

SCIENCE

Primary Goal - To help students in the elementary and junior high school years to understand the world through the application of the various science disciplines as well as the scientific method, and to enable students at the senior high school level to gain proficiency in specialized science areas.

<u>Staff</u>	<u>Students</u>	<u>Budget</u>	<u>Cost Per Student</u>
43.88	5,644	\$4,747,489	\$841

ELEMENTARY

2008 NYS Fourth Grade Science Assessment
Total Population

	Number Tested		Average Score		Level 4		Level 3		Level 2		Level 1	
	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007
District	397	421	87	87	70%	72%	26%	24%	4%	3%	0 %	1%
Blue Creek	77	64	88	91	74	89	22	9	4	2	0	0
Boght Hills	78	77	87	89	72	77	23	22	5	1	0	0
Forts Ferry	77	88	85	86	62	68	31	27	7	4	0	1
Latham Ridge	55	75	85	84	58	57	38	36	4	5	0	1
Loudonville	43	48	89	88	84	77	16	21	0	2	0	0
Southgate	67	69	87	85	70	70	27	24	3	5	0	2

The New York State Science Assessment at grade 4 is the first benchmark to measure the attainment of content skills and application of science by our elementary students. This year 96% of our students scored at level 3 and 4, identical to the 96% attained in 2007. This year, as in the previous year, we had no students scoring at level 1. The number of students scoring at level 4 declined from 89% to 74%, while the average scored remained constant at 87%. This test continues to be a requirement for district accountability as a part of No Child Left Behind. The test focuses on science content and skill application and features a lab portion which requires our students to apply science skill to the world settings.

Last year the results from the district examination at grade 6 were not included. This was due to the fact that we discovered that results were reported inconsistently throughout the district. The inconsistency was traced to the fact that some schools were reporting results of the entire test including the performance section as well as the traditional items including multiple choice questions while other schools reported only the multiple choice and traditional paper and pencil items. This year's result feature the test reported in its entirety including the performance piece and the traditional written items. The test serves as a valuable district benchmark between the 4th and 8th grade state tests and is similar format in that it that it includes written responses, multiple

SCIENCE (cont.)

choice and performance. Our results on this test are very positive as 96% of our students achieved a grade of C or above, with 81% receiving A's or B's and over half the student body earning an A. The test is subject to annual review by our elementary science faculty and provides us additional valuable information about the progress of our elementary students in the science curriculum.

HIGHLIGHTS

The content area of science continues to provide teachers with the opportunity to implement hands-on, discovery-based instruction. Teachers are encouraged to incorporate experimentation, demonstration, problem solving experiences and the use and manipulation of materials during science instruction.

OBJECTIVES

- Continue to monitor student performance and the administration and scoring of the Grade 4 New York State Science Assessment. Utilize time during the school year for staff development to familiarize elementary teachers with the NYS Science Assessment.

Evaluation: Were students successful on this state assessment? What areas are in need of improvement? Were any problems identified in the administration of this assessment? Were any problems identified with the scoring of this assessment? Was time utilized during the school year to familiarize elementary teachers with state assessment?

The Grade 6 District End of Year Exam has been revised. The new exam will be used this year, June 2008. Last year there were problems related to the scoring of the assessment, which will be clarified with teachers through a memo at the end of May.

- Continue to keep staff informed of the resources and materials available for science instruction.

Evaluation: Were the staff in all six elementary buildings kept informed of available resources and materials for science instruction?

New teachers were informed of materials available at one of the orientation days over the summer. Resources for science instruction continue to be housed in various locations throughout the district. A survey will be distributed in June, asking for the locations of science materials. With the results of the survey, we will develop a plan to standardize storage locations and/or a system to account for the locations of materials.

SCIENCE (cont.)

- Continue to refine the district plan to improve the systemic approach to K-6 science instruction in the district. Prepare and distribute the recently revised

units of instruction to teachers in K-6. Continue to review science curriculum to address curricular and instructional needs.

