

**THE SCHOOL BOARD OF BROWARD COUNTY, FLORIDA  
OFFICE OF THE SUPERINTENDENT**

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SUPERINTENDENT OF SCHOOLS**

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*Approved memorandum with signatures is on file.*

August 14, 2007

TO: School Board Members

FROM: Katherine Blasik, Ph.D., Associate Superintendent  
Research, Evaluation, Assessment & Boundaries

VIA: James F. Notter  
Superintendent of Schools

SUBJECT: **MARINE SCIENCE MAGNET THEME EVALUATION REPORT, 2006-07**

The attached report describes an evaluation of the implementation and impact of the Marine Science Magnet Program in Broward County Public Schools (BCPS). Three area schools offer the Marine Science program: North Fork Elementary, New River Middle, and South Broward High.

Data indicate that the Marine Science Magnet Program is an effective vehicle for promoting school choice. The program has the desired impact on instructional practices at the school level and enrollment in terms of the number of students who attend the Marine Science schools and their diversity. The program provides a benefit in terms of accelerated gains in proficiency on the Florida Comprehensive Assessment Test-Sunshine State Standards (FCAT-SSS) for some groups of students at each educational level (e.g., elementary, middle and high school levels).

Major findings included:

- A total of 3,288 students were enrolled in the Marine Science program in 2005-06. Over the three-year period from 2003-04 to 2005-06, enrollment declined from 3,547 students to 3,288.
- Each year the program draws more than 500 out-of-boundary students to the Marine Science schools. The number of out-of-boundary magnet students increased over the three-year period, attributed to growth in the number of out-of-boundary students at South Broward High.
- Marine Science magnet schools have become more diverse as a result of the magnet program. Out-of-boundary students who participated in the program in the 2005-06 school year had a smaller percentage of minority students and a larger percentage of non-minority students than did the in-boundary population.
- Relative to permanent capacity, both New River Middle and South Broward High are currently over-enrolled; and New River Middle is projected to be over-enrolled in the 2011-12 school year. This finding indicates that without the additional and currently available relocatables the opportunity for out-of-boundary to enroll would be limited. Only South Broward High is over-enrolled, when gross capacity is taken into account.

## Marine Science Magnet Theme Evaluation Report, 2006-07

August 14, 2007

Page 2

- FCAT-SSS performance gains in reading and mathematics were observed for magnet students at the elementary level relative to non-magnet students. For students at the high school level, FCAT-SSS performance gains in mathematics were observed for magnet students relative to non-magnet students. However, magnet students at the middle school level tended to lose ground relative to non-magnet students.

Findings from the qualitative research conducted as part of the study show that instruction and physical resources for the Marine Science program have been implemented as defined in a manner consistent with the BCPS mandate for high quality educational programs. However, the sequential nature of the course of study for the program has not been implemented as defined, due to the lack of cohesive and comprehensive curriculum for the Marine Science program, particularly at the elementary and middle school level. Improvements to the curricular design of the program may help promote improved academic performance of students whose performance did not improve as rapidly as that of others in the study.

A detailed discussion of the trends in the data is provided in the attached evaluation report. The report may also be accessed via the Research Services Web site ([http://www.broward.k12.fl.us/research\\_evaluation/newmain.htm](http://www.broward.k12.fl.us/research_evaluation/newmain.htm)). If you have questions or comments about this evaluation, **please contact me at 754-321-2470 or Dr. Russell Clement, Director, Research Services at 754-321-2500.**

JFN/KAB/RWC:rmc

Attachment

cc: Executive Leadership Team  
Area Directors  
Selected Principals

THE SCHOOL BOARD OF BROWARD COUNTY, FLORIDA  
OFFICE OF THE DEPUTY SUPERINTENDENT  
CURRICULUM & INSTRUCTION/STUDENT SUPPORT

August 3, 2007

TO: James F. Notter  
Interim Superintendent of Schools

FROM: Earlean C. Smiley, Ed.D., Deputy Superintendent  
Curriculum & Instruction/Student Support

SUBJECT: **RESPONSE TO MARINE SCIENCE MAGNET THEME  
EVALUATION REPORT**

**RECOMMENDATION 1:** *The need to improve student achievement while integrating Marine Science theme-based curriculum.* Participation in the magnet program provided a benefit, in terms of accelerated gains in proficiency on the FCAT-SSS, for some groups of students at each educational level (e.g., elementary, middle, and high). Specifically, performance gains in reading and mathematics were notable for magnet students at the elementary level, and in mathematics for students at the high school level. However, magnet students at the middle school level tended to lose ground to their non-magnet counterparts. Improvements to the curricular design of magnet program may help promote improved academic performance for students whose performance did not improve as rapidly as that of others in the study.

**RESPONSE 1:** The Marine Science Magnet Schools recognize the need to improve student achievement for students while integrating theme-based instruction. The schools have implemented a variety of instructional strategies to increase student achievement, which includes the following:

- Provide individualized assistance for Level 1 & 2 students in areas needing improvement
- Before and after school tutoring
- Saturday FCAT Camp
- Computerized instructional programs such as Kaleidoscope to assist students

During the 2007-2008 school year, the Magnet/Program Development staff will work collaboratively with the schools to identify theme-related instructional resources and curriculum aligning with the magnet theme and the goals of their school improvement plans to increase student achievement. The Magnet staff will assist the schools with identifying possible staff development opportunities to ensure theme integration and improve student achievement for both reading and math. To create relevant student activities, the Magnet staff will assist the schools in expanding their marine industry partnerships while utilizing the surrounding marine habitat.

## **RESPONSE TO MARINE SCIENCE MAGNET THEME EVALUATION REPORT**

August 3, 2007

Page Two

**RECOMMENDATION 2:** *The need to review capacity at the middle and high school to determine ways to accept out-of-boundary students at New River Middle and South Broward High School. Access to the magnet program may be limited based upon permanent/gross capacity at the two schools.*

**RESPONSE 2:** The Magnet/Program Development staff currently conducts an annual review of seats available to determine the number of out-of-boundary student openings at the magnet schools. This is a collaborative process with input from the school sites, School Boundaries, Facilities and representatives from the Class Size Reduction Action Committee. The Magnet staff will meet with these departments to review the District's Educational Facility Plan and identify possible solutions regarding capacity. The Magnet staff will provide recommendations aligning with the Facilities and School Boundaries planning timelines.

**RECOMMENDATION 3:** *The need to develop a comprehensive marketing plan to ensure diversity at the elementary Marine Science Magnet school. The research shows that out-of-boundary magnet students had a smaller percentage of non-minority students than the other Marine Science programs and the in-boundary population.*

**RESPONSE 3:** The Magnet/Program Development Department staff will monitor the number of Marine Science applications received for the 2008-2009 school year and work with the school staff to expand and enhance the marketing plan for the school. The Magnet staff will implement the following strategies in 2007-2008:

- Direct mailing to parents with an informational brochure
- Targeted marketing to students attending private schools
- Grand Opening of the new Marine Science magnet building
- Review the school website and make recommendations to ensure quality magnet information
- Promotional events such as open house, parent informational meetings, and presentations to local associations and community groups

For additional information, or should you have any questions, please contact **Leona Miracola, Director, Magnet/Program Development at 754-321-2380**

ECS/LB/LM:kg

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**The School Board of Broward County, Florida**

**Marine Science Magnet Theme  
Evaluation Report, 2006-07**



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August 2007

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**The School Board of Broward County, Florida**

**Marine Science Magnet Theme  
Evaluation Report, 2006-07**

TABLE OF CONTENTS

I. EXECUTIVE SUMMARY	i
II. INTRODUCTION	1
III. SCHOOL BOARD POLICY RELATED TO MAGNET PROGRAMS	2
IV. PURPOSE OF THE EVALUATION	3
V. METHODS	4
VI. COST IMPACT	4
VII. FINDINGS	5
What are the characteristics of the Marine Science magnet students?	5
What are the enrollment patterns for the Marine Science magnet schools?	7
What is the quality of curriculum and instruction for the Marine Science Magnet Program?	12
How well do Marine Science magnet students perform on the Florida Comprehensive Assessment Test (FCAT), compared to their non-magnet peers?	21
VIII. SUMMARY	30
IX. RECOMMENDATIONS	30
X. APPENDICES	32

## **The School Board of Broward County, Florida**

### **Marine Science Magnet Theme Evaluation Report, 2006-07**

#### **Executive Summary**

This report presents the findings of an evaluation of the Marine Science Magnet Program in Broward County Public Schools (BCPS). The Marine Science Magnet Program is offered at three area schools in BCPS: North Fork Elementary, New River Middle, and South Broward High. The purpose of the evaluation was to examine the fidelity of program design and implementation, in order to identify areas of improvement for the magnet program, and whether the program induced sustained effects on student participants, defined in terms of measures of the impact of magnet programs developed for the study.

Multiple sources of data and methods of collection were employed. Data collection methods from quantitative research assessed the impacts of the program, and qualitative research methods assessed magnet program formation—e.g., program design and implementation.

The focus of the research came from School Board Policy 5004 for Magnet Schools/Programs. The policy describes the goals and salient design features for magnet programs (Policy 5004 is accessible at <http://www.broward.k12.fl.un/sbbcpolicies/docs/P5004.pdf>). The questions and measurements for the study were developed in consultation with the Broward Magnet/Program Development Department Office (MPDO).

The following specific questions are addressed in the evaluation.

- What are the characteristics of Marine Science magnet students?
- What are the enrollment patterns for the Marine Science magnet schools?
- What is the quality of curriculum and instruction for the Marine Science Magnet Program?
- How well do Marine Science magnet students perform on the Florida Comprehensive Assessment Test (FCAT), compared to their non-magnet peers?

Findings were based on analysis of data gathered for the following measures of magnet programs. Statistical analysis of quantitative data provided by BCPS assessed (a) the size, diversity, and boundary status of program enrollments; (b) Marine Science students' continuation in a magnet program after the Marine Science program; and (c) change in Marine Science students' test scores over time, compared to non-magnet students. Qualitative research methods assessed the curriculum, instruction, and extracurricular activities developed for the Marine Science programs, using data collected from observations during school visits; interviews with teachers and administrators; and review of relevant curricular documents provided by the District. The qualitative data were gathered, analyzed, and interpreted by an evaluator with subject area expertise in Marine Science, who was selected from the District's pool of external research and evaluation consultants. Qualitative research findings were generated with respect to curriculum and extracurricular activities; instruction, professional staff development, and physical resources for the Marine Science programs; and possible areas of improvement for the magnet program.

The Marine Science Magnet Program builds student knowledge and understanding of science and the natural world through instruction that is focused on the marine environment and rich South Florida ecosystem. The program offers engaging, research-oriented, and experiential (hands-on and exploratory) curriculum that incorporates field trips, opportunities for mentoring, and exposure to sophisticated laboratory experimentation at the secondary level. The program is designed to provide students with the critical life skills needed to make sound decisions and take positive actions to care for and preserve South Florida's natural resources. The Marine Science program seeks to prepare students to enter post secondary education and the world of work in the fields of maritime and science industries. Descriptions of the Broward Marine Science Magnet Programs are accessible at <http://www.browardschoolsmagnetprograms.com>.

North Fork Elementary and New River Middle offer total-school magnet OPTIONS programs and South Broward High offers a magnet OPTIONS program that is total-school for grades 9 and 10 and program-within-a-school for grades 11 and 12. Note that students at North Fork Elementary and New River Middle should mirror District non-magnet students at similar schools in terms of their demographic characteristic and academic performance, as students at the elementary level are not required to meet minimum academic or other admissions criteria when applying to magnet programs. At New River Middle, a significant number of in-boundary students may participate in the program. In-boundary students are not required to apply for entry into magnet programs or meet the minimum qualifications for their magnet programs, as stated in School Board Policy 5004. At South Broward High, a high proportion or number of in-boundary students may participate in the magnet program in grades 9 and 10. These students should also mirror District non-magnet students at similar schools. The program type at each Marine Science magnet school, as well as educational level, school model (total-school or program-within-a-school), and year the program was opened is available in Appendix A.

The main findings addressed in this report are summarized below. The research, in brief, revealed that the magnet program is an effective vehicle for promoting school choice, as the program had the desired impact on instructional practices at the school level and the size and diversity of school enrollments. The program provides a benefit in terms of accelerated gains in proficiency on the Florida Comprehensive Assessment Test-Sunshine State Standards (FCAT-SSS) for some groups of students at each educational level (e.g., elementary, middle, and high). Improvements to the curricular design of the program may help promote improved academic performance of students whose performance did not improve as rapidly as that of others in the study.

#### Program Enrollment

- A total of 3,288 students were enrolled in the Marine Science program in the 2005-06 school year. Over the three-year period, enrollment declined from 3,547 students in 2003-04 to 3,288 in 2005-06.

#### Demographic Characteristics of Marine Science Magnet Students

- Black students were the largest group served at the elementary level. At the middle school level, Hispanic students were the largest group served in the 2005-06 school year. At South Broward High, White students were the largest group served in 2005-06.
- The three largest racial/ethnic groups at New River Middle changed during the three-year period under review from Black, White, and Hispanic students in 2003-04 to Hispanic, Black, and White students in 2005-06.

- At South Broward High, the three largest racial/ethnic groups served (White, Hispanic, and Black students) remained the same. However, the number of White students increased during the three years from 519 to 537, while the number of Hispanic and Black students, respectively, declined—from 429 to 386 for Hispanic students and 401 to 284 for Black students.

