

**ENVIRONMENTAL HEALTH
SCIENCE**

ASSESSMENT REPORT

2008-2009

The Environmental Health Science (EHS) Program at East Central University is one of 30 accredited undergraduate environmental health programs in the United States. The EHS Program contributes to the overall mission of the University by offering a baccalaureate degree in the major. In addition, it offers a viable minor for students with other majors in the natural and social sciences. The course entitled *EHS 1114 Introduction to Environmental Health Science* is part of the general education curriculum of the University and the course entitled *EHS 2413 Radiologic Health* is part of the Medical Physics Program curriculum. Other EHS courses, although not part of the general education curriculum, are available as elective courses for any undergraduate student.

The EHS Program is one of the eighteen undergraduate and ten pre-professional programs administered through the College of Health and Sciences (CHS). The Program supports the CHS mission by offering numerous courses to educate students about the biological and physical science interactions between humans and their environment and technologies used to protect human health and the natural environment. In addition, the Program furthers the CHS mission by employing new instructional technologies, acquiring new equipment and encouraging students to participation in professional organizations and research activities. Students graduating from the EHS Program are prepared for entry into a range of professional positions in environmental protection, public health or occupational safety or for entry into graduate programs.

The EHS Department is committed to a process of continuous improvement as part of the strategy to achieve its primary goal of preparing graduates for employment in the environmental health science field. The assessment plan facilitates continuous improvement and identifies EHS Program strengths and weaknesses through the evaluation of student performance relative to student learning outcomes and through the collection of information from other key stakeholders. The student learning outcomes describe knowledge and skills the faculty of the EHS Department consider as essential for students entering professional positions or progressing to graduate programs. Performance of currently enrolled students is measured using a standardized exam administered to graduating seniors and oral and written assignments from required EHS courses. Information from students and other key stakeholders is also obtained through surveys and during meetings with stakeholder groups. Program strengths identified in the assessment process are noted and methods explored to utilize such resources more fully when possible. Examples include research opportunities afforded students at the Robert S. Kerr Environmental Research Center and internship experiences available with the United States Public Health Service facilitated through continuing faculty relationships with these agencies. All students in the EHS Program are required to perform a six credit hour internship at a site which they must locate and secure through personal investigation and interviews. The internship requirement is satisfied by completion of the course entitled *EHS 4946 Field Experience in Environmental Health*. When Program concerns are identified, they are examined by the EHS Faculty to determine the cause and significance and appropriate actions are initiated to remedy the concerns.

The key stakeholders of the EHS Program for purposes of assessment outcomes include currently enrolled students, alumni, Program faculty, the Program's advisory council and the

employers of the Program’s graduates. Results of EHS Program Assessments and reports concerning progress in response to assessment recommendations are communicated by sending summaries to key stakeholders through email. Assessment information is also posted on the Department of EHS Internet web pages. The estimate of the unduplicated number of students, alumni, employers and internship supervisors who supplied data for this report is 80.

Primary Program Goal and Student Outcomes

The primary goal of the EHS Program is to prepare graduates from the major for employment in the environmental health science field. To fulfill this goal, program graduates should attain the following three student outcomes:

Student Outcome 1: Program graduates should possess a basic understanding of the various environmental health science and environmental protection principles.

Criteria for Student Outcome 1:

A. The opinions of internship site supervisors, alumni, and employers.

Assessment Instruments:

- a) Internship Site Supervisor Survey, items 3, 4, and 6.
- b) Alumni Survey, items 3, 4, and 6.
- c) Employer Survey, items 3, 4, and 6.

