Science Program Evaluation

Grades K-8

2003

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Evaluation Introduction

The science program evaluation is part of the traditional curriculum evaluation cycle as approved by the Board of Education. The last K-5 and 6-8 science program evaluations were conducted in December of 1996. The science program evaluation was lead by the district science supervisor and consisted of numerous teachers. The K-5 program evaluation segment consisted of teachers representing each grade level and each of the elementary schools. The 6-8 science program evaluation segment consisted of each of the nine science teachers at William Annin School therefore all of three main subject area categories of physical science, life science, and earth science have all been adequately represented.

The results from this analysis will be provided to the District Curriculum Committee, the Board of Education Curriculum Committee, and the full Board of Education. The evaluation will help determine the relative strengths and areas that need more attention within the K-8 science program.

Resources

The students in grades K-5 are exposed to varied content annually in the areas of life science, earth science, and physical science. The individual units are developed such that they are independent of each other. Therefore, the sequence of the units is to be determined by teacher discretion but primarily to allow for the integration of language arts, social studies, and mathematics thematic units. Interdisciplinary integration is encouraged whenever possible. *Science Anytime* (1995) is a traditional science kit system that is used in grades K-4. *Discovery Works* (1996) is used in grade five and this product encourages a smooth transition to the science program and structure that is present at the middle school. On the elementary level consumables are reordered at each grade level annually.

In the middle school the students learn physical science in grade six, life science in grade seven, and earth science in grade eight. In all of these three areas a main textbook and material sources are used. Some of these textbooks contain coordinating lab activities, but more often the teachers supplement the text with activities and lab work of their own. In grade six the *Voyage of the Mimi* (1985) and *Prentice Hall's Motion, Forces, and Energy* (1994) are used as the main sources of the science material. The current life science textbook package that is being used is *Glencoe's Life Science* (1999). In grade eight the students are using *Merrill's Earth Science* (1994).

In the middle school science instruction takes place in a classroom. With the exception of the three sixth grade physical science classrooms the other science classrooms are equipped with water and gas outlets for instruction and a more advanced laboratory component. Two of the three seventh grade classrooms are well equipped with an updated lab station area. The earth

science classrooms also have a lab area within their classrooms. Although, not all optimal, these facilities at the middle school provide the students with an opportunity to perform laboratory experiments and hands-on activities. Consumables are reordered annually at each grade level.

Grouping Strategies

Students are heterogeneously grouped in science in grades K-8. This gives the students the opportunity to work in cooperative groups with other students of varying ability levels. Cooperative learning is a natural outgrowth in the study of science and these groupings are flexible and change throughout the year. Cooperative experiences are not stereotypical with regard to race, gender, or educational ability.

PHILOSOPHY OF SCIENCE EDUCATION

Education in science introduces students to the community of scientists, to the traditions of science, and to scientific exploration. Through the experiences provided in learning science, students become acquainted with the processes by which scientific concepts are created and then explored. Knowledge of these processes and concepts leads to the awareness that science is not a set of findings but rather the search for them. This awareness is accompanied by the understanding that issues created by the advance of science can only be resolved by moral judgment and political choice.

Science education addresses the students' need to deal with science as part of our culture. For some students, the experiences of science education initiate or respond to a personal interest in preparing to enter those courses of study and training that led to participation in the democratic community of pure and applied scientists. In addition, science education prepares all students to respond to scientific information regarding the social and personal issues raised by technology and to be functional members of the society.

Students need to understand the interrelations between science and technology and develop a conceptual understanding of the nature and process of technology. Students will combine their understanding of the nature of technology and science in order to develop their abilities to make predictions, decisions, think critically, and ultimately to problem solve. Science will continue to advance with the knowledge and application of technology.

Students learn science best when they have opportunities to model the methods of science, to learn by doing. This complements students' development as they move from dependence on concrete activities to tentative experiences with abstract thinking. At all grade levels, educators strive to provide guidance and stimulate students' curiosity and interest in science.

The content of science education is selected to meet students' needs. The content provides for the development of science concepts that are encountered and explored using the processes of science. There are opportunities for independent critical thinking through hands-on activities and a discovery-based program. These encourage a healthy skepticism.

Students learning science collect real data in classrooms, laboratories, and the outdoors. They record observations and measurements done on large and small scales, in qualitative and quantitative modes. They manipulate apparatus and follow directions to assemble and disassemble it. They analyze, manipulate, and communicate data using scientific terminology. They use mathematics to find patterns, discover relationships, and generate explanations and employ quick mental estimates for many mathematical operations.

Through the exploration of matter, motion, forces, space, and earth students will find that science is connected to their everyday lives. Students need to understand the environment as a system of interdependent components affected by human activity and phenomena. From the study of organisms to how our universe was created, students can see the relationship between their lives and global issues.

The outcomes of science education are recognized when students…

- demonstrate the knowledge and use of the processes of science
- demonstrate knowledge of and appreciation for the nature of science
- apply knowledge in the science disciplines
- demonstrate skills for applying the processes, the knowledge, and the appreciation of science to issues wherein science, technology, and society meet
- demonstrate an understanding of the interrelationship between science and technology
- demonstrate an understanding of the interrelationship between human activity and the environment

The student who has achieved mastery in science education has experienced, can describe, and can choose to use the overall purpose of science: to search for truth in the world in which we live and beyond.

BERNARDS TOWNSHIP PUBLIC SCHOOLS
SCIENCE CURRICULUM OVERVIEW
GOALS AND OBJECTIVES K-5

Goal 1:

To develop learners who can use problem solving, decision-making, and inquiry skills (NJCCS 5.1).

Objectives:

- Students will formulate usable questions and hypotheses
- Students will plan experiments
- Students will conduct systematic observations
- Students will interpret, analyze, and draw conclusions about data
- Students will communicate results
- Students will apply the language of science and the scientific method
- Students will understand and practice safety procedures for science investigations

Goal 2:

To develop learners who understand that people of various cultures have contributed to the advancement of science and technology (NJCCS 5.2).

