Washington University in St. Louis
Arts & Sciences
Department of Education
Center for inquiry in science teaching and learning

CISTL St. Louis

Science Attainment by Content Strands
in St. Louis Area School Districts

TECHNICAL REPORT

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Center for Inquiry in Science Teaching and Learning (CISTL) St. Louis Regional Database Project

The CISTL St. Louis Regional Database Project strives to provide information to schools and the community about indicators of science attainment at the elementary, middle, and high school levels using local, state, and national data sources. Information on science attainment for area students assists the planning and decision-making of teachers, school officials, and policy-makers.

Schools and educators are accountable under the requirements of the No Child Left Behind Act (NCLB) of 2001 in which they participate in standards-based reform to insure all students demonstrate content knowledge and skills at specific mastery levels. Schools monitor their performance closely to show Adequate Yearly Progress (AYP) for increasing student achievement. The movement of high-stakes accountability to drive school improvement has resulted in widespread access to data about schools and districts. With the availability of this data, student performance can be studied for the region as a whole. Comparisons across school districts inform both educational and business communities about student performance variation within the region.

A regional perspective assists in planning for the growing demand for scientists and technicians in the St. Louis area. The region continues to develop into a national technology hub for research and production in medical, biological, engineering, and industrial applications. In order to provide human resources to sustain this scientific and technological growth, the area's schools need to provide high quality education, training, and strong scientific coursework.

This Technical Report is one in a series of papers designed to inform the community about overall trends in science attainment for the St. Louis region.

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Mark C. Hogrebe, Lydia Kyei-Blankson, Li Zou

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Executive Summary

This report presents an overview of performance on the eight science content strands from the State of Missouri Assessment Program (MAP) for years 2000 – 2005 in thirty St. Louis area school districts at grades three, seven, and ten.

As with the overall MAP science test results, the individual content strands showed much lower performance in seventh grade than third grade except in the Ecology and Scientific Relevance strands. By the tenth grade, Ecology scores were lower than in seventh grade, but Scientific Relevance scores remained fairly constant for all three grade levels.

For third grade, the median percentage points earned (MPPE) ranged from 54% in Ecology to 79% for Scientific Inquiry. Ecology, Earth Systems, and the Universe all had MPPE between 54–57%. By contrast, Matter & Energy, Living Systems, and Scientific Inquiry had MPPE between 73–79%.

Seventh grade MPPE were substantially lower than for third grade on 6 of the 8 content strands. Only Ecology and Scientific Relevance had MPPE slightly higher than third grade. MPPE for Force & Motion was 35%, for Earth Systems 35%, and for the Universe, 41%. The highest MPPE was 66% for Scientific Relevance.

MPPE at the tenth grade level were very similar to seventh grade and much lower than for third grade. The largest difference between seventh and tenth grade MPPE was for Ecology where the difference was 56% for seventh grade vs. 44% for tenth grade. The remainder of the content strands had less than 5 percentage points difference between seventh and tenth grades.

Each content strand performance was given geo-spatial perspective by a series of district maps in which comparisons and patterns were highlighted. The performance patterns in the GIS school district maps, especially for seventh and tenth grades, showed that the lower performing districts across content strands tended to be St. Louis City and adjacent districts, and those to the north of St. Louis City.

In order to compare the median percentage points earned (MPPE) for each of the 8 science content strands within districts, three attainment levels were represented in an 8–bar graph. These graphs were given geo-spatial perspective by being mapped onto their districts' overall percentage of Proficient/Advanced students in science.

Science Attainment by Content Strands

in St. Louis Area School Districts

Mark C. Hogrebe
Lydia Kyei-Blankson
Li Zou

CISTL Tech Brief No. 1 (Hogrebe & Kyei-Blankson, 2006) presented on overview of science attainment in St. Louis area school districts as determined by the State of Missouri Assessment Program (MAP) in science from 2000 through 2005. The findings indicated that in the third grade, almost 49% of students scored at the Proficient or Advanced levels. By the seventh grade, there was a substantial difference from the third grade in the percentage of students at the Proficient/Advanced levels across all districts. The average percentage of seventh grade students at these levels was 14.1%. By the tenth grade, the average percentage in the Proficient/Advanced levels was only 6.6% and the range of students at these levels across districts was narrow (1% to 16%).

Since the MAP science test consists of eight content strands, the important follow-up investigation was to determine if MAP test performance was similar on all eight content strands or were there strengths and weaknesses in specific content areas. The purpose of this report was to examine the performance on each of the eight content strands at the third, seventh, and tenth grade levels across St. Louis area school districts.

The emphasis of this report is on an "overview" of science attainment by content strands in St. Louis area school districts. MAP test data from specific schools, districts, and the entire state are available on the Missouri Department of Elementary and Secondary Education (DESE) website http://dese.mo.gov. Anyone can visit the website and examine test scores for a specific school or district; however, the data are not aggregated to give a picture of particular regions within the state. The specific content strand data used in this analysis are not available on the DESE website.

This report examines thirty St. Louis area school districts in order to gain an understanding of the level of proficiency on the science content strands across districts and for the St. Louis region as a whole. Although data are limited to Missouri school districts, Illinois school districts in close proximity are certainly important contributors to the St. Louis region and its employers. However, the present study did not include districts on the Illinois side of the St. Louis region because the Illinois testing and criteria for determining student proficiency status are very different from Missouri's and are not directly comparable.

The Data

The thirty school districts selected to represent the St. Louis area were those with the greatest concentration of school-aged children (5 – 17 years old) based on the 2000 U.S. census data. The districts form a contiguous area westward from the Mississippi River with the St. Louis City district as the eastern anchor.

The data for the thirty school districts in this report are DESE MAP data obtained from the Missouri Office of Social and Economic Data Analysis. The indicators of achievement are the median percentage points earned on each science content strand test by district, separately, for the third, seventh, and tenth grades.

MAP science data were gathered for the years 2000 through 2005. Since state funding for the science test was eliminated after 2002, schools could elect to give the science test on a voluntary basis; therefore, some schools did not administer the science test during each subsequent year and did not have data for all six years, but all districts had at least three years of data. For this report, the median was calculated to summarize each district's percentage of points earned on the science content strand tests during the 2000 – 2005 period. The administration of the science MAP test in grades 5, 8, and 11 will be mandatory in spring 2008.

The MAP science test measures students' progress relative to the Missouri Show-Me standards. The science test assesses eight content areas or strands that are described in detail in the Missouri "Framework for Curriculum Development in Science" which can be found at the DESE website http://www.dese.mo.gov/divimprove/curriculum/webframeworks/05SC.PDF

The eight content strands are:

I. Matter and Energy
- Properties, Characteristics and Structure of Matter
- Characteristics, Forms and Sources of Energy
- Interactions of Matter and Energy

II. Force, Motion, and Mechanical Energy
- Relative Motion
- Types and Properties of Forces and Motion
- Interactions of Forces and Motion

III. Living Systems
- Structure/Function/Characteristics of Living Organisms
- Life Processes
- Diversity/interdependence
- Reproduction/Heredity
- Adaptation/Evolution

IV. Ecology
- Interactions of Ecosystems
- Changes in Ecosystems

V. Earth Systems
- Physical Systems
- Processes of Systems

VI. The Universe
- Characteristics of the Universe
- Motion of the Universe
- Tools of Space Exploration

VII. Scientific Inquiry
- Processes
- Investigations

VIII. Scientific Relevance
- Nature of Technology
- Historical Perspective
- Science as a Human Endeavor

Test items included three types:

- Multiple-choice items from the TerraNova, a nationally normed test.
- Constructed response items that require students to supply (rather than select) an appropriate response. Sometimes called an open-ended item.
- Performance event items that involve longer and more demanding tasks which require students to work through problems or experiments.

Table 1 describes the number and type of items for each content strand at each grade level. It shows the maximum number of points that could be earned on each content strand.

Table 1. Number of Items and Maximum Possible Points on Missouri MAP Science Content Strands 2004-05

	3rd Grade		7th Grade		10th Grade	
Content Strand	**Item Type**	**Points**	**Item Type**	**Points**	**Item Type**	**Points**
Matter & Energy	5 MC 2 CR	9	3 MC 3 CR	8	3 MC 2 CR	8
Force & Motion	5 CR	8	1 MC 3 CR	8	1 MC 2 CR	6
Living Systems	4 MC 2 CR	9	3 MC 4 CR	8	4 MC 3 CR	9
Ecology	4 CR	7	4 MC 3 CR	9	2 MC 4 CR	9
Earth Systems	2 MC 3 CR	7	2 MC 3 CR	8	2 MC 3 CR	8
Universe	2 MC 3 CR	7	2 MC 3 CR	7	2 MC 4 CR	8
Scientific Inquiry	5 MC 8 PE	16	7 MC 9 PE	20	6 MC 6 PE	18
Scientific Relevance	1 MC 3 CR	8	2 MC 3 CR	8	3 MC 3 CR	8
Total Items and Points	19 MC 22 CR 8 PE	71	24 MC 22 CR 9 PE	76	23 MC 21 CR 23 PE	74

MC = multiple choice items
CR = constructed response items
PE = performance event items

The MAP tests are scored by CTB/ McGraw-Hill and reported as MAP Scale Scores based on students' correct responses and points earned. The Scale Scores are used to indicate the current five achievement levels: Step 1, Progressing, Nearing Proficient, Proficient, and Advanced. Each achievement level provides a description of what students can do in terms of the content area at that grade level. (For more information see the "Missouri Assessment Program: Guide to Interpreting Results, Revised 2005" at the Missouri DESE website: http://dese.mo.gov/divimprove/assess/GIR_2005.pdf).

The proficiency categories were used to describe overall science attainment among St. Louis school districts in CISTL Tech Brief No.1 (Hogrebe & Kyei-Blankson, 2006). The science performance measures for the present Technical Report are the median percentage points earned on each science content strand test by district, separately, for the third, seventh, and tenth grades.

Science Attainment by Content Strands

The first set of analyses aggregates data across the thirty districts to get an overall view of performance by content strands. Figure 1 presents the median percentage points earned (2000 – 2005) by content strand for all districts at the third, seventh, and tenth grade levels. For third grade, the median percentage points earned (MPPE) ranged from 54% in Ecology to 79% for Scientific Inquiry. Ecology, Earth Systems, and the Universe all had MPPE between 54–57%. By contrast, Matter & Energy, Living Systems, and Scientific Inquiry had MPPE between 73–79%.

Seventh grade MPPE were substantially lower than for third grade on 6 of the 8 content strands. Only Ecology and Scientific Relevance had MPPE slightly higher than third grade. MPPE for Force & Motion was 35%, for Earth Systems 35%, and for the Universe, 41%. The highest MPPE was 66% for Scientific Relevance.

MPPE at the tenth grade level were very similar to seventh grade and much lower than for third grade. The largest difference between seventh and tenth grade MPPE was for Ecology where the difference was 56% for seventh grade vs. 44% for tenth grade. The remainder of the content strands had less than 5 percentage points difference between seventh and tenth grades.

Figures 2, 3, and 4 graph the differences in MPPE by content strand between the three grade levels. The top line in Figure 2 shows the MPPE for third grade content strands while the bottom line plots the difference in MPPE for the seventh grade, arranged according to progressively larger differences. The largest discrepancies between third and seventh grade MPPE were for Force & Motion (33 percentage points), Living Systems (24 percentage points), and Matter & Energy (23 percentage points).

Figure 3 is similar, but the differences are from third to tenth grades. For both Figures 2 and 3, the content strands with the largest differences from third grade were Matter & Energy, Force & Motion, and Living Systems. Figure 4 shows that the differences in MPPE between seventh and tenth grades were much less than when compared to third grade performance.

Grade comparisons by content strands for each of the thirty districts are presented in Figures 24 – 31 found in the Appendix. Within grade levels, the range of MPPE from the lowest to the highest districts was generally within 25–35 percentage points.

Figure 1. Science MAP Performance by Content Strands
Average of the Percentage Points Earned (2000–2005 Median Values) across 30 St. Louis Area School Districts

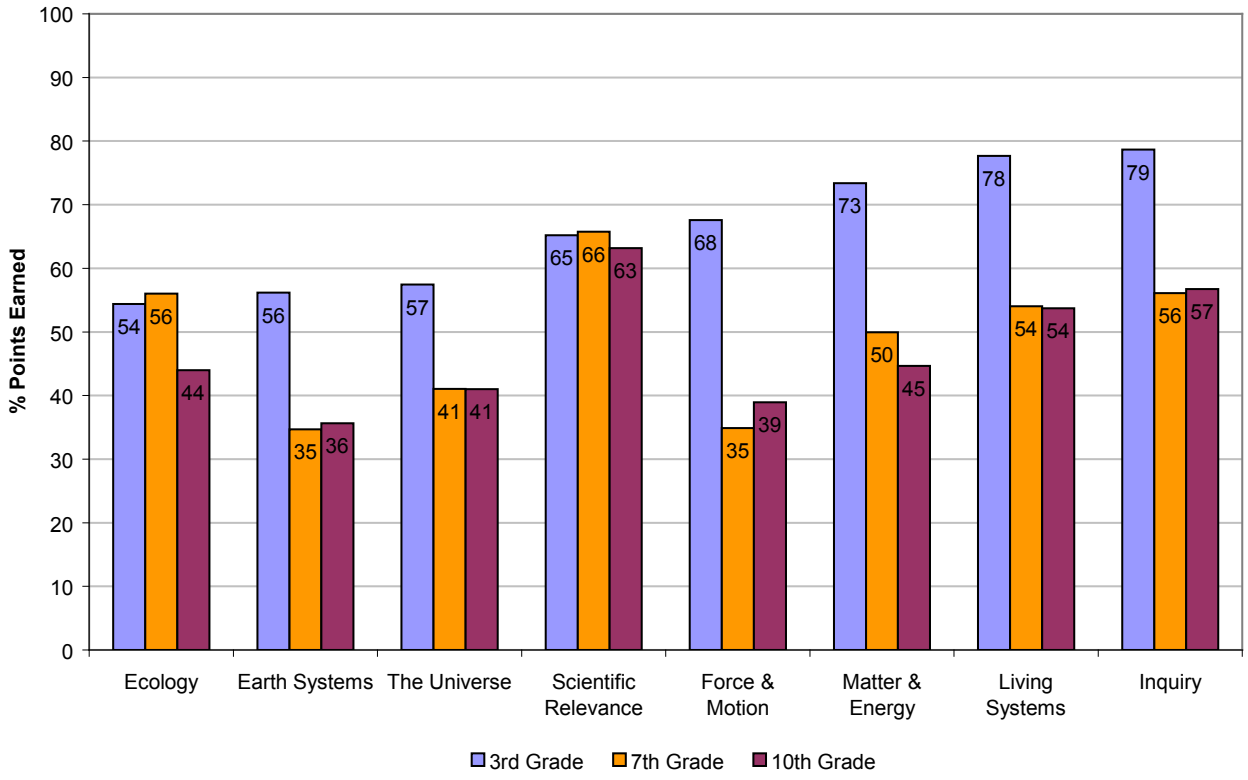


Figure 2. Science MAP Performance by Content Strands
Third to Seventh Grade Change in Percentage Points Earned (2000–2005 Median Values) across 30 St. Louis Area School Districts