#### Enrollment by Out-of-Boundary Status, Percent of Permanent Capacity, and Continuation in Theme

- The Marine Science program is a successful magnet program in terms of promoting choice/access to magnet programs, increased diversity, and stabilization of school enrollments.
  - Each year the program draws more than 500-plus out-of-boundary students to the Marine Science schools. Out-of-boundary students represent approximately 20% of Marine Science magnet enrollment Districtwide. These out-of-boundary students likely would not be able to attend the Marine Science schools without participating in the magnet program.
  - The number of out-of-boundary magnet students increased over the three-year period. The increase was explained by growth in the number of out-of-boundary students at South Broward High.
  - Marine Science magnet schools have become more diverse as a result of the magnet program. At each Marine Science school, out-of-boundary students who participated in the program in the 2005-06 school year had a smaller percentage of minority students and a larger percentage of non-minority students than did the in-boundary population.
  - The magnet out-of-boundary population was more diverse than the in-boundary population for every year of the analysis and for every school in the analysis, except North Fork Elementary in the 2003-04 school year, where magnet out-of-boundary students were less diverse.
- Related to permanent capacity, data suggest that without the additional and currently available relocatables that boost gross capacity, the opportunity for out-of-boundary students to participate in the magnet program would be limited.
  - Relative to permanent capacity, both New River Middle and South Broward High are currently over-enrolled; and New River Middle is projected to be over-enrolled by the 2011-12 school year. At South Broward High, projected enrollment relative to permanent capacity may result in some available openings by 2011-12.
  - Only South Broward High is over-enrolled, when gross capacity is taken into account, which includes non-permanent structures.

#### Student Academic Performance

- Analysis of student academic performance examined the number of Marine Science students that reached proficiency on the FCAT-SSS each year from the 2003-04 to 2005-06 school years. Major sub-groups for Marine Science magnet students and a District comparison group of non-magnet students were identified to examine the impact of the magnet program on specific student groups. The sub-group for elementary students was students receiving Free of Reduced-Price Lunch (FRL). For middle and

high school students, the sub-groups were students whose race/ethnicity was Black, Hispanic, or White.

- Participation in the magnet program came at a cost at the middle school level in terms of reading gains for Black, Hispanic, and White students, and mathematics gains for Black and Hispanic students. Magnet participation came at a cost in reading at the high school level for Hispanic and White students.
- Participation in the magnet program conferred a benefit in the following areas and upon the following student sub-groups.
  - Reading and mathematics for elementary students with FRL status
    - The proportion of students who performed at Achievement Level 3 and above in both reading and mathematics, respectively, increased more rapidly for magnet students than for non-magnet students over the three years reviewed.
  - Mathematics for middle school students who were White
    - The proportion of students who scored Achievement Level 3 and above in mathematics increased more rapidly for magnet students who were White than for District non-magnet students who were White.
  - Reading for high school students who were Black
    - The proportion of students who scored Achievement Level 3 and above in reading declined for Black, Hispanic, and White students, respectively, in both the magnet and District non-magnet populations. However, the decline was slower for magnet students who were Black than for District non-magnet students who were Black.
  - Mathematics for all three high school sub-groups (Black, Hispanic, and White students)
    - The proportion of Black students Districtwide who performed at Achievement Level 3 and above decreased over the three years at the high school level, while for magnet students at the high school level, the proportion increased.
    - Over the three-year period, the proportion of high school students who scored Achievement Level 3 and above in mathematics increased more rapidly for magnet students who were Hispanic than for District non-magnet students who were Hispanic.
    - The proportion of White students at the high school level who scored Achievement Level 3 and above in mathematics declined for both magnet and District non-magnet students. However, the decline was steeper for District non-magnet students who were White.

#### Marine Science Magnet Program Design and Implementation

- Results from qualitative research, disaggregated by school, are presented in this report, starting on page 13.
- The research, in brief, found that instruction and physical resources for the Marine Science program have been implemented as defined in a manner consistent with the Broward County mandate for high quality educational programs; however, the sequential nature of the course of study for the program has not been implemented as defined, due to a lack of curriculum, particularly at the elementary and middle school levels.

## **Recommendations**

1. The Marine Science Magnet Program provides a benefit, in terms of accelerated gains in proficiency on the FCAT-SSS, for some groups of students at each educational level (e.g., elementary, middle, and high). Improvements to the curricular design of program, such as those identified in this report that were developed from site visits to the Marine Science schools, may help promote improved academic performance for students whose performance did not improve as rapidly as that of others in the study. Research shows that academic performance lagged in the following areas for the following groups of students: middle school reading for Black, Hispanic, and White students; middle school mathematics for Black and Hispanic students; and high school reading for Hispanic and White students.

Magnet/Program Development staffs will work collaboratively with the Marine Science schools to address student achievement through their school improvement plans, while aligning with the Marine Science theme. Magnet staffs will assist the Marine Science schools in identifying theme-related curricular resources, materials to improve student achievement, and possible staff development opportunities for instructional staffs for the 2007-08 school year. The steps to be taken will be included in each of the Marine Science schools' annual magnet planning document that will be submitted to the MPDO by September 28, 2007.

2. Student access to the magnet program may be limited at New River Middle and South Broward High by the number of available openings for out-of-boundary magnet students, when permanent capacity is taken into account. Both New River Middle and South Broward High are currently over-enrolled, relative to permanent capacity; and New River Middle is projected to be over-enrolled in the 2011-12 school year. At South Broward High, projected enrollment, relative to permanent capacity, may result in some available openings by the 2011-12 school year. Only South Broward High is over-enrolled, when gross capacity is taken into account.

Magnet/Program Development staffs will work collaboratively with the Marine Science schools, the District's School Boundaries Department, and the District's Class Size Reduction (CSR) Task Force to ensure that the number of magnet students who can be admitted into the Marine Science program in the 2008-09 school year, based on school capacity utilization projections, does not exceed available openings at the host schools.

3. The Marine Science magnet schools have become more diverse as a result of the magnet program. The research shows that out-of-boundary magnet students had a smaller percentage of minority students and a larger percentage of non-minority students than did the in-boundary population. However, at North Fork Elementary, where minority students predominate, non-minority students were only a small proportion of out-of-boundary and in-boundary students.

Magnet/Program Development staffs will monitor the number of Marine Science applications the District receives for the 2008-2009 magnet applicant pool. MPDO will work with staffs at North Fork Elementary to conduct targeted direct marketing campaigns designed to make

students and parents aware of the opportunities that are available in BCPS for specialized theme-based Marine Science educational programming.

MPDO has created a marketing plan designed to attract and inform parents and students of the many opportunities afforded in a magnet program/school. The following will be implemented in the 2007-08 school year:

- Direct mailing to parents/students with an informational brochure;
- Targeted marketing to students attending private schools through direct mail, fliers, and phone calls;
- Presentations to students at school sites;
- Hosting the annual Magnet Showcase at the Broward Convention Center;
- Printed advertisement in local and community publications;
- Open houses at the magnet schools;
- Informational Web site and Pod cast with magnet information; and
- Magnet Parent Advisory marketing network to promote the magnet programs.

## **The School Board of Broward County, Florida**

### **Marine Science Magnet Theme Evaluation Report, 2006-07**

#### **Introduction**

Magnet programs attract students to select schools by developing specialized programs and theme-based courses of study that appeal to students' personal interests and intellectual affinities. Choice is implicit in the magnet program/school approach. Students who apply to magnet programs must reflect on their interests and aptitudes; and then, together with their parents or guardian, select from alternative courses of study and available themed-based programs at different schools. Broward County Public Schools (BCPS) offers a wide variety of academically enriched theme-related magnet programs. Currently, there are 47 schools offering 63 magnet programs in Broward County. As described in School Board Policy 5004, the School Board of Broward County (SBBC) uses magnet programs as a vehicle to meet the District goals of (1) providing quality educational opportunities for all students, regardless of background; (2) encouraging all parents to play an active role in their children's education and increasing the educational choices available to parents and students; and (3) providing settings for education that promote understanding and diversity, tolerance, and fair play (SBBC Policy 5004, p. 1, <http://www.broward.k12.fl.un/sbbcpolicies/docs/P5004.pdf>).

This report provides the findings of an evaluation of the Marine Science Magnet Program in BCPS. The evaluation assessed the impact of the Marine Science program and whether the program was implemented as it has been defined. Three schools offer the Marine Science Magnet Program: North Fork Elementary, New River Middle, and South Broward High.

Multiple data sources and collection methods were used to support the research. Data collection methods from quantitative research assessed the impacts of the program and qualitative research methods assessed magnet program formation—e.g., the design and implementation of the magnet program.

The focus of the research was derived from School Board Policy 5004 for Magnet Schools/Programs. The policy describes the goals and salient design features for magnet programs. Broward County identifies several goals for magnet schools/programs. At the level of individual students, magnet schools/programs create opportunities for unique and in-depth educational experiences that may enhance students' chances for success in the classroom. At the school level, magnet programs are District models designed to promote educational excellence through the development of innovative instructional approaches that lead to systemic school reform. Magnet programs also are designed to facilitate increased diversity and stabilization of school enrollments. School Board Policy 5004 gives students the opportunity to apply to the magnet schools/programs of their choice, whether or not the schools/programs are located in students' residentially assigned areas; and effective marketing practices make students and parents aware of the opportunities for choice that are available through magnet programs. BCPS defines magnet programs as "those schools/programs with a specialized curriculum and those with an emphasis on instruction that includes a rigorously defined sequential course of study not offered at other schools" (SBBC Policy 5004, p. 1).

The questions that guided the research process were developed from School Board Policy 5004. The questions and subsequent measurements were developed in consultation with the Broward Magnet/Program Development Department Office (MPDO). The following specific questions are addressed in the evaluation.

1. What are the characteristics of Marine Science magnet students?
2. What are the enrollment patterns for the Marine Science magnet schools?
3. What is the quality of curriculum and instruction for the Marine Science Magnet Program?
4. How well do Marine Science magnet students perform on the Florida Comprehensive Assessment Test (FCAT), compared to their non-magnet peers?

The findings are based on analysis of data gathered for the following measures. Statistical analysis of quantitative data provided by BCPS assessed (a) the size, diversity, and boundary status of program enrollments; (b) Marine Science students' continuation in a magnet program after the Marine Science program; and (c) change in Marine Science students' test scores over time, compared to non-magnet students. Qualitative research methods assessed the curriculum, instruction, and extracurricular activities developed for the Marine Science programs, using data collected from observations during school visits; interviews with teachers and administrators; and review of relevant curricular documents provided by the District. The qualitative data were gathered, analyzed, and interpreted by an evaluator with subject area expertise in Marine Science, who was selected from the District's pool of outside research and evaluation consultants. The evaluation team had extensive Marine Science education and programming experience. Findings from the qualitative research were generated with respect to curriculum and extracurricular activities; instruction, professional staff development, and physical resources for the Marine Science programs. These represent the evaluator's conclusions about how the Marine Science program works, based on review of the relevant data.

### **School Board Policy Related to Magnet Programs**

The SBBC defines magnet schools/programs as those with specialized curriculum and an emphasis on instruction that includes a rigorously defined sequential course of study not offered at other schools. Magnet schools/programs can align to either total-school or program-within-a-school models. Policy 5004 calls for total-school magnet programs, whenever possible, at schools where the total-school approach is appropriate. Appendix A provides a list of magnet Marine Science programs in BCPS and the year they were opened. Appendix A also provides the program type (CHANGE or OPTIONS), educational level, and school model (total-school or program-with-a-school) for each magnet Marine Science program.

BCPS offers two different types of magnet programs: Opportunity to Increase Our New Students (OPTIONS) and Challenging Additions that Nurture Growth and Enrichment (CHANGE). OPTIONS programs are defined as "any magnet school/program meeting the following criteria: under-enrolled by 5% or more of permanent gross capacity for two consecutive years and/or projections indicate an enrollment decrease of 5% or more due to natural enrollment changes, demographic changes or board-approved boundary changes and will continue to be 5% or more under capacity in subsequent years" (SBBC Policy 5004, p. 2). OPTIONS programs are expected to be innovative programs that do not replicate common educational practices within the school District, unless replication of program in an additional

geographic area is needed to provide equity and access. Schools with OPTIONS programs qualify for student transportation beyond school boundaries.

CHANGE programs are schools “with a trend of identified loss of students to private schools, charter schools, magnet schools, boundary schools, or new school openings that would benefit from a theme-based curriculum with attached effective marketing practices” (SBBC Policy 5004, p. 2). CHANGE programs may also be appropriate when it is determined that an established magnet school no longer needs additional students from beyond the board-approved boundaries to meet diversity and enrollment needs. In this circumstance, marketing for the magnet program is focused within the established school boundary. CHANGE students are not assigned through the magnet process; student assignment is the result of School Board-approved school boundaries. CHANGE schools do not qualify for student transportation beyond established boundaries.