Evaluation: Was a plan developed to improve science instruction in the district? Were the survey results reviewed and a plan developed to address curricular and instructional needs?

As part of the District Curriculum Mapping Committee, Keith Bogart and I are considering how to implement district mapping initiatives for K-12 science instruction.

Newly revised units of instruction will be distributed in the fall of 2008.

LEVEL 7-8

Regents Earth Science 8X

	2007-08	2006-07	2005-06	2004-05	2003-04
Percent passing	100%	100%	100%	100%	100%
Number enrolled	93	91	92	95	91

Science 7E Final Exam Assessment

Grade	Number of Students/Percentage 2007-08	Number of Students/Percentage 2006-07
A	81/76%	86/80%
B	22/21%	21/20%
C	3/3%	0/0%
D	1/1%	0/0%
F	0/0%	0/0%

**District Final Examinations
Grade 7 Science**

Grade	Number of Students/Percentage 2007-08	Number of Students/Percentage 2006-07
A	91/25%	73/21%
B	123/33%	119/35%
C	92/25%	100/29%
D	39/11%	35/10%
F	25/7%	16/ 5%

SCIENCE (cont.)

Grade 8 Science

Grade	Number of Students/Percentage 2007-08	Number of Students/Percentage 2006-07
A	103/28%	73/22%
B	137/38%	119/36%
C	79/22%	82/25%
D	26/7%	27/8%
F	20/6%	30/9%

NYS Grade 8 Science Assessment

	Number Tested	Number/% Level 4	Number/% Level 3	Number/% Level 2	Number/% Level 1
2007-08	449	304/68%	121/27%	21/5%	3/<1%
2006-07	419	273/65.1%	119/28.4%	21/5.0%	6/1.4%
2005-06	467	296/63.4%	151/32.3%	18/3.8%	2/.4%
2004-05	467	296/63.4	151/32.3	18/3.8	2/.4
2003-04	471	286/60.7	161/34.2	22/4.7	2/.42

Junior high school students who are accelerated in science have the opportunity to earn high school credit by taking the Earth Science Regents in grade 8. This year we had 93 students attempt this exam, and we achieved a 100% passing rate on the test. Again, as in 2007, 98% of our students scored 85 or above. Particularly impressive is the fact that 55% of our students scored in the 95 – 99 range compared to 30% the previous year. This is a remarkable achievement for our junior high school students and their teachers! Ninety three (93) students took the exam representing 20% of the Shaker Junior High School 8th grade class. Again this year, Earth Science lab teachers were brought together to examine the laboratory programs at both the junior high school and high school. This collaboration has served our students well as the laboratory experience has been enhanced for Earth Science. The collaboration also helps to ensure continuity of instruction from the junior high school to the high school.

To prepare our students for the Earth Science program, the district has created the science 7E program. Seventy-six (76%) of our students scored an A or higher compared to 80% in 2006-07. On the district final examination at grade 7, the number of students achieving A's jumped from 21% to 25% percent. Eighteen (18) percent of our students scored D or F compared to 15% in 2006-07 and 20% in 2005-06. The goal of the department is to have no more than 15% of our students achieve D's or F's and they will continue to monitor the program. They are also investigating the need to implement a new science text in grade 7 and 8. Results on the grade 8 final exam were

SCIENCE (cont.)

very positive. The number of our students achieving A's or B's was 66% compared to 58% the previous year. Only 13% of our students scored in the D or F range compared to 17% the previous year.

On the New York State grade 8 science assessments, 95% of our students achieved competency or mastery, with the number of our students achieving mastery at level 4 up slightly, 68% to 65%. District wide we had only three students achieve at level 1. This represents less than 1% of our district population. As with the grade 4 exam, this test is used to determine accountability for the federal and No Child Left Behind mandate. It also serves as an effective benchmark to identify students in need of academic intervention services in order to pave the way for graduation from Shaker High School.