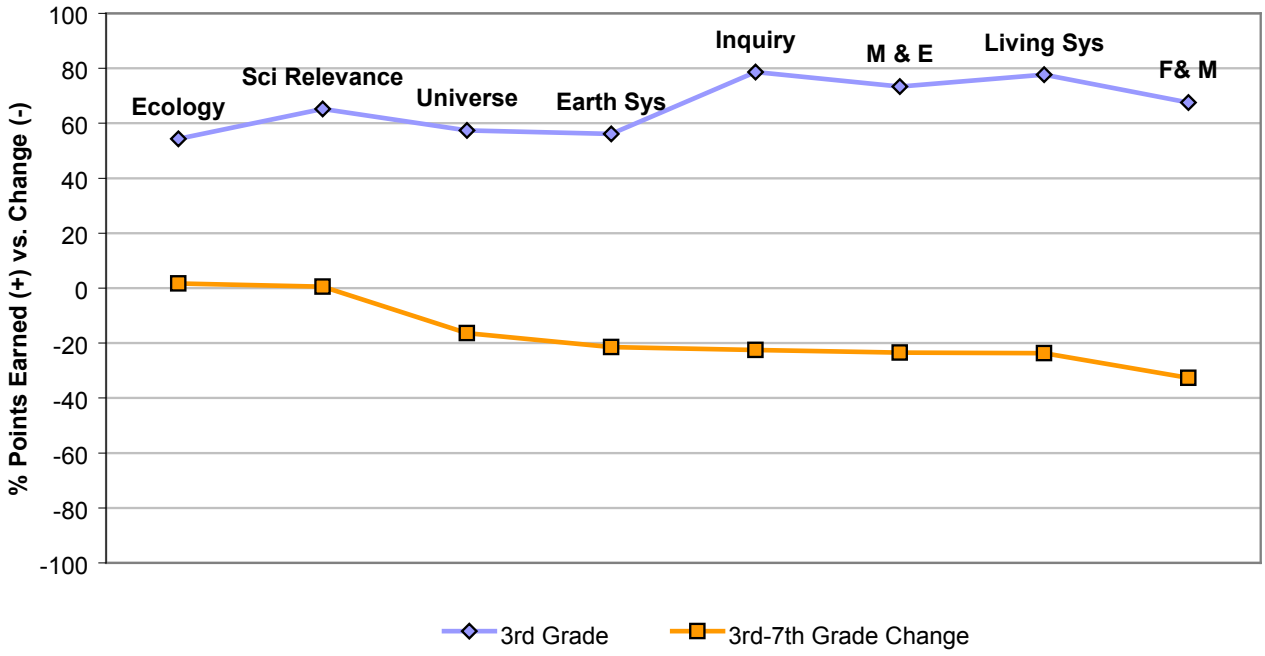


Figure 3. Science MAP Performance by Content Strands
Third to Tenth Grade Change in Percentage Points Earned (2000–2005 Median Values) across 30 St. Louis Area School Districts

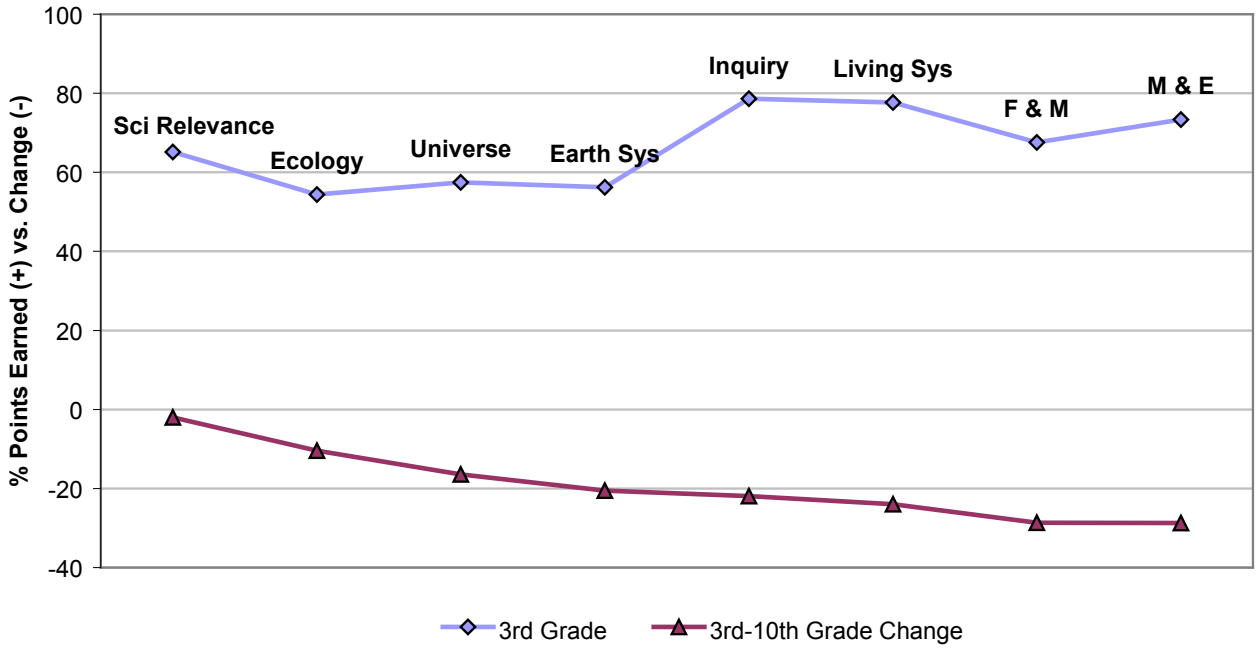
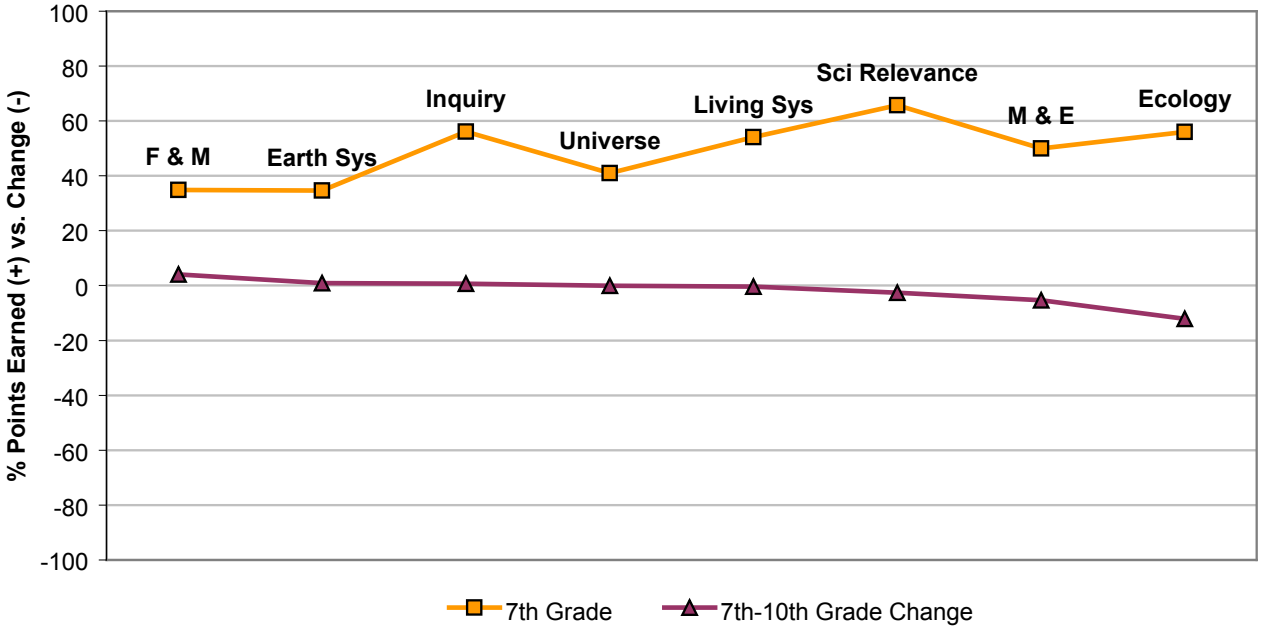


Figure 4. Science MAP Performance by Content Strands
Seventh to Tenth Grade Change in Percentage Points Earned (2000–2005 Median Values) across 30 St. Louis Area School Districts



Exploring Variation in Science Content Strand Attainment across Districts

In order to study the variation in science attainment across school districts, this section gives geo-spatial perspective to the graphs in the figures and demonstrates the importance of location using Geographic Information Systems (GIS) mapping. GIS mapping uses student and school data to create powerful spatial maps based on school district boundaries. Variation and patterns in data become more apparent when they are plotted spatially on a regional school district map.

The following maps and graphs (Figures 5 – 20) of St. Louis area school districts show the variation in median percentage points earned (MPPE) for the eight science content strands. The three maps at the top of each figure display the variation in MPPE for grades three, seven, and ten. The range of MPPE for each content strand is broken down into three categories: less than 40%, between 40.1% and 60%, and greater than 60%. These three categories correspond to an estimation of performance that needs much improvement (lower attainment level), needs improvement (middle attainment level), and acceptable (upper attainment level), respectively. These categories are not definitive, and one could argue for using other break points. Three solid colors were used to represent these three categories: red (lower attainment level), yellow (middle attainment level), and green (upper attainment level).

The bottom two maps in each figure depict the changes in attainment level from grade three to grade seven, and from grade seven to grade ten. The changes were coded in four colors. For example, on the map of changes in attainment level from the third grade to the seventh grade, dark green (increase one level) represents the movement from the lower level of attainment in grade three to the middle level in grade seven, or from the middle level in grade three to the upper level in grade seven. Very light green (same level) represents the same attainment level in both grades three and seven. Light red (drop one level) represents the movement from the upper level of attainment in grade three to the middle level in grade seven, or from the middle level in grade three to the lower level in grade seven. Dark red (drop two levels) represents the movement from the upper attainment level in grade three to the lower level in grade seven.

Viewing Altogether: Eight Content Strands and Percentage Proficient/Advanced

In order to compare within districts the median percentage points earned (MPPE) for each of the 8 science content strands, three attainment levels were represented in an 8–bar graph. The height of the bars correspond to the attainment level: lower (less than 40% MPPE), middle (40.1% – 60%), and upper attainment level (greater than 60% MPPE). Using this approach, the MPPE in the 8 science content strands can be compared to each other within a district and across districts.

In addition, these content strand graphs were give geo-spatial perspective by being mapped onto their districts' overall percentage of Proficient/Advanced students in science (Figures 21, 22, and 23). The maps indicate a consistent trend in percentage of Proficient/Advanced students in conjunction with MPPE in 8 content strands for all three grades. For example, at third grade, school districts that had most of the 8 content strands at the upper attainment level, also had a high percentage of Proficient/Advanced students.

Districts with the lower MPPE in the content strands tended to have a lower percentage of Proficient/Advanced students. In some instances, there was wide variation in the 8 content strands within a district, especially for grades seven and ten. School districts with a low percentage of students at the Proficient/Advanced levels may have various MPPE for the 8 content strands. For example, the percentage of Proficient/Advanced students in school district 2 (Figure 23) was less than 10% in grade ten. However, among the 8 science content strands for this district, four of them were at lower attainment level, three were at middle level, and one was even at upper level, showing considerable variation.

Concluding Comment

As with the overall MAP science test results, the individual content strands showed much lower performance in seventh grade than third grade except in the Ecology and Scientific Relevance strands. By the tenth grade, Ecology scores were lower than in seventh grade, but Scientific Relevance scores remained fairly constant for all three grade levels (MPPE 65%, 66%, 63%). After the drop in MPPE from third to seventh grade, the remaining six content strands showed no differences between seventh and tenth grades greater than five percentage points. The geo-spatial performance patterns in the GIS school district maps, especially for seventh and tenth grades, showed that the lower performing districts across content strands tended to be St. Louis City and adjacent districts, and those to the north of St. Louis City.

