

# Appendix B

## Survey Data

(B1) Science Survey Results

Pages 1—22

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## Science Survey Results

As part of the Science program evaluation, the Science Office and the Office of Planning and Evaluation created four surveys aimed at the following teacher groups:

- Elementary classroom teachers and science specialists
- Elementary Science lead teachers
- Secondary Science teachers
- Secondary Science lead teachers and Science department chairs

The purpose of these teacher surveys was to collect information on Science instruction and district support that could not be collected through observation.

In addition to the teacher surveys, the 2013 Site-Based Survey included a question about science instruction for students and parents at the elementary, middle, and high school levels, as well as elementary teachers.

This report summarizes the responses from the various surveys and disaggregates the data by grade level and response groups where appropriate.

### Findings from the Science Teacher Survey

The response rates from the science teacher surveys are listed below. Three teachers indicated that they teach both middle school and high school; their responses are included in the high school response group. Due to the small number of middle school lead teacher responses (four out of a possible five), all secondary lead teacher/department chair responses are reported as one response group.

**Table 1: Response Rates from the Science Teacher Survey**

Response Group	Invitations	Responses	Response Rate	Margin of Error (95% Confidence Interval)
Elementary Teachers	549	293*	53%	3.91
Elementary Lead Teachers	22	16	73%	13.1
Middle School Teachers	47	36	77%	8.0
High School Teachers	79	62	78%	5.8
Secondary Lead Teachers and Department Chairs	18	14	78%	12.7

\*Note: The 293 elementary responses include teachers who responded to the survey but were not responsible for their students' science instruction. The n for most of the elementary teacher questions will be lower than 293.

The margin of error for this survey is calculated at a 95% confidence interval, meaning that we can be 95% confident that the sample result reflects the actual population within the margin of error. In other words, in 19 out of 20 cases the data obtained would not differ by any more than the percentage points in the margin of error in either direction if the survey were repeated multiple times employing the same survey methodology and sampling method across the same population. When the margin of error is greater than 5, the results should be interpreted with caution.

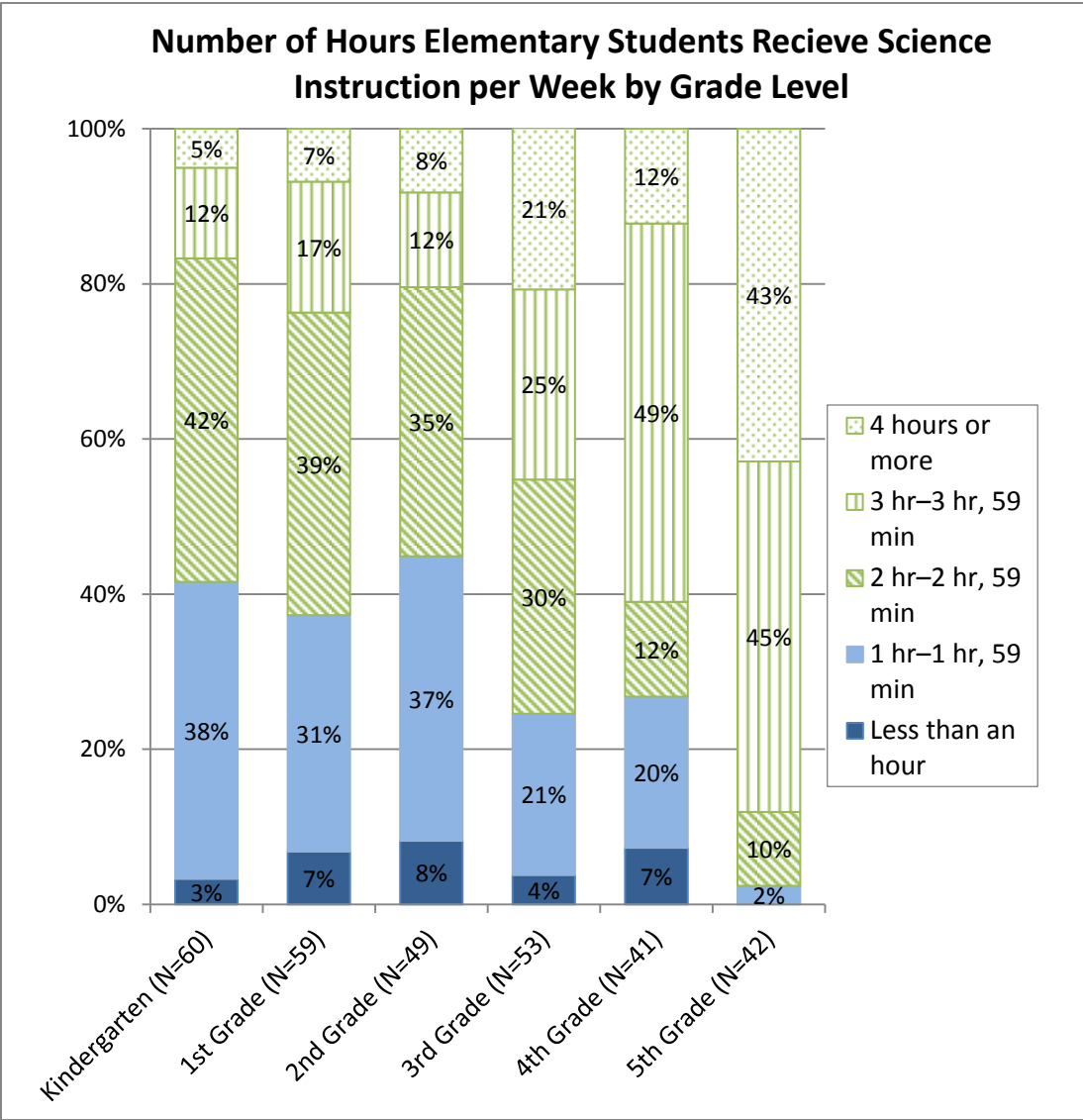
**Recommended Science Instructional Time for Elementary Students**

In an effort to determine whether Science instructional time was consistent for elementary students across grade levels, elementary classroom teachers were asked the following question:

- On average, how many hours per week do your students normally receive Science instruction?

Figure 1 shows the average amount of time elementary teachers said their students received science instruction each week.

Figure 1: Average Number of Hours Elementary Students Receive Science Instruction per Week



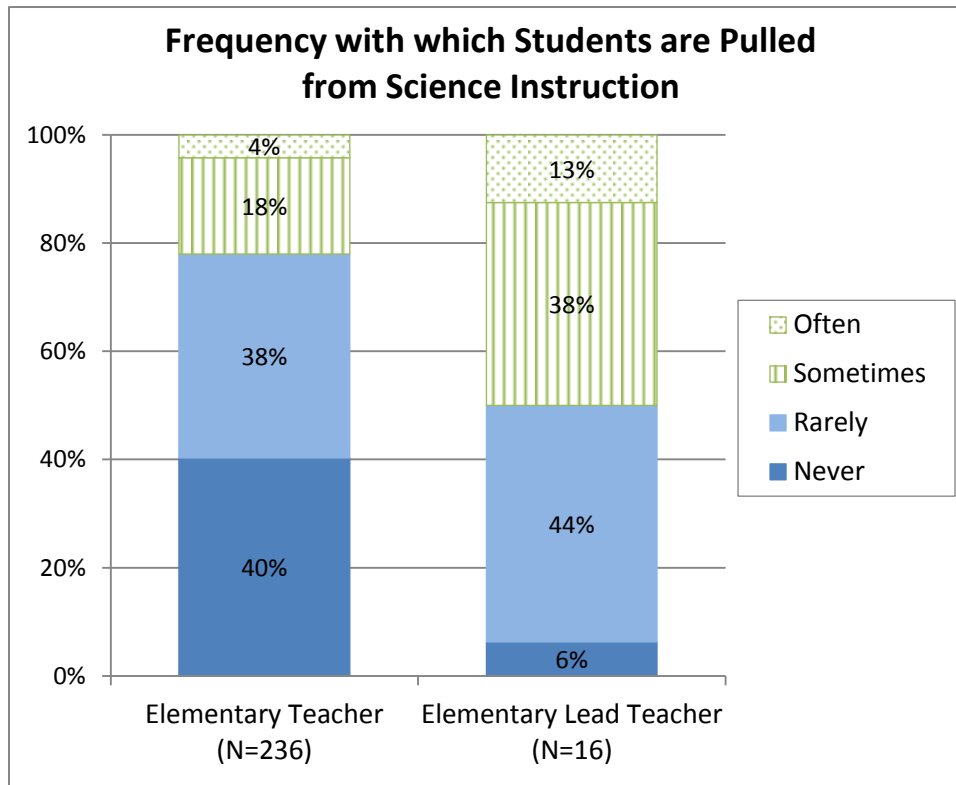
Note: See Figure 24 to compare results from the Site-Based Survey related to Science instructional time.

In an effort to determine how often elementary students were pulled out of science instruction, elementary teachers and elementary lead teachers were asked the following questions:

- *Teachers: How frequently are individual students pulled from science instruction in your classroom?*
- *Lead Teachers: To the best of your knowledge, how frequently are individual students pulled from science instruction?*

**Figure 2** shows how often elementary students are pulled out of science instruction according to elementary teachers and elementary lead teachers.

