# Annual Survey of Science Teachers

Office of Teaching and Learning Instructional Programs and Services

May 2023

MARYLAND STATE DEPARTMENT OF EDUCATION

EQUITY AND EXCELLENCE

## MARYLAND STATE DEPARTMENT OF EDUCATION

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# Introduction

Section 7-203 (e) of the Education Code of the Annotated Code of Maryland requires the Maryland State Department of Education (MSDE) to survey a statewide, representative sample of public schools and public school teachers annually to measure the amount of instructional time spent on social studies and science instruction in elementary schools; the availability and use of appropriate instructional resources and teaching technology in social studies and science classrooms; the availability and use of appropriate professional development for social studies and science teachers; and the number of secondary school social studies and science classes that area taught by teachers who are certified in the subject being taught and not certified in the subject being taught.

The 2022 annual survey opened on October 3 and accepted responses until November 4, 2022. Responses totaled 4,527. Approximately half (50.72%) of respondents identified themselves as teachers in elementary schools. The remaining respondents were nearly evenly split between middle school teachers (24.10%) and high school teachers (25.18%). Respondents identified themselves as educators within each of Maryland's twenty-four local education agencies (LEA).

This report provides an analysis of the responses related to science instruction in Maryland and is organized by school level beginning with elementary school.

# Elementary School

Elementary teacher respondents provided information about the amount of time dedicated to teaching science along with information about instructional methods, instructional resources, technology resources, and professional learning. There were 2,296 respondents who identified as elementary teachers.

To more fully describe science instruction at the elementary level, the survey asked teachers to indicate the instructional model employed in their current teaching assignment. For the purposes of the survey, the models were either **departmentalized** or **integrated**.

- Departmentalized – Teachers are assigned to teach either science or social studies.
- Integrated – Teachers are assigned to teach both science and social studies.

Most respondents (80.95% or 1,836)) reported they teach in elementary schools that use an integrated instructional model. The balance of respondents (19.05% or 432) reported teaching in a departmentalized model. Approximately 176 respondents indicated they teach science in a departmentalized context.

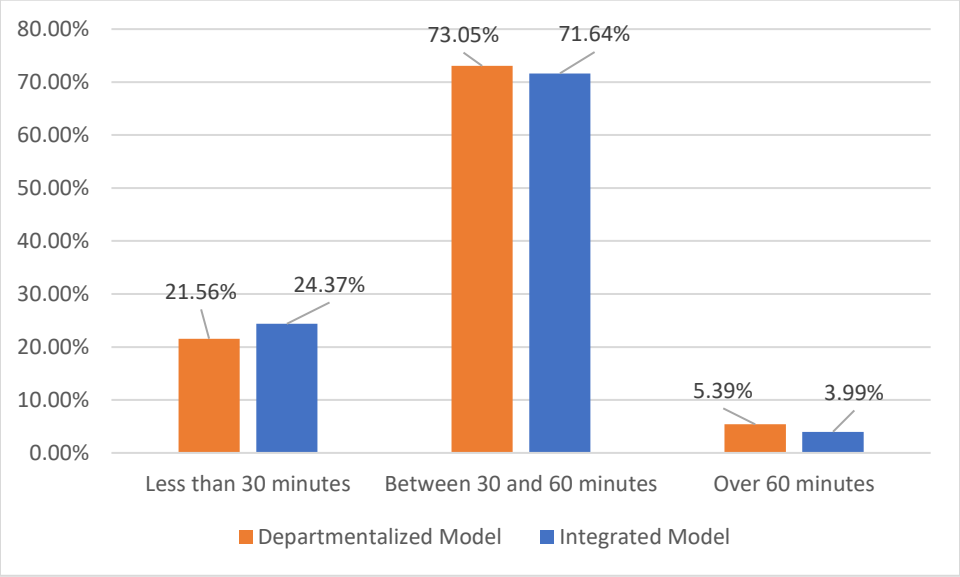
The data for each reporting category are disaggregated based on this organizational distinction.