PROGRAM HIGHLIGHTS

Our students continue to do well on academically at all grade levels. The Earth Science program represents 20% of the 8th grade class which is a solid representation. Our students continue to do well on the N.Y.S. Science 8 Assessment with 95% of our students achieving levels 3 and 4. Teachers continue to hold students accountable for their work.

OBJECTIVES

- Analyze results of the 2007 New York State Grade 8 Science assessment.

Evaluation: Were any curricular/instruction revisions suggested?

Due to new testing dates, the 8th grade teachers have met several times to make the necessary curriculum changes. Ongoing work will continue regarding this objective. Our students have continued to do well on the Science 8 Assessment. Ninety-four percent of our 8th grade students achieved levels 3 and 4. Twenty-seven students were required to receive AIS. Only six students received a score on Level 1 and twenty-one scored on level 2. These results are higher than previous years.

- Analyze results of the 2007 Earth Science exam.

Evaluation: Were any curricular/instruction revisions suggested?

No curricular/instruction revisions needed at this time. However, there will be a new Part D lab component on the Earth Science Regents Exam in June 2008.

SCIENCE (cont.)

On the Earth Science Regents Exam in June 2007, 98% of the students scored 85 or higher. Our goal is to have 90% score 85 or higher, thereby exceeding our goal.

- Monitor the 7E Laboratory Program.

Evaluation: Were any needs for revisions identified?

Science teachers are currently reviewing, revising, and updating our laboratory program to ensure that our students are ready for the new Part D Lab Exam to be given in June 2008.

- Monitor the Earth Science Laboratory Program.

Evaluation: Were any needs for revisions identified?

Two science teachers updated the Earth Science packet this past summer. The science packet is more streamlined now and is more in line with the core curriculum guide.

- Review, revise and update the Earth Science packet.

Evaluation: Was the Earth Science packet updated?

Teachers are pleased with the new Earth Science book. They will continue to review, revise, and update the implementation of this book.

- Monitor the use of the new Earth Science book.

Evaluation: Were any needs for revisions identified?

There are no curricular revisions to be made at this time.

LEVEL9(-12)

NYS - Regents - Science

Earth Science -SHS- 274 tested (97.5% of those enrolled) Percent passing = 97.5%
Total including Grade 8 Students Percent passing = 98.1%

Biology -SHS- 374 tested -(97.9% of those enrolled) Percent passing = 98.9%

SCIENCE (cont.)

Chemistry -SHS - 353 tested (98.6% of those enrolled) Percent passing = 95.2%

Physics -SHS -177 tested (100% of those enrolled) Percent passing = 96.1%

Percentage of students scoring 85% or higher on Regents examinations:

Earth Science	48.5%
Biology	58.3%
Chemistry	29.5%
Physics	56.5%

CEEB Achievement Tests-Performance standards = ** Biology E; 666 Biology M:
Chemistry 666; Physics 735