**Figure 2: Frequency with which Students are Pulled from Science Instruction**



**Science Instruction Alignment with the Virginia and APS Curriculum Frameworks**

Elementary students are tested annually on the Virginia Science standards in grades 3 and 5. In an effort to determine whether the grade 4 Science standards are introduced as new material in grade 5 prior to state testing, elementary teachers and elementary lead teachers were asked the following questions:

- 4<sup>th</sup> grade teachers: During the 4<sup>th</sup> grade school year, what percentage of the 4<sup>th</sup> grade science curriculum do you cover?
- Lead Teachers: During the 4<sup>th</sup> grade school year, what percentage of the 4<sup>th</sup> grade science curriculum is covered at your school?
- 5<sup>th</sup> grade teachers: During the 5<sup>th</sup> grade school year, what percentage of the 4<sup>th</sup> grade science curriculum do you cover as new material?
- Lead Teachers: During the 5<sup>th</sup> grade school year, what percentage of the 4<sup>th</sup> grade science curriculum is covered as new material at your school?

Figure 3 shows how much of the Grade 4 Science curriculum is covered by grade 4 teachers.

**Figure 3: Percentage of Grade 4 Science Curriculum Covered by Grade 4 Teachers**

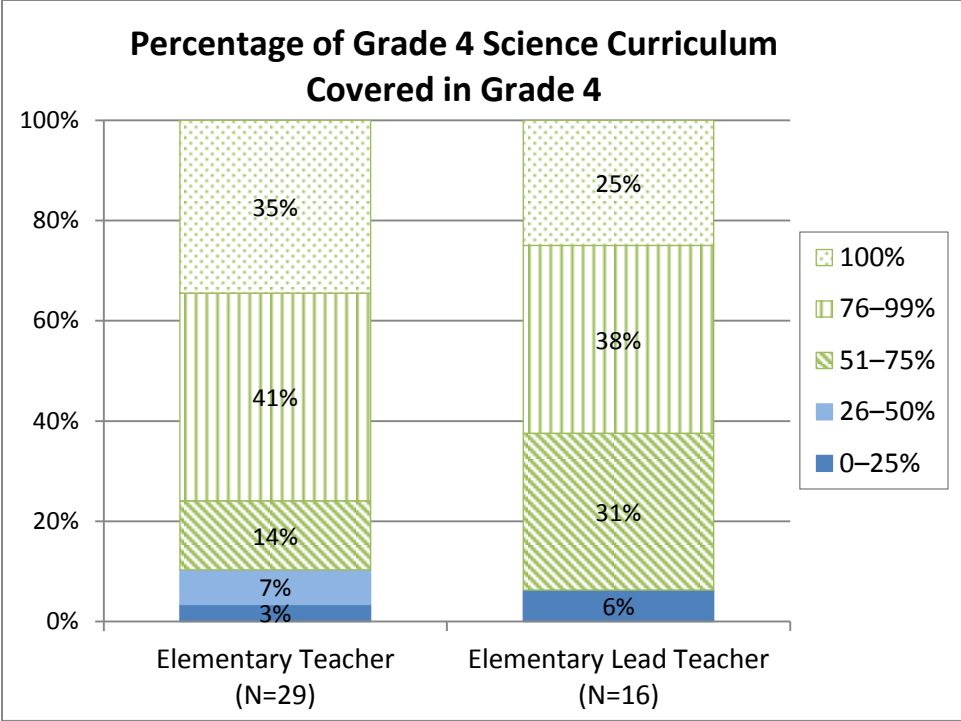
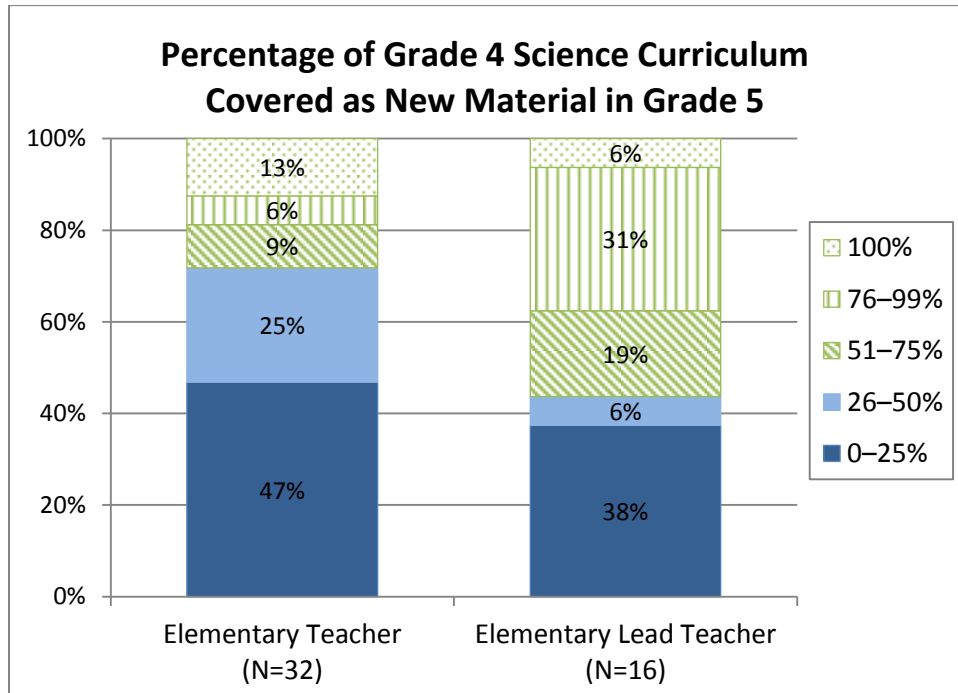


Figure 4 shows how much of the Grade 4 Science curriculum is covered by grade 5 teachers as new material.

Figure 4: Percentage of Grade 4 Science Curriculum Covered as New Material by Grade 5 Teachers



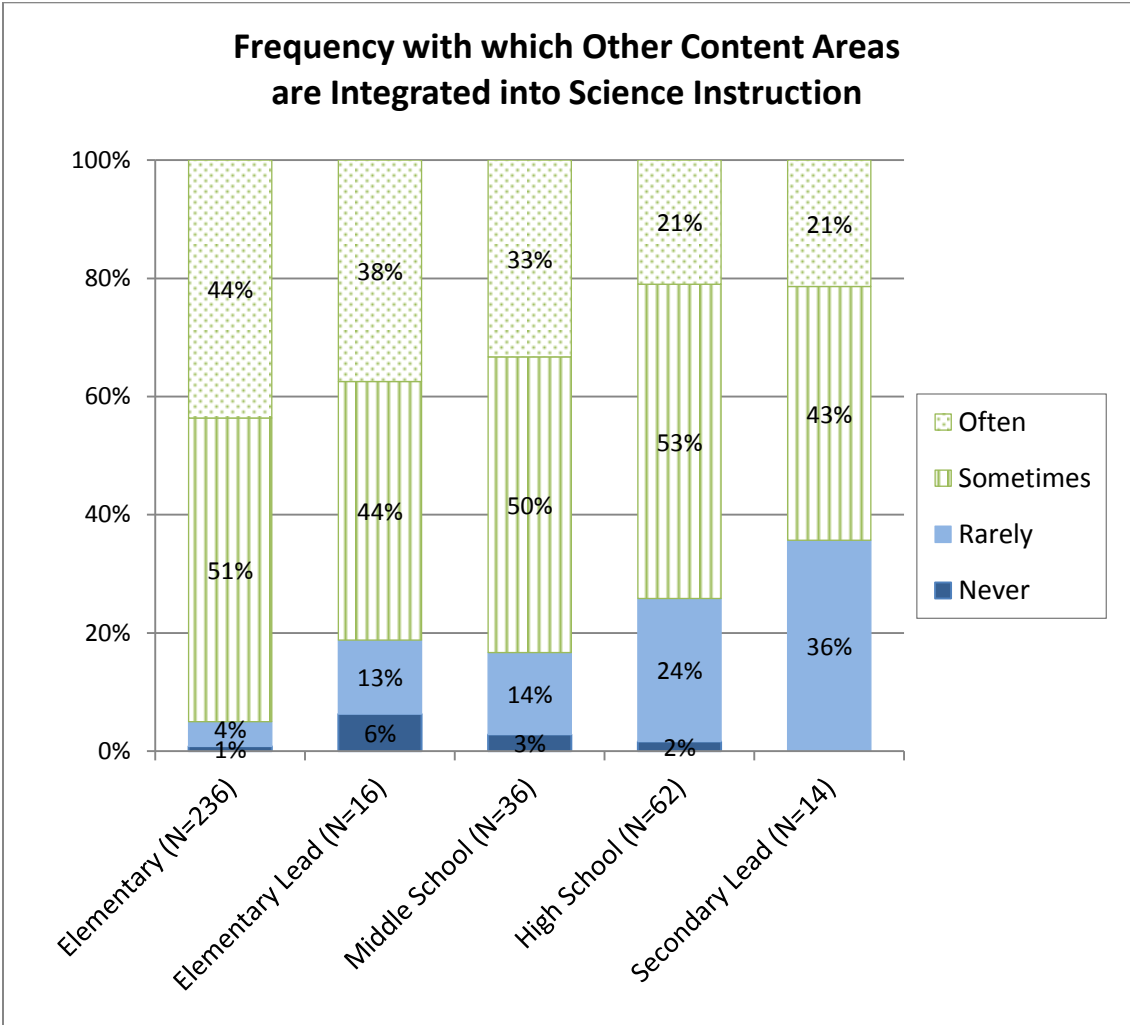
**Cross-Curricular Instructional Planning**

In an effort to determine how often the curriculum from other disciplines was integrated into science lessons, teachers and lead teacher/department chairs at the elementary and secondary levels were asked the following question:

- *Teachers: During your instructional planning, how frequently do you integrate other content areas with your science instruction?*
- *Lead Teachers/Department Chairs: To the best of your knowledge, how frequently are other content areas integrated with science instruction at your school?*

Figure 5 shows the frequency with which other content areas are purposely integrated into Science instruction.