### Instructional Time

Adequate instructional time for science is critical to student success. To understand the amount of time available for elementary students to learn science, the survey asked elementary teachers to provide estimates on the approximate number of minutes and number of days for science instruction.

The majority of respondents from both departmentalized (73.05%) and integrated (71.64%) models report spending between 30 and 60 minutes on science instruction when science is taught.

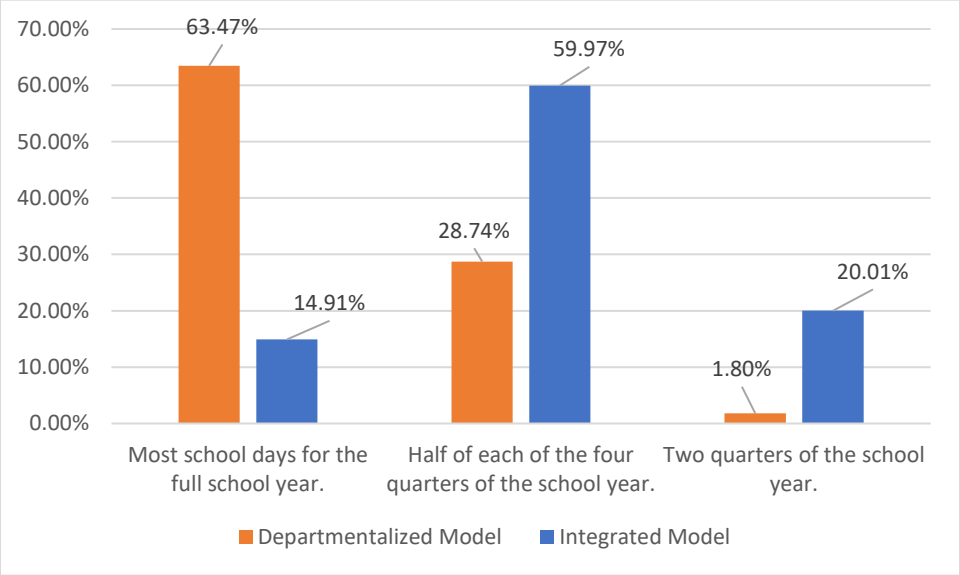
**Number of Minutes for Science Instruction**




The number and distribution of days for science instruction differ across the two organizational models, however. Students attending schools using the departmentalized model are more likely to engage in science

instruction during most days of the school year. Conversely, students attending schools where the integrated model is in use are more likely to engage in science instruction for about half of the days of the school year. The distribution of the days varies, but nearly 60% of respondents from schools using the integrated organizational model report science instruction occurs on about half of the days within each of the four quarters of the school year.

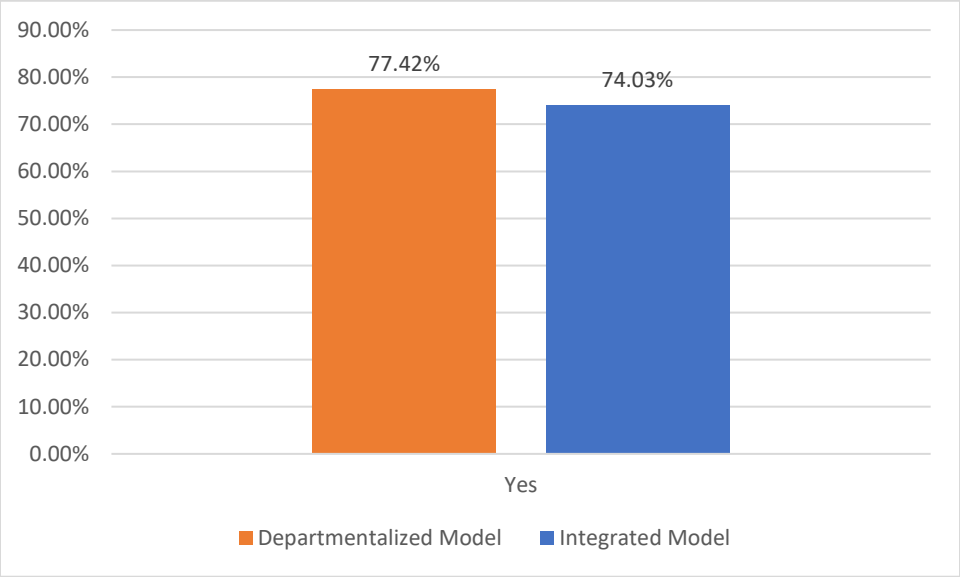
**Days Allotted to Science Instruction**