Broward’s magnet programs are open to qualified students on a Districtwide basis. All Broward County students entering grades Kindergarten through 12 are eligible to apply. At the elementary level, academic or other admission criteria are not used to determine student eligibility. For magnet secondary schools/programs that have academic or other admission criteria, criteria are educationally-related to the specialized curriculum or instructional strategy and are non-discriminatory in determining students who are eligible for the magnet school/program. Academic/talent entrance criteria have been established for admission to each magnet program, as a means of promoting student success. Applicants who do not meet these eligibility criteria may utilize the provisions for a magnet review panel described in Rule 5e of SBBC Policy 5004. No application is required for magnet programs that are open to students who reside within the school boundaries of the schools that host such magnet programs (e.g., in-boundary students). Student assignment at magnet CHANGE programs is the result of School Board-approved boundaries, exclusively. Magnet OPTIONS programs provide a select number of available openings for students who reside outside the school boundaries of schools that host OPTIONS programs (e.g., out-of-boundary students), with remaining openings going to in-boundary students who are not required to apply.

The number of students that can be admitted into a magnet program is based on Florida Inventory of School Houses (FISH) limits; school enrollment projections, which are developed by the District’s School Boundaries Department; and projections of available openings in the respective magnet program, which are developed by the District’s Magnet/Program Development Department Office (MPDO).

### **Purpose of the Evaluation**

The purpose of this evaluation is to assess the Marine Science programs’ sustained effects on students and identify areas of improvement for the program. The sustained effects on students who participated in the program was assessed based on analysis of students’ test scores, enrollment at the Marine Science schools, and Marine Science students’ subsequent enrollment after the program to see whether students continued in theme by enrolling in the same magnet program at subsequent schools. Areas of improvement for the program were identified based on analysis of the processes that were put in place at each Marine Science school to support the program. Curriculum, instruction, and extracurricular activities were included in the study as the salient features of magnet programs that were examined for possible process improvements.

## Methods

Student data were extracted from the District’s Total Educational Research Management System (TERMS) database to examine (a) enrollment at the Marine Science schools; (b) Marine Science students’ subsequent enrollment, after participating in the Marine Science program; and (c) Marine Science students’ academic performance. Three years of data were examined, ranging from the 2003-04 through the 2005-06 school years. Data for District non-magnet students were included in the analysis of student academic performance for comparison purposes. Design and implementation of the Marine Science program was also examined. Documentation describing the goals, curriculum, and instruction for the program at each school was used to assess the quality design of the program. The following school documents were used: professional staff development planning calendars; teacher lesson plans; school curriculum and/or scheduling documentation that identifies and describes the course(s) of study that are available for Marine Science students, including course guides, educational pathways, scheduling sheets, registration cards, school master schedules, curriculum maps, school improvement plans, etc. Site visits of each Marine Science school lasting up to one full day at each school were performed by the consultant to examine implementation of the Marine Science program. Structured interviews were conducted with (a) magnet and non-magnet teachers; (b) the magnet coordinator; and (c) the school principal or assistant principal for each Marine Science school, as well as classroom observations; and a tour of the facilities. More than 18 magnet teachers were interviewed as part of the research.

## Cost Impact

The Marine Science program is an OPTIONS program at all three of the participating schools. The District provides transportation to/from these schools for out-of-boundary students. Transportation costs are not included in the budget information provided below. Funding for the three Marine Science schools is displayed in Table 1. Magnet schools receive funding according to the theme, type, and educational level of the magnet program being offered. Type and educational level refer to CHANGE or OPTIONS programs that are total-school or program-within-a-school at the elementary, middle, or high school level. Magnet funding, in addition to full-time equivalency (FTE), is based on the number of magnet students enrolled at the magnet school—e.g., un-weighted full-time equivalency (UFTE). The funding is for academic enhancement of the following educational categories: material and supplies; field trips; staff (including partial or full support for a magnet coordinator, magnet teacher, substitute days, and clerical personnel); supplements; and Unique Program Requirements (UPR).

Table 1  
*Magnet Funding for Marine Science Magnet Schools*

School	2003-04		2004-05		2005-06	
	UFTE (\$)	Total (\$)	UFTE (\$)	Total (\$)	UFTE (\$)	Total (\$)
North Fork Elementary	503.07	168,868	503.00	171,047	517.17	172,749
New River Middle	1,585.00	160,948	1,479.00	166,709	1,480.00	171,329
South Broward High	2,370.00	209,849	2,431.00	256,709	2,394.00	253,544

## Findings

### 1. *What are the characteristics of Marine Science magnet students?*

#### *Demographic Characteristics*

The racial/ethnic composition, as well as Free and Reduced-Price Lunch (FRL); Exceptional Student Education (ESE); and Limited English Proficient (LEP) status of students in the Marine Magnet Program, are provided in Table 2. The data are for a three-year period from the 2003-04 school year to 2005-06. Students at North Fork Elementary and New River Middle should mirror District non-magnet students at similar schools in terms of their demographic characteristic and academic performance, as students at the elementary level are not required to meet minimum academic or other admissions criteria when applying to magnet programs. At total-school magnets, such as New River Middle, a significant number of in-boundary students may participate in the program. In-boundary students are not required apply for entry into magnet programs or meet the minimum qualifications for their magnet programs, as stated in School Board Policy 5004. At South Broward High, a significant number of in-boundary students may also participate in the magnet program in grades 9 and 10.

Data indicate that:

- Black students were the largest group served at the elementary level. At the middle and high school levels, Hispanic and White students, respectively, were largest groups served.
- The three largest racial/ethnic groups at New River Middle changed during the three-year period under review in the study from Black, White, and Hispanic students in 2003-04 to Hispanic, Black, and White in 2005-06.
- At South Broward High, the three largest racial/ethnic groups served (White, Hispanic, and Black students) remained the same. However, the number of White students increased during the three years from 519 to 537, while the number of Hispanic and Black students, respectively, declined—from 429 to 386 for Hispanic students and 401 to 284 for Black students.
- Enrollment in the program declined over the three years for each school in the study.

Table 2 shows that Black students was the major group served at North Fork Elementary during the three-year period. Black students accounted for more than 90% of school enrollments during the three years. In the 2005-06 school year, the majority of North Fork Elementary students were Black ( $n=498$ ; 92.2%), followed by Hispanic ( $n=23$ ; 4.3%), Multi-racial ( $n=11$ ; 2.0%), White ( $n=7$ ; 1.3%), and Asian ( $n=1$ ; 0.2%). Enrollment increased from 554 in 2003-04 to 579 in 2004-05, but declined in 2005-06, reaching a three-year low of 540 students. The number of students who received FRL decreased slightly from 525 (94.8%) in 2003-04 to 501 (92.8%) in 2005-06.

New River Middle and South Broward High had different student populations than North Fork Elementary. At New River Middle, the majority of students in 2005-06 were Hispanic ( $n=540$ ; 36.3%), followed by Black ( $n=462$ ; 31.0%), White ( $n=408$ ; 27.4%), Multi-racial ( $n=50$ ; 3.4%), Asian ( $n=24$ ; 1.6%), and Native American ( $n=24$ ; 0.3%). The three largest racial/ethnic groups at New River Middle changed during the three years from Black ( $n=544$ ; 34.2%), White ( $n=525$ ; 33.0%), and Hispanic ( $n=470$ ; 29.6%) in 2003-04 to Hispanic ( $n=540$ ; 36.3%), Black ( $n=462$ ; 31.0%), and White ( $n=408$ ; 27.4%) in 2005-06. Overall enrollment declined from 1,590 students in 2003-04 to 1,488 in 2005-06. The number of

students receiving FRL increased from 910 (57.2%) in 2003-04 to 948 (63.7%) in 2005-06, and the number of students classified as ESE increased from 222 (14.0%) to 294 (19.8%) during the same period. The number of LEP-classified students increased from 104 (6.5%) in 2003-04 to 162 (10.9%) in 2005-06.

At South Broward High, the majority of students in 2005-06 were White ( $n=537$ ; 42.6%), followed by Hispanic ( $n=386$ ; 30.6%), Black ( $n=284$ ; 22.5%), Multi-racial ( $n=30$ ; 2.4%), Asian ( $n=20$ ; 1.6%), and Native American ( $n=3$ ; 0.2%). Among the three largest racial/ethnic groups over the three-year period (White, Hispanic, and Black students), the number of White students increased from 519 (37.0%) in 2003-04 to 537 (42.6%) in 2005-06, while the number of Hispanic and Black students declined. Total enrollment declined at South Broward High from 1,403 in 2003-04 to 1,260 in 2005-06. The number of students receiving FRL stabilized at 600 (47.6%) in 2005-06, as did the number of LEP-classified students ( $n=127$ ; 10.1%). The number of students classified as ESE declined from 155 (11.0%) to 91 (7.2%) during the three years.

Table 2

*Enrollment in the Marine Science Magnet Program by Race/Ethnicity, 2003-04 through 2005-06*

School	2003-04		2004-05		2005-06	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
North Fork Elementary						
Race/Ethnicity						
Asian	0	0.0	2	0.3	1	0.2
Black	517	93.3	522	90.2	498	92.2
Hispanic	17	3.1	25	4.3	23	4.3
Multi-racial	13	2.3	18	3.1	11	2.0
Native American	0	0.0	0	0.0	0	0.0
White	7	1.3	12	2.1	7	1.3
Total	554	100.0	579	100.0	540	100.0
Free or Reduced-Price Lunch	525	94.8	526	90.8	501	92.8
Exceptional Student Education	95	17.1	108	18.7	95	17.6
Limited English Proficient	68	12.3	30	5.2	23	4.3
New River Middle						
Race/Ethnicity						
Asian	14	0.9	20	1.3	24	1.6
Black	544	34.2	504	32.8	462	31.0
Hispanic	470	29.6	527	34.3	540	36.3
Multi-racial	34	2.1	35	2.3	50	3.4
Native American	3	0.2	3	0.2	4	0.3
White	525	33.0	447	29.1	408	27.4
Total	1,590	100.0	1,536	100.0	1,488	100.0
Free or Reduced-Price Lunch	910	57.2	951	61.9	948	63.7
Exceptional Student Education	222	14.0	241	15.7	294	19.8
Limited English Proficient	104	6.5	182	11.8	162	10.9

Note. Information based on District's TERMS 20<sup>th</sup> Day enrollment data.

(table continues)

Table 2 (continued).

*Enrollment in the Marine Science Magnet Program by Race/Ethnicity, 2003-04 through 2005-06*

School	2003-04		2004-05		2005-06	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
South Broward High						
Race/Ethnicity						
Asian	31	2.2	25	1.8	20	1.6
Black	401	28.6	372	27.1	284	22.5
Hispanic	429	30.6	438	31.9	386	30.6
Multi-racial	18	1.3	16	1.2	30	2.4
Native American	5	0.4	2	0.1	3	0.2
White	519	37.0	522	38.0	537	42.6
Total	1,403	100.0	1,375	100.0	1,260	100.0
Free or Reduced-Price Lunch	582	41.5	606	44.1	600	47.6
Exceptional Student Education	155	11.0	142	10.3	91	7.2
Limited English Proficient	123	8.8	159	11.6	127	10.1

*Note.* Information based on District’s TERMS 20<sup>th</sup> Day enrollment data.

2. *What are the enrollment patterns for the Marine Science magnet schools?*

*Enrollment of Out-of-Boundary and In-Boundary Students*

School boundary information for magnet students at the Marine Science schools is provided in Tables 3 and 4. The data indicate whether students were enrolled at their residentially-assigned boundary school. In the tables, students who attended their residentially-assigned boundary schools were classified as in-boundary students, while students who attended schools outside of their residentially-assigned boundary schools were classified as out-of-boundary students. The data are disaggregated by school in Table 3 and by race/ethnicity in Table 4.

Review of Tables 3 and 4 indicates that:

- Each year the magnet program draws more than 500-plus out-of-boundary students to the Marine Science schools. These out-of-boundary students likely would not be able to attend the schools, without participating in the magnet program. Out-of-boundary students represent approximately 20% of Marine Science magnet enrollment Districtwide.
- The number of out-of-boundary magnet students increased over the three-year period. The increase was explained by growth in the number of out-of-boundary students at South Broward High, where, according to MPDO staffs, the success and growing reputation of the Marine Science program are particularly strong.
- Marine Science magnet schools are becoming more diverse as a result of the magnet program. At each Marine Science school, out-of-boundary students who participated in the program in the 2005-06 school year had a smaller percentage of minority students and a larger percentage of non-minority students than did the in-boundary population. At each Marine Science magnet school, the magnet out-of-boundary population was more diverse than the in-boundary population for every year of the analysis, except for the 2003-04 school year at North Fork Elementary, where magnet out-of-boundary students were less diverse.

Table 3 shows that out-of-boundary students represent approximately 30.0% of Marine Science elementary enrollment, 17.0% of Marine Science middle school students, and 20%-plus of Marine Science high school enrollment. Districtwide, the number of out-of-boundary elementary students increased over the three-year period from 550 (19.7% of magnet students) in the 2003-04 school year to 667 (23.7%) in 2005-06, a difference of 117 students. The increase was explained by growth in the number of out-of-boundary students at South Broward High. The number of out-of-boundary students increased at South Broward High from 165 (14.6%) in 2003-04 to 306 (28.1%) in 2005-06, a difference of 141 students. The number of out-of-boundary students declined at North Fork Elementary and New River Middle, respectively, during the same period from 153 (37.3%) to 139 (30.2%) at North Fork Elementary and from 232 (18.6%) to 222 (17.5%) at New River Middle.