**Figure 5: Integration of Other Content Areas into Science Instruction**

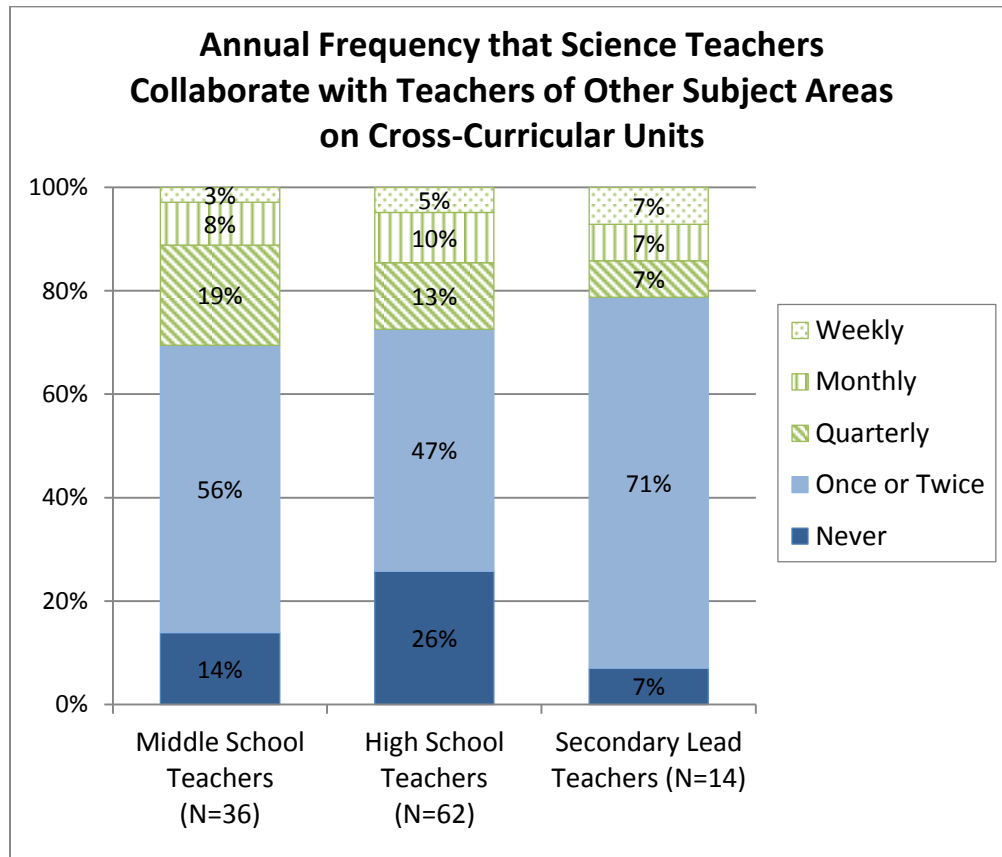


In an effort to determine how often Science teachers at the secondary level collaborate with teachers in other subject areas to design instruction, middle school and high school teachers were asked the following question:

- *Teachers: On average, how many times per year do you collaborate with teachers of other subject areas on cross-curricular units (not including co-teaching)?*
- *Lead Teachers/Department Chairs: To the best of your knowledge, how many times per year does the average science teacher at your school collaborate with teachers of other subject areas on cross-curricular units (not including co-teaching)?*

Figure 6 shows the frequency with which Science teachers report that they purposely collaborate with teachers in other subject areas to develop cross-curricular units.

**Figure 6: Annual Collaboration Time between Science Teachers and Other Subject-Area Teachers to Develop Cross-Curricular Units**





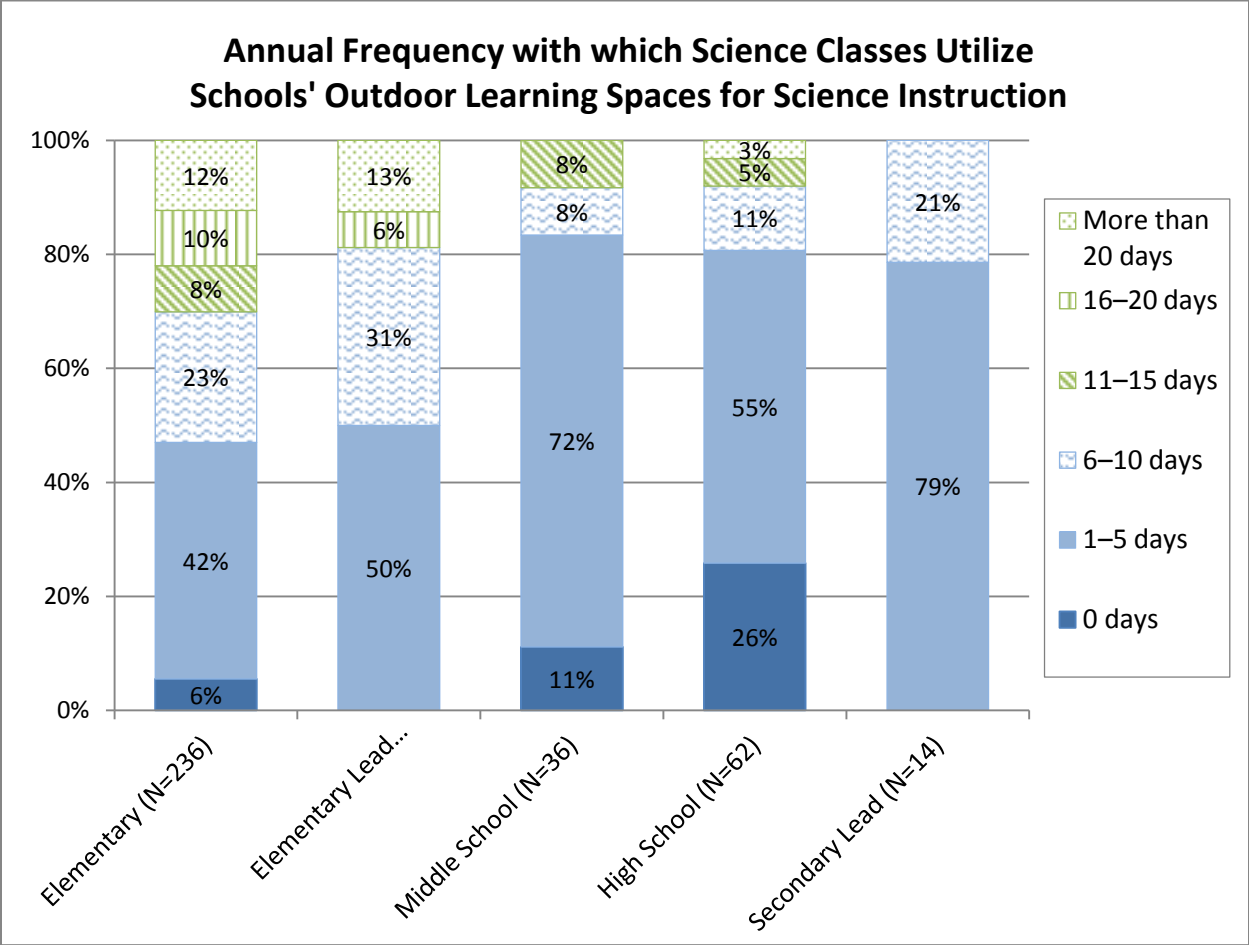
**Outdoor Learning to Support Science Instruction**

In an effort to determine the extent to which outdoor learning spaces are utilized at schools for Science instruction, teachers and lead teachers/department chairs at the elementary and secondary levels were asked the following question:

- *Teachers: Focusing on a single class of students: On average, how many days per year does this class utilize the outdoor learning spaces at your school for the purposes of science instruction?*
- *Lead Teachers/Department Chairs: To the best of your knowledge, how many days per year does the average teacher utilize outdoor learning spaces at your school as part of the science curriculum?*

Figure 7 shows the frequency with which Science teachers utilize their school’s outdoor learning spaces to support science instruction.

**Figure 7: Annual Use of Outdoor Learning Spaces for Science Instruction**



In an effort to determine the effectiveness of Science lessons taught in outdoor learning spaces, teachers, lead teachers, and department chairs at the elementary and secondary levels were asked to rate their response to the following question on a scale of 0 (not at all) to 5 (a great deal):

- *To what degree do outdoor learning spaces at your school support instruction and extend student learning?*

Figures 8, 9, 10, 11, and 12 show how teachers or lead teachers/department chairs rated the degree to which outdoor learning spaces at their schools supported instruction and extended student learning.