Reference

Hogrebe, M.C., & Kyei-Blankson, L. (2006). Science attainment in St. Louis area school districts: Tech Brief No. 1. St. Louis, MO: Washington University, Center for Inquiry in Science Teaching and Learning. Retrieved December 15, 2006, from http://cistl.wustl.edu/Downloads/index.php?ProgramID=0

Figure 5. Matter & Energy: Median Percentage Points Earned 2000–2005 for Third, Seventh, and Tenth Grades

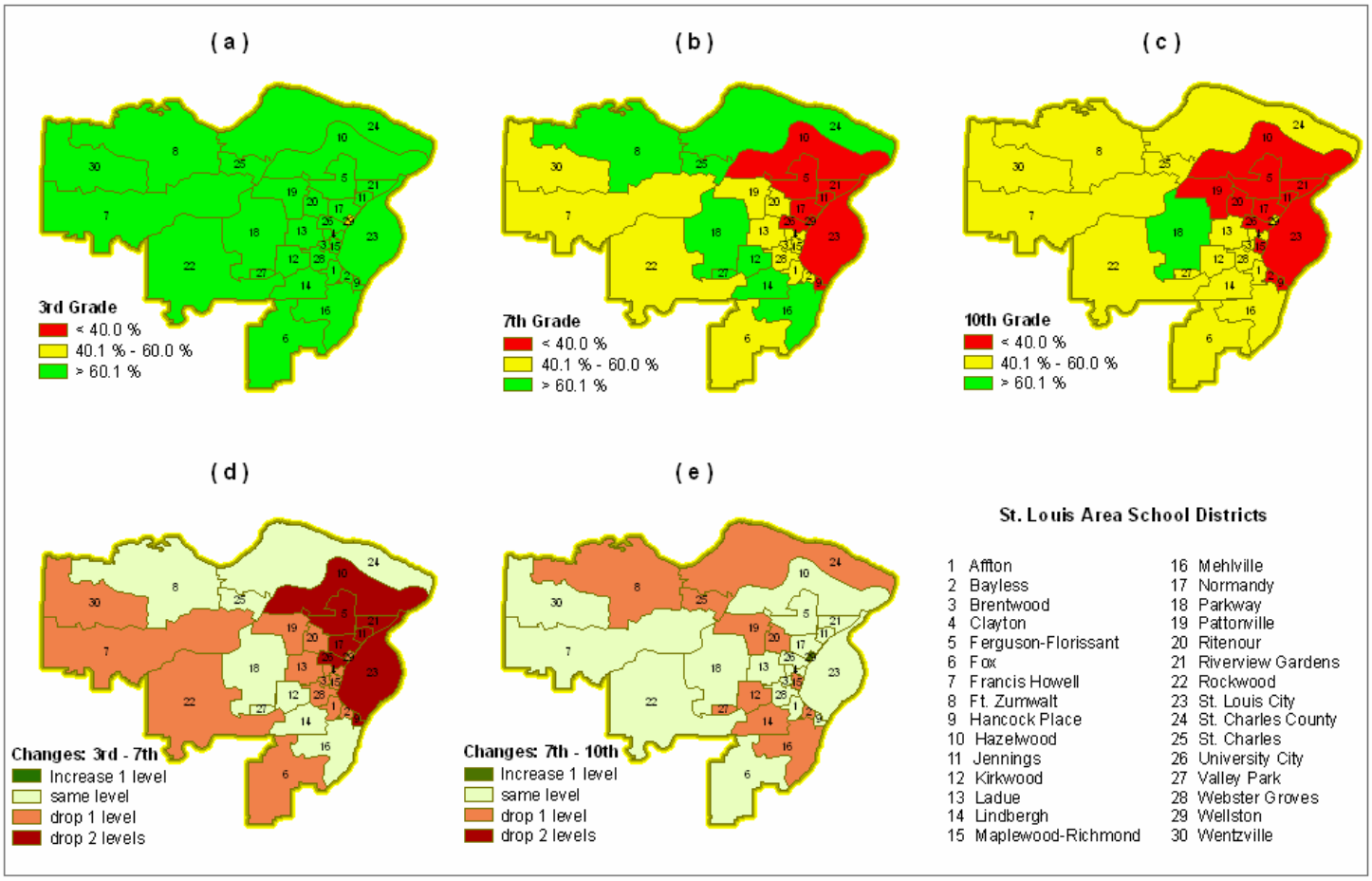
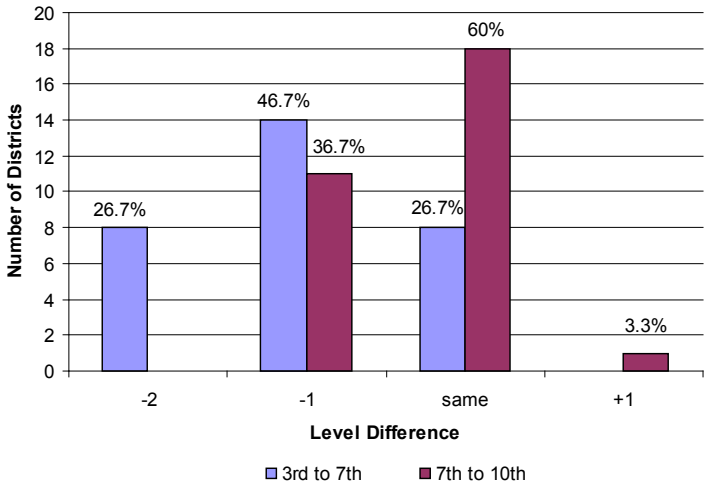


Figure 6. Matter & Energy Grade Differences: Third-to-Seventh, Seventh-to-Tenth



The differences in this graph correspond to the changes in levels represented in maps (d) and (e) above.

MPPE less than 40% equal Lower Level.
MPPE between 40.1% and 60% equal Middle Level.
MPPE greater than 60% equal Upper Level.

MPPE is median percentage points earned (2000–2005) on content strand.

Matter & Energy. The variation in median percentage points earned by the third, seventh, and tenth grade students on the Matter and Energy content strand is plotted for each school district in Figure 5 (a), (b), and (c). The grade differences are plotted in maps (d) and (e) and graphed in Figure 6.

Third-to-seventh. In the third grade, all school districts except one had MPPE above 60% (upper level). At the seventh grade level, only 8 districts had MPPE in the upper level, while 46.7% of the districts (14) had MPPE one level lower than third grade, and 26.7% of the districts (8) had MPPE two levels lower.

Seventh-to-tenth. Even though 60% of the districts had tenth grade MPPE at the same level as seventh grade, 11 districts (36.7%) had MPPE one level lower than their seventh grade MPPE.

Comment. On the Matter & Energy content strand, MPPE decreased across grade levels and by tenth grade, only one district had MPPE above 60% while 12 districts had MPPE below 40%. The remaining 17 districts had MPPE in the middle range (40.1 – 60%).

Figure 7. Force & Motion: Median Percentage Points Earned 2000–2005 for Third, Seventh, and Tenth Grades

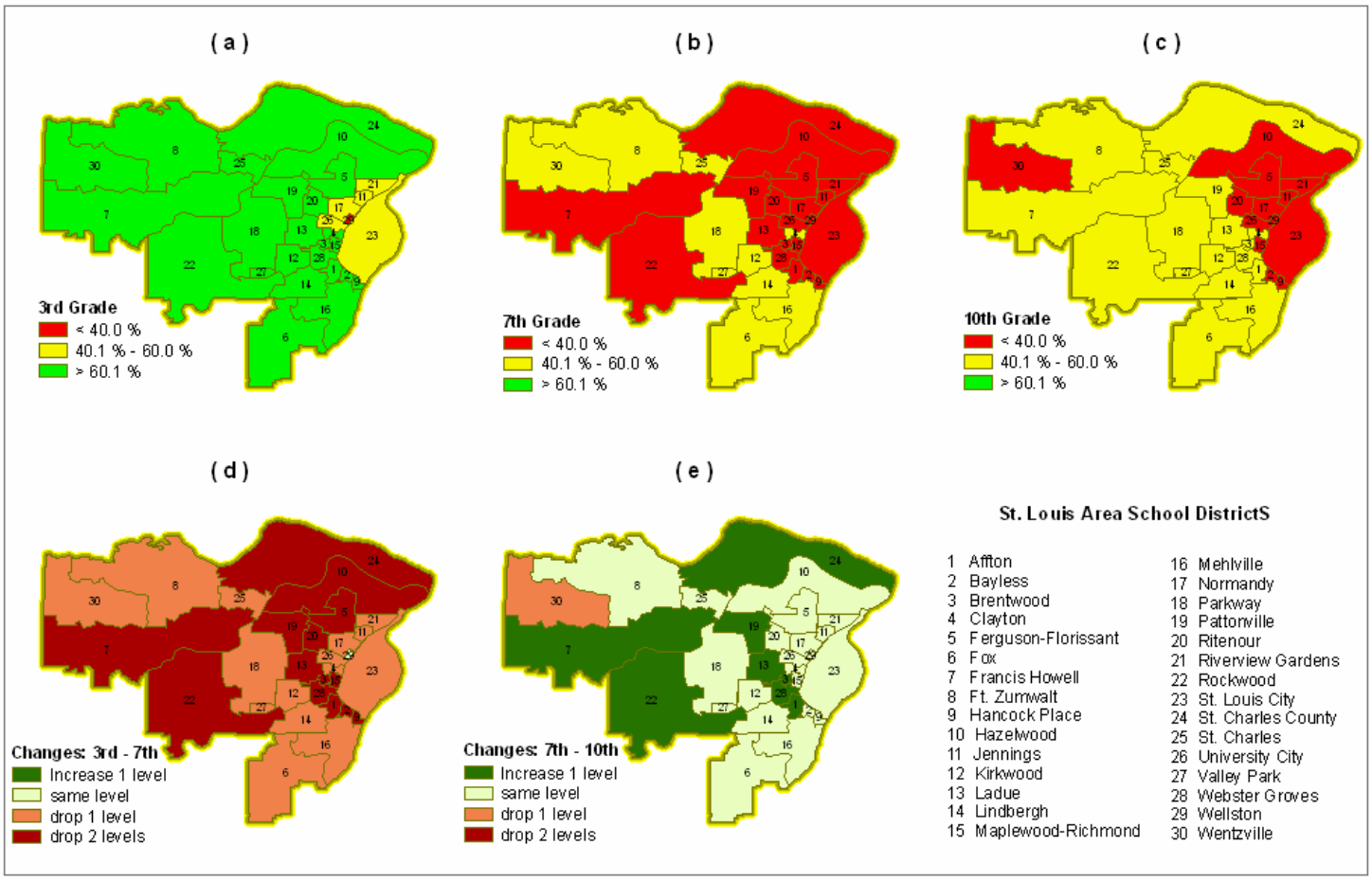
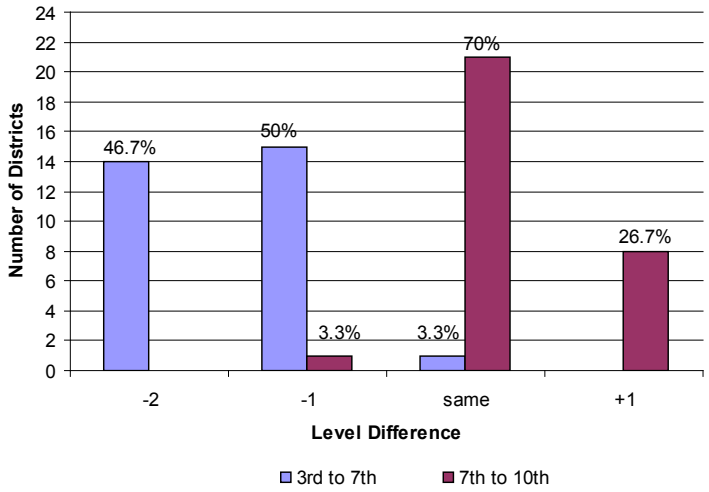


Figure 8. Force & Motion Grade Differences: Third-to-Seventh, Seventh-to-Tenth



The differences in this graph correspond to the changes in levels represented in maps (d) and (e) above.

MPPE less than 40% equal Lower Level.
MPPE between 40.1% and 60% equal Middle Level.
MPPE greater than 60% equal Upper Level.

MPPE is median percentage points earned (2000–2005) on content strand.

Force & Motion. The variation in median percentage points earned by the third, seventh, and tenth grade students on the Force and Motion content strand is plotted for each school district in Figure 7 (a), (b), and (c). The grade differences are plotted in maps (d) and (e) and graphed in Figure 8.

Third-to-seventh. In the third grade, 24 school districts had MPPE above 60% (upper level). At the seventh grade level, none of the districts had MPPE in the upper level, while 50% of the districts (15) had MPPE one level lower than third grade, and 46.7% of the districts (14) had MPPE two levels lower.

Seventh-to-tenth. Even though 70% of the districts had tenth grade MPPE at the same level as seventh grade, only one district had MPPE one level lower than their seventh grade MPPE. Eight districts (26.7%) had MPPE one level higher than seventh grade.

Comment. On the Force & Motion content strand, MPPE decreased substantially from third to seventh grade, but did stabilize and increase for 8 districts by tenth grade. In both seventh and tenth grades no district had MPPE above 60%, while 13 districts had MPPE below 40% in tenth grade compared to 20 in third grade.

Figure 9. Living Systems: Median Percentage Points Earned 2000–2005 for Third, Seventh, and Tenth Grades

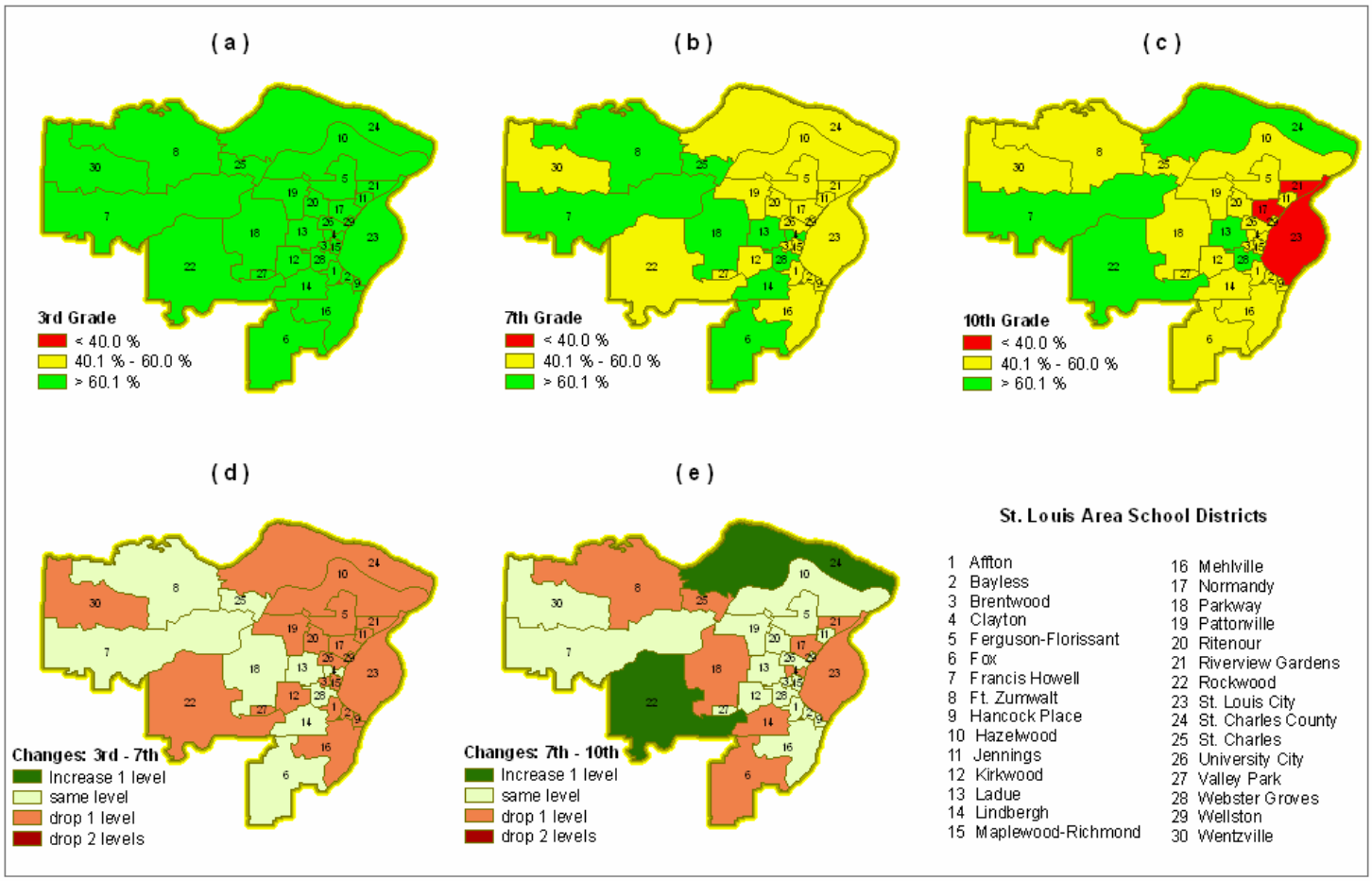
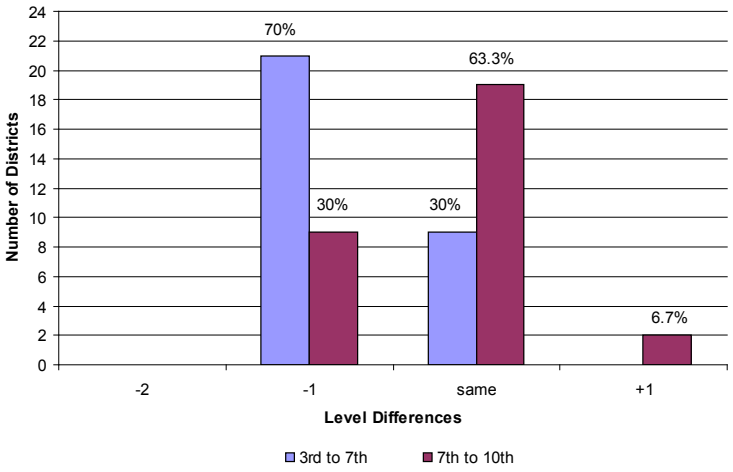


Figure 10. Living Systems Grade Differences: Third-to-Seventh, Seventh-to-Tenth



The differences in this graph correspond to the changes in levels represented in maps (d) and (e) above.