Table 4 provides magnet student boundary school information over the same three-year period, disaggregated by race/ethnicity. At all three Marine Science schools, the magnet program is drawing more diverse populations, as Table 4 indicates. At each school, out-of-boundary students who participated in the program in the 2005-06 school year had a smaller percentage of minority students and a larger percentage of non-minority students than did the in-boundary population. The magnet out-of-boundary population was more diverse than the in-boundary population at each school for every year of the analysis, except for the 2003-04 school year at North Fork Elementary, where magnet out-of-boundary students was less diverse. Minority students accounted for 97.8% ( $n=136$ ) of out-boundary elementary students in 2005-06 and 99.4% ( $n=319$ ) of in-boundary elementary students. Minority students accounted for 62.2% ( $n=138$ ) of out-boundary middle school students in 2005-06 and 75.0% ( $n=787$ ) of in-boundary middle school students. At the high school level, minority students accounted for 46.1% ( $n=141$ ) of out-of-boundary students and 61.2% ( $n=479$ ) of in-boundary students during 2005-06.

Table 3  
*Enrollment of Out-of-Boundary and In-Boundary Students*

School	2003-04		2004-05		2005-06	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
North Fork Elementary						
Out-of-Boundary	153	37.3	149	33.9	139	30.2
In-Boundary	257	62.7	291	66.1	321	69.8
New River Middle						
Out-of-Boundary	232	18.6	204	17.0	222	17.5
In-Boundary	1,018	81.4	999	83.0	1,049	82.5
South Broward High						
Out-of-Boundary	165	14.6	163	14.8	306	28.1
In-Boundary	968	85.4	939	85.2	783	71.9
Total						
Out-of-Boundary	550	19.7	516	18.8	667	23.7
In-Boundary	2,243	80.3	2,229	81.2	2,153	76.3

*Note.* Data for non-mobile students for each year were extracted from the District's TERMS database.

Table 4  
*Enrollment by Race/Ethnicity and Boundary Status*

School	Asian		Black		Hispanic		Multi-racial		Native American		Minority		White Non-Minority		Total <i>n</i>
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	
North Fork Elementary															
Out-of-Boundary															
2003-04	0	0.0	141	92.2	9	5.9	3	2.0	0	0.0	153	100.0	0	0.0	153
2004-05	1	0.7	133	89.3	5	3.4	5	3.4	0	0.0	144	96.6	5	3.4	149
2005-06	1	0.7	129	92.8	3	2.2	3	2.2	0	0.0	136	97.8	3	2.2	139
In-Boundary															
2003-04	0	0.0	243	94.6	3	1.2	9	3.5	0	0.0	255	99.2	2	0.8	257
2004-05	0	0.0	270	92.8	7	2.4	10	3.4	0	0.0	287	98.6	4	1.4	291
2005-06	0	0.0	298	92.8	14	4.4	7	2.2	0	0.0	319	99.4	2	0.6	321
New River Middle															
Out-of-Boundary															
2003-04	1	0.4	75	32.3	48	20.7	2	0.9	0	0.0	126	54.3	106	45.7	232
2004-05	1	0.5	72	35.3	47	23.0	2	1.0	0	0.0	122	59.8	82	40.2	204
2005-06	4	1.8	69	31.1	57	25.7	8	3.6	0	0.0	138	62.2	84	37.8	222
In-Boundary															
2003-04	8	0.8	351	34.5	349	34.3	25	2.5	2	0.2	735	72.2	283	27.8	1,018
2004-05	14	1.4	326	32.6	368	36.8	28	2.8	2	0.2	738	73.9	261	26.1	999
2005-06	18	1.7	320	30.5	408	38.9	37	3.5	4	0.4	787	75.0	262	25.0	1,049
South Broward High															
Out-of-Boundary															
2003-04	4	2.4	19	11.5	40	24.2	5	3.0	1	0.6	69	41.8	96	58.2	165
2004-05	5	3.1	28	17.2	39	23.9	2	1.2	0	0.0	74	45.4	89	54.6	163
2005-06	7	2.3	43	14.1	80	26.1	9	2.9	2	0.7	141	46.1	165	53.9	306
In-Boundary															
2003-04	22	2.3	290	30.0	312	32.2	10	1.0	3	0.3	637	65.8	331	34.2	968
2004-05	17	1.8	259	27.6	316	33.7	9	1.0	2	0.2	603	64.2	336	35.8	939
2005-06	9	1.1	188	24.0	264	33.7	17	2.2	1	0.1	479	61.2	304	38.8	783

*Note.* Data for non-mobile student for each year were extracted from the District's TERMS database.

*Projected Enrollment at the Marine Science Magnet Schools*

Table 5 provides data from the District’s Enrollment and Facilities Planning Inventory (EFPI) report. These data were used to examine the impact of the Marine Science programs in light of current and projected enrollment at the Marine Science schools and the number of available openings based on permanent capacity. The EFPI report is produced by the District’s School Boundaries Department. The EFPI report provides each school’s current year enrollment, as well as projected enrollment for the 2006-07 school year and five years in the future (2011-12). For projections of school enrollment, the District’s School Boundaries Department uses a geographically-based cohort survival model that projects future student populations by grade. The model is considered a reliable procedure that is used by the United States Census Bureau and the State of Florida for population projections and reports. The EFPI also provides each school’s permanent capacity data for planning purposes, which can be used to estimate the number of available openings at each school.

Table 5 shows that:

- At New River Middle and South Broward High, available openings for out-of-boundary magnet students may be limited, when permanent capacity is taken into account.
- Both New River Middle and South Broward High are currently over-enrolled relative to permanent capacity, and New River Middle is projected to be over-enrolled in the 2011-12 school year. At South Broward High, projected enrollment, relative to permanent capacity, may result in some available openings by 2011-12.
- Conversely, when gross capacity is taken into account, only South Broward High is over-enrolled.

Enrollment in 2006-07 was 79.9% ( $n=584$ ) of permanent capacity at North Fork Elementary, while at New River Middle and South Broward High, respectively, enrollment was 106.9% ( $n=1,479$ ) and 101.6% ( $n=2,410$ ). Enrollment at North Fork Elementary is projected to increase over the five-year period from 584 (79.9% of permanent capacity) in 2006-07 to 626 (85.6%) in 2011-12, while at New River Middle and South Broward High, respectively, enrollments are projected to decline to 1,413 (102.1%) students at New River Middle and 2,229 (93.9%) students at South Broward High in 2011-12.

Table 5

*Five Year Enrollment Projections with Percent of Permanent and Gross Capacity for the Marine Science Magnet Schools/Programs*

School	Permanent Capacity	Gross Capacity	2006-07		2007-08		2011-12	
			<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
North Fork Elementary	731	789	584	79.9	595	81.4	626	85.6
New River Middle	1,383	1,502	1,479	106.9	1,468	106.1	1,413	102.1
South Broward High	2,373	2,373	2,410	101.6	2,398	101.0	2,229	93.9

*Note.* Percent of capacity each year is based on permanent capacity. Capacity for North Fork Elementary reflects classroom additions and demolition.

*Continuation in Theme*

Tables 6 and 7 examine Marine Science students’ selection of educational programs, as they transition from elementary to middle school (grade 5 to 6) and middle to high school (grade 8 to 9). Three years of data are provided—e.g., fifth grade students’ selection for sixth grade for

three separate years (2003-04, 2004-05, 2005-06) and eighth grade students' selection for ninth grade for three separate years (the same three years).

Tables 6 and 7 show that:

- Relatively few Marine Science students continue in theme by choosing the Marine Science program for middle school or high school. More than 60.0%-plus of Marine Science students, who transitioned from elementary to middle school, attended a non-magnet middle school. Of the 30.0%-plus of Marine Science elementary magnet students who stayed in a magnet program, as they transitioned from elementary to middle school, only approximately 12.0% chose to stay in the program by selecting New River Middle.
- Approximately 30.0%-plus of middle school students remained in a magnet program in high school in the 2005-06 school year. However, of these 30.0%-plus of students, a smaller proportion chose to stay in the Marine Science program for high school (7.2% in 2005-06).

The number of Marine Science fifth grade students who continued in their magnet theme by choosing New River Middle for sixth grade was 9 (12.9%) in 2003-04; 14 (22.6%) in 2004-05; and 8 (12.9%) in 2005-06, as Table 6 shows. During the same period the number of Marine Science fifth grade students who chose a different magnet program for sixth grade was 14 (20.0%); 9 (14.5%); and 14 (22.6%). The number of Marine Science fifth grade students who chose a non-magnet school for the sixth grade was 47 (67.1%) in the 2003-04 school year; 39 (62.9%) in 2004-05; and 40 (64.5%) in 2005-06.

Table 6

*Marine Science Fifth Grade Students' Educational Selection for Grade 6*

Fifth Grade Students' Selection for Grade 6	2003-04		2004-05		2005-06	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Marine Science (e.g., New River Middle)	9	12.9	14	22.6	8	12.9
Other Magnet	14	20.0	9	14.5	14	22.6
Non-Magnet	47	67.1	39	62.9	40	64.5
Total	70	100.0	62	100.0	62	100.0

Table 7 shows that the number of Marine Science eighth grade students, who continued in their magnet theme by choosing the Marine Science program at South Broward High for ninth grade, was 16 (3.8%); 21 (5.4%); and 29 (7.2%) for the three-year period. The number of Marine Science grade 8 students who chose a different magnet program for ninth grade was 97 (23.1%); 80 (20.5%); and 104 (25.9%) during the three-year period. The number of students who chose a non-magnet school for ninth grade was 307 (73.1%) in 2003-04; 290 (74.2%) in 2004-05; and 269 (66.9%) in 2005-06.

Table 7

*Marine Science Eighth Grade Students' Educational Selection for Grade 9*

Eighth Grade Students' Selection for Grade 9	2003-04		2004-05		2005-06	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Marine Science (e.g., South Broward High)	16	3.8	21	5.4	29	7.2
Other Magnet	97	23.1	80	20.5	104	25.9
Non-Magnet	307	73.1	290	74.2	269	66.9
Total	420	100.0	391	100.0	402	100.0

### *3. What is the quality of curriculum and instruction for the Marine Science Magnet Program?*

Qualitative research methods examined the design and implementation of the Marine Science Magnet Program. The qualitative research was conducted by an outside evaluator with extensive Marine Science education and programming experience. The evaluator gathered qualitative data from observations during school visits, structured interviews with teachers and administrators, and review of relevant curricular documents provided by the District.

The evaluator conducted a site visit of each Marine Science school. Structured interviews with school-based administrators (the school principal or assistant principal), magnet program coordinators, magnet teachers, and non-magnet teachers were performed. More than eighteen interviews with magnet teachers were conducted as part of the research. Classroom observations and a tour of the facilities at each school were also conducted during the site visits.

Additionally, documentation describing the goals, curriculum, and instruction for the program at each Marine Science school was analyzed. The evaluator examined the following school documents: professional staff development planning calendars; teacher lesson plans; school curriculum and/or scheduling documentation that identifies and describes the course(s) of study that are available for Marine Science students, including course guides, educational pathways, scheduling sheets, registration cards, school master schedules, curriculum maps, and school improvement plans.

Data from site visits, interviews with teachers and administrators, and review of relevant curricular documents yielded observations with respect to curriculum and extracurricular activities; instruction, professional staff development, and physical resources for the Marine Science programs; and possible areas of improvement for the magnet program. The observations represent the evaluator's conclusions about how the magnet program works, based on review of the relevant data.

#### **Marine Environmental Science Magnet Program at North Fork Elementary School**

##### *Description of Curriculum and Extracurricular Activities*

The Marine Science curriculum at North Fork Elementary involves a 45-minute class for students in grades K-4 that meets once a week. The class represents a relatively new design of the curriculum that was initiated during the 2006 school year. Non-Marine Science teachers link their instructional content to the marine science content covered by the Marine Science teacher. In the fifth grade, efforts are being made to infuse marine science into the science curriculum through team-teaching. Marine science content is integrated into geography, where students study tides, why communities started near waterways, and the relationship of sea life and the food supply. Students also use Yahoo maps to study how rivers go to the ocean and CNN.com for information about current events issues, such as global warming. Marine science themes are also integrated with the study of language arts. Students read marine science-related non-fiction materials and complete writing assignments, using information culled from this reading. In lower level classes, after the Marine Science teacher conducts a Marine Science lesson, the regular classroom teacher builds on what was covered, referring to the points made repeatedly, while integrating the information shared into the rest of the day's instruction. Teachers also integrate marine science themes into the study of mathematics, using marine science-related situations for mathematics problems. When teaching FCAT Mathematics, examples from marine science are used. Fifth grade students, mostly gifted students, build a floating raft with

plywood using mathematics and physics and other fields of study; and complete written assignments related to the project; and study tides.

The school offers field trip opportunities for students at each grade level that are marine science-themed. Examples of field trips are as follows: Kindergarten students went on field trips to Safety Town/Ty Park, Swim Central, and Bailey Hall at Broward Community College. Second grade students went to Buehler Planetarium. Third grade students went to the IMAX 3D Deep Sea movie. Students in fourth grade went to the Everglades/Sawgrass Recreation Park, Little Monster Tales, Charlotte's Web (SEAS), International Game Fish Association (IGFA), Fishing Hall of Fame, and Mangrove Planting. Fifth grade students went to coral reefs for a first-hand experience of one of the unique features of the South Florida ecosystem. Many of the teachers integrate what is learned on the field trip with classroom instructional activities. While teachers indicated that a substantial number of students are involved in field trips, they also mentioned the fact that students need to take more field trips, given the limited experience and access to water-based activities that many students have outside of school hours. The limited exposure and experience may impede students' understanding of some of the dimensions of the marine science curriculum, teachers said.