**Figure 8: Elementary School Teacher Rating on the Effectiveness of Outdoor Learning Spaces to Support Science Instruction and Extend Student Learning**

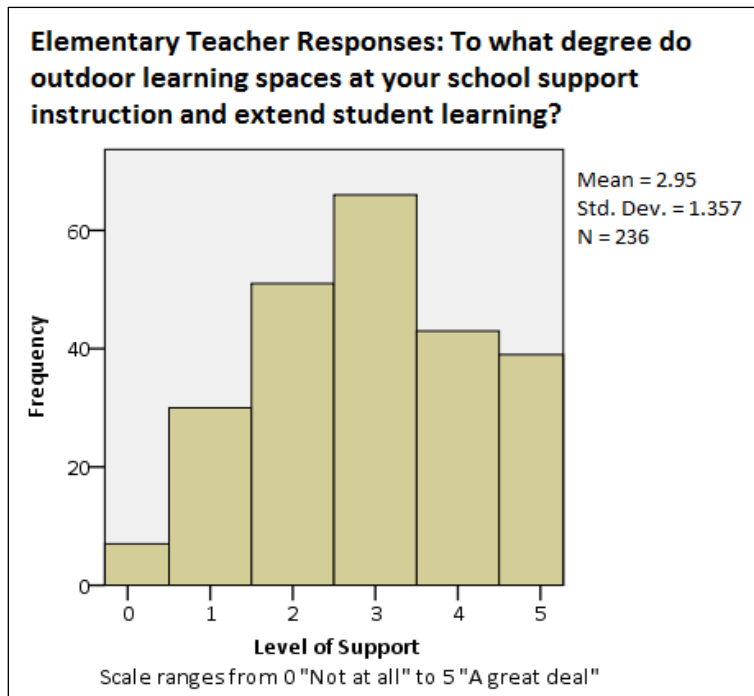


Figure 9: Elementary Lead Teacher Rating on the Effectiveness of Outdoor Learning Spaces to Support Science Instruction and Extend Student Learning

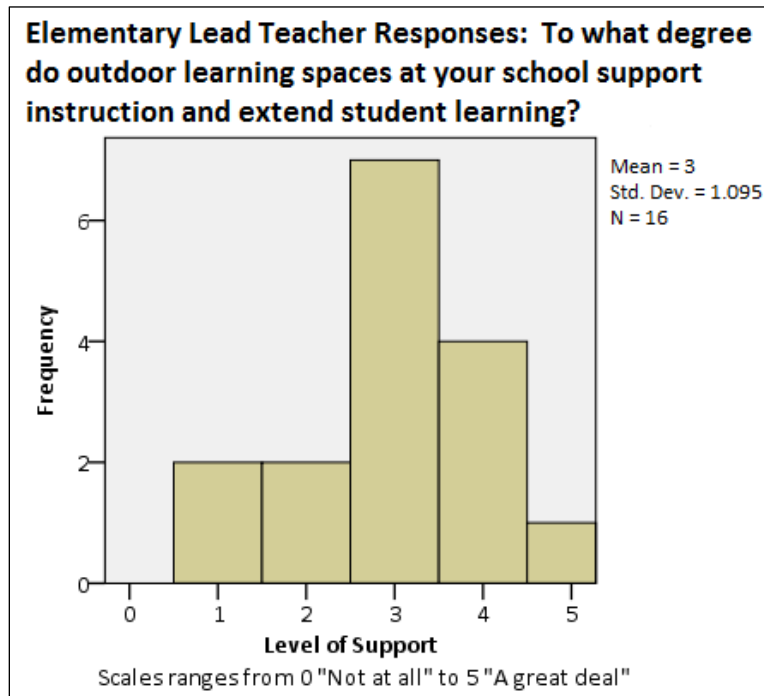


Figure 10: Middle School Teacher Rating on the Effectiveness of Outdoor Learning Spaces to Support Science Instruction and Extend Student Learning

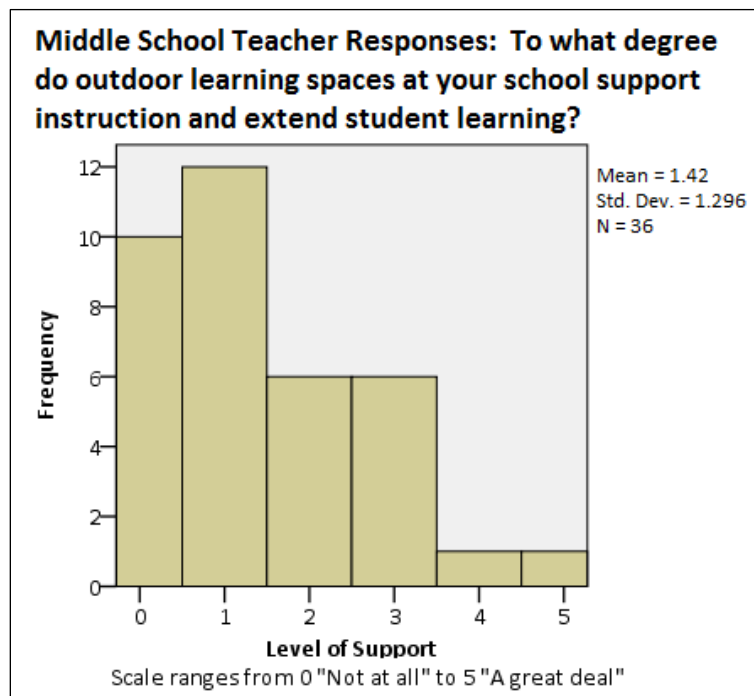


Figure 11: High School Teacher Rating on the Effectiveness of Outdoor Learning Spaces to Support Science Instruction and Extend Student Learning

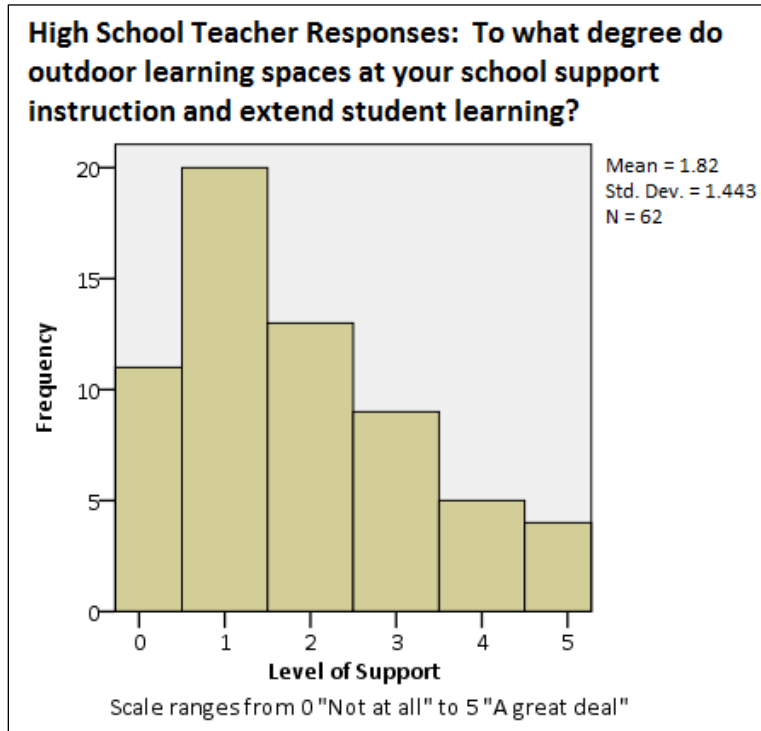
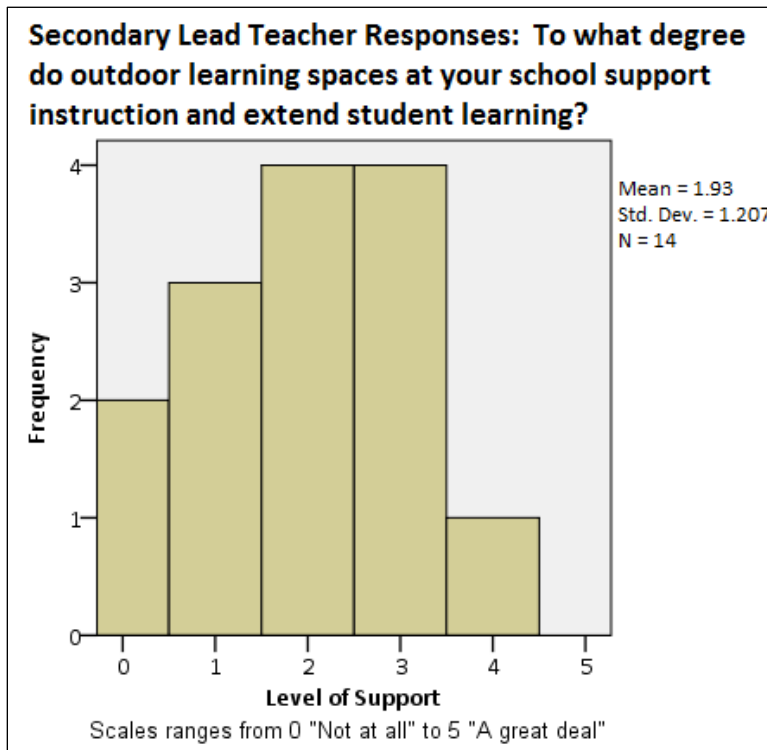


Figure 12: Secondary Lead Teacher/Department Chair Rating on the Effectiveness of Outdoor Learning Spaces to Support Science Instruction and Extend Student Learning



In an effort to determine the effectiveness of science lessons taught in the Outdoor Lab, teachers familiar with the Outdoor Lab were asked the following question:

- *Please rate the degree to which the Outdoor Lab experience supports instruction and extends student learning.*

Teachers who were asked this question belonged to one of the following groups:

- Elementary teachers who indicated that they taught 3<sup>rd</sup> or 5<sup>th</sup> grade
- Secondary teachers who answered “yes” to the question, “Do you use the Outdoor Lab with your students?”
- All elementary lead teachers
- All secondary lead teachers/department chairs

Figures 13, 14, 15, 16, and 17 show how teachers or lead teachers/department chairs rated the degree to which the Outdoor Lab supported instruction and extended student learning.