## Instructional Materials and Methods

Science instruction is resource intensive, and it is important that students have access to appropriate materials to engage actively in science experiences. The survey asked respondents to indicate whether they had adequate access to laboratory and safety materials for student use when learning science. Over 77% of teachers in departmentalized schools and over 74% of teachers in integrated model schools reported adequate access to resources for laboratory investigations.

**Elementary School Respondents' Perceptions of Resource Adequacy**




The survey also asked respondents to indicate the types of materials they use with students. The most commonly reported materials among elementary respondents were:

- District created materials
- Hands-on manipulatives
- Science kits
- Digital tools such as science videos, simulations, and animations.

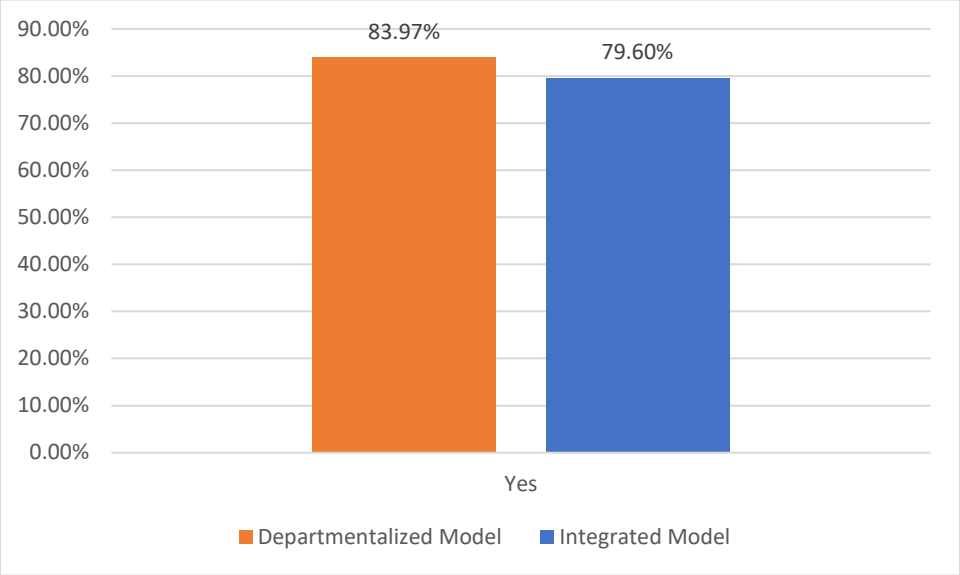
## Instructional Technology

The survey asked respondents to indicate the types of instructional technology available for their use when teaching science. Elementary teachers report using a variety of instructional technologies. Among the most frequently cited were document cameras, teacher computers with projectors, and interactive displays for large group presentations. School issued computers for student used both in and out of school were also frequently cited.

## Professional Learning

The survey asked respondents to indicate whether professional learning experiences specific to science were available to them. Most elementary level respondents confirmed they had access to science specific professional learning. Respondents in departmentalized schools reported slightly more access than respondents in schools using the integrated organizational model.

**Availability of Science Specific Professional Learning among Elementary Respondents**




The survey asked respondents to indicate the types of professional learning available to them. The most common type of professional learning reported by teachers was planning time with colleagues. District level science professional learning was also reported as a frequent source of professional learning.