Survey of Internship Site Supervisors for Student Outcome 1Aa						
Survey Item	Survey Years					Weighted Average
	2004-05	2005-06	2006-07	2007-08	2008-09	
3	5.0	4.3	4.3	4.3	4.3	4.4
4	5.0	4.8	4.8	4.9	4.9	4.8
6	5.0	4.5	4.6	4.0	3.9	4.4
Participants	5	6	12	8	7	38
Average	5.0	4.6	4.5	4.4	4.4	4.5

Survey of Alumni for Student Outcome 1Ab						
Survey Item	Survey Years					Weighted Average
	2004-05	2005-06	2006-07	2007-08	2008-09	
3	4.9	4.4	4.6	4.1	4.4	4.5
4	4.8	4.2	4.6	4.4	4.4	4.5
6	4.8	3.3	4.3	4.3	4.3	4.2
Participants	14	11	12	17	51	95
Average	4.8	4.8	4.5	4.3	4.4	4.4

Survey of Employers for Student Outcome 1Ac						
Survey Item	Survey Years					Weighted Average
	2004-05	2005-06	2006-07	2007-08	2008-09	
3	3.7	4.8	5.0	4.0	4.2	4.3
4	4.0	4.5	5.0	4.5	4.6	4.5
6	4.5	4.0	4.0	4.0	4.4	4.3
Participants	3	4	1	2	9	19
Average	4.1	4.4	4.7	4.2	4.4	4.3

Performance Goal: The average rating on all survey items should be 3 or greater using a (1-5) scale, where 5 means “Far Above Average”, 4 means “Above Average”, 3 means “Average”, 2 means “Below Average” and 1 means “Far Below Average”.

Judgement: The performance goal was achieved for the average ratings determined from analyses of surveys received from all three groups, alumni, employers and internship site supervisors. In addition, all three groups rated graduates as better than average in their understanding of basic environmental health science and environmental protection principles. Ratings for 2008-09 are similar to the values recorded in the previous three years but less than the five maximum values noted in 2004-05. Differences that were noted are likely of minimal significance due the relatively minor size of these differences and considering the numbers of surveys returned.

Actions: Assessment reports in previous years have noted the small number of surveys returned as a continuing problem and have recommended the development of strategies to encourage greater participation by all stakeholder groups. In response, the collection of assessment data from alumni and employers for the 2008-09 academic year was collected through the use of electronic survey forms made available at a web site on the Internet. The electronic survey forms were constructed using software provided by an

commercial survey company which also provided data compilation and reporting services. Stakeholders were informed of the survey and given directions that would allow them to anonymously participate through email. The numbers of alumni and employer surveys returned utilizing the electronic surveys were much greater than when surveys were administered through regular mail. To further substantiate the increased participation, next years surveys will also be conducted electronically.

B. Student performance on an EHS departmental graduating senior exit examination administered to seniors during their final semester before graduation. Beginning in the Fall of 2003, seniors were given a new test developed from questions listed in the manual for a comprehensive EHS self study course published by the National Center for Environmental Health (Beck, 1994). The exam was constructed by selecting ten questions from each of 14 different subject areas in EHS as identified in the manual. The subject area reference for each question was maintained to permit an item analysis to identify subject areas in which students are less well prepared and as a tool for EHS Program improvement.

Assessment instrument:

a) Scores from the EHS departmental graduating senior exit exam.

Performance on Graduating Senior Exit Examination for Student Outcome 1B			
Calendar Year	Total Number of Examinations	Examination Scores At or Above 50 Percent	
		Number	Percent
2004-05	10	10	100
2005-06	12	12	100
2006-07	13	13	100
2007-08	9	9	100
2008-09	10	10	100
Total	54	54	100

Performance Goal: At least 80 percent of students will score at or above 50 percent.

Judgements: This was the sixth year in which the current version of the exit exam was used and as recorded in the previous five years the performance goal was achieved for the 2008-09 academic year. Moreover 100 percent of students have scored at or above the 50 percent criterion. These results have been interpreted as an indication that students in

the program are knowledgeable about the principles of environmental health science and environmental protection as encompassed in the wide range of subject areas included in the EHS departmental exit exam. However, as noted for the exams analyzed in the previous year's report, the actual number of questions answered correctly by individual students was relatively low and ranged from 54.4 to 72.8 percent in 2008-09. The average proportion of questions answered correctly for the entire group tested was 58.0 percent in 2007-08 and 64.5 percent in 2008-09.