**Figure 13: Elementary School Teacher Rating on the Effectiveness of the Outdoor Lab to Support Science Instruction and Extend Student Learning**

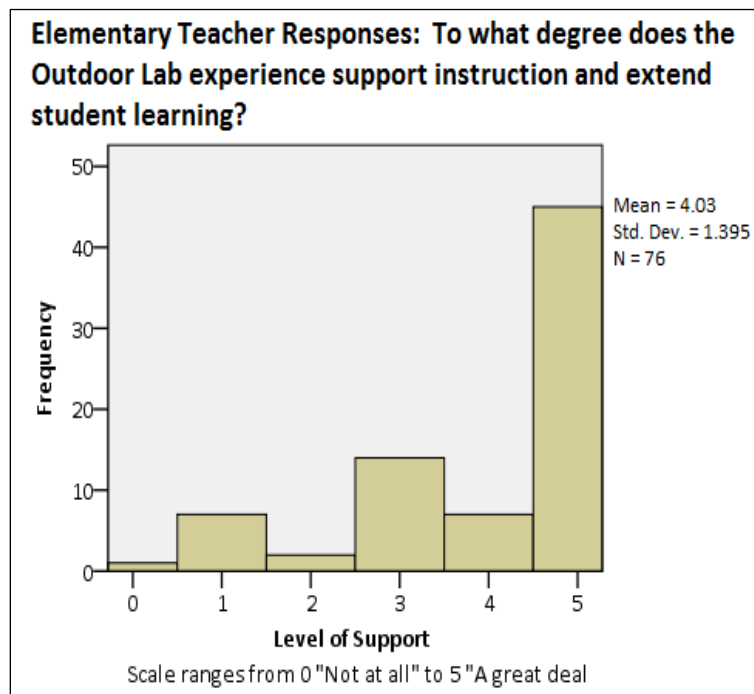


Figure 14: Elementary Lead Teacher Rating on the Effectiveness of the Outdoor Lab to Support Science Instruction and Extend Student Learning

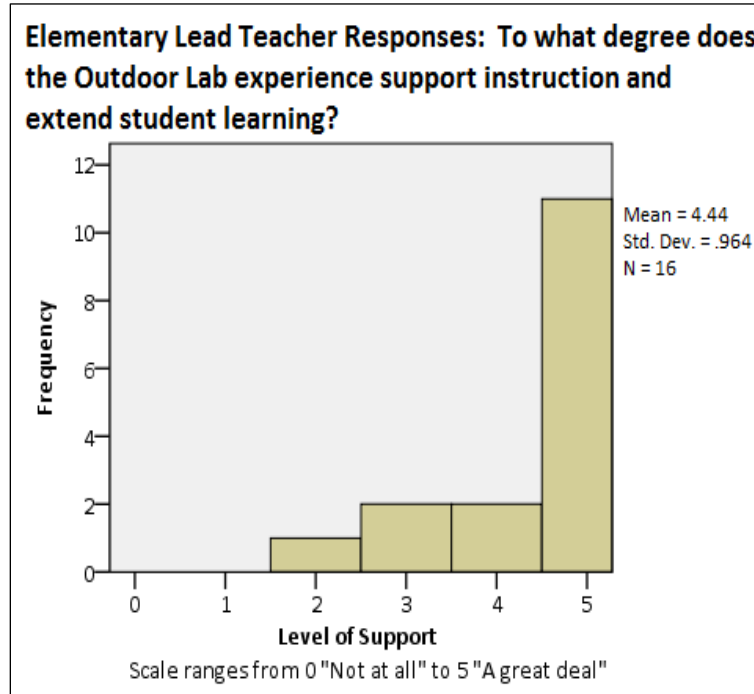


Figure 15: Middle School Teacher Rating on the Effectiveness of the Outdoor Lab to Support Science Instruction and Extend Student Learning

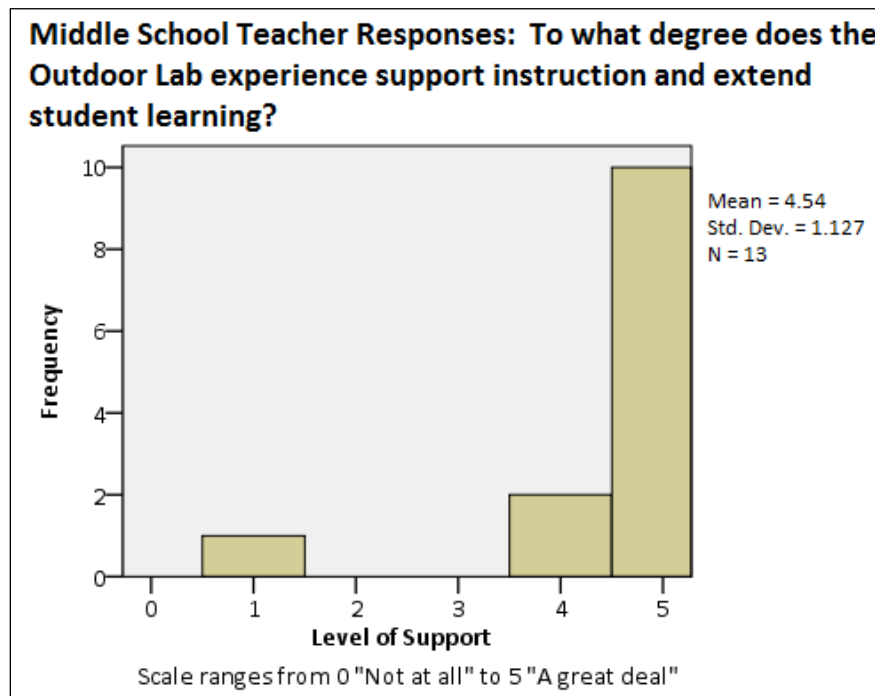


Figure 16: High School Teacher Rating on the Effectiveness of the Outdoor Lab to Support Science Instruction and Extend Student Learning

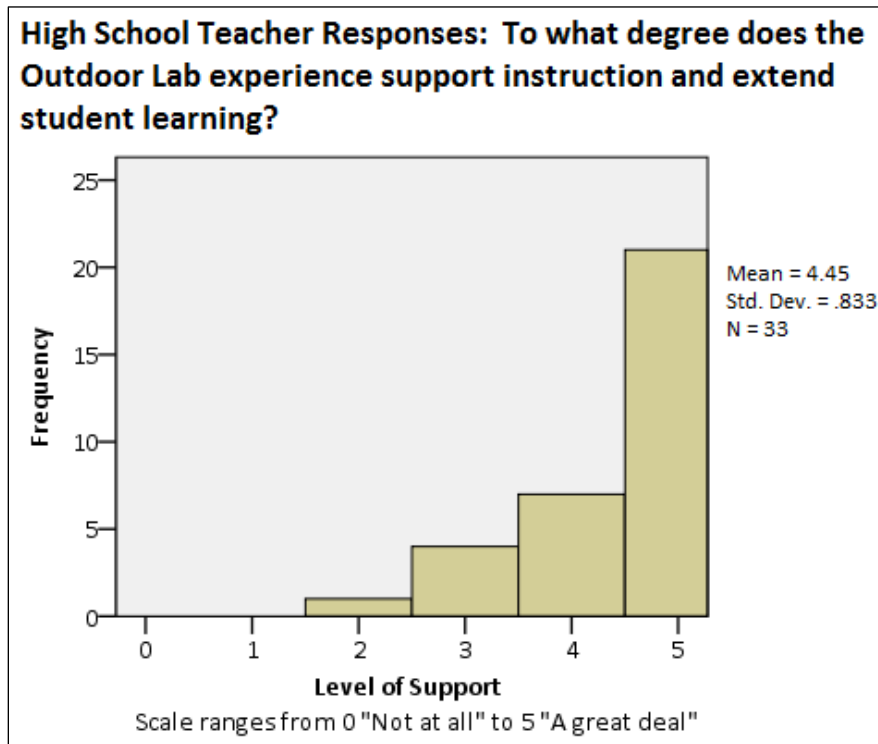
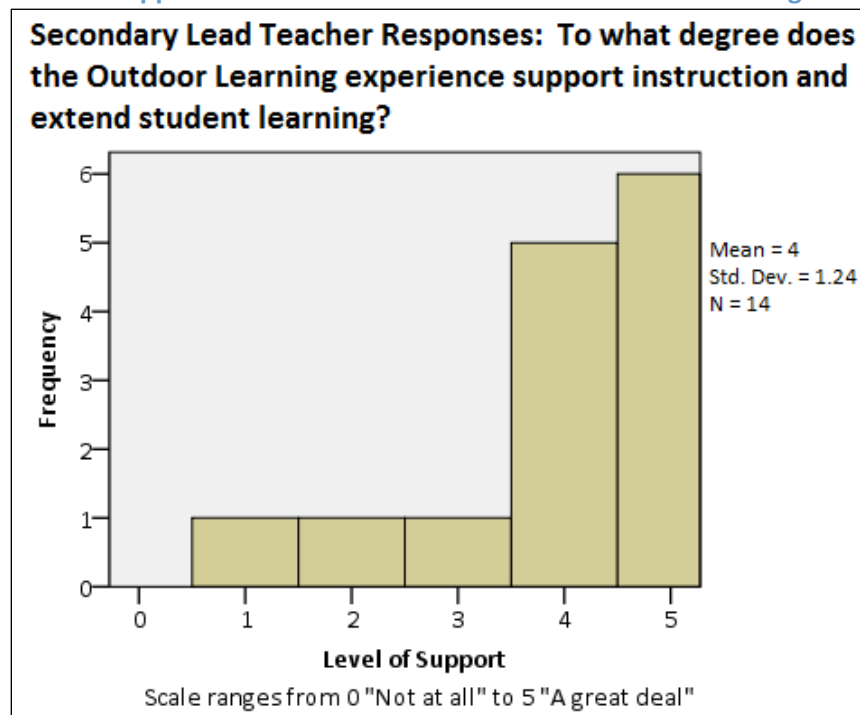


Figure 17: Secondary Lead Teacher/Department Chair Rating on the Effectiveness of the Outdoor Lab to Support Science Instruction and Extend Student Learning



**Teachers' Content Knowledge in Scientific Concepts**

In an effort to determine the degree to which teachers are trained in scientific concepts that support success in teaching Science, teachers at the elementary and secondary levels were asked the following two questions:

- *Have you completed continuing education coursework for college credit in the area of science in the last five years?*
- *Have you completed any professional development sessions or activities in the area of science in the last five years?*

**Figure 18** shows the percentage of elementary, middle, and high school teachers who have participated in some type of Science course for college credit in order to advance their knowledge of scientific concepts.