MPPE less than 40% equal Lower Level.
MPPE between 40.1% and 60% equal Middle Level.
MPPE greater than 60% equal Upper Level.

MPPE is median percentage points earned (2000–2005) on content strand.

Living Systems. The variation in median percentage points earned by the third, seventh, and tenth grade students on the Living Systems content strand is plotted for each school district in Figure 9 (a), (b), and (c). The grade differences are plotted in maps (d) and (e) and graphed in Figure 10.

Third-to-seventh. In the third grade, all school districts had MPPE above 60% (upper level). At the seventh grade level, only 9 districts had MPPE in the upper level, while 70% of the districts (21) had MPPE one level lower than third grade, and 30% of the districts (9) had MPPE at the same level.

Seventh-to-tenth. Even though 63.3% of the districts had tenth grade MPPE at the same level as seventh grade, 9 districts (30%) had MPPE one level lower than their seventh grade MPPE.

Comment. On the Living Systems content strand, MPPE decreased across grade levels and by tenth grade, only 5 districts had MPPE in the upper level (>60%) while 3 districts had MPPE below 40.1%. The remaining 22 districts had MPPE in the middle range (40.1 – 60%).

Figure 11. Ecology: Median Percentage Points Earned 2000–2005 for Third, Seventh, and Tenth Grades

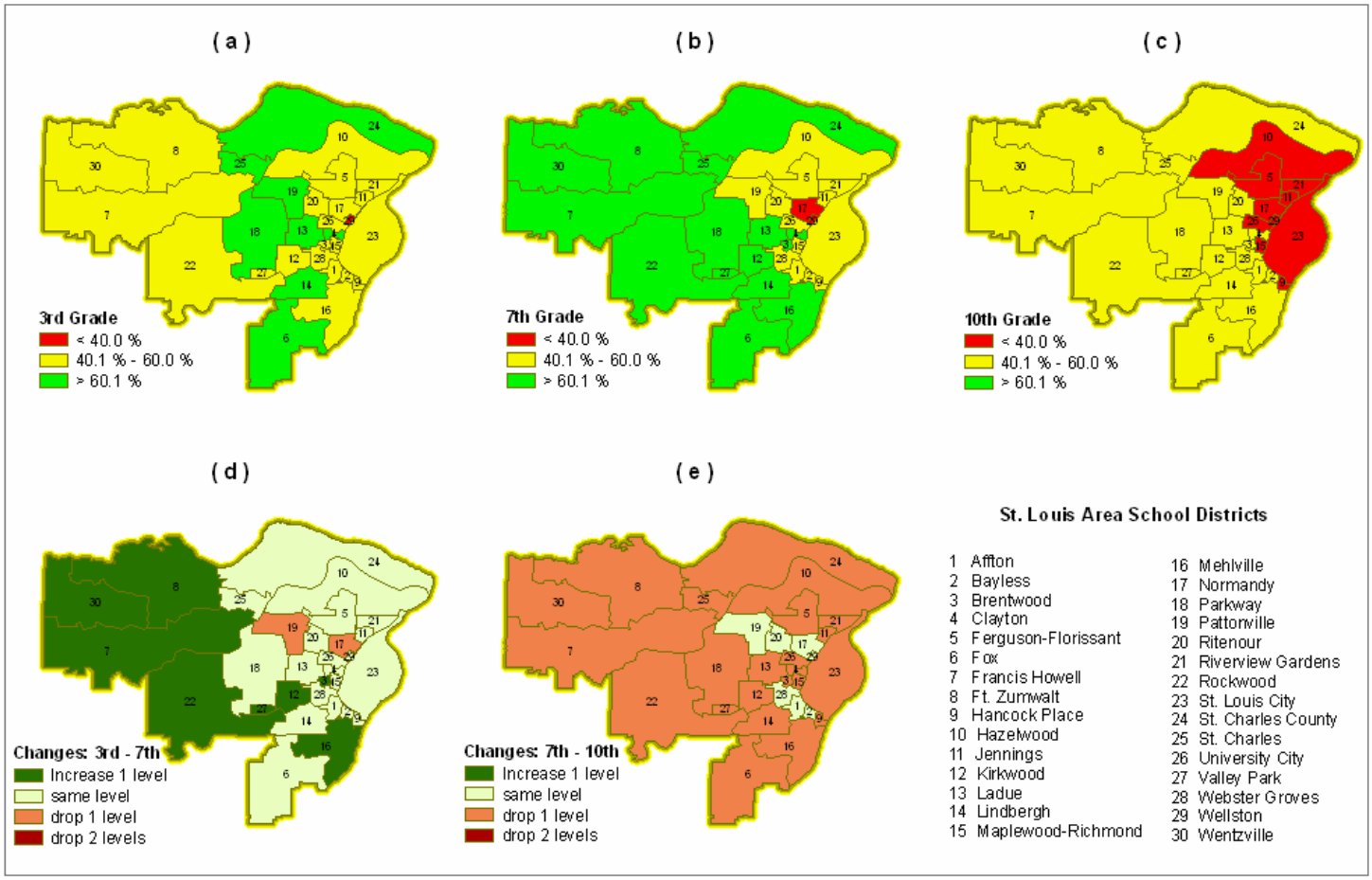
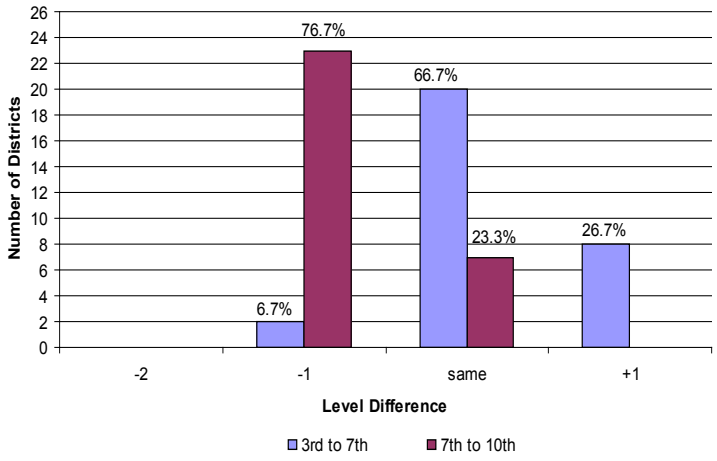


Figure 12. Ecology Grade Differences: Third-to-Seventh, Seventh-to-Tenth



The differences in this graph correspond to the changes in levels represented in maps (d) and (e) above.

MPPE less than 40% equal Lower Level.
MPPE between 40.1% and 60% equal Middle Level.
MPPE greater than 60% equal Upper Level.

MPPE is median percentage points earned (2000–2005) on content strand.

Ecology. The variation in median percentage points earned by the third, seventh, and tenth grade students on the Ecology content strand is plotted for each school district in Figure 11 (a), (b), and (c). The grade differences are plotted in maps (d) and (e) and graphed in Figure 12.

Third-to-seventh. In the third grade, only 8 school districts had MPPE above 60% (upper level). At the seventh grade level, 15 districts had MPPE in the upper level. In contrast to third grade, only 2 of the districts had MPPE one level lower than third grade, while 28 of the districts had MPPE at the same level or higher.

Seventh-to-tenth. In the tenth grade, 23 districts (76.7%) had MPPE one level lower than their seventh grade MPPE while 7 districts (23.3%) had MPPE at the same level as seventh grade.

Comment. On the Ecology content strand, MPPE was highest at the seventh grade level with 15 districts in the upper level. In tenth grade, no districts had MPPE in the upper level and 10 districts had MPPE in the lower level (<40%). In comparison to other content strands, ecology had the fewest districts (8) in the upper level at the third grade.

Figure 13. Earth Systems: Median Percentage Points Earned 2000–2005 for Third, Seventh, and Tenth Grades

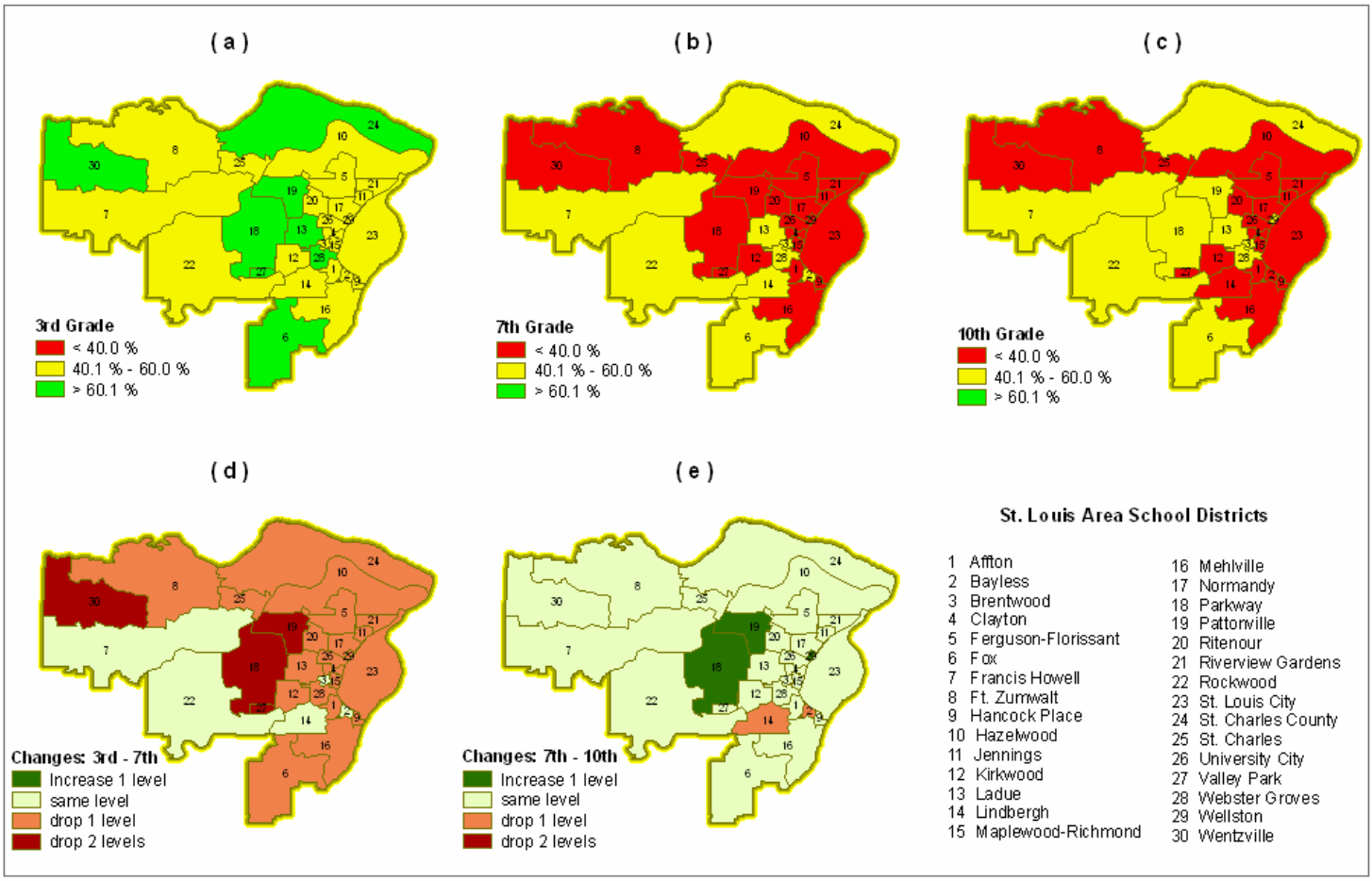
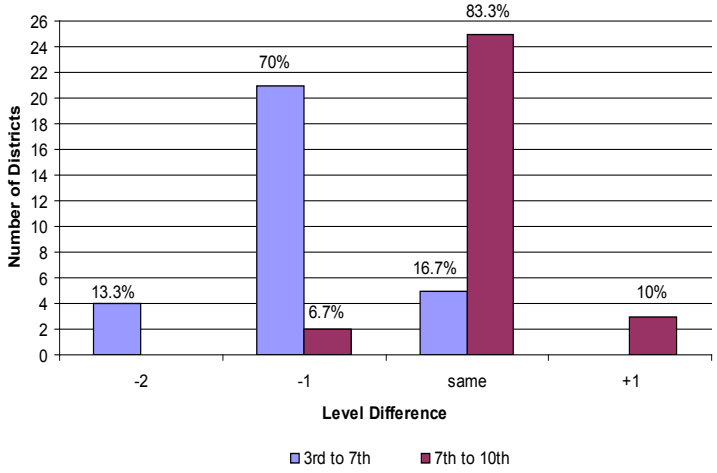


Figure 14. Earth Systems Grade Differences: Third-to-Seventh, Seventh-to-Tenth



The differences in this graph correspond to the changes in levels represented in maps (d) and (e) above.