An item analysis was performed on the exit exam answer sheets and the results are shown in Appendix A. Analysis of the results from tests administered in the 2008-09 academic year found that 45 of the 140 total questions were answered incorrectly on more than 50 percent of the exams. Subscores for the 14 subject areas were calculated and showed that the areas with greatest proportion of incorrect answers were Air Pollution, Residential and Institutional Health, and Environmental Planning and Impact Analysis.

Actions: The consistently high proportion of students scoring at or above the level needed to meet the performance goal and the low level of performance required to meet the goal and suggests that the current performance goal has limited ability to assess graduating seniors' knowledge of environmental health science and environmental protection principles. In addition, the relatively low scores on the exam demonstrate that students are not satisfactorily prepared for the exam.

In response, EHS Department faculty have reviewed the results of exit exam to identify needed changes in EHS Program course content and pedagogy to address subject matter deficiencies. The exam has also been reviewed and modifications suggested such that the exam will more accurately reflect areas of subject matter emphasis in the EHS Program curriculum. The faculty will also review the performance goal and determine appropriate criteria for evaluating exit exam results.

Outcome 2: Program graduates should possess the occupational-related skills required for employment in environmental health science and related fields.

Criteria for Student Outcome 2:

A. The opinions of internship site supervisors, alumni, and employers.

Assessment instruments:

- a) Internship Site Supervisor Survey, items 7, 8, 9.
- b) Alumni Survey, items 7, 8.
- c) Employer Survey, items 7, 8, 9.

Survey of Internship Site Supervisors for Student Outcome 2Aa						
Survey Item	Survey Years					Weighted Average
	2004-05	2005-06	2006-07	2007-08	2008-09	
7	4.8	4.5	4.3	4.4	4.4	4.4
8	5.0	4.2	4.3	4.0	4.1	4.3
9	4.6	4.3	4.3	4.1	4.3	4.3
Participants	5	6	12	8	7	38
Average	4.8	4.3	4.3	4.2	4.3	4.3

Survey of Alumni for Student Outcome 2Ab						
Survey Item	Survey Years					Weighted Average
	2004-05	2005-06	2006-07	2007-08	2008-09	
7	3.8	3.7	4.2	4.2	3.8	3.9
8	4.8	3.9	4.3	4.0	4.3	4.3
Participants	14	11	12	7	51	95
Average	4.3	3.8	4.3	4.1	4.1	4.1

Survey of Employers for Student Outcome 2Ac						
Survey Item	Survey Years					Weighted Average
	2004-05	2005-06	2006-07	2007-08	2008-09	
7	4.3	4.5	4.5	4.5	4.1	4.3
8	4.7	4.5	5.0	5.0	3.9	4.3
9	3.5	ND	5.0	3.5	4.0	3.9
Participants	3	4	1	2	9	19
Average	4.2	4.5	5.0	4.3	4.0	3.9

Performance Goal: The average rating on all survey items should be 3 or greater using a (1-5) scale, where 5 means “Far Above Average”, 4 means “Above Average”, 3 means “Average”, 2 means “Below Average” and 1 means “Far Below Average”.

Judgements: The performance goal was achieved for the average ratings calculated from surveys obtained from all three of the groups sampled. The ratings indicate that students assessed in this report do possess the occupational related skills required for employment

in environmental health science. Ratings from internship site supervisors were consistent with those from previous years indicating that students have better than average skills. Ratings from alumni and employers for several of the survey questions were lower than those for 2007-08. However, ratings supplied by employers in response to question nine which compared the preparation of EHS graduates from ECU with those from other universities rebounded from the previous five year minimum. The average rating for question eight was found to have decreased by the greatest amount however this statistic still indicates that students have a better than average level of skill.

Action: As mentioned previously, a greater number of alumni and employer surveys were returned contributing to an increased level of confidence in the ratings for 2008-09. Electronic surveys will be employed in the following year as part of a continuing strategy to increase stakeholder participation and improve the assessment process.

