for one-on-one. Moreover, the time that I did have as a presenter was cut short with no time for questions or discussion with the girls
	2006 (6) Satisfaction, grade 9 students know more than I thought; Awareness of what jr. high kids are exposed to on a daily basis; It was rewarding to see the students positively responding to what they were learning; Have the girls meet each other prior to the job shadow – my girls were very quiet most of the day until they got to know each other; I am always amazed at the maturity of most of these girls. I am not sure I was as self assured at that age; to also learn from the girls
	2007 (3) Good to get a glimpse of what 13 year old girls are thinking; Good to answer questions and provide thoughts that may have helped me when I was their age; The girls taught me a lot about being 13 and the feelings involved with being 13. They were a very polite and appreciative group of girls
opportunity to inspire / potential impact	**2005 (9)** I like to share the day to day rewards and challenges of my job; A chance to share and inspire young people. I enjoy my job and I enjoy telling others what I do; Feeling good about doing community service; Good to give back; "feel good" from helping others; The feeling that I was helping out; Overall, I found it rewarding because I felt that maybe they would consider science/engineering as a profession in the future; The chance to open some minds to new possibilities; It made me feel good knowing I could possibly show a young woman the importance of pursuing a career in something you truly enjoy; It definitely felt good to know that I might have a positive influence on one or all of them. They all wanted to keep in touch. Hopefully in 10 years they will be university grads and enjoying a career in science if that is what they want;

	Satisfaction I may have influenced another's life
	2006 (6) Opening possible career paths for girls they may not have considered; If I can give / pass on any of the good influences and eventual confidence or inspire it in any way, then perhaps somebody has something they did not have before; hoping I could influence them in making good life choices; Feeling of satisfaction that the students were receptive to different career options; Also a feeling that at least a small part of what I said and did will stay with the girls; I hope that I provided them an environment that they will go to school for later, that is satisfying enough for me
	2007 (10) I felt good about volunteering in this role. I enjoy having the opportunity to expose the girls to my profession at an early age. Most volunteers or students we see are older; Feeling of giving back and introducing new career paths to young women. They may not have been ware of the types of jobs; It was nice to be able to do something to help young girls make decisions in what they would like to do in their education. I wish I had something like this when I was growing up; I got to share my passion for my work and science with others; Satisfaction that I may have been able to get through at least one girl by showing them the rewards for pursuing such a career; Satisfaction in helping that day and hopefully having an effect in the future; I got to do something I enjoy doing and also got to share some knowledge of geology; A feeling of satisfaction that I may have helped build a young girls self confidence; I also feel good about opening up possible doors for these girls that they may not have thought of; The satisfaction of showing that science can be rewarding as a career. Felt good about potentially making a difference in someone's choices in life.
networking with other mentors	**2005 (0)**
	2006 (2) Working together with other women mentors; The great satisfaction that I have shared some of our grad students', colleagues'
	2007 (1) I had fun and worked closely with some of my friends at work.

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