# A Study of the Correlation between Grade 10 Science Performance and Course Performance

## Overview

Texas Education Code Section 39.182(a)(6) mandates an evaluation of the correlation between student grades and student performance on state-mandated assessment instruments. To comply with this statute, the Student Assessment Division at the Texas Education Agency has conducted periodic studies to determine the relationship between students' classroom performance and their scores on statewide criterion-referenced assessments.

This report describes the most recent study, which compares the passing rates of grade 10 students on their spring 2007 Texas Assessment of Knowledge and Skills (TAKS) tests with their passing rates (credit) in related courses. Specifically, TAKS grade 10 science was selected for this year's grade correlation study. Student performance on 2007 TAKS grade 10 science was compared with passing rates for biology, chemistry, physics, and integrated physics/chemistry (IPC) courses. Only those students who had both TAKS and course data available were considered for comparison. For students who enrolled in a course multiple times through the years of 2002-2007, the most recent course enrollment was used for comparison.

## Results

### Overall Student Performance

The overall results for students are presented in Table 1. The table is presented in three sections. The first section (columns 1, 2, and 3) identifies the TAKS test (science) and course for which the comparison is being made as well as the number of students in each comparison group. The second section of the table (columns 4 and 5 highlighted in gray) presents spring passing rates for the TAKS science assessment, and passing rates for the course. The third section (columns 6 through 9) presents passing rates for both the TAKS test and the course, for the TAKS test only, for the course only, and the percentage of students who did not pass either the TAKS test or the course. On a given row, these columns in the third section add up to 100 percent.

Course enrollment in order of class size from largest to smallest was biology, IPC, chemistry, and physics. The highest TAKS passing rate was for chemistry students and the lowest was for IPC students. Biology students had the highest course passing rate, followed closely by chemistry and IPC, while the course passing rate for physics students was slightly lower. Chemistry students passed both the TAKS test and their course most often, and IPC students passed both the least often. For all students, the percentage that passed the course was higher than the percentage that passed the TAKS grade 10 science test. A small percentage of students passed only the TAKS (5 percent or less). The proportion of students passing the course only ranged from 16 percent in chemistry to 41 percent in IPC. Some students (7 to 11 percent) passed neither the TAKS test nor the course.

Table 1. Overall Student Performance

| TAKS | Course | Student Course Enrollment | TAKS Passing Rate | Course Passing Rate | % Passing Both | % Passing TAKS Only | % Passing Course Only | % Not Passing Either |
|---|---|---|---|---|---|---|---|---|
| Science | Biology | 257,494 | 59% | 90% | 57% | 2% | 33% | 8% |
| Science | Chemistry | 85,563 | 77% | 89% | 73% | 4% | 16% | 7% |
| Science | Physics | 3,385 | 65% | 85% | 60% | 5% | 24% | 11% |
| Science | Integrated Physics/Chemistry | 181,944 | 50% | 88% | 48% | 2% | 41% | 9% |

Note: This table is based on students who have both TAKS and course data available.

## Student Performance by Ethnicity

### Summary of Student Performance by Ethnicity

Regardless of ethnicity, students passed their science courses at higher rates than they passed the TAKS grade 10 science test. However, this difference between passing rates tended to be greater for African American students and Hispanic students than for White students. The percentage passing both the TAKS test and the course was higher for White students than for African American students or Hispanic students. The pattern of pass rates by course was similar across ethnic groups.

African American Students

Results for African American students are presented in Table 2. For African American students the highest passing rate for the TAKS was for those enrolled in chemistry while the lowest was for those who took IPC. The highest percentages of passing a course were for biology students and IPC students, while the lowest percentage was for physics students. The highest percentage passing both the TAKS and a course was for chemistry students and the lowest percentage was for IPC students.