B. Ability of senior level students to apply occupational skills to complete a task representative of those performed by professionals in EHS or related disciplines.

Assessment instrument:

a) EHS 4802 Environmental Health Laboratory practical exam.

Ratings to be assigned for comparison among academic years:

- a. 5 - Far Above Average
- b. 4 - Above Average
- c. 3 - Average
- d. 2 - Below Average
- e. 1 - Far Below Average

Performance on Laboratory Practical for Student Outcome 2B			
		Exam Scores at or Above a Score of 3	
Calendar Year	Total Number	Number	Percent
2007-08	14	13	93.0
2008-09	11	10	90.9
Five Year Total/Average			

Performance Goal: At least 75 percent of students should score 3 or greater.

Judgements: The performance goal was met for the 2008-09 academic year. This is the second year that this assessment instrument has been included in the EHS Assessment Plan. The results from the previous year were reviewed and the assigned task was modified to require a broader range of skills and to make the task more representative of work expected of baccalaureate students.

Actions: EHS faculty will continue to review the exercise, performance goal and results from individual students to determine if changes are needed to enhance the value of this assessment instrument.

Student Outcome 3: Program graduates should be able to demonstrate that they can communicate effectively in oral presentations and in the various written formats associated with Environmental Health Science.

Criteria for Student Outcome 3:

A. The opinions of internship site supervisors, alumni, and employers of the ability of EHS majors to write reports, research papers, and other documents appropriate to the field and use professional language in oral and written communications.

Assessment Instruments:

- a) Internship Site Supervisor Survey, items 1, 2, 5.
- b) Alumni Survey, item 1, 2, 5.
- c) Employer Survey, item 1, 2, 5.

Survey of Internship Site Supervisors for Student Outcome 3Aa						
Survey Item	Survey Years					Weighted Average
	2004-05	2005-06	2006-07	2007-08	2008-09	
1	4.8	4.7	4.3	4.3	4.1	4.4
2	4.6	4.2	3.8	3.9	3.9	4.0
5	4.6	4.8	4.9	4.8	4.3	4.7
Participants	5	6	12	8	8	39
Average	4.7	4.6	4.3	4.3	4.1	4.4

Survey of Alumni for Student Outcome 3Ab

Survey Item	Survey Years					Weighted Average
	2004-05	2005-06	2006-07	2007-08	2008-09	
1	4.3	3.5	3.7	4.0	3.8	3.9
2	4.4	4.0	4.4	4.3	4.3	4.3
5	3.4	3.5	3.6	3.9	4.0	3.8
Participants	14	11	12	7	51	95
Average	4.0	3.7	3.9	4.0	4.1	4.0

Survey of Employers for Student Outcome 3Ac						
Survey Item	Survey Years					Weighted Average
	2004-05	2005-06	2006-07	2007-08	2008-09	
1	4.0	4.3	4.0	4.0	3.9	4.0
2	4.3	4.3	4.0	4.0	4.3	4.3
5	4.0	4.0	4.0	4.5	4.3	4.2
Participants	3	4	1	2	9	19
Average	4.1	4.2	4.0	4.2	4.2	4.2

Performance Goal: The average rating on all survey items should be 3 or greater using a (1-5) scale, where 5 means “Far Above Average”, 4 means “Above Average”, 3 means “Average”, 2 means “Below Average” and 1 means “Far Below Average”.

Judgement: The performance goal was achieved for the average ratings summarizing the responses provided by alumni, employers, and internship supervisors. Average ratings for all three groups indicated that EHS graduates possess better than average abilities to write reports and other documents, understand professional literature, and use professional language in oral and written communications. Actual numerical ratings obtained from all three groups were similar to those collected in the previous four years. Minimal differences were found in average ratings between 2008-09 and the previous year even though the number of surveys received from these groups was much greater than in previous years.

Actions: Electronic surveys will be employed in the following year as part of a continuing strategy to increase stakeholder participation and improve the assessment process.