#### *Instruction, Professional Staff Development, and Physical Resources*

The school campus and classroom environments that were observed were vibrant and text-rich with marine science-themed materials. Instructional activities were dynamic and students were engaged in learning. The classrooms had technology materials for the teachers and some had computers for students. Teachers had computers and LCD projectors.

Faculty members, as a group, have been innovative in searching for resources; and instruction demonstrated marine science theme integration into the classroom at different grade levels. Instructional standards, regarding instruction in marine science, are evolving. Teachers utilize a curriculum guide and curriculum maps that provide a broad overview of what they are to cover in their classes during the school year. The teachers have responsibility for developing their own lesson plans, based on these guides that indicate the relevant Florida Sunshine State Standards. However, the curricular resources (e.g., textbooks) available are too difficult for elementary school level students. As a result, teachers spend a considerable amount of time modifying the materials, in order to make them comprehensible for their students. Teachers engage in a considerable amount of independent work finding marine science resources online and elsewhere for use in their classes. Teachers work as colleagues to clarify and review their instructional activities. They discuss methods of instruction, as well as the technology they might like to have for instructional purposes. Nevertheless, the teachers do not seem to have ample curriculum resources nor experiences or time to develop a comprehensive marine science curriculum and to integrate marine science themes and materials with non-science instructional activities. Therefore, teachers would benefit from additional curriculum and staff development support and assistance, as they continue to develop their schoolwide marine environmental education magnet school.

The existing facilities and classrooms and Media Center at North Fork are visually appealing and a visitor to the school quickly realizes that this is a school with a marine science magnet theme. The main office at the school had an aquarium, seashells, and sea netting on top of computers and cabinets. The hallways had been named after different marine life, such as "Loggerhead

Lane” and “Jellyfish Junction.” Classrooms and the campus in general provide a visually appealing environment rich with marine science-related materials. Teachers said they felt students are enthusiastic about the magnet theme and the hands-on nature of many of their classes.

*Possible Areas of Improvement for the Magnet Program*

- The vision statement in the North Fork Elementary School Improvement Plan (SIP) makes reference to the magnet theme; however, objectives describing the magnet program’s role in school improvement initiatives and activities are absent. The magnet program has a role to play in promoting the development of academic skills and in enhancing curricular activities, partnerships with parents, and other areas of school performance and improvement. The magnet program’s role should be clarified and incorporated into deliberations and school planning. Thus, for example, the magnet theme should be presented as one of the avenues being employed to improve school performance in meeting Florida Sunshine State Standards.
- Assistance is needed in identifying and utilizing curricular materials and resources currently available that would support the magnet theme at North Fork Elementary, as well as adapting these resources for elementary school students and aligning them to the Florida Sunshine State Standards.
- The teaching staff at North Fork Elementary should have greater access to professional development opportunities that focus on teaching in a marine environmental sciences magnet school at different grade levels, with instruction that is tied to the FCAT. The school has begun the process in some classes of integrating Florida Sunshine State Standards and marine science instructional content. However, more preparation is needed to integrate the magnet theme into daily instructional activities, especially in terms of preparing students for FCAT. Staff should be informed of best practices used across the country to integrate and teach marine science content in different areas at different elementary school grade levels. An example of integration of marine content with the Florida Sunshine State Standards is amply illustrated by the curriculum resources made available online through the Florida Department of Education/Office of Environmental Education’s Web site. The Office of Environmental Education also has a professional staff that is available for consultation with local districts in Florida. Their Web site presents an overview of environmental education content that is grade-appropriate and aligned with the Florida Sunshine State Standards.
- The teaching staff expressed a desire to know more about the other marine science magnet sites in the District in order to network among their peers and share ideas, approaches, and lessons learned. Formal and informal professional development opportunities that take place on a regular basis, rotating among the three marine science schools, could be hosted. The interaction could be structured so that the North Fork faculty and staff have an opportunity to learn what is being taught at the other sites, what best practices are being employed, and how the question of integrating the magnet theme with the Florida Sunshine State Standards is being addressed. The interaction among faculty and staff would not only improve the integration of the magnet theme across curriculum areas, but would also enable the District to realize the magnet program goal of having a sequential course of study related to marine science at North Fork Elementary, New River Middle, and South Broward High.

- Regular formal and informal staff development opportunities for faculty at North Fork Elementary should be organized to insure faculty interaction among North Fork Elementary staffs and their colleagues at New River Middle School and South Broward High School. The collaborative could serve as a forum for sharing information about resources for funding field trips for North Fork Elementary. The District should continue to share information pertaining to public and private funding sources to cover the expenses of field trips.
- The curriculum at North Fork offers an introduction to basic knowledge about marine science and associated skills. Ongoing collaboration with New River Middle School is called for to encourage curriculum alignment. In addition, the physical plant (e.g., the new marine science building coming online at North Fork Elementary) should be thought of as a collective resource for the Marine Science program countywide. Planning for the new building should reflect a Districtwide marine science theme perspective.

### **New River Middle School of Marine Science**

#### *Description of Curriculum and Extracurricular Activities*

Out-of-boundary students at New River Middle receive two hours of theme-related instruction each day through a combined core science course and marine science course. The two-hour course is often referred to as the marine science research class. Students in the two-hour unit take a marine science course, in lieu of a reading course that is required of other students. In-boundary students are exposed to marine science content in their core science course, which incorporates some content on marine science. An in-boundary student can take the two-hour marine science class, if they meet the magnet program criteria in terms of FCAT scores, and if there is room in the marine science class for additional students. The extent to which theme integration is achieved varies with each teacher. Efforts are made to infuse the magnet school theme throughout the school by integrating marine science content in all classes each year during the spring, following FCAT; and theme integration is fostered by the school's use of such curricular resources as the Florida Water Story, involvement in Week of the Ocean, and field trips. Staffs interviewed said that the curriculum was academically challenging. Students in the Marine Science program sometimes find the program too challenging and are unable to maintain the 2.5 Grade Point Average (GPA) that is required. Because the coursework is rigorous, New River Middle School staffs are meeting with South Broward High School staffs to discuss the possibility of New River students receiving high school credit at South Broward for marine science coursework taken in middle school.

A wide range of marine science themed-related field trips are available through the magnet program. However, faculty said they felt there were not enough in-class and out-of-class hands-on opportunities for students in magnet and non-magnet classes. Teachers and other staff felt that there were more opportunities available to the school because of its location on the New River than were being utilized. They described efforts to develop locations for an outdoor classroom and a functioning dock with equipment that would enable students to have real world experience of the marine environment. Respondents offered ideas of the extensive educational opportunities these could provide for both magnet and non-magnet students in their science, mathematics, language arts and other classes. Arranging field trips was difficult at times, according to respondents, because of the amount of paperwork required prior to field trips. Given the nature of the trips taken by students, which typically involved access to water, there

was a desire that forms for water-related trips be completed at the beginning of the school year and thus not be submitted for each individual trip taken. The importance of water-related extracurricular activities was reiterated in the documents reviewed and the interviews that were conducted—particularly for students who had limited exposure and experience with the ocean and other basic aspects of marine science outside of school.

A major challenge facing the school was facilitating the infusion of marine science content throughout the school's curriculum. Professional development for non-magnet teachers might facilitate this objective. Additionally, teachers' ability to provide a cohesive, comprehensive Marine Science program was hampered by the absence of a textbook for middle school students and a detailed curriculum guide.

### *Instruction, Professional Staff Development, and Physical Resources*

The New River Middle School faculty was enthusiastic about the magnet theme. All the teachers interviewed felt that the theme provided an opportunity to take advantage of the natural curiosity of students to improve their formal learning in a number of content areas. The professional preparation and background of teachers in marine science was impressive and provided a valuable resource for the Marine Science Magnet Program. The magnet staffs demonstrated a genuine interest and enthusiasm for the magnet subject matter, as evidenced by the numerous professional development activities they have undertaken in the past.

All of the classrooms visited offered text-rich environments promoting the marine science theme with posters, computer screen savers, mobile aquariums, and marine science artifacts—however, more information about career opportunities in the marine sciences field could be made available through such classroom materials. All of the classrooms had a television/VCR/DVD player and a computer for each teacher. Teachers used this technology for marine science-themed presentations and exercises. The teachers noted that computers for students were provided by mobile laptop carts that were rolled into their classrooms when appropriate. The type of instruction observed was diverse, incorporating both didactic and interactive methods. Students were observed reading and discussing a book related to marine sciences; discussing the scientific method and conducting a science experiment; and dissecting crayfish, after hearing a presentation by the teacher and watching a video about crayfish. The teaching objectives and expectations for the day were written on classroom boards.

A limited amount of marine science-related professional development opportunities are available. Teachers are encouraged to join marine science professional associations and funds are available to pay for teachers to attend marine science conferences. However, limited local opportunities exist for marine science education. Staff indicated that, given the rich marine science-related resources in South Florida, more professional development opportunities should be available to marine science teachers, as well as teachers who are expected to integrate marine science themes into their instructional activities.

Whether the school, at present, is technologically ready with marine science equipment is an issue that was raised during discussions with teachers. One teacher who was interviewed said that while teachers at the school were well versed on instructional practices, "they are not always aware of the [marine science] technology." An example of such technology might be the equipment needed to project strands of sand being viewed in a microscope onto a screen for

examination and class discussion. The teachers said they learned elsewhere about state-of-the-art marine science technology that could be utilized in the classroom and in curriculum development elsewhere and employed it at New River Middle, and noted that they could help the school learn more about technology.

The facilities at New River Middle School are appealing with the architecture of the school building reflecting the marine theme. The classrooms, Media Center, and administrative offices are filled with visual illustration of the marine theme at the school and marine-related artifacts.

#### *Possible Areas of Improvement for the Magnet Program*

- Steps should be taken to reinforce the sequential nature of the elementary and middle school Marine Science magnet programs, as well as the high school Marine Science Magnet Program. During interviews, New River Middle staffs offered proposals for ways to reinforce the sequential nature of the Marine Science magnet programs that included consideration for having New River Middle School offer a Marine Science I course that would be aligned with the South Broward High School course offerings, and thus would result in New River Middle students enrolled in Marine Science I being able to receive high school credit. Another proposal called for New River Middle School and South Broward High School students to engage in more joint activities, such as field trips. A third proposal addressed the concern that New River Middle parents and students may not be clear that the magnet program in marine science continues at South Broward High School. Activities to provide more information to students and parents could include presentations and promotional materials for students and parents that clarify the sequential nature of the marine science programs at New River and South Broward, as well as joint New River-South Broward student activities.
- New River Middle has not taken full advantage of its unique location on the New River. There are limitations to the extent to which this resource makes a difference in academic activities at the school, as many of the curriculum offerings and academic activities at the school could be offered at any school in the District. An outdoor classroom concept could be considered as a way of enriching academic content in the marine science curriculum. Developing the New River as an educational resource could also provide a collective educational resource for the marine science magnet programs at North Fork Elementary and South Broward High, offering opportunities to reinforce the sequential and collective identity of the marine science magnet program in the District.
- There was limited evidence of the marine science theme in New River Middle's 2006 School Improvement Plan. The School Improvement Plan for New River should include specific plans that demonstrate ways in which the marine science magnet theme will be integrated into non-marine science courses, such as mathematics, and promote use of the marine science theme as one of the school's strategies to improve student performance on the Florida Sunshine State Standards.
- The absence of a marine science textbook designed for middle school students needs to be addressed. The extensive experience and expertise of the staff at New River Middle School could be tapped to identify, and possibly develop, educational materials that are congruent with the magnet theme for different middle school grade levels.
- Greater effort should be made to integrate marine science content into non-marine science courses at New River Middle School. While there were a number of specific schoolwide activities during the year which brought teachers from different content areas

together, interviews indicated that marine science integration was elective in non-marine science courses. It may be that the integration is minimal because teachers are unsure how to integrate the magnet theme into their mathematics, language arts, and other courses. Additional marine science professional development training and education opportunities should be offered by the District or by partners in Broward County.

- Professional development issues should be addressed separately for the elementary, middle, and high school levels to address the different needs of teachers at different school levels. The complexity of marine-related assignments at different levels varies considerably as does the rigor with which career opportunities are discussed. At the same time, communication across levels is necessary to insure that the marine science program has an integrated sequential curriculum. Therefore, teachers and Magnet Coordinators at the three magnet schools should also meet jointly with the District's Magnet Coordinator to discuss Districtwide professional development needs in marine science education. The knowledge and expertise of the marine science staff is an in-house resource for the District in this effort to identify staff development offerings.

## **Marine Science Career Pathway at South Broward High School**

### *Description of Curriculum and Extracurricular Activities*

South Broward High School offers students six four-year career pathways from which to choose to structure their high school coursework. The six career pathways are Arts/Entertainment; Hospitality/Business Management; Engineering/Physical Sciences; Information/Media/Telecom; Education/Social/Public Services, and Marine Science. The Marine Science Career Pathway is home to the school's magnet program. The mission of the Marine Science Career Pathway is "To provide students with unique opportunities to gain knowledge, develop skills, and ultimately enter careers in marine science, technology and industry" (South Broward High School Marine Science & Technology Magnet brochure). To enroll in the Marine Science Career Pathway, students must score at Level 3 or higher on the FCAT Mathematics and Reading, have a 2.0 GPA in middle school, and be able to maintain a 2.5 GPA while enrolled.