**Figure 19** shows the percentage of elementary, middle, and high school teachers who have participated in some type of professional development opportunity in order to advance their knowledge of scientific concepts.

**Figure 18: Percent of Teachers Completing Science Coursework for College Credit in the Last Five Years**

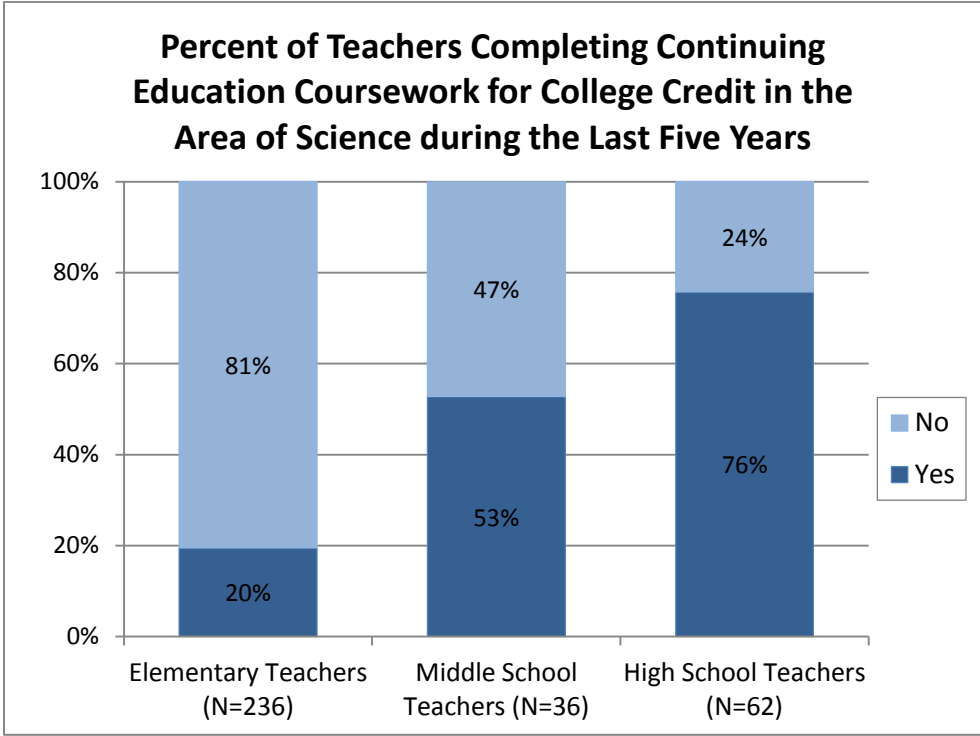
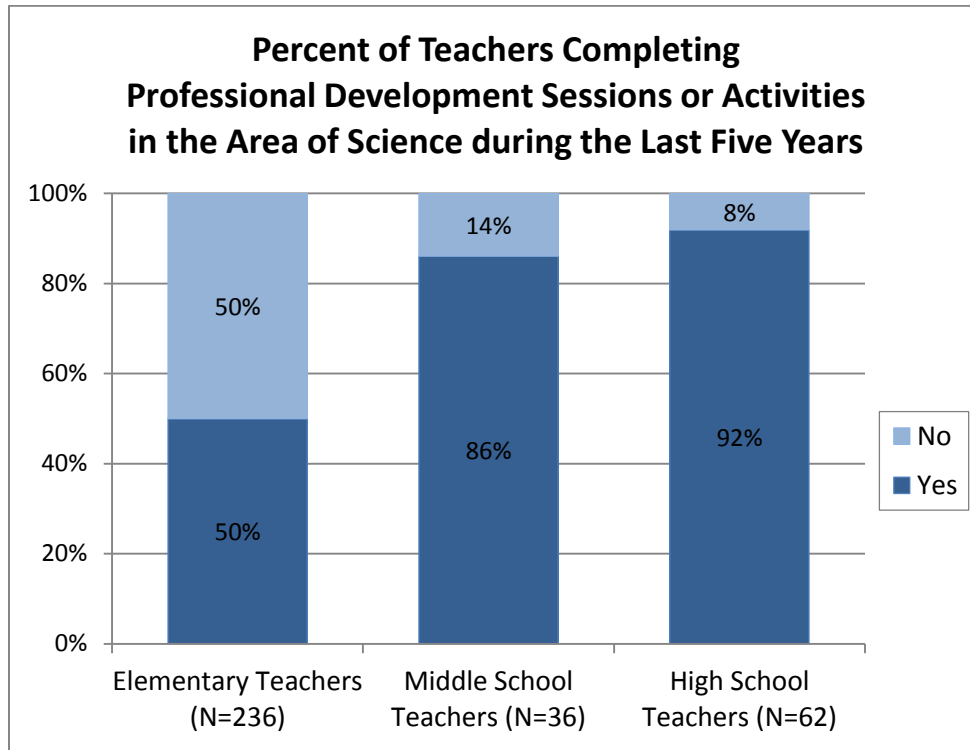




Figure 19: Percent of Teachers Completing Science Professional Development in the Last Five Years



In an effort to determine teachers' satisfaction level with the support they receive from the division to teach Science and the quality of Science professional development opportunities available, teachers and lead teachers/department chairs at the elementary and secondary levels were asked the following:

- *All response groups: Please rate your level of satisfaction with division-level support of your Science classroom instruction.*
- *Secondary teachers, All lead teachers/department chairs: Please rate your level of satisfaction with the quality of APS professional development opportunities that are available in the area of Science.*

Elementary teachers were not asked about the quality of professional development because only lead teachers at the elementary level have traditionally received direct professional development in the area of Science. Lead teachers are expected to share information with staff in their building.

**Figure 20** shows how satisfied teachers (elementary, middle, and high) and lead teachers/department chairs are with APS in terms of the support they receive to teach Science to their students.

**Figure 21** shows how satisfied teachers (middle and high) and lead teachers/department chairs are with the quality of the Science professional development opportunities available to them in Arlington Public Schools.

Figure 20: Teacher Satisfaction with Division-Level Support for Science Instruction

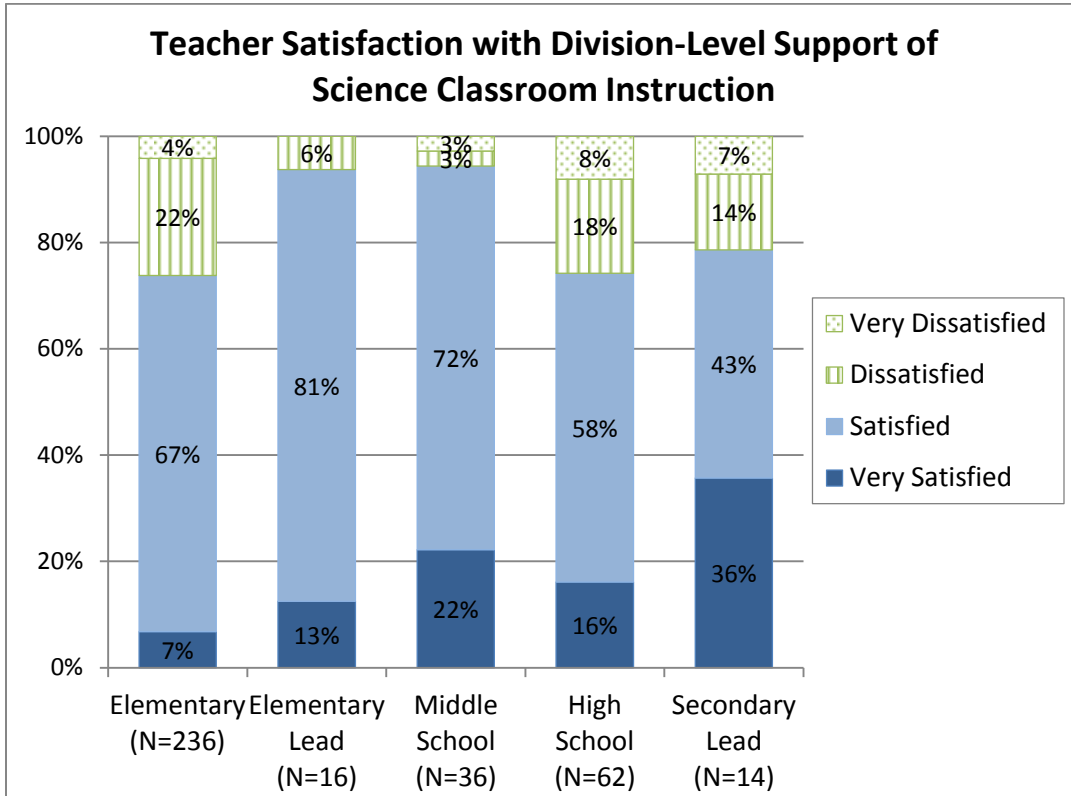
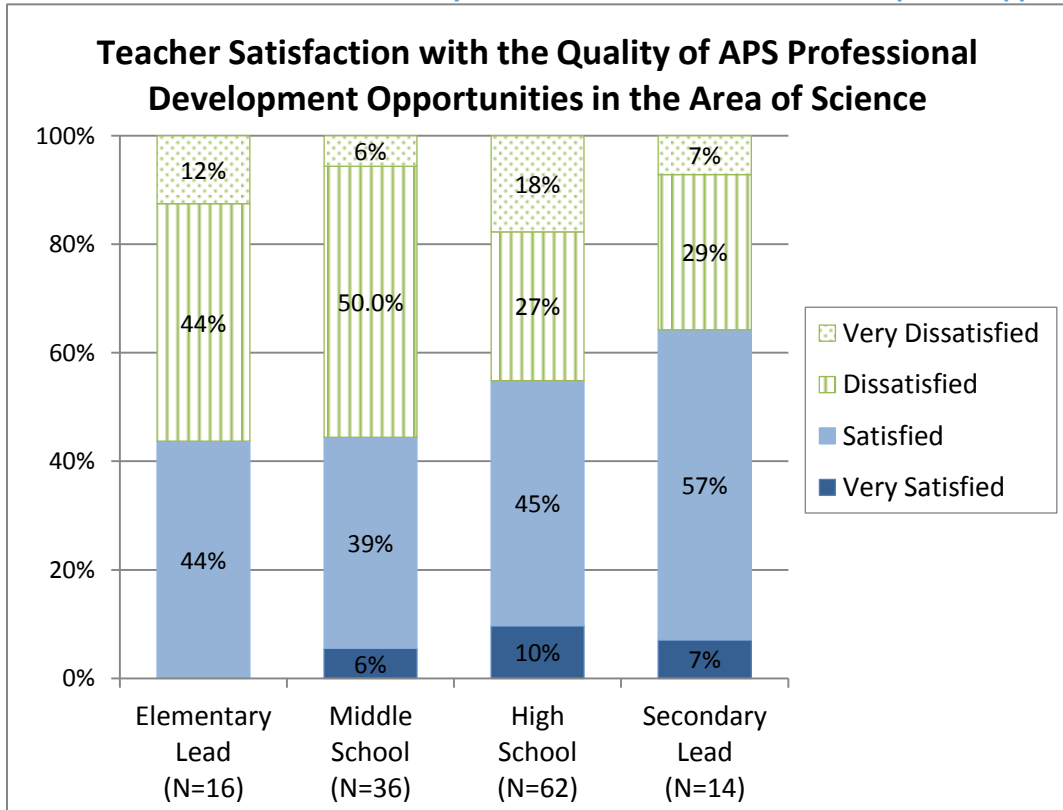