B. Quality of writing in a portfolio containing examples of student’s written work.

Assessment instrument:

a) Written work evaluated using a standardized rating form.

Ratings to be assigned for comparison among academic years:

- a. 5 - Far Above Average
- b. 4 - Above Average
- c. 3 - Average
- d. 2 - Below Average
- e. 1 - Far Below Average

Ratings of Student’s Written Work for Student Outcome 3B			
		Portfolio Ratings at or Above a Score of 3	
Calendar Year	Total Number	Number	Percent
2004-05	7	7	100
2005-06	12	10	83.3
2006-07	14	12	85.7
2007-08	16	15	93.8
2008-09	21	14	66.7
Five Year Total/Average	70	58	82.9

Performance Goal: At least 90% of the students should achieve an average rating of 3 or greater on their writing portfolio.

Judgements: The performance goal was not achieved and the average rating fell to the minimum value for the five year period included in this report. Although not readily apparent from the sample numbers in the preceding tables, 2007-08 was the first year in an effort to increase the number of examples of written work used as evidence of student’s abilities to communicate in written formats. It was also the first attempt to use a single rubric to evaluate all examples of students written work and questions arose concerning the scoring and interpretation of some portions of the rubric in both years. Exercises to be used as examples of student’s written work included an emphasis on communicating faculty expectations for the quality of written work. A similar number of examples of student’s written work were evaluated in 2008-09 as in 2007-08 but less attention may have been given to informing students about criteria used to assess written work. Current year statistics suggest that two thirds of students in the EHS Program have

an average or better ability to effectively communicate in appropriate written formats but that improvement is needed.

Actions: Faculty in the EHS Department will review the rubric used to rate student work and directions accompanying exercises to insure that the rating process provides a fair evaluation of student abilities. As noted in the previous years report, the number of examples of written work included as evidence in the portfolio increased but additional examples would further strengthen the validity of the evaluation. Results in the current assessment report are based on work required in senior level courses; however the faculty will endeavor to collect evidence for future assessment reports from junior and lower division courses. Efforts to incorporate work from other than senior level courses could also be expected to facilitate earlier and greater development of students' written communication abilities.

C. Quality of student's oral presentations.

Assessment instrument:

a) Oral presentations evaluated according to a standardized rating form.

Ratings to be assigned for comparison among academic years:

- a. 5 - Far Above Average
- b. 4 - Above Average
- c. 3 - Average
- d. 2 - Below Average
- e. 1 - Far Below Average

Ratings of Student's Oral Presentations for Student Outcome 3C			
Calendar Year	Total Number	Average Ratings at or Above a Score of 3	
		Number	Percent
2004-05	7	4	100
2005-06	12	12	100
2006-07	14	14	100
2007-08	16	13	81.3
2008-09	21	15	71.4
Five Year Total/Average	70	61	87.1

Performance Goal: At least 90% of the students should achieve an average rating of 3 or greater on their oral presentations.

Judgements: As for the previous year, the performance goal was not met indicating that an unacceptably large proportion of EHS Program majors have inadequate abilities to communicate effectively in oral presentations. Although the last two year's results are in opposition to the statistics reported in the previous three years, presentations delivered in a wider range of courses were used as evidence of students abilities. The results do support the conclusion that approximately 70 percent of EHS majors have an average or better ability to communicate orally but that improvement is needed.

Actions: As for written communication, faculty in the EHS Department will review the rubric used to rate student work and directions accompanying exercises to insure that the rating process provides a fair evaluation of student abilities. Efforts will continue to be made to further increase the number of examples used as evidence of oral communication abilities. Current assessment results are based on work in senior level courses. Requiring additional oral presentations in junior level and lower division courses for assessment purposes would be expected to contribute to the development of greater student oral communication skills.

Program and Departmental Policy Changes

Changes to the EHS Program or departmental policies made in response to annual assessment results or other influences will be documented and reviewed for a period of at least five years following their institution. The purpose of the continued monitoring is to help the EHS faculty evaluate the impact of program or policy changes on student learning as quantified through the student learning outcomes.