Students in the Marine Science Career Pathway have an opportunity to focus on one of two academic tracks: Marine Science or Marine Technology. In both tracks, students complete a variety of magnet courses that are sequential in nature and seek to offer a comprehensive educational and skill base in the marine science field. The prospect of combining hands-on activities with a rigorous and challenging course schedule is common to both the Marine Science and Marine Technology tracks. Magnet students can participate either in the Marine Science or Marine Technology tracks. In terms of District organization, Marine Science is overseen by the Magnet/Program Development Department Office (MPDO), while Marine Technology is overseen by the Career Technical and Adult/Community Education (CTACE) Department.

Marine Science Career Pathway students in the ninth grade are able to take Research I, a Maritime Seminar which includes an introduction to Remotely Operated Vehicles (ROV) building and deployment and to Geographic Information Systems (GIS), as well as the development of the study habits and critical thinking skills needed for success in the marine science field. In grades 10 through 12, students can take the following courses: Marine Science I; Research 1-4, which includes Marine Affairs/GIS and Ocean and Atmosphere; Research 5 and

6 (providing mentorship opportunities in which students may be involved in internships); and Water Safety, which is paired with Personal Fitness. Students who are not in the Marine Science Career Pathway are able to take a Marine Science course for which the prerequisite is Biology, and which provides an overview of different aspects of the marine environment.

Students in the Marine Science program are able to register for an increasing number of theme-related courses as they progress through the program. In grade 10, students can take two marine science electives; and in grades 11 and 12, students can register for three career pathway electives each year. Dual enrollment opportunities are available for juniors and seniors during the school year; and efforts are being made to expand the number of dual enrollment courses.

Students in the Marine Technology program take Marine Service 1-6, beginning with Marine Service 1 in grade 9 or 10. Marine Service 1-6 courses provide training in the care and operation of power tools, engine theory and applications, and offers instruction in the use of marine woods and fiberglass. Students in the Marine Technology emphasis have an opportunity to earn dual credit from Broward Community College.

Students in the magnet program at South Broward have a wide range of after-school clubs and activities related to marine science. These include South Florida Student Shark Program, ROV Underwater Robotics Team, Ocean Bowl Team, Southern Florida Watershed Program, Skills USA Marine Technology Team, and a variety of marine-related field trip opportunities that are organized through the programs. The school also offers the “Marine College Academy” for students who entered grade 9 with at least two high school credits, maintained an un-weighted 3.0 GPA at South Broward, and passed the College Placement Test. Students in the academy have an opportunity to take such disparate college-level courses as Fundamentals in Engineering and Introduction to Ocean Engineering at Florida Atlantic University; Marine Biology and Oceanography & Lab at Florida International University; and Marine Environmental Workshop offered at Barry University through the Barry-National Oceanic and Atmospheric Administration (NOAA) Educational Partnership Program. Students may participate in the GIS Satellite Program for which a Broward Community College professor comes to the high school on Tuesdays and Thursdays during the second and third period to work with students in the GIS lab. High school juniors receive seven college credits through Broward Community College for GIS 1; seniors receive six college credits through Broward Community College.

In addition, summer programs are open to magnet students in grades 9, 10, and 11 that provide dual enrollment credit from Florida Atlantic University and Florida International University. The summer activities include marine fisheries research, coral reef restoration, dolphin and manatee sighting, historic shipwreck exploration with ROVs, boater training and sailing, canoeing and kayaking, and research training using seine nets and various types of oceanographic equipment. South Broward High School offers students, who have been in the magnet program for two years, the opportunity to qualify to participate in the GIS Satellite Program. This curriculum offers both high school and college credit, while introducing innovative state-of-the-art computer mapping technology. Some of the projects in which students have been involved are crocodile research, local reef conservation, and studies of shark attacks on seals in South Africa.

The career track of the Marine Science Magnet Program at South Broward High has great potential. The program has established connections with many in the local marine industry, and

school staffs are knowledgeable about what the program needs to do to prepare graduates to transition to a career in marine industries.

#### *Instruction, Professional Staff Development, and Physical Resources*

The teachers were professional and knowledgeable about their area of teaching. They were enthusiastic about the magnet theme and described a desire for continual improvement in the quality of the program. Staffs are professionally networked, not only within Florida but nationally as well. Staffs were able to provide examples of what was learned at marine science conferences they had attended; and how what they learned was of benefit to the students in the magnet program.

Teachers evidenced a strong commitment to a Marine Science Magnet Program that offers best practice instructional standards. Staffs were mindful of the need for technology integration, demonstrated use of varied instructional methods, and provided a text-rich and visually appealing learning environment that promoted the marine science theme. In interviews, teachers said that an essential component of instruction in the magnet program was the focus of marine science field trips on the marine environment and related industries and uses. The trips compensate for the limited exposure many students have to marine life outside of their school experiences. Teachers said that there should be more extracurricular activities including school clubs, summer program opportunities for all incoming students, and a larger number of field trips.

The facilities at the school were appealing with many marine exhibits available throughout the school. Students in the magnet program were very enthusiastic about what they were learning, with many of the activities involving teamwork and collaboration among the students. The classrooms were text-rich, with many posters and marine exhibits, as well as colorful displays of student work—especially in the Media Center. Students were friendly and anxious to show and explain to the external evaluators what they were doing, and what they hoped to accomplish by their activities.

#### *Possible Areas of Improvement for the Magnet Program*

- Information on students who complete the Marine Science program—such as students' choice of postsecondary schools and programs and/or their industry and job placement—should be used as a resource for planning purposes for the Marine Science program. Such data could inform Marine Science schools and the District about the attractiveness of the program to postsecondary institutions, the areas of interest that graduates pursue, as well as the employment opportunities available to students interested in marine science-related fields. The data may provide an indication of some of the merits of the Marine Science program, as well as areas in which the program can be strengthened. A data collection system that was capable of identifying the number of marine science program graduates who enter colleges/universities, their college majors, and the type of employment students attain after graduating with a postsecondary degree would need to be developed, in order to be able to use the data.
- More linkages with colleges and universities should be developed to provide additional resources and opportunities, such as access to laboratories, opportunities for students to engage in research projects, mentoring relationships between college faculty/students and Marine Science students, field trip opportunities, and college faculty who can serve as

classroom guest speakers and offer workshops to faculty. Such relationships would also offer the Marine Science program opportunities to discuss the alignment of the District's Marine Science program with different college majors. The District could consider increasing the number of coordinator positions from one and one-half to two full time staff positions, allowing one full-time coordinator to serve as the Marine Science Coordinator, and the second to serve as a staff responsible for creating college and university connections and external fund-raising and support.

- Efforts to generate external funding as a stable source of support for field trips should be considered. The importance of the field trips to the integrity of the Marine Science Magnet Program at South Broward High School was repeatedly emphasized by all those interviewed. Staff indicated concerns about the continuing fiscal resources needed to provide students with that hands-on, real-life experience.
- More efforts are needed to establish connections between South Broward High and New River Middle students. Information from visits to New River Middle and South Broward High suggests that one factor that may contribute to some New River Middle School students not attending South Broward High School to continue in the magnet program is that New River students know little about South Broward High, and may be uncomfortable attending the school, if they do not know other students who already attend school there. Efforts aimed at creating student and program connections may include arranging joint field trips and projects and developing a CD or other marketing materials that highlight innovative in-class activities, field trips, and competitions, for distribution to middle school students and their parents. These efforts will build upon joint programs and linkages that have already been developed, such as demonstrations of the GIS and ROV to elementary school students.

4. *How well do Marine Science magnet students perform on the Florida Comprehensive Assessment Test (FCAT) compared to their non-magnet peers?*

To examine the impact on student achievement of participation in the Marine Science program, Achievement Level data from the Florida Comprehensive Assessment Test-Sunshine State Standards (FCAT-SSS) Reading and Mathematics subtests were analyzed for Marine Science magnet students and a District comparison group of non-magnet students. The FCAT-SSS identifies what Florida public school students should know and be able to do in each academic area. The FCAT-SSS is given to students in Grades 3-10.

Three grade-specific cohorts were created for the analysis; one for elementary, middle, and high school students, respectively. The first cohort—for elementary students—consisted of third grade students in the 2003-04 school year, fourth grade students in 2004-05, and fifth grade students in 2005-06. The second cohort was for middle school students and consisted of students in grade 6 in 2003-04, grade 7 in 2004-05, and grade 8 in 2005-06. The third cohort was for high school students; the high school cohort included grade 9 students in 2004-05 and grade 10 students in 2005-06. The cohorts included Marine Science magnet and District non-magnet students who were non-mobile for each of the respective years of the analysis (e.g., the 2003-04 school year to 2005-06), but not necessarily over the entire three-year period. Non-mobile means students did not change schools.

The analysis examined the number of students who reached proficiency within each cohort each year from the 2003-04 school year to 2005-06. The data in the analysis were disaggregated by

sub-group (or grouping variable) to examine the impact of the magnet program on specific student groups. Grouping variables comprised salient student sub-groups accounting for the majority of the student population. The sub-groups were identified from magnet student demographic data. The sub-group for the elementary cohort was students receiving Free and Reduced-Price Lunch (FRL). Students who receive FRL represent the largest sub-group at the elementary level. For the middle and high school cohorts, respectively, the sub-groups were students whose race/ethnicity was Black, Hispanic, or White. Black, Hispanic, and White students, respectively, were the largest racial/ethnic groups at the middle and high school levels.

The results of this analysis must be interpreted with caution, as the analysis does not take into consideration any of the variables that might account for differences in the academic performance of magnet and District non-magnet students, such as students' academic performance prior to entering the magnet program, which may be higher for magnet students as a result of the eligibility criteria that require out-of-boundary middle and high school students who apply to magnet programs to demonstrate minimum academic or talent standards. The analysis also does not estimate the size of the effect that participation in the magnet program has as a cause of the observed differences in scores between the two groups. Therefore, the degree to which the differences may be attributed to magnet program participation is not specified.

Tables 8 through 14 provide proficiency rates on the FCAT-SSS Reading and Mathematics subtests over a three-year period for each cohort, disaggregated by sub-group. These data are also displayed graphically in Figures 1 through 6. The data show that performance gains in reading and mathematics were observed for magnet students at the elementary level, and for students at the high school level in mathematics. However, magnet students at the middle school level tended to lose ground to non-magnet students.

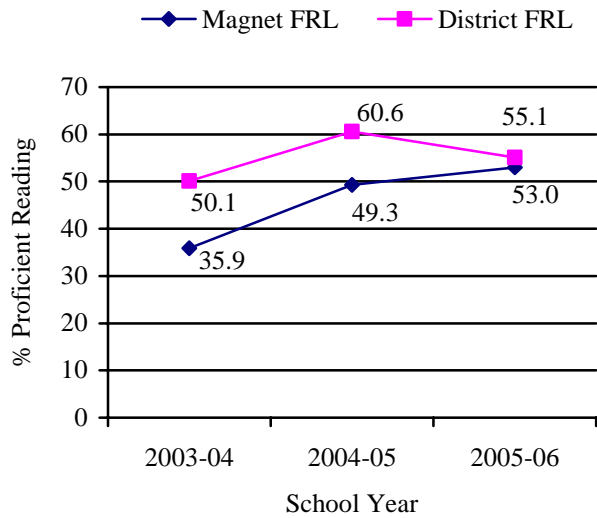
- At the elementary level in reading and mathematics, participation in the magnet program conferred a benefit for students receiving FRL.
  - For elementary students who received FRL, the proportion of students who performed at Achievement Level 3 and above in both reading and mathematics, respectively, increased more rapidly for magnet students than for non-magnet students over the three years.
  - In mathematics for District non-magnet FRL elementary students, the proportion of students who performed at Achievement Level 3 and above decreased over the three years, as Figure 2 shows.
- At the middle school level in reading, for students who were Black, Hispanic, and White, respectively, participation in the magnet program came at a cost in terms of Achievement Level 3 and above gains.
  - The proportion of magnet students who were Black and scored Achievement Level 3 and above in reading declined over the three-year period, while for District non-magnet Black students the proportion increased. Magnet students who were Black scored higher as a group than their District non-magnet counterparts in sixth grade, but their scores were lower by eighth grade.
  - For middle school students who were Hispanic, the proportion who performed at Achievement Level 3 and above in reading decreased over the three years, while for District non-magnet Hispanic students in middle school the proportion increased slightly.

- The proportion of White students at the middle school level who scored Achievement Level 3 and above in reading declined for both magnet and District non-magnet students. However, the decline was steeper for White students in the magnet program.
- In mathematics at the middle school level, participation in the magnet program came at a cost in terms of Achievement Level 3 and above gains for Black and Hispanic students, but not for White students who did better than their District non-magnet counterparts.
  - Over the three-year period, the proportion of middle school students who scored Achievement Level 3 and above in mathematics increased more slowly for magnet students who were Black and Hispanic, respectively, than for District non-magnet students from the same groups.
- The proportion of students who scored Achievement Level 3 and above in reading declined for Black, Hispanic, and White students, respectively, at the high school level for students in both the magnet and District non-magnet populations.
  - The proportion declined more slowly for magnet students who were Black than for District non-magnet students who were Black.
  - For Hispanic and White students in the magnet program, the decline was more rapid.
- In mathematics, in high school, participation in the magnet program conferred a benefit for magnet students for all three sub-groups, Black, Hispanic, and White students.
  - Black students in the magnet program performed lower as a group in ninth grade than Black students Districtwide, but by tenth grade magnet students who were Black surpassed their non-magnet counterparts. The proportion of Black students Districtwide who performed at Achievement Level 3 and above decreased over the three years, while for magnet students the proportion increased.
  - Over the three-year period, the proportion of high school students who scored Achievement Level 3 and above in mathematics increased more rapidly for magnet students who were Hispanic than for District non-magnet students who were Hispanic.
  - The proportion of White students at the high school level who scored Achievement Level 3 and above in mathematics declined for both magnet and District non-magnet students. However, the decline was steeper for White District non-magnet students.