Objectives:

- Students will listen to, read, write, and talk about scientists and inventors in historical context
- Students will recognize that people in different cultures have made and continue to make contributions to science and technology

Goal 3:

To develop learners who use mathematics as a tool for problem solving in science, and to express scientific theories (NJCCS 5.3).

Objectives:

- Students will use tools for everyday purposes
- Students will use measuring instruments
- Students will use mathematical skills and concepts in ordering, estimating, counting, identifying, measuring and describing
- Students will use tables and graphs to represent and interpret data

Goal 4:

To develop learners who will understand the interrelationships between science and technology and to develop conceptual understanding of the nature and process of technology (NJCCS 5.4).

Objectives:

- Students will distinguish between things that occur in nature and those that have been designed to solve human problems
- Students will demonstrate how measuring instruments are used to gather information in order to design things that work properly
- Students will describe a product or device in terms of the problem it solves or the need it meets
- Students will use the design process to identify a problem, look for ideas, and develop and share solutions with others
- Students will identify the basic components of a technological system: input, process, output, and feedback

Goal 5:

To develop learners who have an understanding of their world in the areas of life science, physical science, and earth science (NJCCS 5.5, 5.6, 5.7, 5.8, 5.9, 5.10).

Objectives:

- Students will gain an understanding of the structure, characteristics, basic needs of organisms and investigate the diversity of life
- Students will gain an understanding of the structure and behavior of matter
- Students will gain an understanding of natural laws as they apply to motion, forces, and energy transformations
- Students will gain an understanding of the structure, dynamics, and geophysical systems of the earth
- Students will gain an understanding of the theories of origin, evolution, and structure of the universe
- Students will gain an understanding of the environment as a system of interdependent components affected by human activity and natural phenomena

Goal 6:

To develop learners who can identify systems of interacting components and understand how their interactions combine to produce the behavior of a system (NJCCCS 5.5).

Objectives:

- Students will recognize that most things are made of components
- Students will recognize that a system may not work if a component is missing
- Students will diagram the components of a system

Please remember to:

- *Sign the sign-in sheet located in this room.*
- *Check "Yes" on the sign-in sheet if you are interested in assisting with the K-5 science revision process.*
- *Return this questionnaire to the yellow envelope located in this room before leaving.*

K-5 Science Program Evaluation

Teacher Survey

Directions: Using a scale from A (the highest) to E (the lowest), please rate the following questions by circling a letter on the scale following each question. Please think about the science program at your grade level and discuss it with your colleagues before responding to the following questions.

1. To what extent are the science objectives that are developed at the local level available to teachers?

A	B	C	D	E

2. To what extent are lesson plans and actual class instruction based on the objectives outlined in the science curriculum?

A	B	C	D	E

3. To what extent are assessment items appropriate for measuring the student attainment of the objective?

A	B	C	D	E

4. To what extent does the student assume responsibility for the attainment of the objectives?

A	B	C	D	E

5. To what extent are teachers aware of informal assessment activities and conferences as a means for assessing student attainment?

A	B	C	D	E

6. To what extent are activities based on students' previous scientific experiences and knowledge?

A	B	C	D	E

7. How well do the instructional activities lead students from concrete facts to abstract thinking?

A	B	C	D	E

8. To what extent do instructional activities regularly include problem solving involving scientific applications that are meaningful to students?

A	B	C	D	E

9. To what extent do students use hands-on materials to learn scientific concepts?

A	B	C	D	E

10. To what extent do teaching practices include large-group, small-group, and individualized instruction as appropriate to each lesson?

A	B	C	D	E

11. To what extent are students appropriately involved in a variety of activities?

A	B	C	D	E

12. To what extent are laboratory activities and hands-on experiences incorporated into the prescription of the science lessons?

A	B	C	D	E

13. To what extent do teachers employ teaching styles compatible with students' learning styles?

A	B	C	D	E

14. To what extent does the teacher create a positive learning environment when studying science?

A	B	C	D	E

15. To what extent does the teacher use an acceptable method for recording student progress in the study of science?

A	B	C	D	E

16. To what extent is technology integrated into the study of science?

A	B	C	D	E

17. How effective is the communication of student progress to both students and parents?

A	B	C	D	E

18. To what extent are provisions made for all students?

A	B	C	D	E

19. To what extent are provisions made for gifted and talented students, where needed?

A	B	C	D	E

20. To what extent are provisions made for middle level students, where needed?

A	B	C	D	E

21. To what extent are provisions made for remedial instruction, where needed?

A	B	C	D	E

22. To what extent are provisions made for handicapped students, where needed?

A	B	C	D	E

23. To what extent are provisions made for disadvantaged students, where needed?

A	B	C	D	E

24. To what extent are services available for special needs students?

A	B	C	D	E

25. To what extent are there system approved curriculum guides available for each teacher in the school?

A	B	C	D	E

26. To what extent are the guides current and consistent with state and local goals and objectives?

A	B	C	D	E

27. To what extent have teachers been involved in the past when developing the science program?

A	B	C	D	E

28. To what extent is the science curriculum understood and followed?

A	B	C	D	E

29. To what extent is the material scientifically sound?

A	B	C	D	E

30. To what extent is the level of the content appropriate for the identified grade level group on which the material is taught?

A	B	C	D	E

31. To what extent are there meaningful applications within the science program content?

A	B	C	D	E

32. To what extent does the science program reflect current topics in science education?

A	B	C	D	E

33. To what extent do you believe that our current science program is successful?

A	B	C	D	E

34. To what extent do you believe that the science program materials meet the preparation needs of the teacher?

A	B	C	D	E

35. To what extent in the past have provisions been made for teachers to participate in the evaluation of materials?

A	B	C	D	E

36. To what extent are the current science materials organized for easy retrieval?

A	B	C	D	E

37. To what extent are the science materials easily accessible to the teacher?

A	B	C	D	E

38. To what extent are the materials periodically reviewed and updated?

A	B	C	D	E

39. To what extent are a variety of materials available and matched with the instructional program?

A	B	C	D	E

40. To what extent is the science program presented using active student participation in a discovery-based manner?

A	B	C	D	E

Thank you for your time and attention to these questions, as your feedback will be used in the development of the K-5 science program evaluation process.