MPPE less than 40% equal Lower Level.
MPPE between 40.1% and 60% equal Middle Level.
MPPE greater than 60% equal Upper Level.

MPPE is median percentage points earned (2000–2005) on content strand.

Earth Systems. The variation in median percentage points earned by the third, seventh, and tenth grade students on the Earth Systems content strand is plotted for each school district in Figure 13 (a), (b), and (c). The grade differences are plotted in maps (d) and (e) and graphed in Figure 14.

Third-to-seventh. In the third grade, 8 school districts had MPPE above 60% (upper level). At the seventh grade level, no districts had MPPE in the upper level, while 70% of the districts (21) had MPPE one level lower than third grade, and 13.3% of the districts (4) had MPPE two levels lower.

Seventh-to-tenth. In the tenth grade, 83.3% of the districts (25) had tenth grade MPPE at the same level as seventh grade. However, 21 districts at the seventh grade level and 20 districts at the tenth grade level had MPPE less that 40%. No districts had MPPE in the upper level (>60%) for the seventh or tenth grades.

Comment. Taking into account all three grades, overall performance on the Earth Systems content strand had the lowest MPPE across all districts.

Figure 15. The Universe: Median Percentage Points Earned 2000–2005 for Third, Seventh, and Tenth Grades

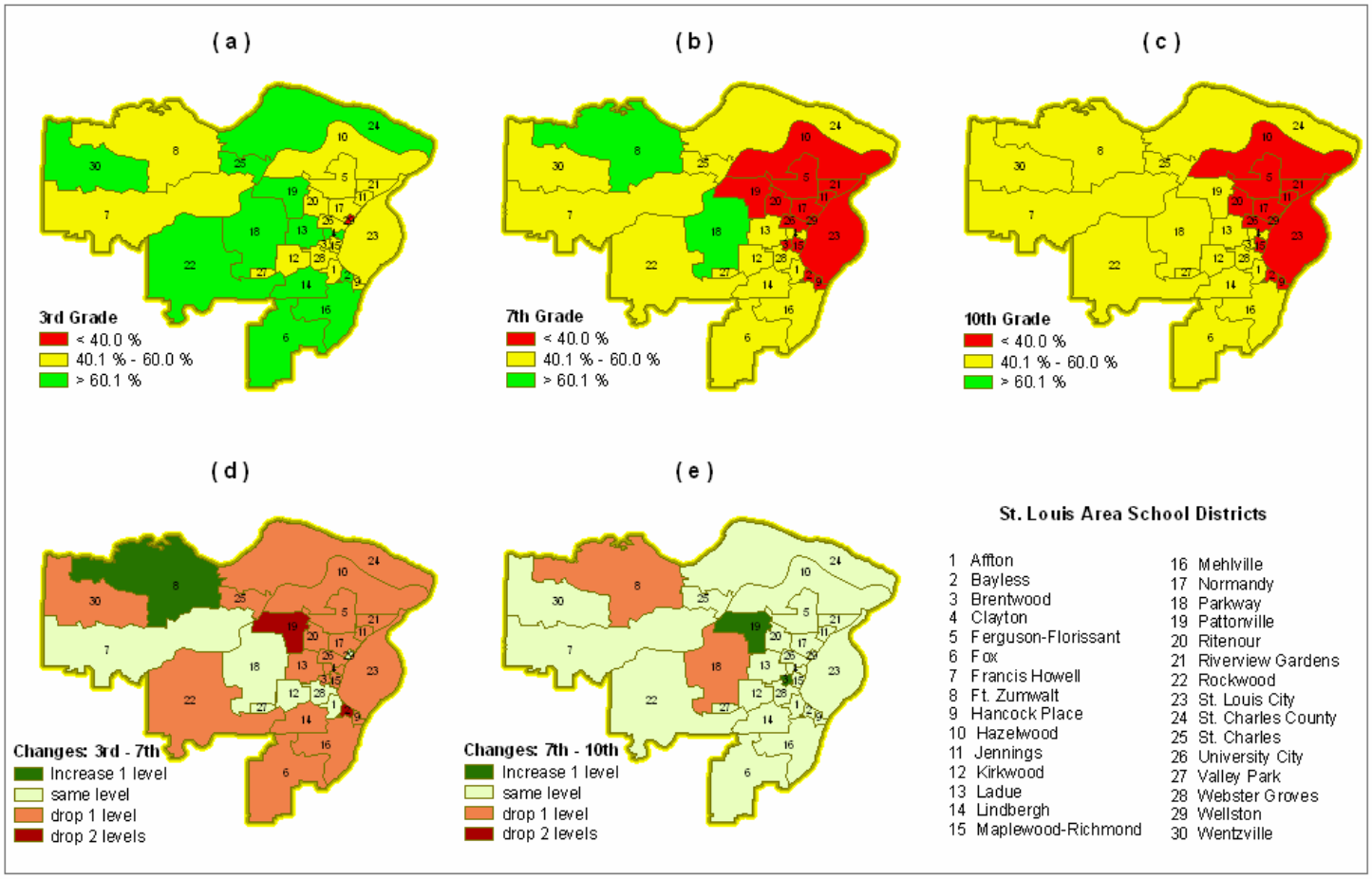
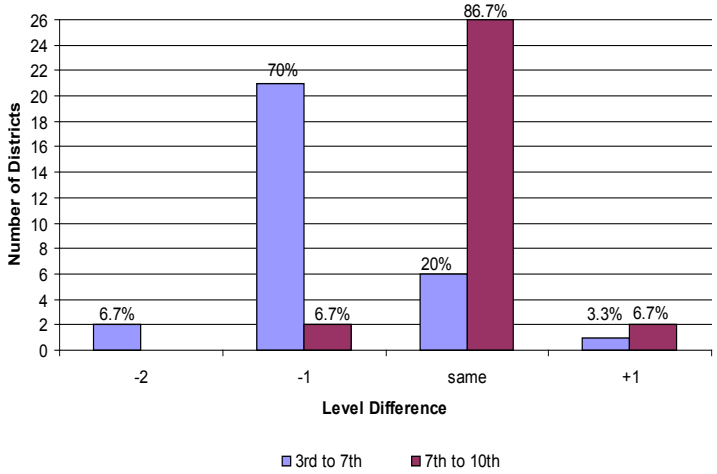


Figure 16. The Universe Grade Differences: Third-to-Seventh, Seventh-to-Tenth



The differences in this graph correspond to the changes in levels represented in maps (d) and (e) above.

MPPE less than 40% equal Lower Level.
MPPE between 40.1% and 60% equal Middle Level.
MPPE greater than 60% equal Upper Level.

MPPE is median percentage points earned (2000–2005) on content strand.

The Universe. The variation in median percentage points earned by the third, seventh, and tenth grade students on the Universe content strand is plotted for each school district in Figure 15 (a), (b), and (c). The grade differences are plotted in maps (d) and (e) and graphed in Figure 16.

Third-to-seventh. In the third grade, 12 school districts had MPPE above 60% (upper level). At the seventh grade level, only 2 districts had MPPE in the upper level, while 70% of the districts (21) had MPPE one level lower than third grade, and 20% of the districts (6) had MPPE at the same level.

Seventh-to-tenth. Over 86% of the districts had tenth grade MPPE at the same level as seventh grade, 2 districts (6.7%) had MPPE one level lower than their seventh grade MPPE, and 2 districts had MPPE one level higher.

Comment. On the Universe content strand, MPPE decreased across grade levels and by tenth grade, no districts had MPPE above 60% while 12 districts had MPPE below 40%. The remaining 18 districts had MPPE in the middle range (40.1 – 60%).

Figure 17. Scientific Inquiry: Median Percentage Points Earned 2000–2005 for Third, Seventh, and Tenth Grades

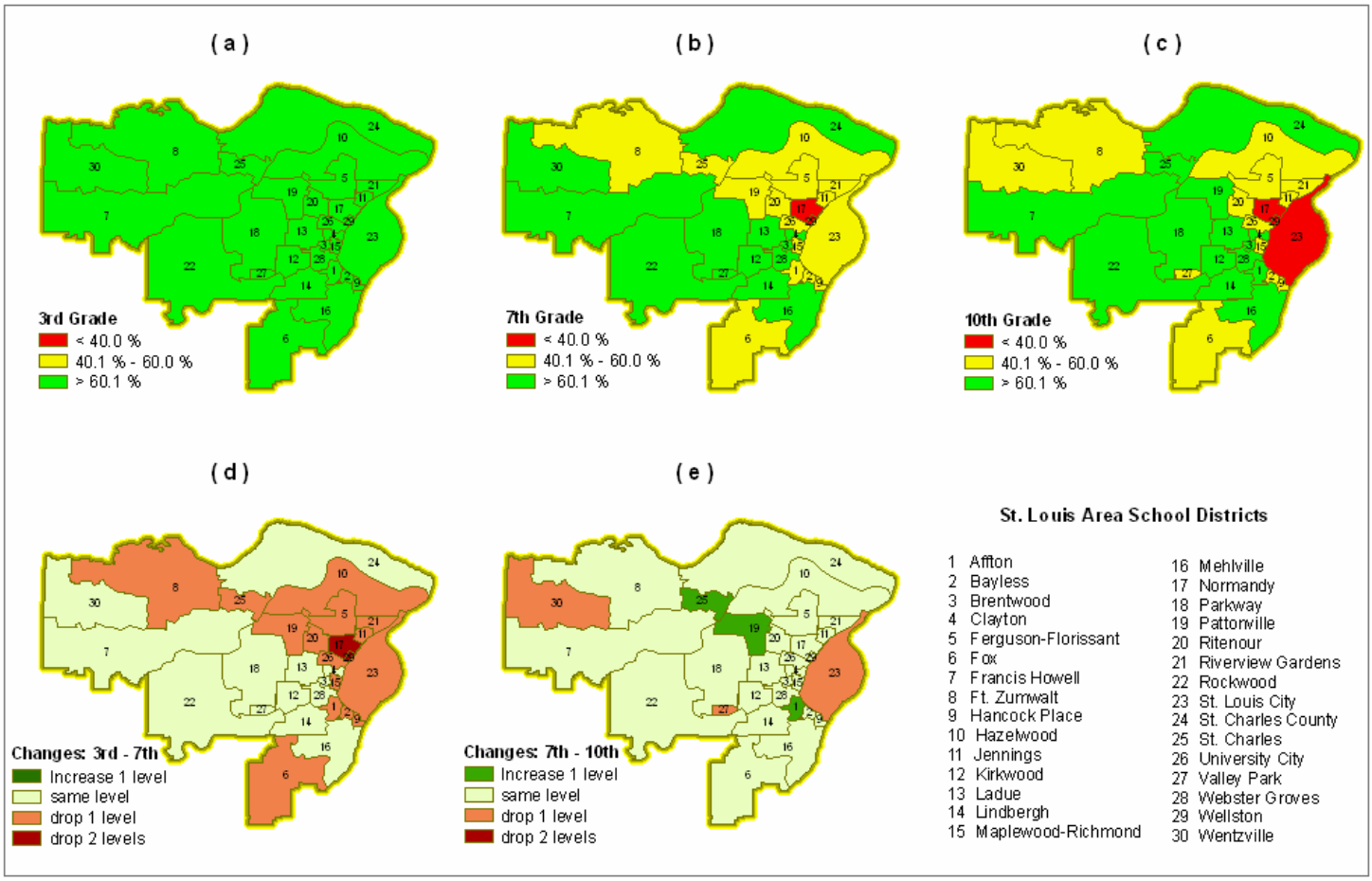
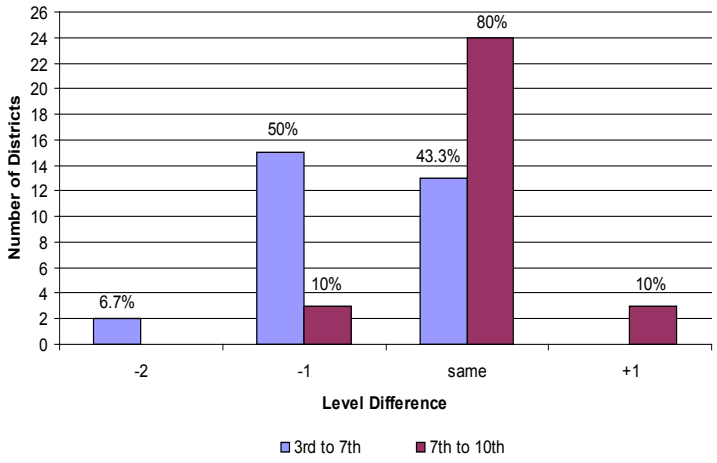


Figure 18. Scientific Inquiry Grade Differences: Third-to-Seventh, Seventh-to-Tenth



The differences in this graph correspond to the changes in levels represented in maps (d) and (e) above.

MPPE less than 40% equal Lower Level.
MPPE between 40.1% and 60% equal Middle Level.
MPPE greater than 60% equal Upper Level.

MPPE is median percentage points earned (2000–2005) on content strand.

Scientific Inquiry. The variation in median percentage points earned by the third, seventh, and tenth grade students on the Scientific Inquiry content strand is plotted for each school district in Figure 17 (a), (b), and (c). The grade differences are plotted in maps (d) and (e) and graphed in Figure 18.

Third-to-seventh. In the third grade, all 30 school districts had MPPE above 60% (upper level). At the seventh grade level, 13 districts had MPPE in the upper level, while 50% of the districts (15) had MPPE one level lower than third grade, and 43.3% of the districts (13) had MPPE at the same level. Two districts had MPPE two levels lower than in third grade.

Seventh-to-tenth. Even though 80% of the districts had tenth grade MPPE at the same level as seventh grade, 3 districts (10%) had MPPE one level lower than their seventh grade MPPE. Three districts had MPPE one level higher than seventh grade.

Comment. On the Scientific Inquiry content strand, MPPE decreased after the third grade where all districts had MPPE in the upper level (>60%), but remained relatively constant from seventh to tenth grade. Slightly less than half of the districts were in the upper levels in the seventh (43%) and tenth (47%) grades.