Table 8

*Elementary Marine Science Students Scoring At or Above Achievement Level 3 on the FCAT-SSS Reading Test and a District Comparison Group, 2003-04 through 2005-06, by FRL*

Program/Group	2003-04			2004-05			2005-06		
	FRL	Proficient		FRL	Proficient		FRL	Proficient	
	<i>N</i>	<i>n</i>	%	<i>N</i>	<i>n</i>	%	<i>N</i>	<i>n</i>	%
North Fork Elementary School									
Magnet FRL	92	33	35.9	73	36	49.3	66	35	53.0
District Non-Magnet FRL	9,098	4,562	50.1	7,080	4,292	60.6	7,017	3,863	55.1

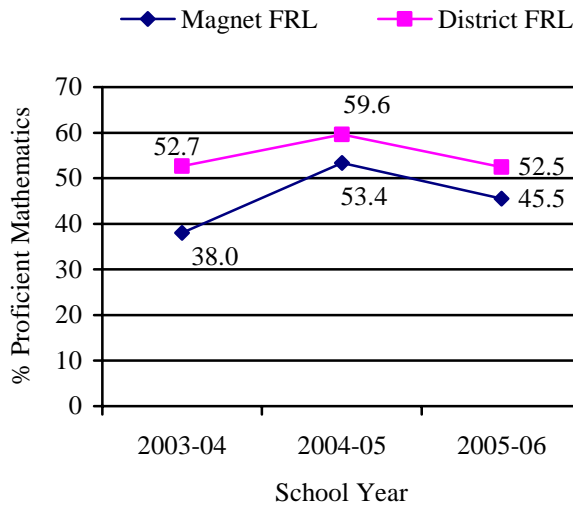


*Figure 1. Elementary Marine Science students scoring at or above Achievement Level 3 on the FCAT-SSS Reading test and a District comparison group, 2003-04 through 2005-06, by FRL.*

Table 9

*Elementary Marine Science Students Scoring At or Above Achievement Level 3 on the FCAT-SSS Mathematics Test and a District Comparison Group, 2003-04 through 2005-06, by FRL*

Program/Group	2003-04			2004-05			2005-06		
	FRL		Proficient %	FRL		Proficient %	FRL		Proficient %
	N	n		N	n		N	n	
North Fork Elementary School									
Magnet FRL	92	35	38.0	73	39	53.4	66	30	45.5
District Non-Magnet FRL	9,098	4,796	52.7	7,080	4,219	59.6	7,017	3,682	52.5

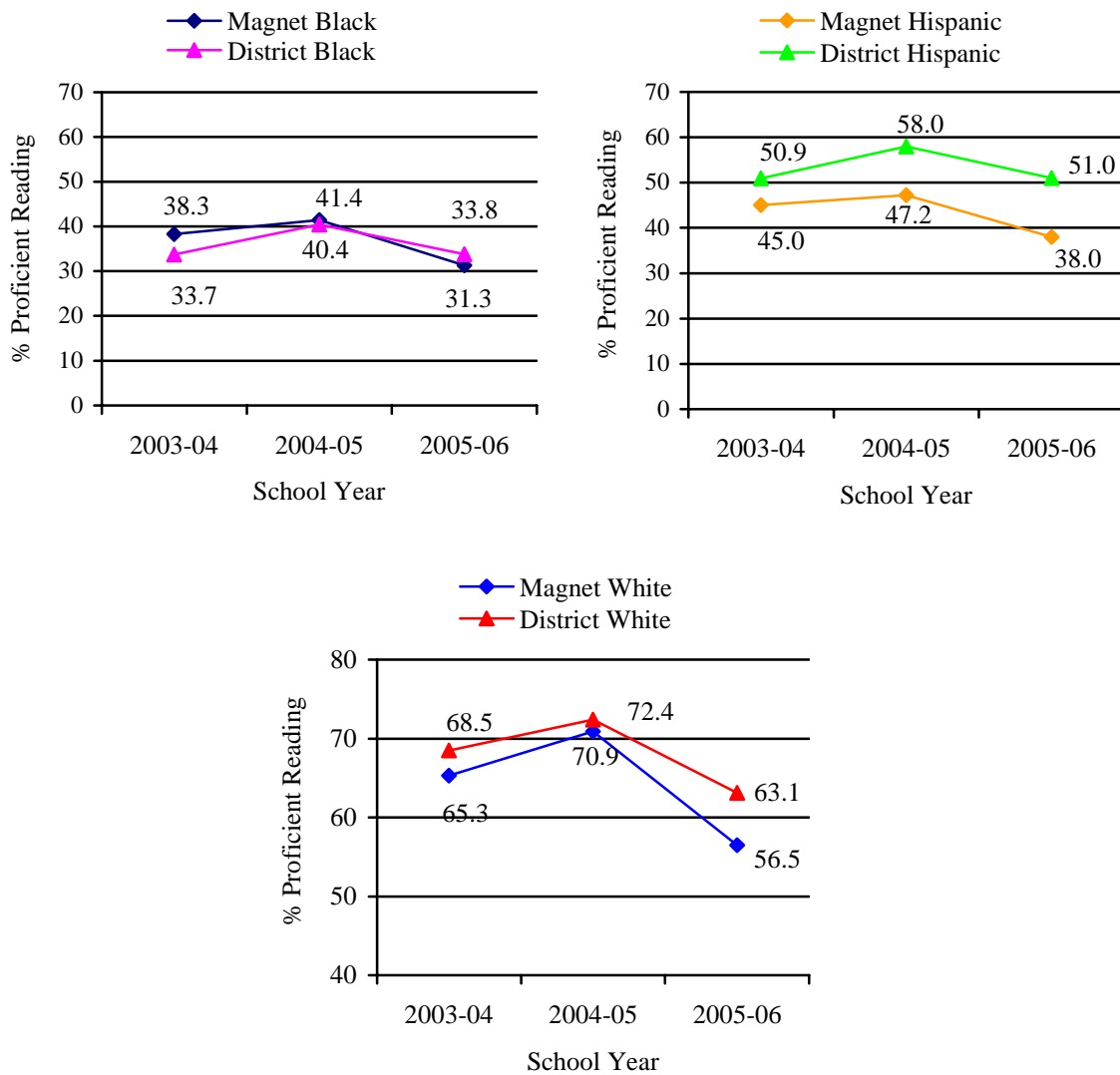


*Figure 2.* Elementary Marine Science students scoring at or above Achievement Level 3 on the FCAT-SSS Mathematics test and a District comparison group, 2003-04 through 2005-06, by FRL.

Table 10

*Middle School Marine Science Students Scoring At or Above Achievement Level 3 on the FCAT-SSS Reading Test and a District Comparison Group, 2003-04 through 2005-06, by Race/Ethnicity*

Program/Group	2003-04			2004-05			2005-06		
	Race/Ethnic	Proficient		Race/Ethnic	Proficient		Race/Ethnic	Proficient	
	<i>N</i>	<i>n</i>	%	<i>N</i>	<i>n</i>	%	<i>N</i>	<i>n</i>	%
New River Middle School									
Magnet									
Black	167	64	38.3	134	56	41.8	128	40	31.3
Hispanic	151	68	45.0	161	76	47.2	158	60	38.0
White	167	109	65.3	117	83	70.9	115	65	56.5
District Non-Magnet									
Black	4,969	1,677	33.7	4,721	1,906	40.4	4,775	1,614	33.8
Hispanic	3,365	1,713	50.9	3,519	2,042	58.0	3,720	1,897	51.0
White	5,281	3,620	68.5	5,163	3,737	72.4	5,286	3,338	63.1

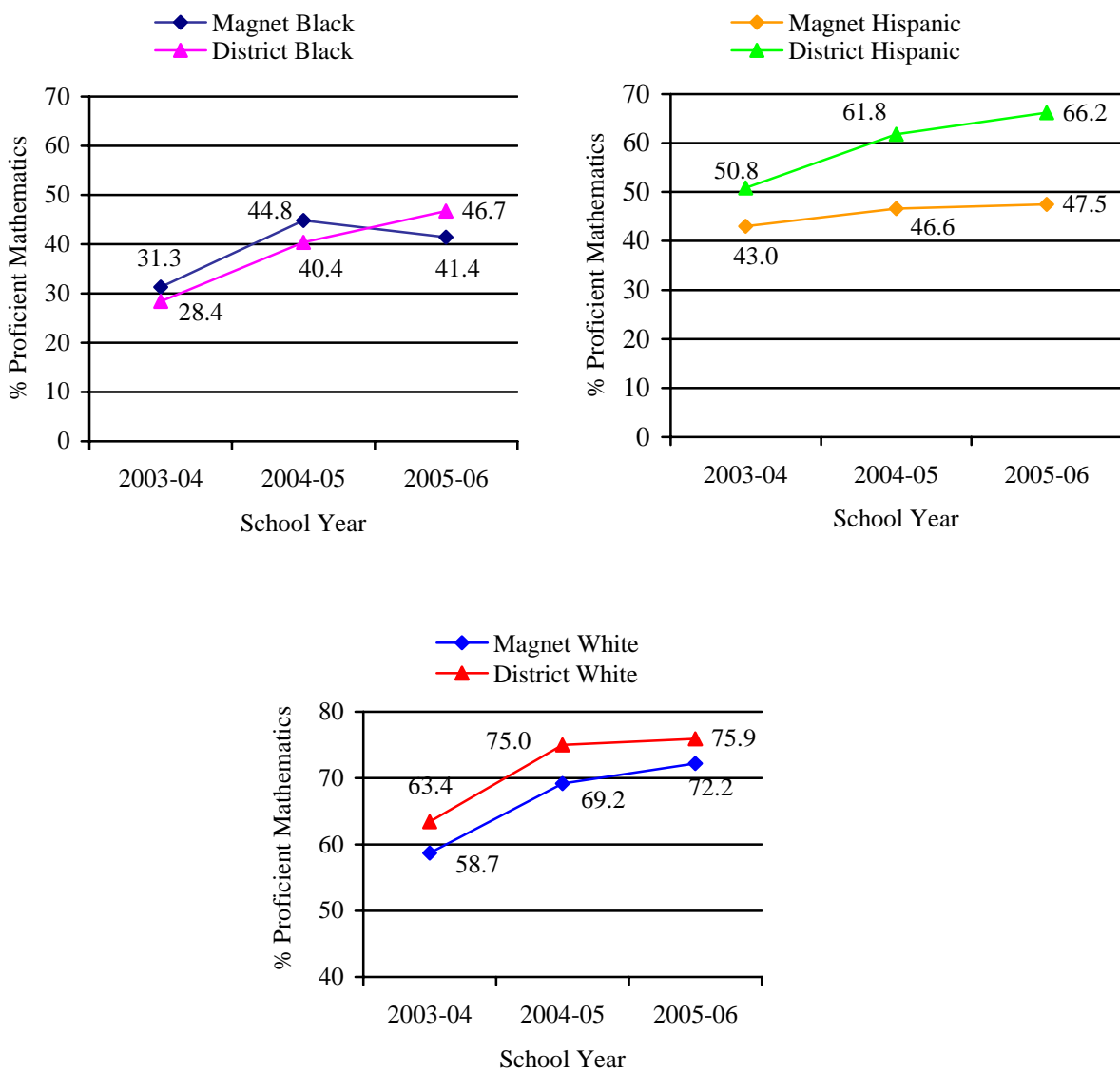


*Figure 3. Middle School Marine Science students scoring at or above Achievement Level 3 on the FCAT-SSS Reading test and a District comparison group, 2003-04 through 2005-06, by Race/Ethnicity.*

Table 11

*Middle School Marine Science Students Scoring At or Above Achievement Level 3 on the FCAT-SSS Mathematics Test and a District Comparison Group, 2003-04 through 2005-06, by Race/Ethnicity*

Program/Group	2003-04			2004-05			2005-06		
	Race/Ethnic	Proficient		Race/Ethnic	Proficient		Race/Ethnic	Proficient	
	N	n	%	N	n	%	N	n	%
New River Middle School									
Magnet									
Black	167	52	31.1	134	60	44.8	128	53	41.4
Hispanic	151	65	43.0	161	75	46.6	158	75	47.5
White	167	98	58.7	117	81	69.2	115	83	72.2
District Non-Magnet									
Black	4,969	1,410	28.4	4,721	1,908	40.4	4,775	2,232	46.7
Hispanic	3,365	1,709	50.8	3,519	2,174	61.8	3,720	2,462	66.2
White	5,281	3,349	63.4	5,163	3,870	75.0	5,286	4,013	75.9