K-5 Teacher Survey Summary

Kindergarten

The teachers at the kindergarten level were in agreement that science objectives are readily available to the teaching staff and that lesson plans and instruction are based on those objectives.

In terms of the current program, the staff felt strongly that the activities in the current program do not lead students appropriately from the concrete to the abstract and the activities do not provide enough hands-on experimentation. Although teachers felt that the kit materials for the activities are organized and easily accessible, the activities themselves do not encourage higher levels of thinking or the use of the scientific process.

In general, the teachers feel that the program is aimed at middle-level students with little or no opportunity for differentiation for gifted or remedial students.

In summary, teachers at the kindergarten level feel that the current program does an adequate job of providing appropriate materials, however, it does not provide activities that encourage higher-level thinking or the use of the scientific process and, therefore, teachers spend a great deal of time developing additional activities which encourage more active student participation.

Grade 1

Currently, teachers feel the program objectives are readily available and understand the objectives. However, there is a split opinion on the whether the program provides sufficient hands-on activities and materials for science lessons. This split may be a reflection of the fact that the program provides hands-on activities, however the quality of these experiments is poor. The majority of teachers felt the program did not provide meaningful applications of the core science objectives and the program needed more discovery-based learning opportunities. Teachers also had a split opinion with regard to whether the science materials were organized and easily accessible.

The areas of major concern involved meeting student's individual needs. Twelve out of sixteen teachers felt the current program did not address the needs of gifted students. Additionally, eleven out of sixteen teachers felt there were not special accommodations to help remedial students meet the program objectives. Teachers were also concerned that current labs and activities do not develop higher order thinking skills. Overall, nearly 70% of teachers felt the current science program was not successful. An additional 20% felt neutral in regards to the success of the program.

Grade 2

The objectives and curriculum are available and easily understood although teachers may need more assistance in directing students from concrete to abstract thinking. The program does not, however, make accommodations for either gifted students or students needing remedial instruction. With proper planning and organization the materials can be easily accessible. Overall, the teachers believed that the program would benefit from more meaningful and challenging activities, which connect to the students' interests and real lives. Most teachers do not consider the program a success.

Grade 3

Objectives are clearly stated and teachers teach to the objectives. The curriculum is understood and followed by the teachers.

The current program is geared to the middle students. There is no differentiation in the program as it stands and the teachers do large amount of work to supplement it. The SEM model provided the only differentiation and only in the buildings that developed it for science. This accounts for the disparity in the results in the survey. Teachers noted such on the survey and this can account for the disparity in the results of the survey.

Activities in the program do not always lead from the concrete to the abstract. In some cases the activities are too simple and do not provide opportunities for higher-level thinking. In other activities, the leap is too great to be made without teacher guidance. Due to time constraints, teachers are not always able to provide this. Too often activities may be successful as stand alone experiments, but they do not lead to the larger picture of the content.

Most feel the current program is not successful, but the survey does not contain sufficient data to explain why. It is not clear if it is a problem with materials or of time constraints. There were concerns with organization and accessibility of materials.

There were repeated comments about activities being too simple or not working. Activities are segmented. Much is expected of the teacher to bridge the gap between activities for a clear content flow. Success is dependent on the teacher doing this.

Grade 4

In looking at the current science program, the teachers felt that the science objectives were developed but were not successfully met through lesson plans and activities. Although the majority of the teachers felt the program was hands-on, most believed the activities did not lead the students toward abstract thinking. The majority of the teachers felt the program did not challenge advanced learners but was geared more towards the average student. Some concepts of the program were not developed thoroughly therefore, lower students struggled. Although 10 teachers out of 17 felt that the curriculum was understood and followed, 11 believed the applications within the program were not meaningful. The majority felt that materials were not easily accessible. The program did not lend itself to active student participation in a discovery-based manner. The consensus of the overall program was negative.

Grade 5

Teachers did not believe the program provided comprehensive lessons. Therefore, most teachers follow objectives provided in the curriculum, but find the need to continually supplement the program materials. Similarly, teachers felt the program did not provide the guidance needed to lead students from concrete facts to abstract thinking. Most teachers disagreed that students use the hands-on materials to learn scientific concepts. The program did not provide enough student support to aid students in making connections between the labs and the concepts. Teachers did not feel the hands-on activities are incorporated into the presentation of the science lessons.

Teachers were split on provisions made for gifted and talented students, but many teachers noted that any provisions made were teacher-generated and not program directed. The same is true for middle level students. Teachers were undecided about provisions made for remedial instruction as well as whether the science curriculum is understood and followed.

Teachers do not agree that there are meaningful applications within the science program content. Also, teachers do not feel that the current science program is successful. Finally, most teachers do not believe that the science program uses active student participation in a discovery-based manner.

Overall, the teachers feel the program does not provide enough support for the teacher and the students.