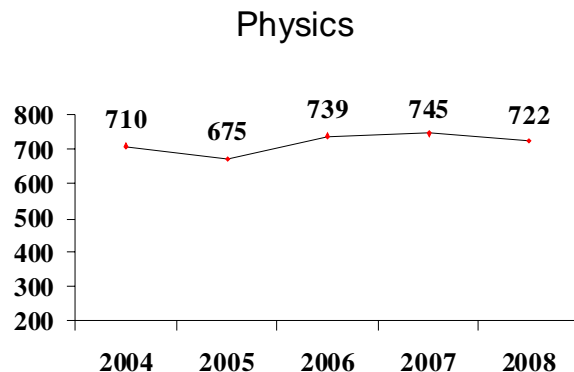
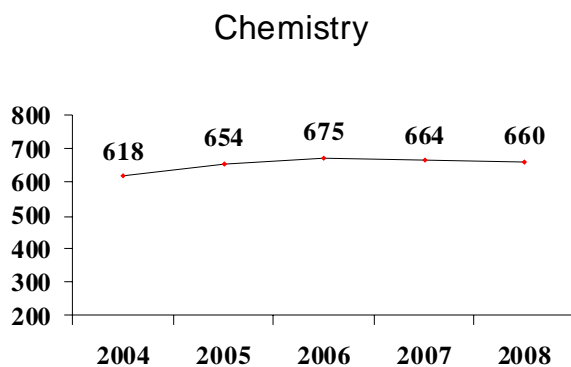
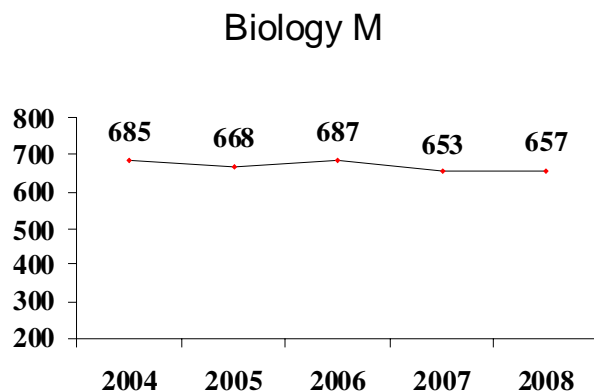
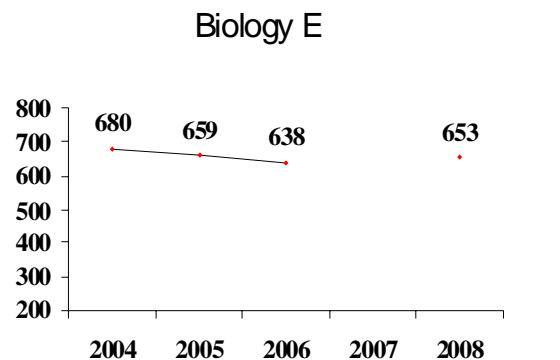
	Biology E	Difference over/under Performance Standard - **	Biology M	Difference over/under Performance Standard - 666
	653		657	-9
Number Tested	27		21	

**No mean score available; data set too small.

	Chemistry	Difference over/under Performance Standard - 666	Physics	Difference over/under Performance Standard - 735
	660	-6	722	-13
Number Tested	50		17	

SCIENCE (cont.)

(2004-2008 Results - CEEB Science Achievement Tests)



CEEB Advanced Placement - Performance standard = 90% score "3" or higher

	Biology	Difference over 90%
SHS Percent scoring "3" or Higher	95%	+5
Number tested	20	
NYS Percent scoring "3" or higher	57	
US Percent scoring "3" or higher	50	

	Chemistry	Difference over 90%
SHS Percent scoring "3" or Higher	94%	+4
Number tested	18	
NYS Percent scoring "3" or higher	66	
US Percent scoring "3" or higher	55	

SCIENCE (cont.)

	Physics B	Difference over 90%
SHS Percent scoring "3" or Higher	88%	- 2
Number tested	41	
NYS Percent scoring "3" or higher	68	
US Percent scoring "3" or higher	59	