Addition of the Introductory Course into the General Education Requirements - Fall 2004

In support of goals to further EHS Program and contribute to the mission of the University, the course entitled *EHS 1114 Introduction to Environmental Health Science* was incorporated into the physical science portion of the lab science requirements of the general education curriculum. This change has helped to bring new students into the major and has contributed to the awareness of current environmental topics of all students who have enrolled in the course.

Revision of the EHS Program Chemistry Requirements - Fall 2005

Recent changes in the scope of practice of environmental health and protection provided strong motivation to review those subject areas covered in the EHS Program curriculum and to identify opportunities to update course work in the Program. Program faculty and alumni as judged from survey responses, felt that the requirement for a full semester course in organic

chemistry as taught for chemistry majors was of much less importance for EHS majors than other subject areas not currently or adequately covered in the Program curriculum. In addition, topics in organic chemistry important for environmental health and protection professionals were being presented in Program courses. In response, the organic chemistry components in the course previously entitled *EHS 4553 Environmental Chemistry* were strengthened and were formally identified by changing the course title to *EHS 4553 Environmental and Organic Chemistry* and including it in the list of required courses in the Program. This action provided EHS majors with a firm introduction to the subject of organic chemistry but in the context of the information most valuable for environmental health and protection professionals and promoted opportunities for students to be well prepared in other areas of current importance.

Addition of an Advisory Committee - Fall 2006

The accelerating rate of change in the discipline of environmental health and protection highlights the increasing need for carefully and continued critical evaluation of the EHS Program curriculum. In response to this need and the possibilities for strengthening previously beneficial relationships, an EHS Advisory Committee was established. The Committee is composed of recent and past alumni employed in a range of professional positions. It is anticipated that interactions between the EHS Program and the Committee will promote additional internship opportunities and encourage other supportive activities by key stakeholders.

Assessment Plan Revisions - Fall 2007

Several changes were made to the EHS Program's Assessment Plan in response to review by the EHS Department faculty and the University Assessment Committee. The changes included the addition of a direct measure for Outcome 2, expansion of the student writing portfolio and increase in the number of oral presentations used as evidence of oral communication abilities.

Revision of EHS Program Chemistry and Mathematics Requirements - Fall 2007

Two courses were added and other changes were made to the EHS Program curriculum in response to concerns identified during the site visit conducted April 17, 2007 for program reaccreditation by the National Environmental Health Science and Protection Accreditation Council (EHAC). The two courses added to the curriculum are *CHEM 1314 General Organic and Biochemistry* and *MATH 2613 Calculus for Business, Life and Social Sciences*. Other changes included the transfer of *EHS 4553 Environmental and Organic Chemistry* from the set of required courses to the list of elective courses. The above mentioned changes will be in effect beginning with the Fall 2008 semester.

Revision of EHS Program Mathematics and Other Requirements - Fall 2008

One course was removed and several other changes were made to the EHS Program curriculum in response to departmental faculty concerns and changes to the undergraduate guidelines published by the National Environmental Health Science and Protection Accreditation Council (EHAC). EHAC guidelines were revised such that a course in college algebra would suffice to meet the mathematics requirement. This change permitted the course entitled *MATH 1513 College Algebra* to be substituted for *MATH 2613 Calculus for Business, Life and Social Sciences*. Replacement of *MATH 2613* effectively reduced the number of hours required for most program majors who would have been required to complete *MATH 1513* as a prerequisite. Other changes included the creation of a new course entitled *EHS 2223 Water Resources Management* and transfer of the course entitled *EHS 4143 Food Hygiene and Consumer Protection* from the list of Program Electives to the set of Required Courses. Finally, the course entitled *EHS 4553 Environmental and Organic Chemistry* was re-titled as *EHS 4553 Environmental Chemistry*. The above mentioned changes will be in effect beginning at the start of the 2009-10 academic year.