Kindergarten Teacher Survey Analysis:

Question	Strongly Agree A	Agree B	Neutral C	Disagree D	Strongly Disagree E
1. To what extent are the science objectives that are developed at the local level available to teachers?	18				
2. To what extent are lesson plans and actual class instruction based on the objectives outlined in the science curriculum?	14	4			
7. How well do the instructional activities lead students from concrete facts to abstract thinking?	2				14
9. To what extent do students use hands-on materials to learn scientific concepts?	3		4	3	7
12. To what extent are laboratory activities and hands-on activities incorporated into the presentation of the science lessons?	4			2	11
19. To what extent are provisions made for gifted and talented students, where needed?	4			4	3
20. To what extent are provisions made for middle level students, where needed?	4	4	1	3	
21. To what extent are provisions made for remedial instruction, where needed?	4			1	7
28. To what extent is the science curriculum understood and followed?	13	3	1	1	
31. To what extent are there meaningful applications within the science program content?	4		10	4	

Question	Strongly Agree A	Agree B	Neutral C	Disagree D	Strongly Disagree E
33. To what extent do you believe that our current science program is successful?	4		2	8	4
36. To what extent are the current science materials organized for easy retrieval?	10	6	2		
37. To what extent are the science materials easily accessible to the teacher?	13	5			
40. To what extent is the science program presented using active student participation in a discovery-based manner?	4			8	6

Grade 1 Teacher Survey Analysis:

Question	Strongly Agree A	Agree B	Neutral C	Disagree D	Strongly Disagree E
1. To what extent are the science objectives that are developed at the local level available to teachers?	10	3	3		
2. To what extent are lesson plans and actual class instruction based on the objectives outlined in the science curriculum?	10	1	3	2	
7. How well do the instructional activities lead students from concrete facts to abstract thinking?			6	9	1
9. To what extent do students use hands-on materials to learn scientific concepts?		4	6	4	2
12. To what extent are laboratory activities and hands-on activities incorporated into the presentation of the science lessons?		5	3	4	1
19. To what extent are provisions made for gifted and talented students, where needed?		2	2	4	8
20. To what extent are provisions made for middle level students, where needed?		3	8	2	3
21. To what extent are provisions made for remedial instruction, where needed?		2	3	2	9
28. To what extent is the science curriculum understood and followed?	6	2	3	5	
31. To what extent are there meaningful applications within the science program content?	1	2	2	7	4

Question	Strongly Agree A	Agree B	Neutral C	Disagree D	Strongly Disagree E
33. To what extent do you believe that our current science program is successful?	1	1	3	3	8
36. To what extent are the current science materials organized for easy retrieval?	1	3	6	3	3
37. To what extent are the science materials easily accessible to the teacher?	2	7	2	4	1
40. To what extent is the science program presented using active student participation in a discovery-based manner?		4	3	3	6

Grade 2 Teacher Survey Analysis:

Question	Strongly Agree A	Agree B	Neutral C	Disagree D	Strongly Disagree E
1. To what extent are the science objectives that are developed at the local level available to teachers?	4	1	6		
2. To what extent are lesson plans and actual class instruction based on the objectives outlined in the science curriculum?	3	10	12		
7. How well do the instructional activities lead students from concrete facts to abstract thinking?		1	7	5	2
9. To what extent do students use hands-on materials to learn scientific concepts?		8	5	1	
12. To what extent are laboratory activities and hands-on activities incorporated into the presentation of the science lessons?		7	7		
19. To what extent are provisions made for gifted and talented students, where needed?			3	11	
20. To what extent are provisions made for middle level students, where needed?		5	6	2	
21. To what extent are provisions made for remedial instruction, where needed?		1	3	8	2
28. To what extent is the science curriculum understood and followed?	1	11	2	1	
31. To what extent are there meaningful applications within the science program content?		1	12	3	

Question	Strongly Agree A	Agree B	Neutral C	Disagree D	Strongly Disagree E
33. To what extent do you believe that our current science program is successful?		1	5	9	
36. To what extent are the current science materials organized for easy retrieval?		8	9		
37. To what extent are the science materials easily accessible to the teacher?	1	5	6	2	1
40. To what extent is the science program presented using active student participation in a discovery-based manner?		2	6	5	2

Grade 3 Teacher Survey Analysis:

Question	Strongly Agree A	Agree B	Neutral C	Disagree D	Strongly Disagree E
1. To what extent are the science objectives that are developed at the local level available to teachers?	15	5	2		2
2. To what extent are lesson plans and actual class instruction based on the objectives outlined in the science curriculum?	21		1		
7. How well do the instructional activities lead students from concrete facts to abstract thinking?		3		13	4
9. To what extent do students use hands-on materials to learn scientific concepts?	2	7	3	2	8
12. To what extent are laboratory activities and hands-on activities incorporated into the presentation of the science lessons?		6	5	7	4
19. To what extent are provisions made for gifted and talented students, where needed?	10	7	3	1	1
20. To what extent are provisions made for middle level students, where needed?	4	4	12	2	
21. To what extent are provisions made for remedial instruction, where needed?	1	5	8	4	4
28. To what extent is the science curriculum understood and followed?	5	6	3	8	
31. To what extent are there meaningful applications within the science program content?			4	16	2

Question	Strongly Agree A	Agree B	Neutral C	Disagree D	Strongly Disagree E
33. To what extent do you believe that our current science program is successful?		2	4	8	8
36. To what extent are the current science materials organized for easy retrieval?		4	8	4	6
40. To what extent is the science program presented using active student participation in a discovery-based manner?		3	5	7	7

Grade 4 Teacher Survey Analysis:

Question	Strongly Agree A	Agree B	Neutral C	Disagree D	Strongly Disagree E
1. To what extent are the science objectives that are developed at the local level available to teachers?	12	2		3	1
2. To what extent are lesson plans and actual class instruction based on the objectives outlined in the science curriculum?	1	2	10	4	1
7. How well do the instructional activities lead students from concrete facts to abstract thinking?	0	0	3	8	7
9. To what extent do students use hands-on materials to learn scientific concepts?	1	13	4	0	0
12. To what extent are laboratory activities and hands-on activities incorporated into the presentation of the science lessons?	2	8	6	2	0
19. To what extent are provisions made for gifted and talented students, where needed?	0	3	2	3	10
20. To what extent are provisions made for middle level students, where needed?	6	5	1	0	5
21. To what extent are provisions made for remedial instruction, where needed?	1	2	4	0	10
28. To what extent is the science curriculum understood and followed?	1	9	4	3	0
31. To what extent are there meaningful applications within the science program content?	0	4	3	4	7