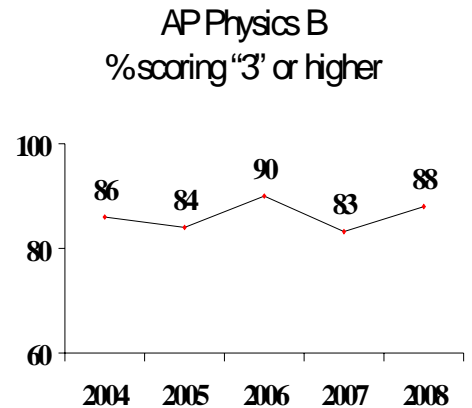
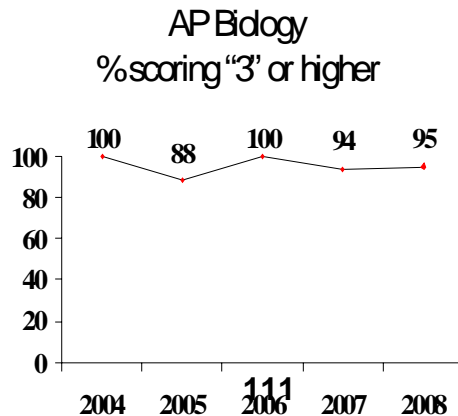
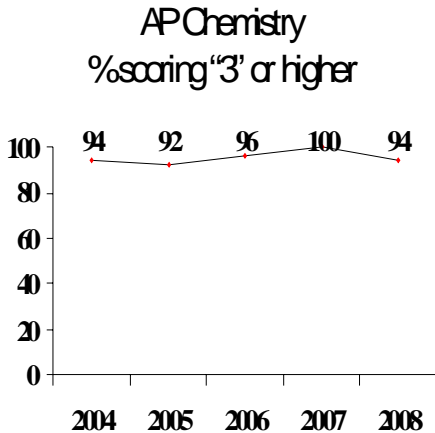
	Physics C, Mechanics	Difference over 90%
SHS Percent scoring "3" or Higher	91%	+1
Number tested	22	
NYS Percent scoring "3" or higher	80	
US Percent scoring "3" or higher	73	

	Physics C, Electricity & Magnetism	Difference over 90%
SHS Percent scoring "3" or Higher	82	- 8
Number tested	22	
NYS Percent scoring "3" or higher	70	
US Percent scoring "3" or higher	70	

	Environmental Science	Difference over 90%
SHS Percent scoring "3" or Higher	87%	-2
Number tested	24	
NYS Percent scoring "3" or higher	61	
US Percent scoring "3" or higher	54	

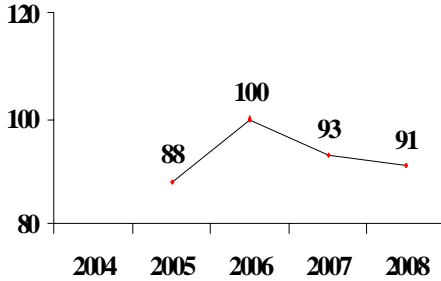
*Data from NYS and US data are for 2008.

(2004-2008 Results - CEEB AP)

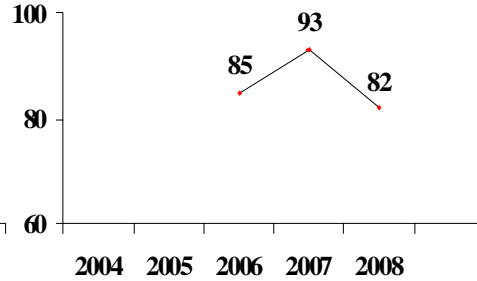


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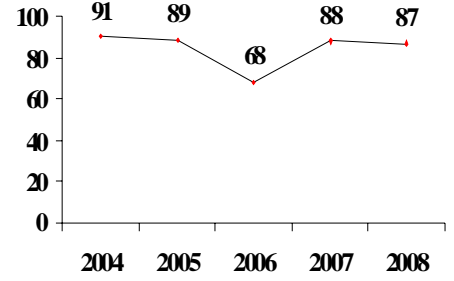
*AP Physics C Mechanics
%scoring "3" or higher



*AP Physics C Elec & Mag
%scoring "3" or higher



AP Environmental Science
%scoring "3" or higher



*AP Physics C Mechanics and AP Physics C Electricity & Magnetism not offered this year.

Regents Competency Tests (RCT)

Grade 9

Subject	Number Failing		Percent of Class Not Completing Requirement	
	2007-08	2006-07	2007-08	2006-07
	9	17	19%	18%

Grade 10

Subject	Number Failing		Percent of Class Not Completing Requirement	
	2007-08	2006-07	2007-08	2006-07
	5	3	.6%	.6%

Grade 11

Subject	Number Failing		Percent of Class Not Completing Requirement	
	2007-08	2006-07	2007-08	2006-07
	1	0	0%	0%

Grade 12

Subject	Number Failing		Percent of Class Not Completing Requirement	
	2007-08	2006-07	2007-08	2006-07
	1	0	0%	0%

SCIENCE (cont.)