References:

Beck, J., Environmental Health Sciences Self Study Course 3010-G, National Center for Environmental Health, Centers for Disease Control and Prevention, Washington DC, 1994.

Appendix A.
Item Analysis for Senior Graduating Senior Assessment Exam

Question Number	Percent Wrong					Question Number	Percent Wrong				
	2007-08	2008-09	2009-10	2010-11	2011-12		2007-08	2008-09	2009-10	2010-11	2011-12
Diseases & Epidemiology						Hazardous Waste					
1	11	0				41	33	30.1			
2	78	71				42	11	0			
3	33	71				43	67	100			
4	0	0				44	56	69.9			
5	44	43				45	33	30.2			
6	11	14				46	89	49.8			
7	56	14				47	0	20.3			
8	0	0				48	33	20.3			
9	44	43				49	100	90.2			
10	0	0				50	11	40.4			
average	27.7	25.6				average	43.3	45.12			
Water Supply						Air Pollution					
11	0	14				51	67	49.8			
12	0	0				52	78	69.8			
13	0	14				53	0	9.9			
14	22	29				54	89	80.3			
15	78	86				55	78	69.8			
16	0	0				56	67	50.2			
17	11	0				57	67	40.4			
18	0	14				58	22	50.3			
19	0	0				59	100	100			
20	0	43				60	33	49.8			
average	11.1	20				average	60.1	57.03			
Wastewater Treatment						Radiation					
21	100	100				61	56	20.3			
22	11	0				62	78	40.4			
23	67	43				63	56	59.6			
24	33	14				64	67	30.2			
25	33	0				65	67	69.8			
26	0	0				66	0	19.7			
27	33	14				67	22	49.8			
28	0	14				68	78	39.9			
29	11	0				69	11	9.8			
30	0	0				70	100	90.2			
average	28.8	18.5				average	53.5	42.97			
Solid Waste						Food Protection					
31	22	57				71	33	19.7			
32	11	14				72	33				
33	11	14				73	22				
34	11	29				74	100				
35	89	57				75	11				
36	0	0				76	67	59.6			
37	0	43				77	11	30.2			
38	100	100				78	11	20.3			
39	0	29				79	22	9.9			
40	0	0				80	89	59.6			
average	24.4	34.3				average	39.9	33.21667			

Question Number	Percent Wrong					Question Number	Percent Wrong				
	2007-08	2008-09	2009-10	2010-11	2011-12		2007-08	2008-09	2009-10	2010-11	2011-12
Recreational Health						Administration					
81	33	60				121	67	49.8			
82	22	0				122	11	0			
83	56	50.2				123	11	40			
84	56	20.1				124	22	9.8			
85	11	40				125	56	9.8			
86	11	9.8				126	22	20.3			
87	44	49.8				127	100	60.1			
88	67	9.8				128	44	0			
89	22	40				129	89	90.1			
90	33	19.7				130	33	9.8			
average	35.5	29.94				average	45.5	28.97			
Vector & Pest Control						Emergency Response					
91	22	9.8				131	11	0			
92	11	0				132	44	19.7			
93	67	40.4				133	0	9.8			
94	78	50.2				134	22	9.8			
95	44	30.1				135	11	0			
96	78	90.1				136	44	70.1			
97	56	59.6				137	56	49.8			
98	67	80.3				138	78	90.1			
99	0	9.8				139	56	30.1			
100	89	90.2				140	44	60			
average	51.2	46.05				average	36.6	33.94			
Residential & Institutional Health											
101	100	100									
102	33	0									
103	78	90.2									
104	11	0									
105	100	90.2									
106	33	9.8									
107	78	69.8									
108	89	80.3									
109	100	79.7									
110	56	30.2									
average	67.8	55.02									
Environmental Planning & Impact Analysis											
111	33	30.1									
112	56	49.8									
113	67	40.4									
114	11	0									
115	44	20.3									
116	100	100									
117	78	60.1									
118	78	69.8									
119	78	50.2									
120	78	90.2									
average	62.3	51.09									