Figure 19. Scientific Relevance: Median Percentage Points Earned 2000–2005 for Third, Seventh, and Tenth Grades

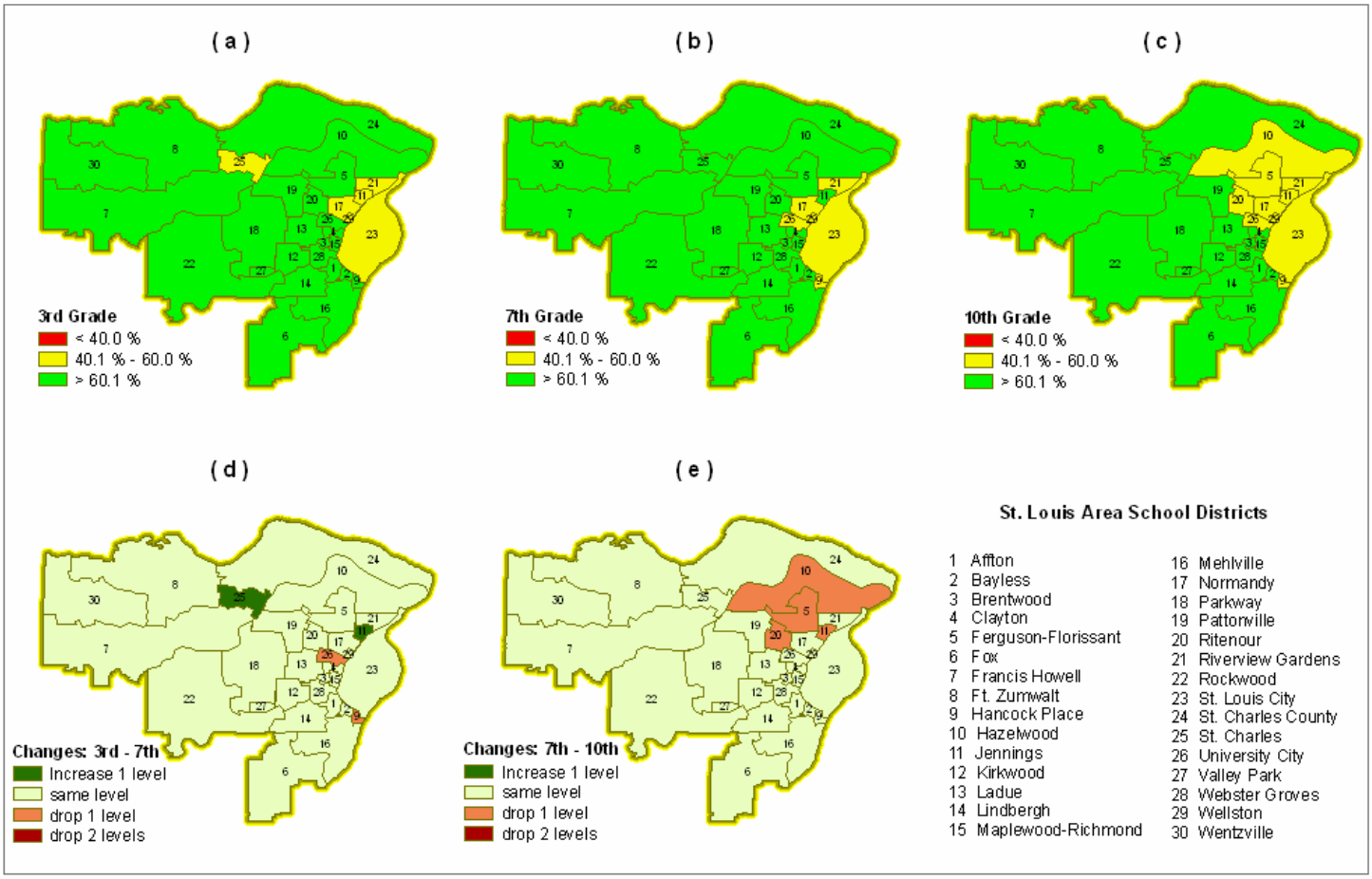
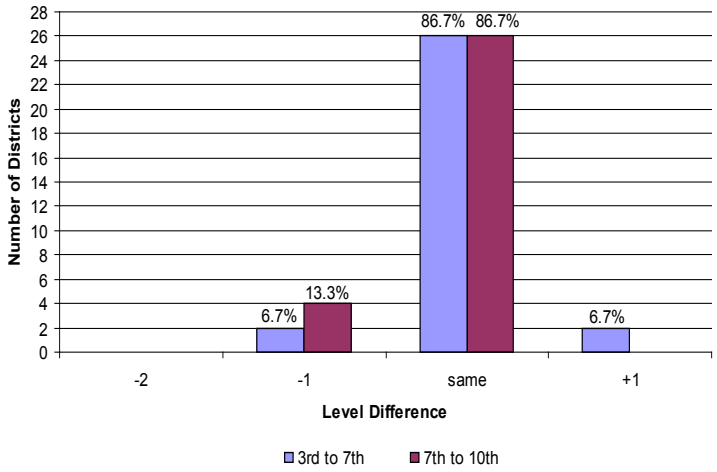


Figure 20. Scientific Relevance Grade Differences: Third-to-Seventh, Seventh-to-Tenth



The differences in this graph correspond to the changes in levels represented in maps (d) and (e) above.

MPPE less than 40% equal Lower Level.
MPPE between 40.1% and 60% equal Middle Level.
MPPE greater than 60% equal Upper Level.

MPPE is median percentage points earned (2000–2005) on content strand.

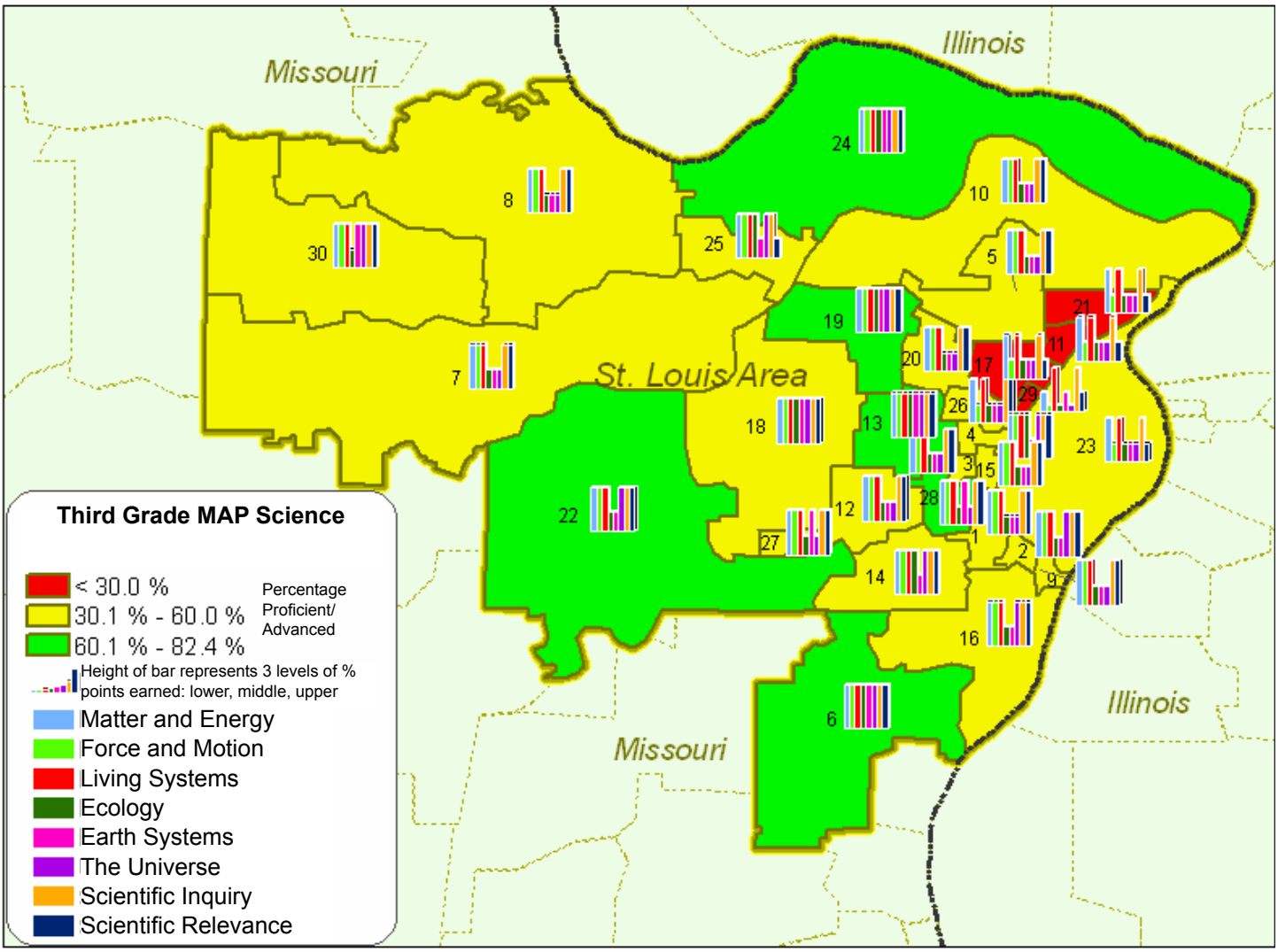
Scientific Relevance. The variation in median percentage points earned by the third, seventh, and tenth grade students on the Scientific Inquiry content strand is plotted for each school district in Figure 19 (a), (b), and (c). The grade differences are plotted in maps (d) and (e) and graphed in Figure 20.

Third-to-seventh. In the third grade, 24 school districts had MPPE above 60% (upper level). At the seventh grade level, 24 districts had MPPE in the upper level, while 86.7% of the districts (26) had MPPE at the same level. Two districts had MPPE one level lower than in third grade and two had MPPE one level higher.

Seventh-to-tenth. Even though 86.7% of the districts had tenth grade MPPE at the same level as seventh grade, 4 districts (13.3%) had MPPE one level lower than their seventh grade MPPE. In the seventh grade, 24 districts had MPPE in the upper level, and in tenth grade, 20 districts.

Comment. Performance on the Scientific Relevance content strand was relatively consistent across the grades with 80% of the districts (24) showing MPPE in the upper level (>60%) for third and seventh grades. In tenth grade, 67% of the districts (20) had MPPE in the upper level. Of all the content strands, scientific relevance had the most districts in the upper level of MPPE (>60%) across all grade levels.

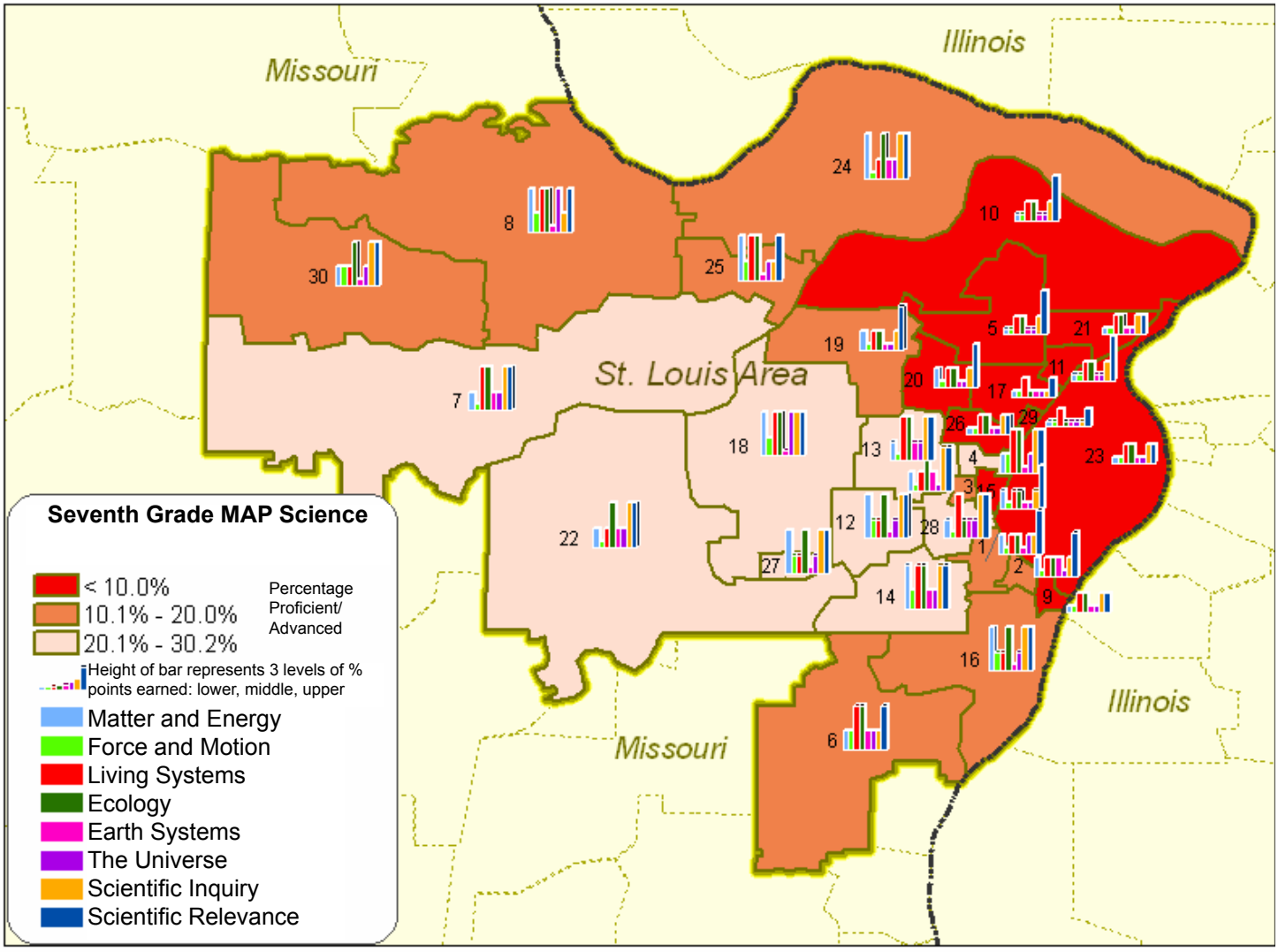
Figure 21. Third Grade Percentage of Proficient/Advanced Students on MAP Science and Median Percentage Points Earned for 8 Content Strands



St. Louis Area School Districts

1. Affton
2. Bayless
3. Brentwood
4. Clayton
5. Ferguson-Florissant
6. Fox
7. Francis Howell
8. Ft. Zumwalt
9. Hancock Place
10. Hazelwood
11. Jennings
12. Kirkwood
13. Ladue
14. Lindbergh
15. Maplewood-Richmond Heights
16. Mehlville
17. Normandy
18. Parkway
19. Pattonville
20. Ritenour
21. Riverview Gardens
22. Rockwood
23. St. Louis City
24. St. Charles County
25. St. Charles
26. University City
27. Valley Park
28. Webster Groves
29. Wellston
30. Wentzville

Figure 22. Seventh Grade Percentage of Proficient/Advanced Students on MAP Science and Median Percentage Points Earned for 8 Content Strands