Question	Strongly Agree A	Agree B	Neutral C	Disagree D	Strongly Disagree E
33. To what extent do you believe that our current science program is successful?	0	2	3	4	8
36. To what extent are the current science materials organized for easy retrieval?	4	2	5	4	3
37. To what extent are the science materials easily accessible to the teacher?	0	2	9	4	3
40. To what extent is the science program presented using active student participation in a discovery-based manner?	1	3	4	4	6

Grade 5 Teacher Survey Analysis:

Question	Strongly Agree A	Agree B	Neutral C	Disagree D	Strongly Disagree E
1. To what extent are the science objectives that are developed at the local level available to teachers?	6		15		
2. To what extent are lesson plans and actual class instruction based on the objectives outlined in the science curriculum?		7	12	1	
7. How well do the instructional activities lead students from concrete facts to abstract thinking?			3	14	4
9. To what extent do students use hands-on materials to learn scientific concepts?		3	6	9	3
12. To what extent are laboratory activities and hands-on activities incorporated into the presentation of the science lessons?			5	14	2
19. To what extent are provisions made for gifted and talented students, where needed?	8	1	3	8	
20. To what extent are provisions made for middle level students, where needed?	10		11		
21. To what extent are provisions made for remedial instruction, where needed?	7	2	6	4	1
28. To what extent is the science curriculum understood and followed?	2	7	5	6	1
31. To what extent are there meaningful applications within the science program content?		1	4	14	2

Question	Strongly Agree A	Agree B	Neutral C	Disagree D	Strongly Disagree E
33. To what extent do you believe that our current science program is successful?			3	10	7
36. To what extent are the current science materials organized for easy retrieval?	2	6	4	5	4
37. To what extent are the science materials easily accessible to the teacher?	5	2	9	2	3
40. To what extent is the science program presented using active student participation in a discovery-based manner?		1	3	15	2

6-8 Science Program Evaluation
Teacher Survey

Directions: Using a scale from A (the highest) to E (the lowest), please rate the following questions by circling a letter on the scale following each question. Please think about the science program at your grade level and discuss it with your colleagues before responding to the following questions.

1. To what extent are the science objectives that are developed at the local level available to teachers?

A	B	C	D	E

2. To what extent does the science program textbook or ancillary materials provide activities, which are based on students' previous scientific experiences and knowledge?

A	B	C	D	E

3. In the current science program how well do the instructional activities provided lead students from concrete facts to abstract thinking?

A	B	C	D	E

4. To what extent do the provided science program instructional activities regularly include problem solving involving scientific applications that are meaningful to students?

A	B	C	D	E

5. To what extent does the science program textbook or ancillary materials encourage students to use hands-on materials to learn scientific concepts?

A	B	C	D	E

6. To what extent do the current science program materials emphasize large-group, small-group, and individualized instruction as appropriate to each lesson?

A	B	C	D	E

7. To what extent does the current science program material encourage laboratory activities and hands-on experiences?

A	B	C	D	E

8. To what extent do the provided textbook and ancillary materials encourage cooperative learning and teaching in various ways to accommodate different students' learning styles?

A	B	C	D	E

9. To what extent do you feel that the current program creates a positive learning environment when studying science?

A	B	C	D	E

10. To what extent is technology integrated within the science program's textbook and provided ancillary materials?

A	B	C	D	E

11. To what extent does the teacher have to work to supplement the current science program materials?

A	B	C	D	E

12. To what extent does the current science program and provided materials make provisions for all students?

A	B	C	D	E

13. To what extent does the current science program and provided materials make provisions for gifted and talented students, where needed?

A	B	C	D	E

14. To what extent does the current science program and provided materials make provisions for middle level students, where needed?

A	B	C	D	E

15. To what extent does the current science program and provided materials make provisions for remedial instruction, where needed?

A	B	C	D	E

16. To what extent does the current science program and provided materials make provisions for handicapped students, where needed?

A	B	C	D	E

17. To what extent does the current science program and provided materials make provisions for disadvantaged students, where needed?

A	B	C	D	E

18. To what extent does the teacher need to supplement the current science program in order to meet the needs of all students?

A	B	C	D	E

19. To what extent are there system approved curriculum guides available for each teacher in the school?

A	B	C	D	E

20. To what extent are the guides current and consistent with state and local goals and objectives?

A	B	C	D	E

21. To what extent have teachers been involved in the past when developing the science program?

A	B	C	D	E

22. To what extent do you like the current science program?

A	B	C	D	E

23. To what extent does the current science program's materials and textbooks contain scientifically sound information?

A	B	C	D	E

24. To what extent is the level of the content information appropriate for the identified grade level group on which the material is taught?

A	B	C	D	E

25. To what extent are there meaningful and practical applications meshed throughout the provided materials in the current science program?

A	B	C	D	E

26. To what extent do you believe that our current science program is successful?

A	B	C	D	E

27. To what extent do you believe that the science program materials meet the preparation needs of the teacher?

A	B	C	D	E

28. To what extent in the past have provisions been made for teachers to participate in the evaluation of materials?

A	B	C	D	E

29. To what extent is the science program periodically reviewed and updated?

A	B	C	D	E

30. To what extent does the current science program encourage active student participation in a discovery-based manner?

A	B	C	D	E

Thank you for your time and attention to these questions, as your feedback will be used in the development of the 6-8 science program evaluation process.

Additional comments with regard to program evaluation are welcomed:

Results of the 6-8 Science Program Evaluation
Teacher Survey Results—2 Most Commonly Chosen Answers Are Listed

Directions: Using a scale from A (the highest) to E (the lowest), please rate the following questions by circling a letter on the scale following each question. Please think about the science program at your grade level and discuss it with your colleagues before responding to the following questions.