In 2007-08, our high school science students continued a string of outstanding achievement on all four New York State Regents exam in science. Our district goal is to achieve a 90% passing rate. Last year we far exceeded that with 95% of our students passing every Regents exam. In Earth Science, the inclusion of the students from the junior high school matched last year's passing rate of 98%. The Living Environment passing rate of 96% was nearly identical to last year's rate of 97%. Our Chemistry and Physics students also did extremely well and matched or nearly matched last year's performance with 95% passing in Chemistry and 96% passing in Physics. The percentage of our students achieving mastery at 85% or better is also impressive. In Earth Science, Living Environment, and Physics, 50% of our students were nearly at or exceeded a 50% mastery rate. In Chemistry, 30% of our students achieved a score of 85 or better compared to 33% the previous year and 23% two years ago. All Regents results represent strong achievement and consistently rank us at the top or near the top among our Suburban Council cohorts.

Our students take four CEEB science tests: Biology E, Biology M, Chemistry, and Physics. On all four of these examinations, our students far exceeded Suburban Council, New York State and national norms.

On the CEEB Advanced Placement test, we had 95% our students scoring at level 3 or better on the AP exam in Biology, Chemistry, and Physics C, Mechanical. In AP Environmental Science, our students continued a strong trend of achievement towards attaining that 90% as they equaled last year's rate of 88%. This rate is up considerably from the 68% achieving at level 3 or better two years ago. In Physics B, 88% of our students achieved at level 3 or better. Although not at the district norm of 90%, this remains the second highest Physics achievement at level 3 or better in the past five years. In Physics C although 82% of our students attained level 3 or better we are pleased by the fact that the participation rate of 22 represents a significant increase over prior years. This is a calculus-based physics program and is the most difficult science AP offered.

PROGRAM HIGHLIGHTS

STATISTICAL

- Our Regents pass rates remained high once again this year. The Living Environment, Chemistry and Physics exams deserve particular attention as they are all above performance standards for the second year in a row.
- Mastery rate in physics has improved slightly once again. The improvement over last year is not too significant, however mastery has improved every year for the last five years, which is a great trend.
- Once again, our Advanced Placement Environmental Science scores were

SCIENCE (cont.)

very good as compared with two years ago. This is especially noteworthy as we have transitioned the program to a new teacher who worked very hard to ensure student success.

- Final Marks in our courses were very good overall, however some courses demonstrated tremendous improvements in Final Marks as compared with previous years. Most noteworthy are Physics R, Physics H, and Science In Our Lives III – all at a three year high.

CURRICULAR

- Laboratory grading practices were modified in the Biology Lab program to improve grading consistency while still holding students accountable for their work. Curriculum alignment in the Biology lab was improved by working with teachers from other laboratory programs and modifying the biology labs to increase correlation. This was the first year of a four year plan to improve grading and curriculum alignment in all Regents labs.
- Earth Science lab teachers were brought together to examine the laboratory programs at both the junior high school and the high school. This collaboration helped improve both laboratories, and ensure that instruction is congruent at each school.
- Our Earth Science Department hosted a “turn-key” training for all interested Earth Science teachers at the junior high school as well as Loudonville Christian School. The training was a large success and helped all schools implement the new Earth Science Performance Test (Part D) successfully.
- Our Science Research Program helped produce a second INTEL Science and Engineering Fair finalist in as many years. Anjali Puttachi won the local RPI science competition and traveled to Atlanta to compete globally with her work.
- The Forensics program ran for the first time this year and was a tremendous success. Students reported very favorable feedback about the program and we hope to run more sections in the near future.
- Honors and AP – B Physics textbooks as well as Environmental Science textbooks were approved for purchase in the 2008-09 school year.
- A new Advanced Placement Physics laboratory was approved for purchase in the 2008-09 school year.