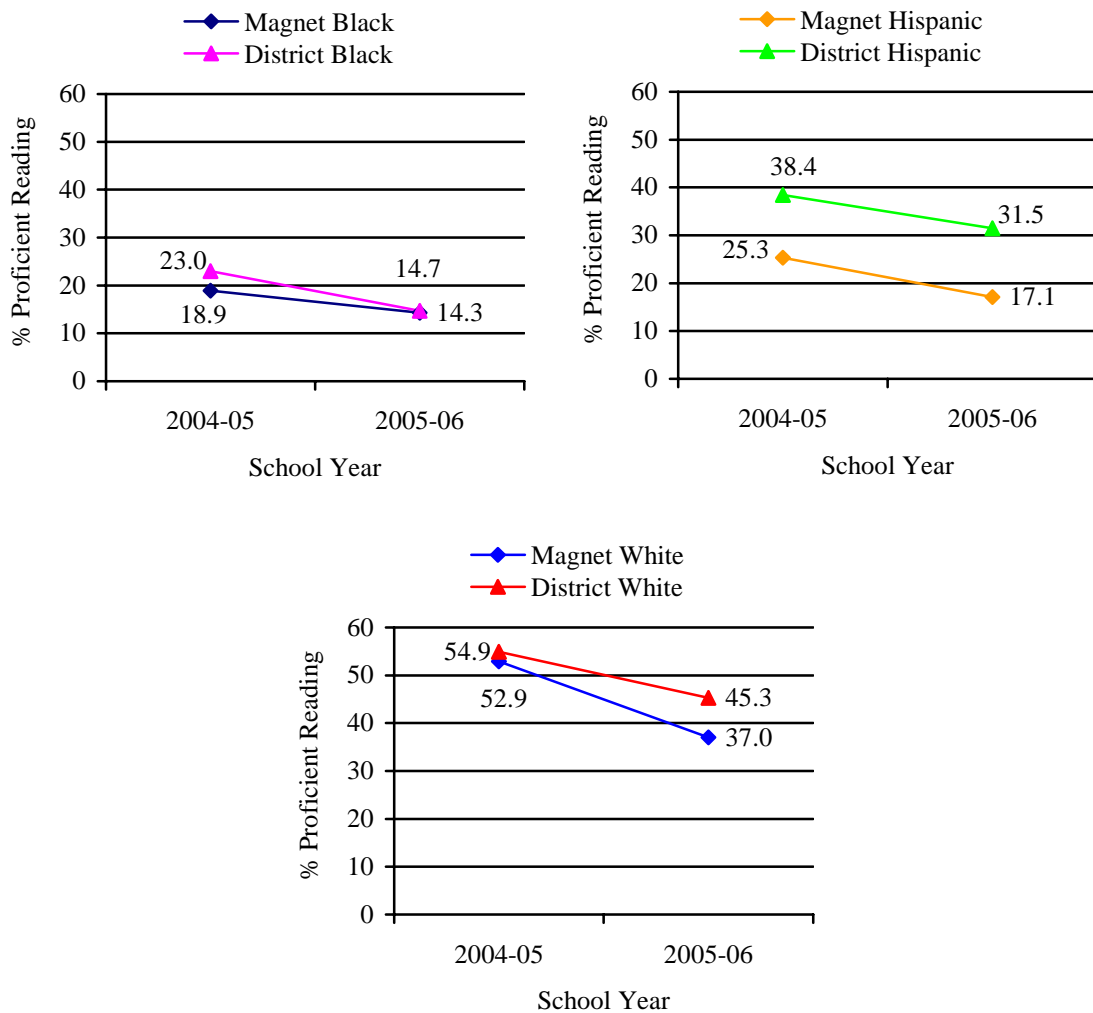


*Figure 4. Middle School Marine Science students scoring at or above Achievement Level 3 on the FCAT-SSS Mathematics test and a District comparison group, 2003-04 through 2005-06, by Race/Ethnicity.*

Table 13

*High School Marine Science Students Scoring At or Above Achievement Level 3 on the FCAT-SSS Reading Test and a District Comparison Group, 2003-04 through 2005-06, by Race/Ethnicity*

Program/Group	2004-05			2005-06		
	Race/Ethnic	Proficient		Race/Ethnic	Proficient	
	<i>N</i>	<i>n</i>	%	<i>N</i>	<i>n</i>	%
South Broward High School						
Magnet						
Black	159	30	18.9	154	22	14.3
Hispanic	186	47	25.3	164	28	17.1
White	225	119	52.9	208	77	37.0
District Non-Magnet						
Black	6,863	1,578	23.0	4,653	686	14.7
Hispanic	4,458	1,710	38.4	3,647	1,148	31.5
White	6,614	3,634	54.9	5,422	2,454	45.3

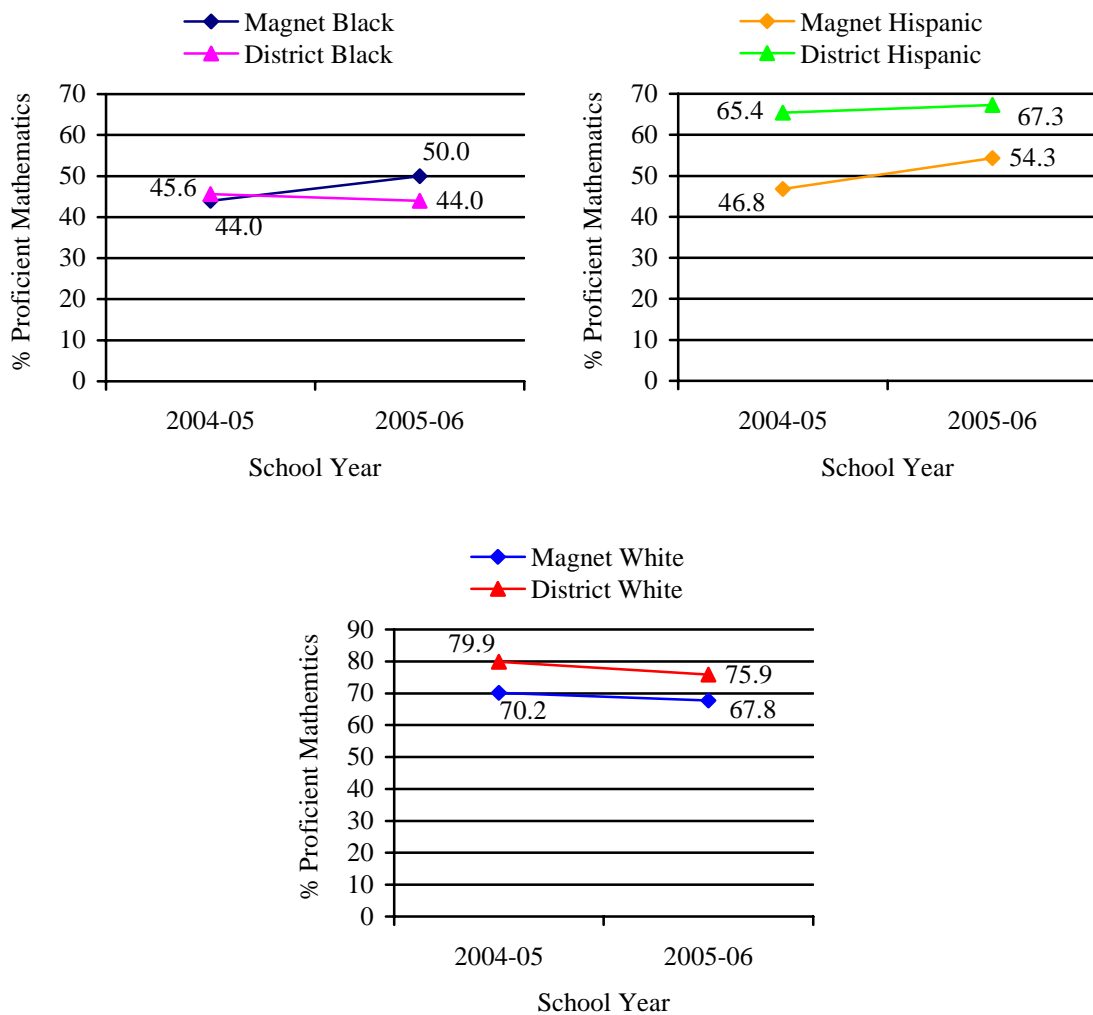


*Figure 5. High School Marine Science students scoring at or above Achievement Level 3 on the FCAT-SSS Reading test and a District comparison group, 2003-04 through 2005-06, by Race/Ethnicity.*

Table 14

*High School Marine Science Students Scoring At or Above Achievement Level 3 on the FCAT-SSS Mathematics Test and a District Comparison Group, 2003-04 through 2005-06, by Race/Ethnicity*

Program/Group	2004-05			2005-06		
	Race/Ethnic	Proficient		Race/Ethnic	Proficient	
	<i>N</i>	<i>n</i>	%	<i>N</i>	<i>n</i>	%
South Broward High School						
Magnet						
Black	159	70	44.0	154	77	50.0
Hispanic	186	87	46.8	164	89	54.3
White	225	158	70.2	208	141	67.8
District Non-Magnet						
Black	6,863	3,130	45.6	4,653	2,048	44.0
Hispanic	4,458	2,917	65.4	3,647	2,453	67.3
White	6,614	5,286	79.9	5,422	4,116	75.9



*Figure 6. High School Marine Science students scoring at or above Achievement Level 3 on the FCAT-SSS Mathematics test and a District comparison group, 2003-04 through 2005-06, by Race/Ethnicity.*

## **Summary**

The results indicate that the magnet program is an effective vehicle for promoting school choice, and that the program has the desired impact on instructional practices at the school level, and the size and diversity of school enrollments. The program provides a benefit in terms of accelerated gains in proficiency on the Florida Comprehensive Assessment Test-Sunshine State Standards for some groups of students at each educational level (e.g., elementary, middle and high school levels). Improvements to the curricular design of program may help promote improved academic performance for students whose performance did not improve as rapidly as that of others in the study.

## **Recommendations**

1. The Marine Science Magnet Program is an effective program, in terms of instructional practice at the school/classroom level and the impact on the size and diversity of school enrollments. The program provides a benefit, in terms of accelerated gains in proficiency on the FCAT-SSS, for some groups of students at each educational level (e.g., elementary, middle, and high). Improvements to the curricular design of program, such as those identified in this report that were developed from site visits to the Marine Science schools, may help promote improved academic performance for students whose performance did not improve as rapidly as that of others in the study. Research shows that academic performance lagged in the following areas for the following groups of students: middle school reading for Black, Hispanic, and White students; middle school mathematics for Black and Hispanic students; and high school reading for Hispanic and White students.

Magnet/Program Development staffs will work collaboratively with the Marine Science schools to address student achievement through their school improvement plans, while aligning with the Marine Science theme. Magnet staffs will assist the Marine Science schools in identifying theme-related curricular resources, materials to improve student achievement, and possible staff development opportunities for instructional staffs for the 2007 school year. The steps to be taken will be included in each of the Marine Science schools' annual magnet planning document that will be submitted to the MPDO by the end of September 2007.

2. Student access to the magnet program may be limited at New River Middle and South Broward High by the number of available openings for out-of-boundary magnet students, when permanent capacity is taken into account. Both New River Middle and South Broward High are currently over-enrolled, relative to permanent capacity; and New River Middle is projected to be over-enrolled in the 2011-12 school year. At South Broward High, projected enrollment, relative to permanent capacity, may result in some available openings by the 2011-12 school year. Only South Broward High is over-enrolled, when gross capacity is taken into account.

Magnet/Program Development staffs will work collaboratively with the Marine Science schools, the District's School Boundaries Department, and the District's Class Size Reduction (CSR) Task Force to ensure that the number of magnet students who can be admitted into the Marine Science program in the 2008-09 school year, based on school capacity utilization projections, does not exceed available openings at the host schools.

3. The Marine Science magnet schools are becoming more diverse as a result of the magnet program. The research shows that out-of-boundary magnet students had a smaller percentage of minority students and a larger percentage of non-minority students than did the in-boundary population. However, at North Fork Elementary, where minority students predominate, non-minority students who were out-of-boundary only slightly outnumbered in-boundary students who were non-minority.

Magnet/Program Development staffs will monitor the number of Marine Science applications the District receives for the 2008-09 magnet applicant pool. MPDO will work with staffs at North Fork Elementary to conduct targeted direct marketing campaigns designed to make students and parents aware of the opportunities that are available in BCPS for theme-driven specialized educational programming focusing on Marine Science.

MPDO has created a marketing plan designed to attract and inform parents and students of the many opportunities afforded in a magnet program/school. The following will be implemented in the 2007-08 school year:

- Direct mailing to parents/students with an informational brochure;
- Targeted marketing to students attending private schools through direct mail, fliers, and phone calls;
- Presentations to students at school sites;
- Hosting the annual Magnet Showcase at the Broward Convention Center;
- Printed advertisement in local and community publications;
- Open houses at the magnet schools;
- Informational Web site and Pod cast with magnet information; and
- Magnet Parent Advisory marketing network to promote the magnet programs.

Appendix A  
Implementation of Magnet Programs

Year	School	Program	Initial Type	Current Type	Total-School Yes or No
1995	South Broward High*	Marine Science	OPTIONS	OPTIONS	No
1996	New River Middle	Marine Science	OPTIONS	OPTIONS	Yes
1997	North Fork Elementary	Marine Science	OPTIONS	OPTIONS	Yes

\*Total-school for grades 9 and 10 and program-within-a-school for grades 11 and 12.