1. To what extent are the science objectives that are developed at the local level available to teachers? (A, B)

A	B	C	D	E

2. To what extent does the science program textbook or ancillary materials provide activities, which are based on students' previous scientific experiences and knowledge? (C, D)

A	B	C	D	E

3. In the current science program how well do the instructional activities provided lead students from concrete facts to abstract thinking? (C, D)

A	B	C	D	E

4. To what extent do the provided science program instructional activities regularly include problem solving involving scientific applications that are meaningful to students? (D, B)

A	B	C	D	E

5. To what extent does the science program textbook or ancillary materials encourage students use hands-on materials to learn scientific concepts? (C, B)

A	B	C	D	E

6. To what extent do the current science program materials emphasize large-group, small-group, and individualized instruction as appropriate to each lesson? (C, D)

A	B	C	D	E

7. To what extent does the current science program material encourage laboratory activities and hands-on experiences? (C, B)

A	B	C	D	E

8. To what extent does the provided textbook and ancillary materials encourage cooperative learning and teaching in various ways to accommodate different students' learning styles? (C, B)

A	B	C	D	E

9. To what extent do you feel that the current program creates a positive learning environment when studying science? (B, C)

A	B	C	D	E

10. To what extent is technology integrated within the science program's textbook and provided ancillary materials? (D, E)

A	B	C	D	E

11. To what extent does the teacher have to work to supplement the current science program materials? (A, B)

A	B	C	D	E

12. To what extent does the current science program and provided materials make provisions for all students? (B, C)

A	B	C	D	E

13. To what extent does the current science program and provided materials make provisions for gifted and talented students, where needed? (D, C)

A	B	C	D	E

14. To what extent does the current science program and provided materials make provisions for middle level students, where needed? (C, B)

A	B	C	D	E

15. To what extent does the current science program and provided materials make provisions for remedial instruction, where needed? (C, E)

A	B	C	D	E

16. To what extent does the current science program and provided materials make provisions for handicapped students, where needed? (C, E)

A	B	C	D	E

17. To what extent does the current science program and provided materials make provisions for disadvantaged students, where needed? (C, D)

A	B	C	D	E

18. To what extent does the teacher need to supplement the current science program in order to meet the needs of all students? (A, B)

A	B	C	D	E

19. To what extent are there system approved curriculum guides available for each teacher in the school? (A, B)

A	B	C	D	E

20. To what extent are the guides current and consistent with state and local goals and objectives? (B, A)

A	B	C	D	E

21. To what extent have teachers been involved in the past when developing the science program? (A, B)

A	B	C	D	E

22. To what extent do you like the current science program? (C, D)

A	B	C	D	E

23. To what extent does the current science program's materials and textbooks contain scientifically sound information? (B, C)

A	B	C	D	E

24. To what extent is the level of the content information appropriate for the identified grade level group on which the material is taught? (B, C)

A	B	C	D	E

25. To what extent are there meaningful and practical applications meshed throughout the provided materials in the current science program? (C, A)

A	B	C	D	E

26. To what extent do you believe that our current science program is successful? (B, A)

A	B	C	D	E

27. To what extent do you believe that the science program materials meet the preparation needs of the teacher? (C, E)

A	B	C	D	E

28. To what extent in the past have provisions been made for teachers to participate in the evaluation of materials? (A, B)

A	B	C	D	E

29. To what extent is the science program periodically reviewed and updated? (B, D)

A	B	C	D	E

30. To what extent does the current science program encourage active student participation in a discovery-based manner? (C, B)

A	B	C	D	E

6-8 Teacher Survey Summary

Curriculum

The teachers agreed that the Board approved curriculum and objectives for instruction are available at the local level. Overall they also agreed that the curriculum guides were kept current with regard to the state and local goals and objectives. The teachers also agreed that they have been involved with decisions pertaining to the science program. Overall the teachers believe the current science program is successful.

Textbook Materials

The middle school teachers did not feel like the science textbook and ancillary materials provided sufficient activities. In addition the science teachers did not believe that the ancillary materials associated with the science textbook materials lead the students from concrete facts to abstract thinking. They did report that hands-on activities were available with the textbook materials, but most of the time the teachers needed to supplement the text with their own laboratory work and activities. The textbook and related materials did not meet the needs of handicapped students, remedial students, and above average students. Because the textbook and coordinating materials did not meet the needs of all students the teachers found themselves supplementing the program materials in order to accommodate the needs of all learners.

Technology

The science teachers reported most negatively with regard to the integration of technology in comparison to the other areas that were reviewed. Overall they believe that the science program's textbook and ancillary materials did not integrate technology into daily instruction. The teachers at William Annin are interested and willing to incorporate technology into the delivery of their lessons.

Bernards Township Public Schools
Office of Curriculum and Instruction
102 Peachtree Road
Basking Ridge, NJ 07920

May 28, 2003

Dear Parent/Guardian:

This year, Board Policy prescribes that it is time to complete the evaluation and revision of the 6-8 science program. Please help by completing the attached survey as you view your child's science experience. After you have completed the survey, please send it back to school with your child by June 4, 2003. Thank you in advance for your time and attention to this matter.

Sincerely,

Lisa Kiel
Supervisor of Science and Nursing

Parent Survey of the 6-8 Science Program
2002-2003

DIRECTIONS: Please read each statement and circle the descriptor that best indicates your opinion.

1. My child is developing proficiencies in problem solving and higher-order thinking skills.

Strongly Agree Agree Neutral Disagree Strongly Disagree Do Not Know

2. My child is developing proficiencies in scientific concepts and skills.

Strongly Agree Agree Neutral Disagree Strongly Disagree Do Not Know

3. My child is encouraged to extend his or her interest in science beyond the classroom.

Strongly Agree Agree Neutral Disagree Strongly Disagree Do Not Know

4. Our family notices that the curriculum for science is inquiry-based and at the appropriate level of difficulty.

Strongly Agree Agree Neutral Disagree Strongly Disagree Do Not Know

5. My child is exposed to appropriate technology (microscopes, computers, data projectors, laserdiscs or media resources) to enhance his or her understanding of science.