SCIENCE (cont.)

OBJECTIVES

- Evaluate and modify lab/classroom safety practices and procedures across the entire science program to help ensure that we are providing the safest possible setting for our students (continued from 06-07 school year).

Evaluation: Were current lab safety practices and procedures evaluated? Were necessary changes made to help further ensure the safety of our students?

Safety in our laboratories is an ongoing commitment for the Shaker High School science department. Our safety contract has been expanded for use this year in our Integrated Regents Program and Science In Our Lives program. Chemical redundancy has been reduced drastically due to the large chemical clean-up which occurred during the summer of 2007. All goggles have been replaced with improved splash resistant OSHA approved models in all laboratories which use liquid chemicals. Additionally this year, we have reduced our chemical concentrations to make safer, yet equally effective, solutions. For example, we were able to reduce the concentrations of our acids and bases in a variety of chemistry laboratories without compromising any instructional effectiveness. Using the lower concentrations has also reduced supply costs.

- Evaluate and, if necessary, modify our procedures and practices for laboratory in both our core subjects as well as our stretch courses (continued from 06-07 school year).

Evaluation: Was an evaluation done to determine if our procedures and practices are appropriate? If deemed necessary, have changes been made to improve our system?

The new grading procedure in the Biology laboratory has worked well this year. Based on the feedback from the biology teachers, we will continue with our four year transition and be implementing the same grading policy in Earth Science next year. The new policy prevents too punitive a consequence if a student is only missing a single lab, but still holds students accountable for their work. Additionally, we have adjusted our laboratory timing so that each lab is worth a certain amount of time, depending on the lab activity being performed, which counts toward the NYS mandate of 1200 minutes. The new timing reflects more closely the amount of time performing the actual laboratory as opposed to a straight 46 minutes (total class time). In this way we ensure that the amount of time our students are earning towards the NYS mandate is not time spent preparing, discussing or cleaning up after a laboratory.

SCIENCE (cont.)

- Monitor the new Forensics program throughout the year. Evaluate and, if necessary, make modifications to the program to address student needs in subsequent years.

Evaluation: Was the Forensics course monitored? If needed, were appropriate changes made to the program to better meet the needs of the students in subsequent years?

The Forensics program is a tremendous success. Students have enjoyed the class and we have the same amount of interest in the program for the 2008-09 school year. This summer, we will evaluate and perhaps modify some portions of the program now that we have a working knowledge of the entire curriculum. For the future, we will pursue the possibility of adding another section of the program.

- Compare, evaluate and, if necessary, modify our Earth Science laboratory programs at Shaker Junior High and Shaker High School to ensure appropriate rigor and alignment.

Evaluation: Were the two Earth Science lab programs compared? Were appropriate changes made to ensure rigor and alignment between the programs?

Two Earth Science laboratory teachers evaluated each program. Portions of the junior high lab are now being used in the high school, and portions of the high school program are now being used at the junior high.

Additionally, the new Earth Science Regents Part D was prepared for implementation in June 2008. To prepare both the junior high and the high school programs, we sent a single high school Earth Science teacher to a NYSED approved BOCES training this winter. That teacher was then approved to provide the same training to the rest of our staff. SJHS and SHS Earth Science teachers were then trained by our teacher this spring on the new part D test. The district is fully ready to implement the new part D exam.

- Evaluate and, if necessary, modify our chemistry curricula in the Regents and Honors levels to better meet the needs of our students.

Evaluation: Were the Chemistry Regents and Honors programs evaluated? If necessary, were changes made to each program to better meet the needs of our students?

The new textbook was integrated into our current curriculum. A large amount of work was also done improving the chemistry laboratory program. All labs were

SCIENCE (cont.)

modified to fit a new format which has greatly improved student comprehension. Labs are being given out on a quarterly basis, so that students always know the next laboratory in advance. This is unique to chemistry, as all of our other programs hand each lab out on a daily basis. We would like to use the improvements made in chemistry lab as a model for our other labs in the future.