St. Louis Area School Districts

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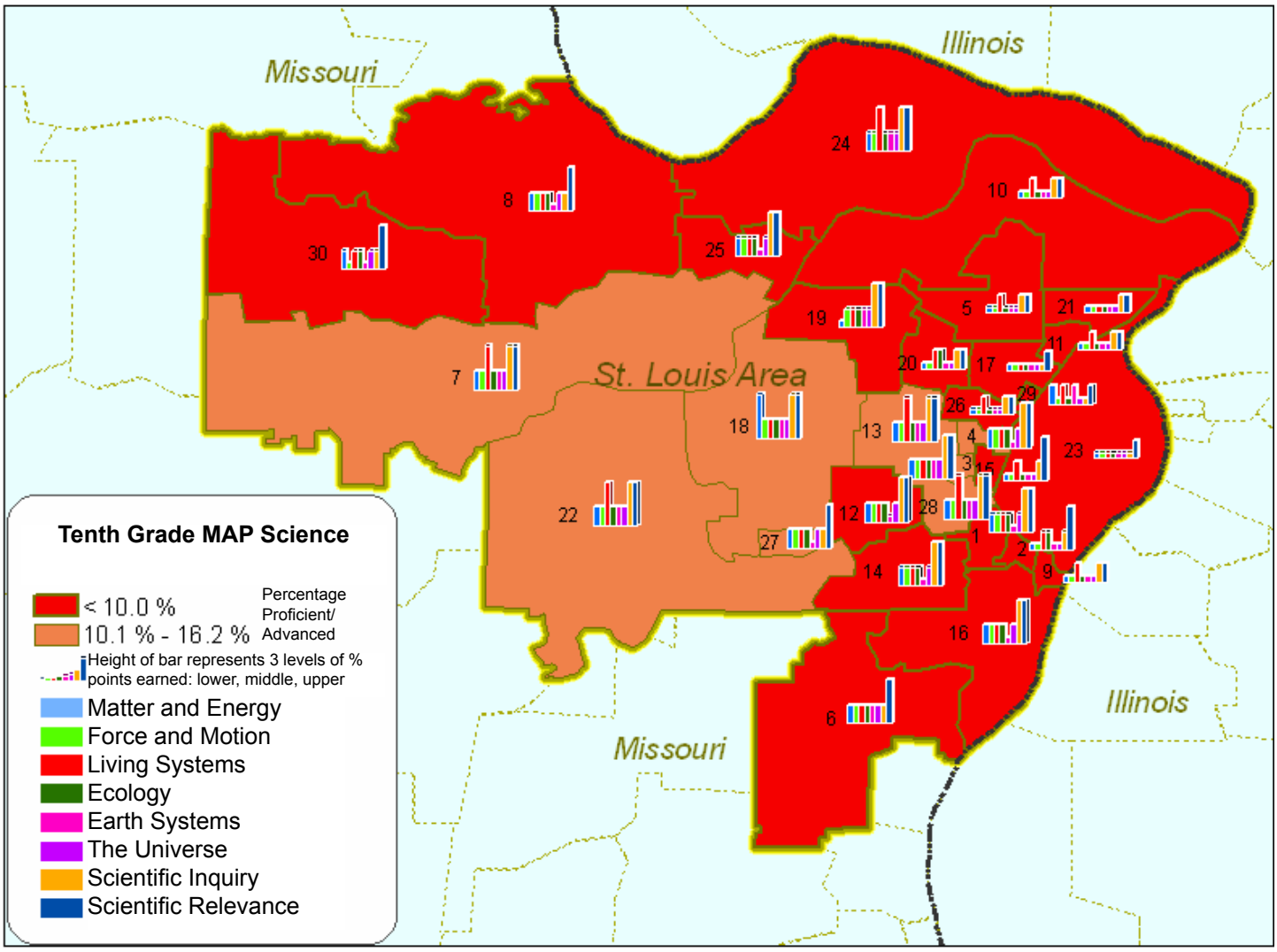
9. Hancock Place
10. Hazelwood
11. Jennings
12. Kirkwood
13. Ladue
14. Lindbergh
15. Maplewood-Richmond Heights
16. Mehlville
17. Normandy
18. Parkway
19. Pattonville
20. Ritenour
21. Riverview Gardens
22. Rockwood
23. St. Louis City
24. St. Charles County
25. St. Charles
26. University City
27. Valley Park
28. Webster Groves
29. Wellston
30. Wentzville

Figure 23. Tenth Grade Percentage of Proficient/Advanced Students on MAP Science and Median Percentage Points Earned for 8 Content Strands



St. Louis Area School Districts

1. Affton
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6. Fox
7. Francis Howell
8. Ft. Zumwalt
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10. Hazelwood
11. Jennings
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13. Ladue
14. Lindbergh
15. Maplewood-Richmond Heights
16. Mehlville
17. Normandy
18. Parkway
19. Pattonville
20. Ritenour
21. Riverview Gardens
22. Rockwood
23. St. Louis City
24. St. Charles County
25. St. Charles
26. University City
27. Valley Park
28. Webster Groves
29. Wellston
30. Wentzville

Appendix

Figure 24. Matter & Energy Content Strand: Median Percentage Points Earned (2000-2005)

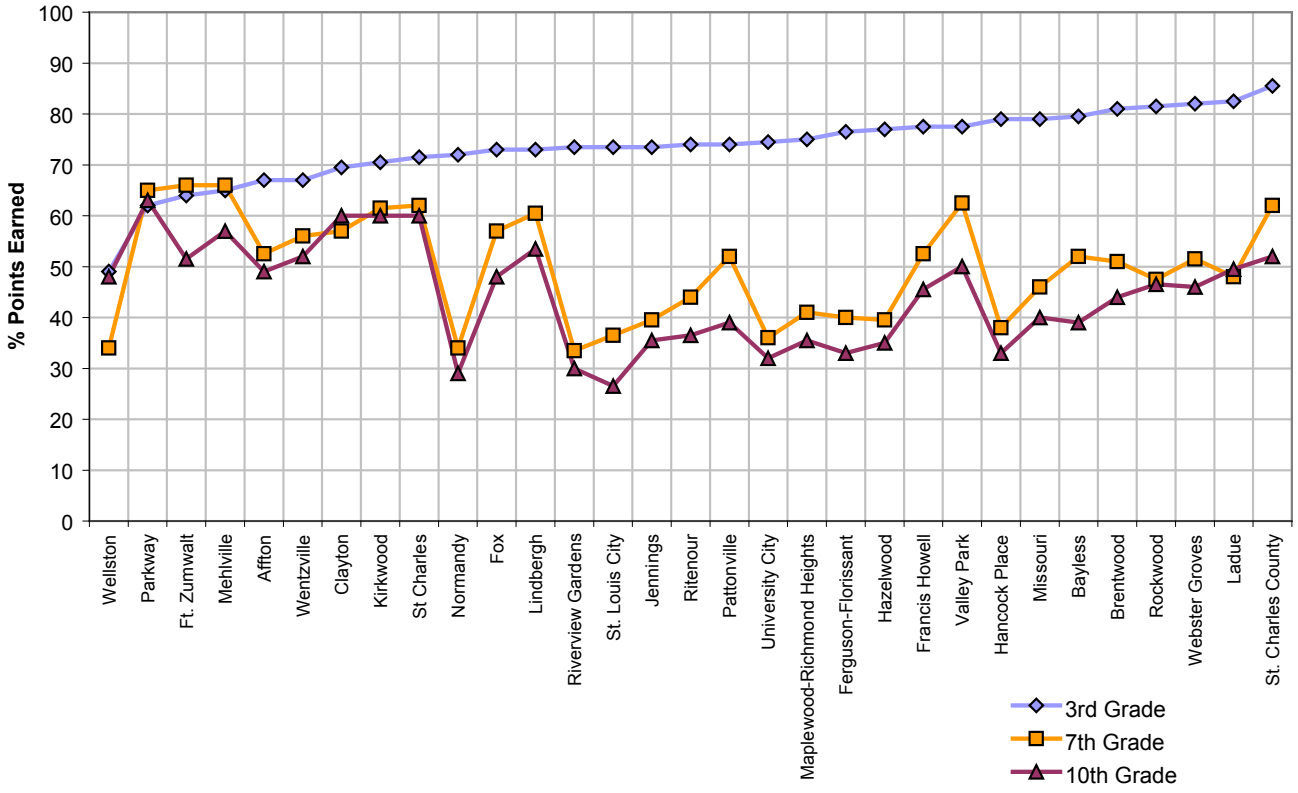

Figure 25. Force & Motion Content Strand: Median Percentage Points Earned (2000-2005)

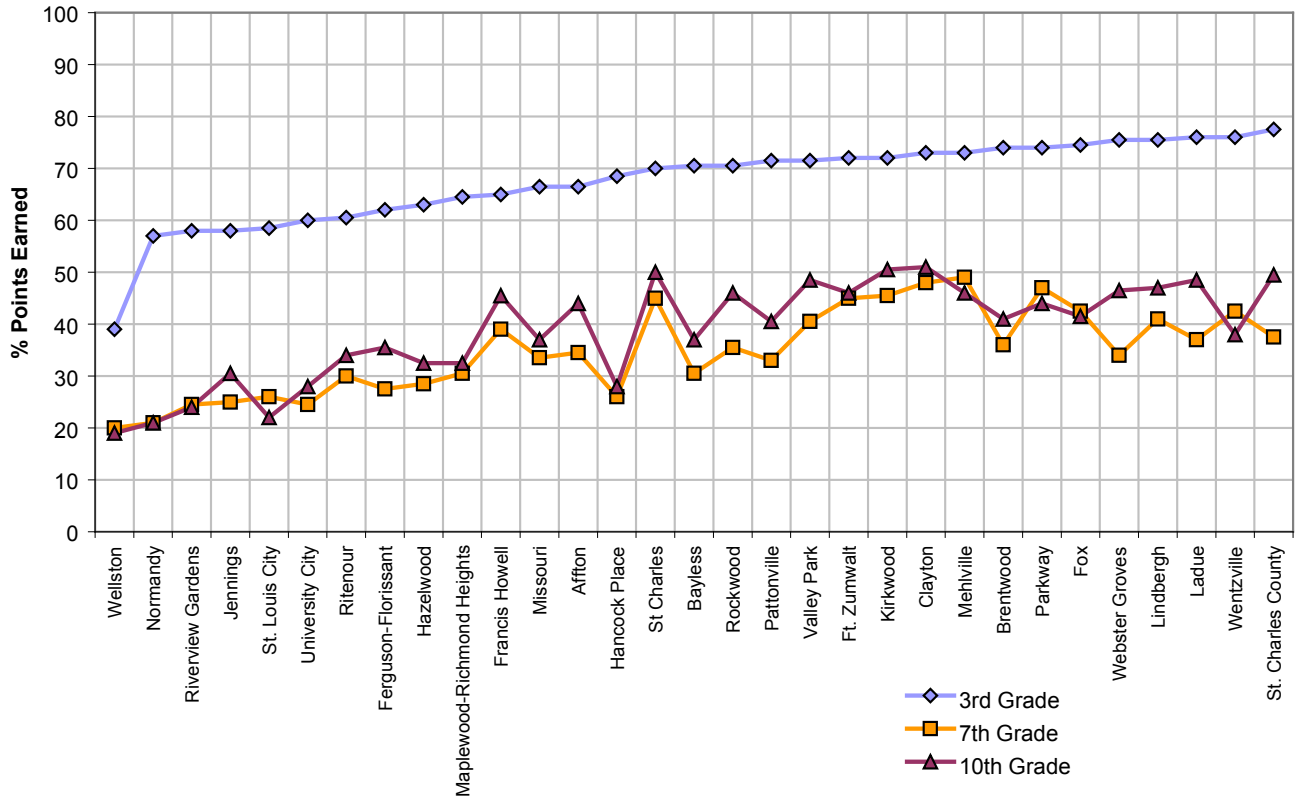

Figure 26. Living Systems Content Strand: Median Percentage Points Earned (2000-2005)

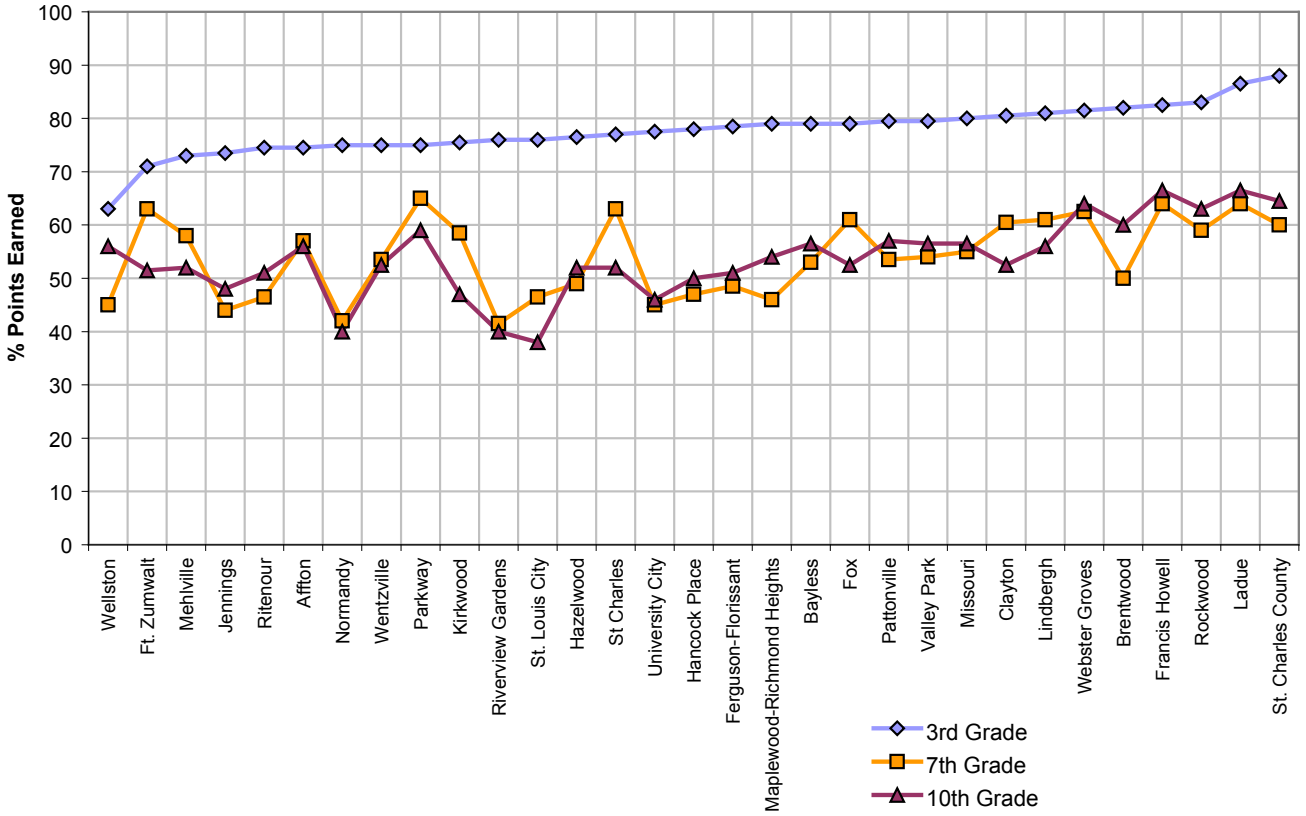

Figure 27. Ecology Content Strand: Median Percentage Points Earned (2000-2005)