Table 2. African American Student Performance

| TAKS | Course | Student Course Enrollment | TAKS Passing Rate | Course Passing Rate | % Passing Both | % Passing TAKS Only | % Passing Course Only | % Not Passing Either |
|---|---|---|---|---|---|---|---|---|
| Science | Biology | 35,337 | 41% | 87% | 39% | 2% | 48% | 11% |
| Science | Chemistry | 8,491 | 58% | 83% | 53% | 5% | 30% | 12% |
| Science | Physics | 336 | 47% | 79% | 43% | 4% | 36% | 17% |
| Science | Integrated Physics/Chemistry | 28,742 | 35% | 87% | 33% | 2% | 54% | 11% |

Note: This table is based on students who have both TAKS and course data available.

Hispanic Students

Results for Hispanic students are presented in Table 3. Hispanic students in chemistry had the highest TAKS passing rate and those in IPC had the lowest. The highest course passing rate for Hispanic students was in biology and chemistry while the lowest was in physics. Chemistry students passed both the course and the TAKS most frequently while IPC students passed both the course and the TAKS least frequently.

Table 3. Hispanic Student Performance

| TAKS | Course | Student Course Enrollment | TAKS Passing Rate | Course Passing Rate | % Passing Both | % Passing TAKS Only | % Passing Course Only | % Not Passing Either |
|---|---|---|---|---|---|---|---|---|
| Science | Biology | 104,104 | 46% | 85% | 43% | 3% | 42% | 12% |
| Science | Chemistry | 30,430 | 62% | 82% | 57% | 5% | 26% | 12% |
| Science | Physics | 1,462 | 51% | 77% | 44% | 6% | 33% | 17% |
| Science | Integrated Physics/Chemistry | 79,735 | 39% | 85% | 36% | 3% | 48% | 13% |

Note: This table is based on students who have both TAKS and course data available.

White Students

Results for White students are presented in Table 4. The highest TAKS passing rate for White students was for those enrolled in chemistry while the lowest was for those in IPC. Biology and chemistry students both had the highest course passing rate, although IPC and physics students had similar rates. Chemistry students were most likely to pass both the course and the TAKS test while IPC students were least likely to pass both the course and the TAKS test.

Table 4. White Student Performance

| TAKS | Course | Student Course Enrollment | TAKS Passing Rate | Course Passing Rate | % Passing Both | % Passing TAKS Only | % Passing Course Only | % Not Passing Either |
|---|---|---|---|---|---|---|---|---|
| Science | Biology | 107,995 | 76% | 94% | 74% | 2% | 20% | 3% |
| Science | Chemistry | 41,154 | 90% | 94% | 86% | 4% | 8% | 2% |
| Science | Physics | 1,276 | 82% | 92% | 78% | 4% | 15% | 4% |
| Science | Integrated Physics/Chemistry | 68,443 | 68% | 93% | 66% | 2% | 27% | 4% |

Note: This table is based on students who have both TAKS and course data available.

## Student Performance by Gender

Summary of Student Performance by Gender

Across students enrolled in these science courses, the passing rate for the TAKS grade 10 science was higher for male students than for female students. However, the course passing rate was higher for females than for males. The passing overlap for the TAKS and a given course was higher for males than for females. The pattern of passing rates by course was similar by gender.

Female Students

Results for female students are presented in Table 5. The highest TAKS passing rate for female students was for chemistry and the lowest was for IPC. Female students' course passing rate was highest for biology and chemistry. Out of the science courses analyzed, the course with the most female students passing both the course and the TAKS grade 10 science test was chemistry, and the course with the least was IPC.

Table 5. Female Student Performance

| TAKS | Course | Student Course Enrollment | TAKS Passing Rate | Course Passing Rate | % Passing Both | % Passing TAKS Only | % Passing Course Only | % Not Passing Either |
|---|---|---|---|---|---|---|---|---|
| Science | Biology | 130,653 | 56% | 91% | 54% | 2% | 37% | 7% |
| Science | Chemistry | 44,489 | 74% | 91% | 71% | 3% | 19% | 6% |
| Science | Physics | 1,539 | 61% | 87% | 58% | 3% | 29% | 10% |
| Science | Integrated Physics/Chemistry | 90,757 | 46% | 90% | 44% | 2% | 46% | 8% |

Note: This table is based on students who have both TAKS and course data available.
Due to rounding, the percentages may not add up to 100%.