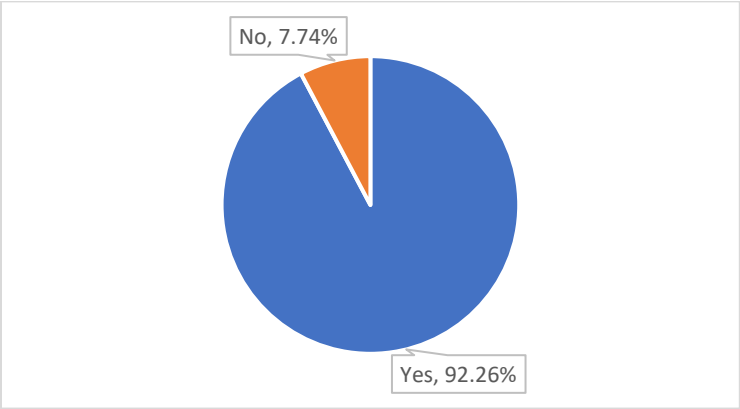
# Middle School

There were 1,091 respondents who identified themselves as middle school educators. Slightly more than half, or 554 respondents, identified as middle school science teachers. The survey asked middle school respondents to provide information about the availability and types of instructional resources, instructional technology, and science specific professional learning.

## Instructional Materials and Methods

Availability of instructional materials and safety equipment for students in middle school is fundamental to student learning. Nearly 93% of middle school respondents indicated that resources for laboratory investigations and safety were available for student use when learning science.

**Middle School Respondents' Perception of Resource Adequacy**




The most commonly reported materials in use were:

- Hands-on manipulatives
- Science videos
- Digital simulations
- Digital animations
- District created materials.

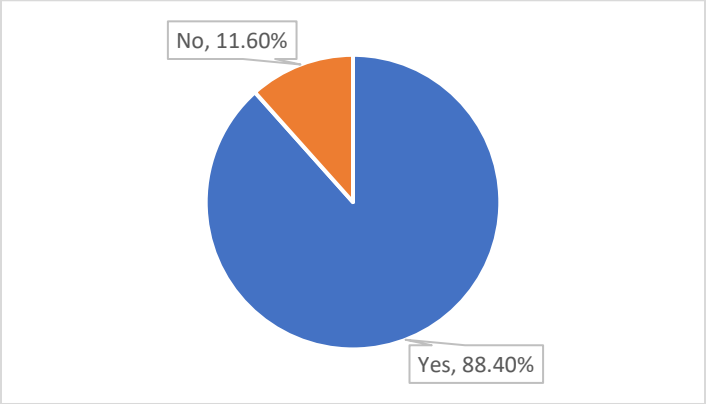
## Instructional Technology

Middle school teachers reported using a variety of instructional technologies with their students. School issued laptops, including Chromebooks and tablets, for use in and out of school were most commonly cited. Teacher computers with projector, learning management systems, document cameras, and interactive displays for large group presentations were also frequently identified.

## Professional Learning

Most (88.40%) middle school science teachers reported access to science-specific professional learning.

### Availability of Science Professional Learning for Middle School Respondents




The most common types of professional learning reported were planning time with colleagues in professional learning communities or teams and district level science professional learning.

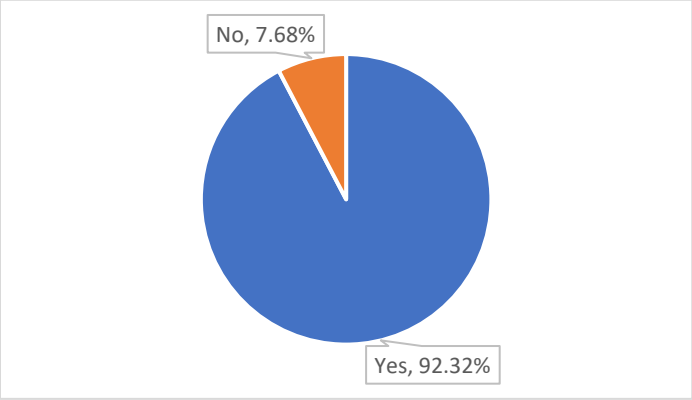
# High School

There were 1,140 respondents who identified themselves as high school teachers. Of these, 594 teachers self-identified as science teachers and responded to the survey. The survey asked high school respondents to provide information about instructional materials and instructional technology used when teaching science. Respondents were also asked about the availability and types of science specific professional learning.