Strongly Agree Agree Neutral Disagree Strongly Disagree Do Not Know

6. My child is learning to use and value the study of science.

Strongly Agree Agree Neutral Disagree Strongly Disagree Do Not Know

7. My child has opportunities to refine scientific concepts through meaningful homework activities.

Strongly Agree Agree Neutral Disagree Strongly Disagree Do Not Know

8. My child enjoys learning science.

Strongly Agree Agree Neutral Disagree Strongly Disagree Do Not Know

QUESTION	STRONGLY AGREE	AGREE	NEUTRAL	DISAGREE	STRONGLY DISAGREE	DO NOT KNOW
My child is developing proficiencies in problem solving and higher-order thinking skills.	108	420	96	27	10	32
My child is developing proficiencies in scientific concepts and skills.	119	527	87	18	10	23
My child is encouraged to extend his or her interest in science beyond the classroom.	190	261	200	50	24	25
Our family notices that the curriculum for science is inquiry-based and at the appropriate level of difficulty.	64	322	132	42	15	53
My child is exposed to appropriate technology to enhance his or her understanding of science.	118	332	70	33	23	48
My child is learning to use and value the study of science.	119	326	104	24	19	21
My child has opportunities to refine scientific concepts through meaningful homework activities.	51	287	152	41	30	25
My child enjoys learning science.	175	262	102	42	15	7

Parental Feedback

Positive Comments:

- Jordan has enjoyed her science class very much this year.
- The 8th grade geology field trips were fabulous!
- Great teachers!
- I enjoyed the Chemistry portion of the curriculum.
- This survey looks like we know very little about what our child has studied and learned this year and it's true with consistent A+ in the class and an obvious enjoyment of the subject, we assume all is well.
- We are very pleased with the science program!
- In response to Question 8 – Largely due to her excellent teacher.
- My child loves science at William Annin 6th grade.
- My child really enjoys science, however in the lower grade levels had a poor presentation of science. Science in William Annin finally exposed my child to science that he now loves.
- My 7th grade daughter loves science!
- My child enjoys science very much!
- One of her favorites subjects!

Neutral Comments:

- In response to Question #5 –"But do you make use of all the equipment or is it wasted?"
- In response to Question #5 –"Except for the microscope."

Neutral Comments Continued:

- In response to Question #6 – “Teacher influence.”
- In response to Question # 7 - Sometimes when practice tests are used to ensure students review the textbook thoroughly.
- In response to Question 8- For this year only.
- In response to Question #4 – Nope, I didn’t notice.

Negative Comments:

- I found the weeks of whale study to be a waste.
- Field trips and current events would be good.
- In response to Question # 7 – Copying definitions from a glossary to notepad is busy work.
- I believe that children learn more during hands-on activities. They would benefit more from a trip to Sandy Hook then from copying words from a glossary or memorizing facts.
- There was no discussion of SARS in the classroom, nor were the students were asked to collect information from magazines, etc.
- My child says he does not like science (although he does very well).
- This parent would like to see “more hands on” in science.
- Students need more homework!
- My child only copies answers from a book.

Negative Comments Continued:

- My child has always loved science and continues to despite the 6th grade program.
- The curriculum could be more advanced.
- Add labs and hands on activities. We teach science at home.
- I believe too much time is spent on the "Mimi Unit."
- My answers are not an indictment of your school, but of my daughter's laziness and disinterest in education, which I am combating constantly.
- I didn't like the Physics topics (force momentum, acceleration, mass).
- The "Mimi" is a waste of time. It could be a learning experience if for example, leverage and physics were taught with regard to the pulling up of sails etc., or aerodynamics with how a sail works with the hull to push the sailboat further. However, as it stands it's just another whale/save the whale segment with some navigation built in. The other segments of the year were much better than the "Mimi."
- I would like to see more field trips.

Bernards Township Public Schools
Office of Curriculum and Instruction

Student Survey

DIRECTIONS: Please read each statement and circle the answer that best describes your opinion.

1. Generally I have felt confident about attempting science.

Strongly Agree Agree Neutral Disagree Strongly Disagree Do Not Know

2. I can get good grades in science.

Strongly Agree Agree Neutral Disagree Strongly Disagree Do Not Know

3. I think that I would be able to handle more advanced science.

Strongly Agree Agree Neutral Disagree Strongly Disagree Do Not Know

4. I am sure that I can learn science.

Strongly Agree Agree Neutral Disagree Strongly Disagree Do Not Know

5. I have a lot of self-confidence when it comes to science.

Strongly Agree Agree Neutral Disagree Strongly Disagree Do Not Know

6. Science is one of my best subjects.

Strongly Agree Agree Neutral Disagree Strongly Disagree Do Not Know

7. I'm not the type to do well in science.

Strongly Agree Agree Neutral Disagree Strongly Disagree Do Not Know

8. For some reason even when I study, science seems to be hard for me.

Strongly Agree Agree Neutral Disagree Strongly Disagree Do Not Know

9. Science is my worst subject.

Strongly Agree Agree Neutral Disagree Strongly Disagree Do Not Know

(Please complete both sides of this survey.)

10. I wish that I could take even more science courses.
Strongly Agree Agree Neutral Disagree Strongly Disagree Do Not Know

11. I don't usually worry about being able to do laboratory activities.
Strongly Agree Agree Neutral Disagree Strongly Disagree Do Not Know

12. I usually have been at ease during science tests.
Strongly Agree Agree Neutral Disagree Strongly Disagree Do Not Know

13. I usually have been at ease during science classes.
Strongly Agree Agree Neutral Disagree Strongly Disagree Do Not Know

14. Science makes me feel uncomfortable and nervous.
Strongly Agree Agree Neutral Disagree Strongly Disagree Do Not Know

15. Science tests scare me.
Strongly Agree Agree Neutral Disagree Strongly Disagree Do Not Know

Thank you for taking the time to complete this student survey. Please return this document to your teacher.