Figure 21: Teacher Satisfaction with Quality of APS Science Professional Development Opportunities



In an effort to determine how confident elementary teachers feel about teaching science, elementary teachers and lead teachers were asked the following:

- *Please rate your level of confidence in your knowledge of science content and your ability to teach the elementary science curriculum.*

Figures 22 and 23 show how confident elementary teachers and elementary lead teachers are in their scientific knowledge and ability to teach the curriculum.

Figure 22: Elementary Teachers' Level of Confidence to Teach the Science Curriculum

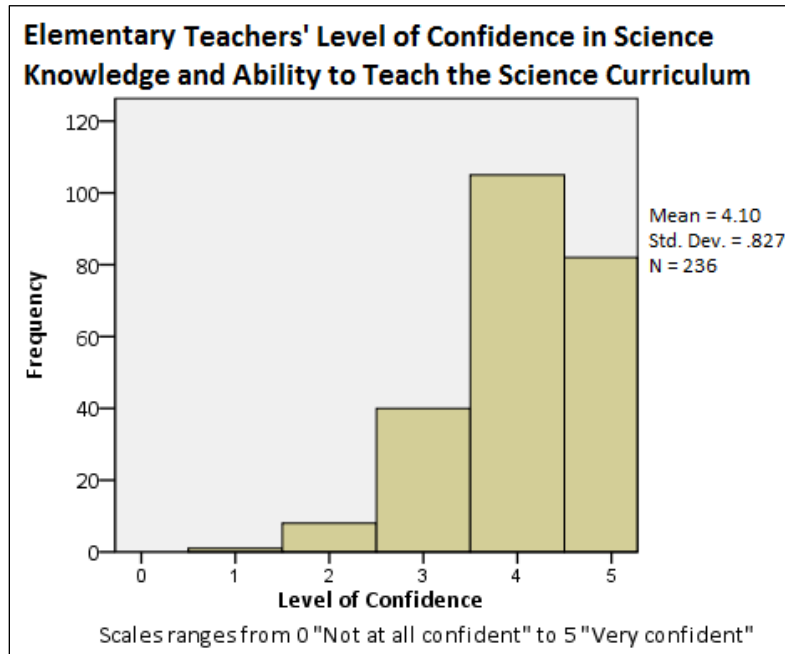
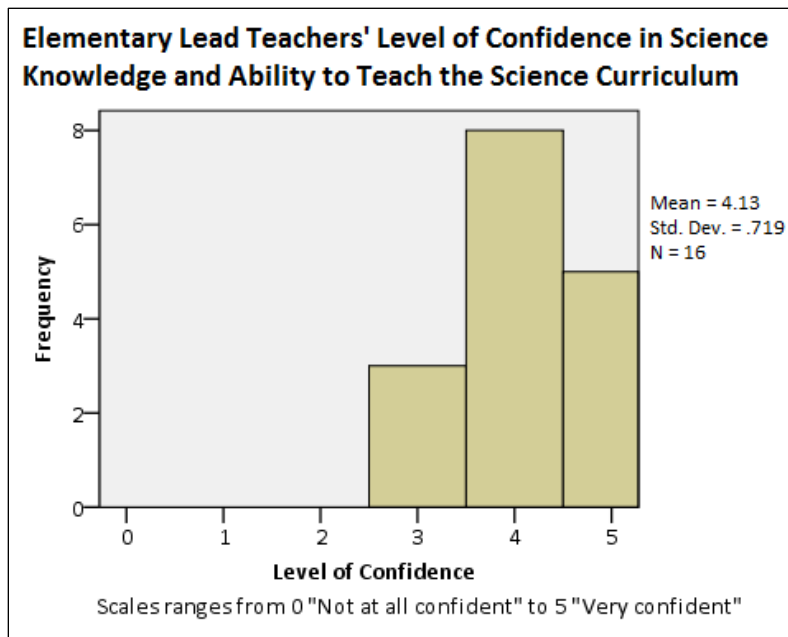


Figure 23: Elementary Lead Teachers' Level of Confidence to Teach the Science Curriculum



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## Findings from the Site-Based Survey

Bi-annual site-based surveys are designed to provide school-level feedback from students, teachers, and parents on issues including school climate, instructional support, cultural competence, the physical condition of the buildings, and related information. In 2013, questions about science instruction were added to the site-based surveys for the purposes of program evaluation.

The response rates of parents and elementary teachers on the site-based surveys are below. Responses from parents of students at the HB-Woodlawn Secondary Program are included in the high school parents group.

**Table 2: Response Rates of Elementary Teachers and Parent Groups on the Site-Based Survey**

Response Group	Population Size	Response Rate	Margin of Error (95% Confidence Interval)
Elementary teachers	1242	55%	2.5
Elementary parents	8878	32%	1.5
Middle school parents	3804	30%	2.4
High school parents	4258	23%	2.8
Alternative program parents	809	12%	9.29

The response rates of students on the site-based surveys are below. Responses from students at the HB-Woodlawn Secondary Program are included in the high school students group.

**Table 3: Response Rates of Student Groups on the Site-Based Survey**

Response Group	School Enrollment	Sample Size	Response Rate	Margin of Error (95% Confidence Interval)
5th grade students	1639	1639	90%	0.8
Middle school students	4202	1781	88%	2.0
High school students	5747	1563	88%	2.3
Alternative program students	1132	1132	75%	1.7

The margin of error for the site-based survey is calculated at a 95% confidence interval, meaning that we can be 95% confident that the sample result reflects the actual population within the margin of error. In other words, in 19 out of 20 cases the data obtained would not differ by any more than the percentage points in the margin of error in either direction if the survey were repeated multiple times employing the same survey methodology and sampling method across the same population. When the margin of error is greater than 5, the results should be interpreted with caution.

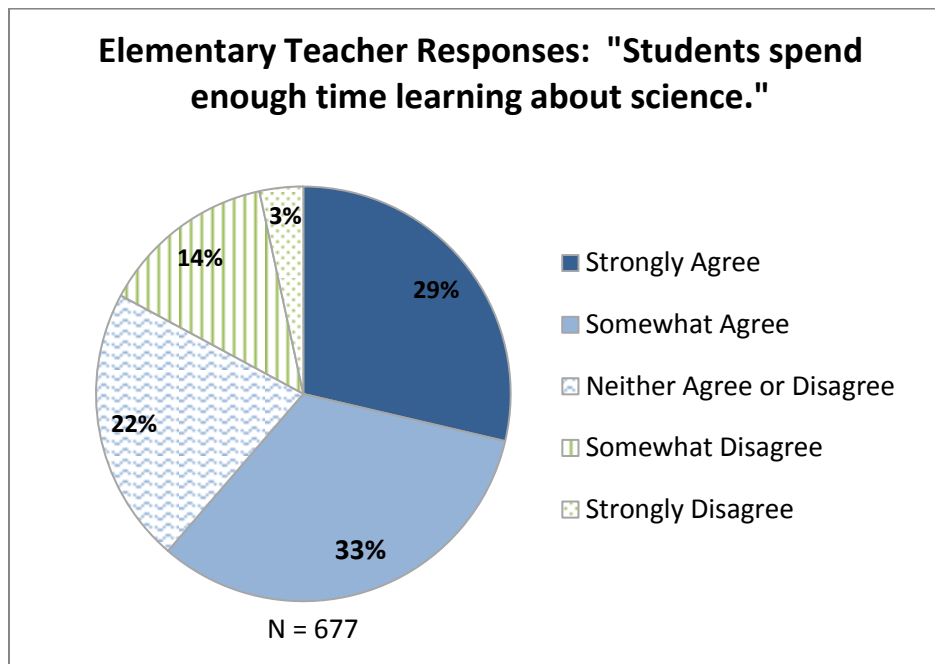
### *Adequate Science Instructional Time for Elementary Students*

In an effort to determine teachers' perceptions of whether enough time was devoted to Science instruction for elementary students, elementary teachers were asked to indicate the degree to which they agreed or disagreed with the following statement:

- *Students spend enough time learning about Science.*

**Figure 24** shows the extent to which elementary teachers agree or disagree that students spend enough time learning about science.