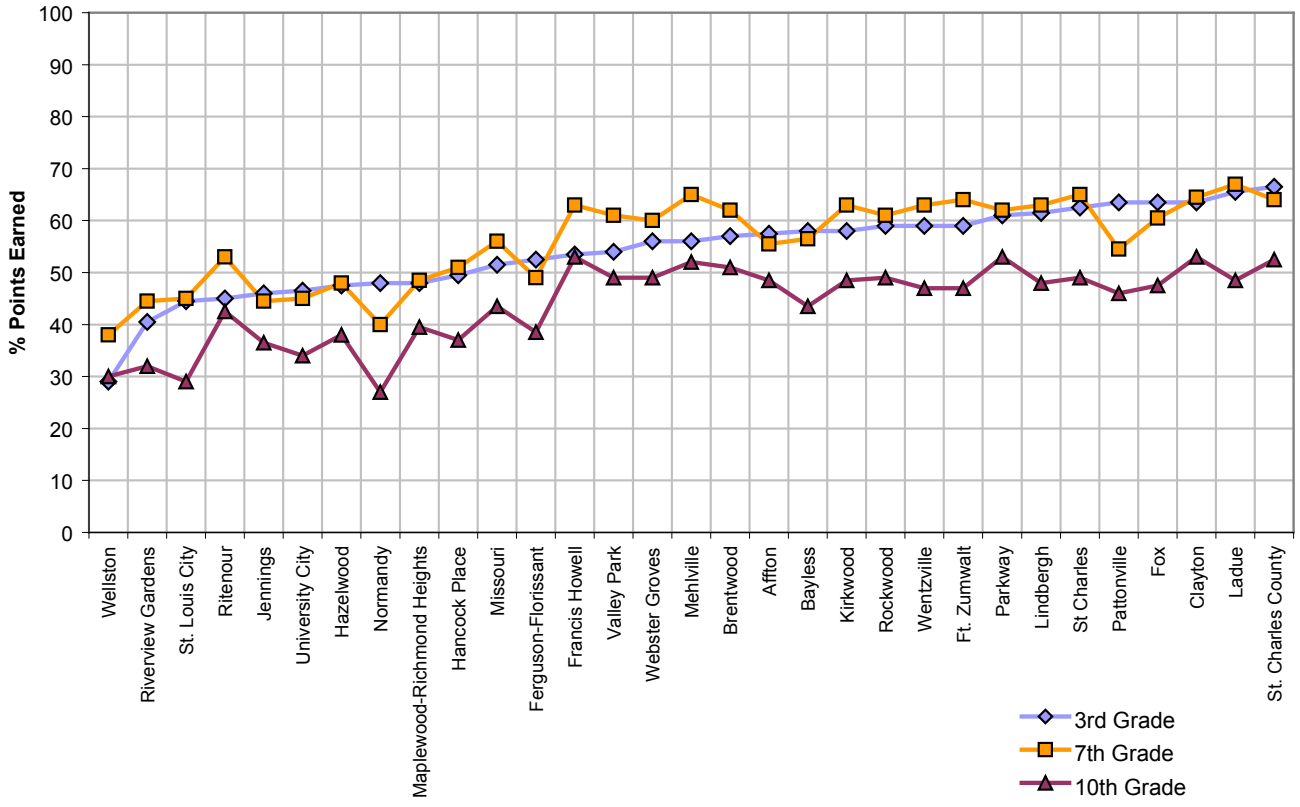

Figure 28. Earth Systems Content Strand: Median Percentage Points Earned (2000-2005)

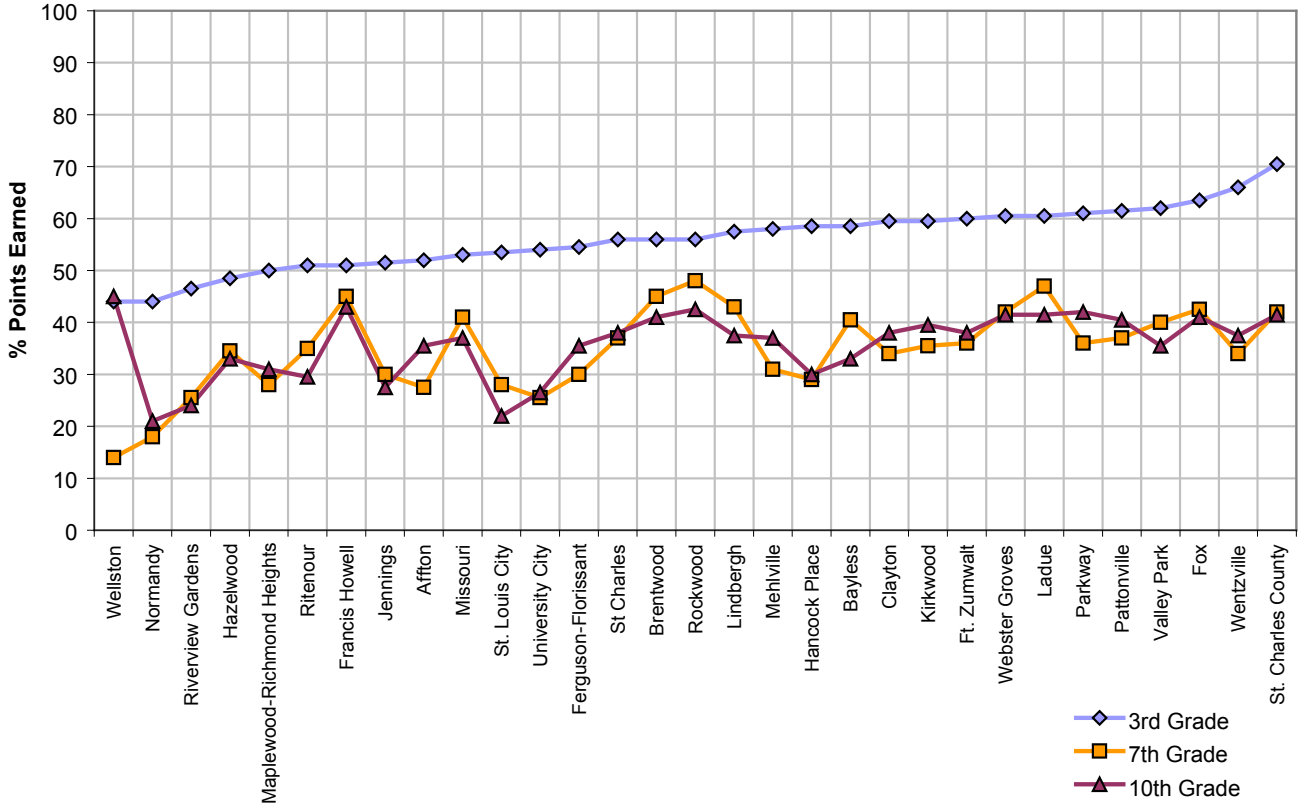

Figure 29. The Universe Content Strand: Median Percentage Points Earned (2000-2005)

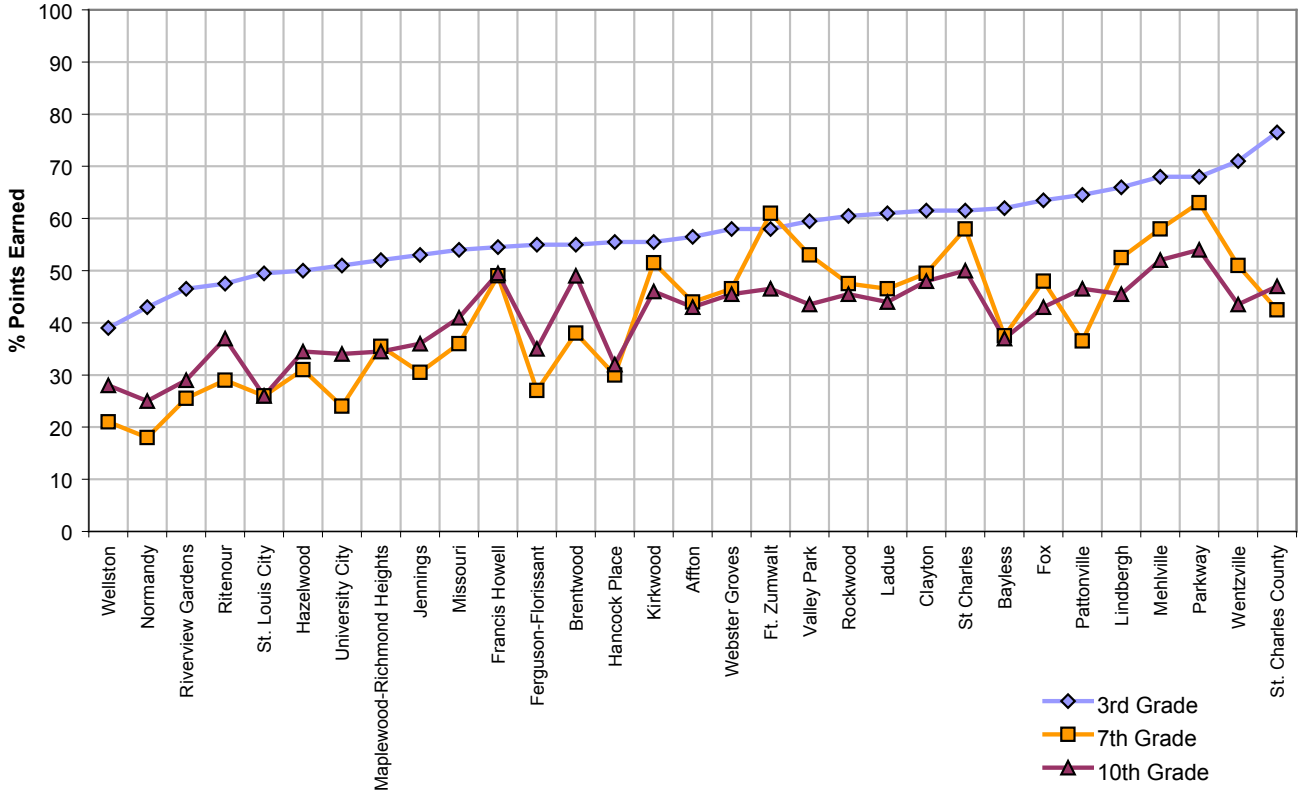

Figure 30. Scientific Inquiry Content Strand: Median Percentage Points Earned (2000-2005)

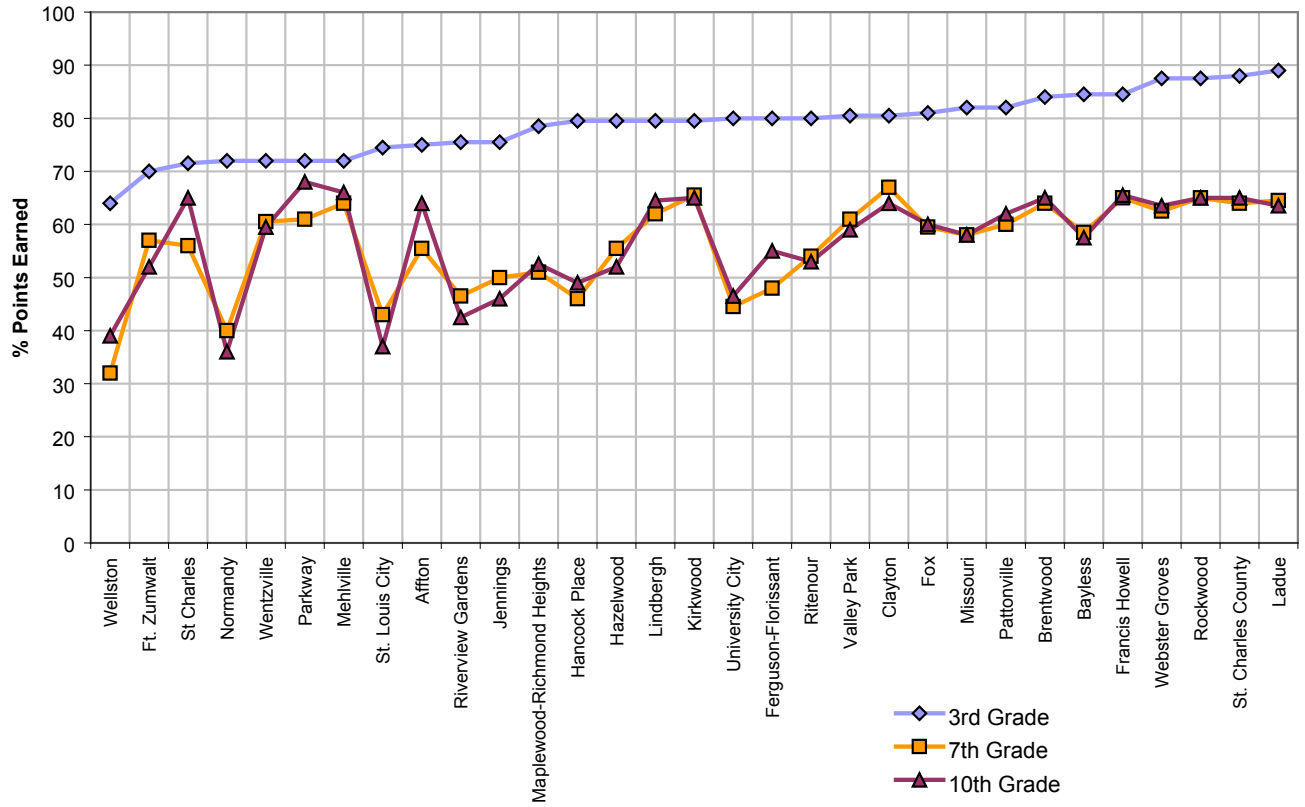

Figure 31. Scientific Relevance Content Strand: Median Percentage Points Earned (2000-2005)