Male Students

Results for male students are presented in Table 6. For male students the highest TAKS passing rate was for chemistry students and the lowest was for IPC students. Their course passing rate was highest for biology and lowest for physics. The course with the most male students passing both the course and the TAKS was chemistry, and the course with the least was IPC.

Table 6. Male Student Performance

| TAKS | Course | Student Course Enrollment | TAKS Passing Rate | Course Passing Rate | % Passing Both | % Passing TAKS Only | % Passing Course Only | % Not Passing Either |
|---|---|---|---|---|---|---|---|---|
| Science | Biology | 126,778 | 63% | 88% | 60% | 3% | 28% | 9% |
| Science | Chemistry | 41,058 | 80% | 87% | 74% | 6% | 13% | 8% |
| Science | Physics | 1,844 | 69% | 83% | 62% | 6% | 20% | 11% |
| Science | Integrated Physics/Chemistry | 91,135 | 54% | 87% | 51% | 3% | 36% | 10% |

Note: This table is based on students who have both TAKS and course data available.

## Student Performance by Economic Status

Summary of Student Performance by Economic Status

The passing rate for non-economically disadvantaged students was higher than for economically disadvantaged students on the TAKS grade 10 science test, a given course, and both TAKS and a course. Passing rate patterns by course were similar for each economic status.

Economically Disadvantaged Students

Results for economically disadvantaged students are presented in Table 7. Economically disadvantaged students enrolled in chemistry passed the TAKS assessment at a higher rate compared to the other science courses analyzed, while those enrolled in IPC passed at a lower rate. Biology was the course with the highest passing rate and physics had the lowest passing rate. Economically disadvantaged students enrolled in chemistry were most likely to pass both the course and the TAKS while those enrolled in IPC were least likely.

Table 7. Economically Disadvantaged Student Performance

| TAKS | Course | Student Course Enrollment | TAKS Passing Rate | Course Passing Rate | % Passing Both | % Passing TAKS Only | % Passing Course Only | % Not Passing Either |
|---|---|---|---|---|---|---|---|---|
| Science | Biology | 108,236 | 44% | 86% | 41% | 3% | 44% | 12% |
| Science | Chemistry | 28,637 | 59% | 82% | 53% | 6% | 28% | 13% |
| Science | Physics | 1,516 | 50% | 78% | 43% | 6% | 34% | 16% |
| Science | Integrated Physics/Chemistry | 85,487 | 38% | 85% | 35% | 3% | 50% | 12% |

Note: This table is based on students who have both TAKS and course data available.

Non-Economically Disadvantaged Students

Results for non-economically disadvantaged students are presented in Table 8. For non-economically disadvantaged students the highest passing rate was for students enrolled in chemistry and the lowest was for those who took IPC. The course passing rate for non-economically disadvantaged students was highest in chemistry and biology and lowest in physics. Students enrolled in chemistry passed both the course and the TAKS assessment most frequently, whereas students in IPC passed the TAKS and the course least frequently.

Table 8. Non-Economically Disadvantaged Student Performance

| TAKS | Course | Student Course Enrollment | TAKS Passing Rate | Course Passing Rate | % Passing Both | % Passing TAKS Only | % Passing Course Only | % Not Passing Either |
|---|---|---|---|---|---|---|---|---|
| Science | Biology | 148,775 | 71% | 93% | 68% | 2% | 24% | 5% |
| Science | Chemistry | 56,806 | 86% | 93% | 82% | 4% | 10% | 4% |
| Science | Physics | 1,861 | 78% | 90% | 74% | 4% | 16% | 6% |
| Science | Integrated Physics/Chemistry | 96,099 | 61% | 91% | 59% | 2% | 33% | 6% |

Note: This table is based on students who have both TAKS and course data available.