GEPA Science March 2003

1. Life Science

	District Mean	DFG I Mean	State Mean
General Education	13.6	12.9	11.2
Special Education	9.9	9.3	7.5
Limited English Proficient	11.7	7.3	6.0
Total Students	13.1	12.4	10.5

2. Physical Science

	District Mean	DFG I Mean	State Mean
General Education	13.0	12.4	10.8
Special Education	9.1	9.1	7.4
Limited English Proficient	11.5	8.4	5.9
Total Students	12.5	11.9	10.1

3. Earth Science

	District Mean	DFG I Mean	State Mean
General Education	11.7	10.6	9.1
Special Education	8.7	7.4	5.9
Limited English Proficient	11.2	6.3	4.7
Total Students	11.3	10.2	8.5

4. Cognitive Skills

	District Mean	DFG I Mean	State Mean
General Education	21.5	19.5	16.7
Special Education	14.9	13.6	10.8
Limited English Proficient	18.0	11.5	8.5
Total Students	20.3	18.7	15.5

5. Process Skills

	District Mean	DFG I Mean	State Mean
General Education	17.2	16.4	14.4
Special Education	12.8	12.2	10.0
Limited English Proficient	16.4	10.5	8.2
Total Students	16.7	15.8	13.5

Recommendations K-5

1. Revise the science curriculum on the elementary level, insuring alignment with the New Jersey Core Curriculum Content Standards for Science, and articulation between and within grades.

The current elementary curriculum does integrate life science, earth science, and physical science at each grade level. It is recommended that the objectives that are outlined in the curriculum are revisited and updated as necessary. It is also recommended that specific hands-on activities and experiments be added into the set curriculum guide. Currently there are specific activities within the Board approved curriculum guides, however the activities are outdated in terms of the latest research and are more teacher directed in their format. It is my recommendation that the curriculum reflect the integration of more hands-on activities and additional active student learning opportunities. The elementary science curriculum, as it stands, does not offer enough technological integration and extension opportunities. Teachers have worked hard to supplement the program and curriculum, but these additions often lack consistency with-in grade levels, between the four schools, and do not address vertical articulation.

Timeline: Ongoing.

2. Focus the program on inquiry-based science and on a more hands-on constructivist approach to learning.

The current *Science Anytime* (1995) and *Discovery Works* (1996) do offer some positive components, but other programs would be much more supportive with regard to the latest research. For example the students are positively exposed to the three main science subject areas at each grade level according to the New Jersey Core Curriculum Content Standards for Science, however these programs lack both practical applications and coordinating critical thinking laboratory activities. Teachers have supplemented extensively with better laboratory substitutes that encourage problem-solving skills. These substitutions have certainly provided the students with an environment that is more conducive to both learning and enjoying the study of science, but this practice is not optimal, as it does not promote horizontal and vertical articulation in all schools. In accordance with the latest research, it is my recommendation that a new program should be implemented that encourages and promotes discovery learning.

Timeline: Ongoing.

Recommendations K-5 Continued

3. A schedule of professional development should be provided to the teachers so they can become familiarized with inquiry-based instruction and program modifications.

The integration of any new program design requires adequate professional development. For example, it would be imperative to provide direct instruction with regard to the use of a new science kit system. A schedule would have to be put into place to ensure that teachers are able to attend each workshop. A support person would also have to initially train and serve as an ongoing resource to new staff with regard to the delivery of our science program.

Timeline: Ongoing.

Recommendations 6-8

1. Revise the science curriculum at the middle school, insuring alignment with the New Jersey Core Curriculum Content Standards for Science, and articulation between and within grades.

The current middle school curriculum does focus an entire year on the study of physical science, life science, and earth science with is necessary and critical to a solid science program. It is recommended however that the objectives that are outlined in the curriculum are revisited and updated as necessary. It is also recommended that the teachers of these three areas work together when writing the curriculum so material is not overlapped between the three grade levels. It is also recommended that specific hands-on activities and experiments be added into the set curriculum guide.

Timeline: Completed.

2. Incorporate the use of technology into the presentation and delivery of instruction at the middle school level.

The use of technology should be maximized in the study of science. Many new lab activities focus on the incorporation of technology based tools to obtain laboratory results. It is recommended that data projectors would be purchased to help with the delivery of content. A science mobile laptop cart with an access point would also serve to equip the students with immediate access to the Internet and a larger range of additional probe-based computer laboratory experiences.

Timeline: Completed.

3. All of the science classrooms on the secondary level should be equipped with a water and gas supply.

It is recommended that all science classrooms should be equipped with both water and gas for use in laboratory experiments. Three out of the nine classrooms would need to be modified to meet this recommendation. However, William Annin Middle School does have rooms available that do supply these needs yet they are not currently being used for science classrooms.

Timeline: Ongoing.

Recommendations 6-8 Continued

4. Focus the materials at each grade level on inquiry-based science and on a more hands-on constructivist approach to learning.

In grade six the *Voyage of the Mimi* (1985) and *Prentice Hall's Motion, Forces, and Energy* (1994) are in need of modernization. The current life science textbook package *Glencoe's Life Science* (1999) is due for a Board approved textbook review and potential revision, however these grade seven materials are in the best condition in comparison to the other grades. In grade eight the students are using *Merrill's Earth Science* (1994). It is recommended that all three of these grade levels be updated with regard to the New Jersey Core Curriculum Content Standards for Science. Teachers have supplemented extensively with better laboratory substitutes and updated the content to keep the material that is presented as current as possible. It would be best however to obtain a program at each grade level that incorporates technology and provides a basic set of ancillary materials and experiments. According to the latest research, it is recommended that a new program should be implemented that encourages and promotes more discovery learning.

Timeline: Completed.

5. A schedule of professional development should be provided to the teachers so they can incorporate the use of technology tools.

Teachers need to receive professional development with regard to the latest technology that can be used to help them in their delivery of the content. Instruction on the use of data projectors needs to take place. In addition, teachers would also need to be first exposed to probe-based computer laboratory experiments. After this exposure they would need to be guided on the process of the integration of this hardware and software. For example, *PASCO Scientific* offers an extensive array of the next generation of probeware and professional development would need to be provided in this area.

Timeline: Completed and continually evolving as technology develops.