**Figure 24: Elementary Teacher Perception of Amount of Time Devoted to Science Instruction**



**Note:** See Figure 1 to compare results from the Teacher Survey related to Science instructional time.

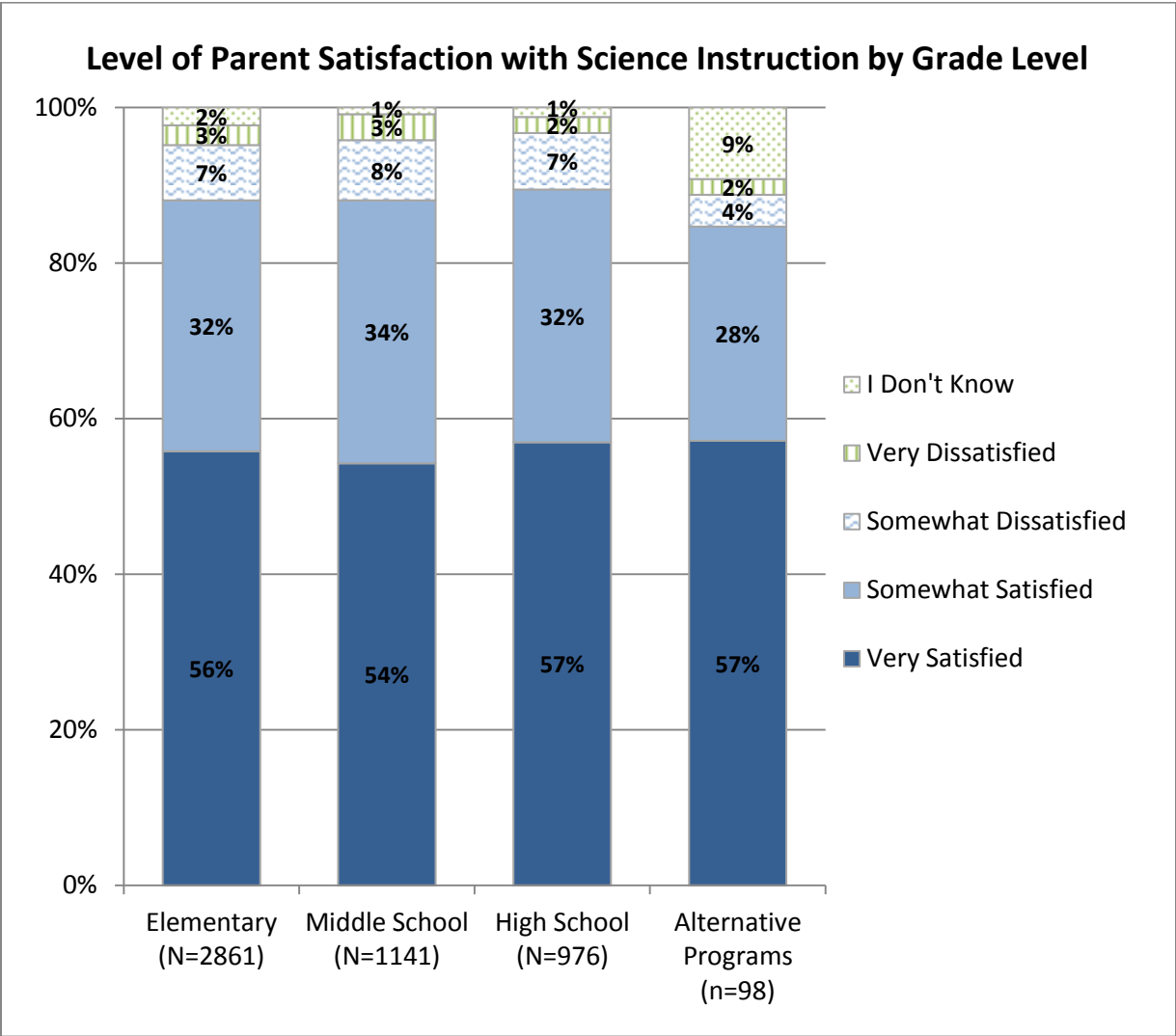
**Satisfaction with APS Science Instruction**

In an effort to determine how satisfied parents are with the Science instruction their children receive in Arlington Public Schools, parents at the elementary, middle, and high school level—including the parents of high school students enrolled in an alternative program—were asked the following:

- Please rate your level of satisfaction with the overall quality of instruction that your child is receiving (in Science).

Figure 25 shows how satisfied parents are with the Science instruction their children receive.

**Figure 25: Parent Satisfaction with Science Instruction by Grade Level**



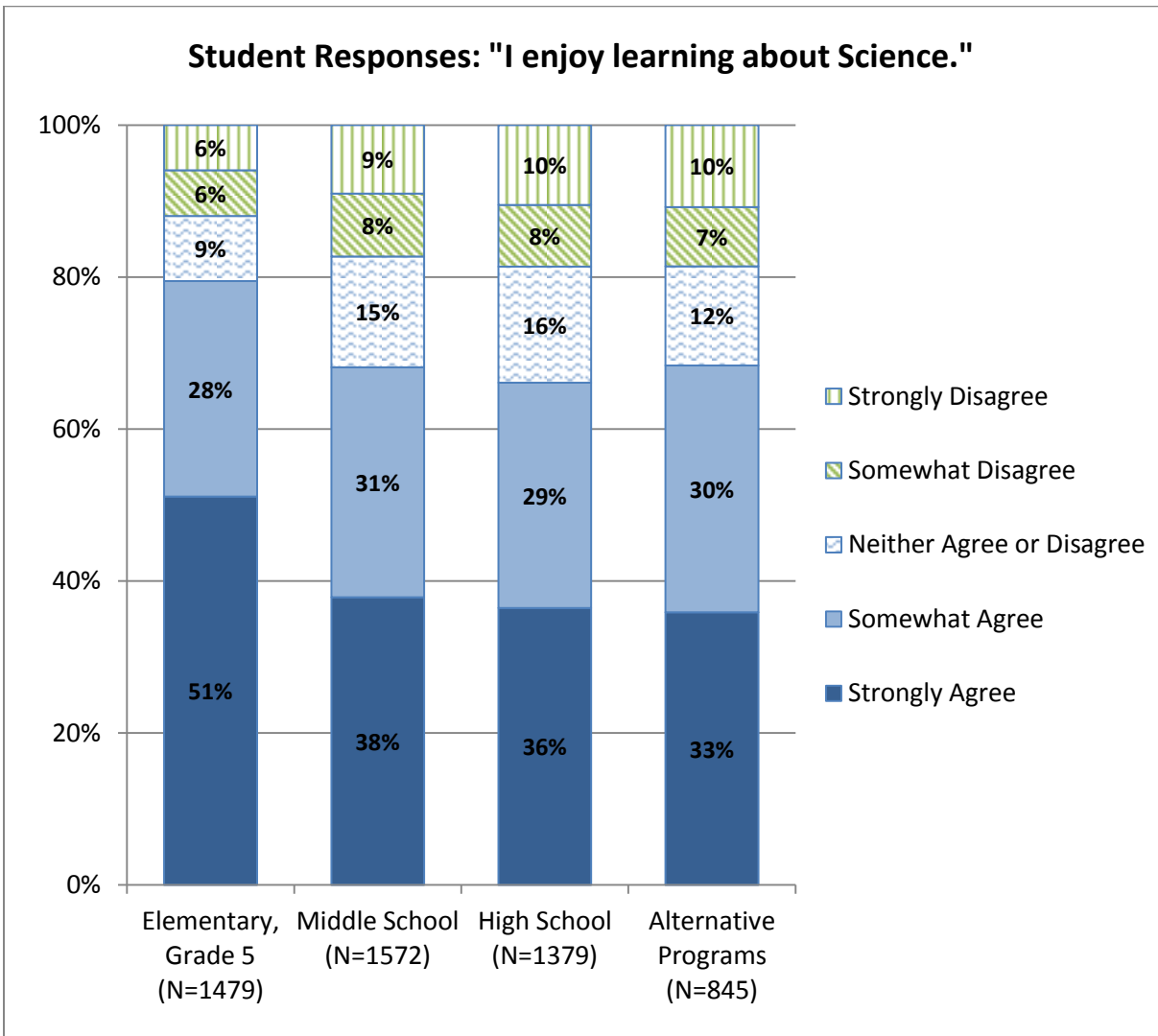
Results were similar for other subject areas.

In an effort to determine the extent to which students enjoy learning about science , grade 5 elementary students, middle school students, high school students, and high school students enrolled in an alternative program were asked to indicate the degree to which they agreed or disagreed with the following statement:

- *I enjoy learning about Science.*

**Figure 26** shows the extent to which students agreed or disagreed that they enjoy learning about science.

**Figure 26: Student Enjoyment of Learning about Science by Grade Level**



Results were similar for other subject areas.