## Instructional Materials and Methods

Student access to instructional materials including laboratory and safety equipment in science remains critical in high school. Most high school respondents (92.23%) reported adequate access to instructional materials.

**High School Respondents' Perceptions of Resource Adequacy**




The most commonly used instructional materials were:

- Science videos
- Hands-on manipulatives
- Digital simulations and animations.

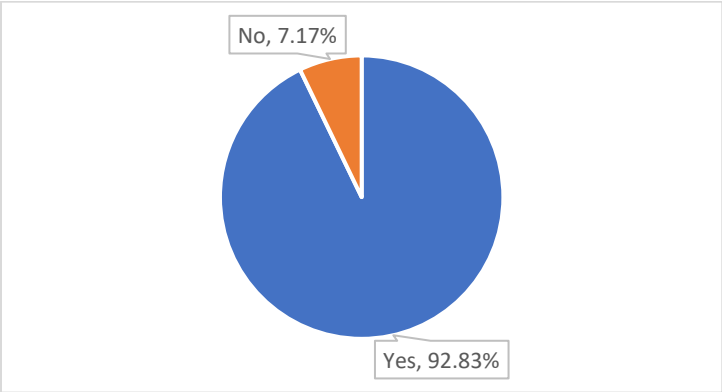
## Instructional Technology

High school teachers reported use of school issued laptops, including Chromebooks and tablets, as the most frequently available instructional technology. Teacher computers with projectors, learning management systems, document cameras are also frequently in use. High school teachers reported the use of sensors and other probeware for data collection as the fifth most frequently used technology.

## Professional Learning

Over 92% of high school science teachers report access to professional learning opportunities specific to science. The most frequently cited professional learning activity is planning time with colleagues such as in professional learning teams or communities. High school teachers also report access to district level science professional learning events.

### Availability of Science Specific Professional Learning for High School Respondents



# Secondary Teacher Certification

At the secondary level, teachers hold certification in particular content areas. Their teaching assignments should correspond to their area of certification. Annually, each LEA reports the number of teachers at the secondary level who are teaching in-field and out-of-field.

- In-field means that the teacher is teaching a class that corresponds to the teacher's certification.
- Out-of-field means that the teacher is teaching a class that does not correspond to the teacher's certification.

Most teachers in each LEA teach within their field of certification. The following table shows the in-field and out-of-field certification status for science teachers in each LEA for the 2020-21 school year.

**Secondary Science Teacher Certification Status in School Year 2020-21**

| Local Education Agency | Teachers | In-Field | In-Field Percent | Out-of-Field | Out-of-Field Percent |
|---|---|---|---|---|---|
| Allegany | 35.20 | 28.52 | 81.02 | 6.68 | 18.98 |
| Anne Arundel | 360.89 | 312.71 | 86.65 | 48.18 | 13.35 |
| Baltimore City | 298.92 | 264.50 | 88.49 | 34.42 | 11.51 |
| Baltimore | 527.02 | 397.78 | 75.48 | 129.24 | 24.52 |
| Calvert | 66.51 | 54.07 | 81.29 | 12.44 | 18.71 |
| Caroline | 23.66 | 20.93 | 88.46 | 2.73 | 11.54 |
| Carroll | 121.66 | 116.83 | 96.03 | 4.83 | 3.97 |
| Cecil | 68.83 | 64.32 | 93.45 | 4.51 | 6.55 |
| Charles | 112.00 | 112.00 | 100.00 | 0 | 0 |
| Dorchester | 24.82 | 21.82 | 87.91 | 3.00 | 12.09 |
| Frederick | 170.66 | 158.42 | 92.83 | 12.24 | 7.17 |
| Garrett | 19.08 | 19.08 | 100.00 | 0 | 0 |

| Local Education Agency | Teachers | In-Field | In-Field Percent | Out-of-Field | Out-of-Field Percent |
|---|---|---|---|---|---|
| Harford | 159.93 | 140.58 | 87.90 | 19.35 | 12.10 |
| Howard | 243.64 | 225.88 | 92.71 | 17.77 | 7.29 |
| Kent | 8.17 | 7.67 | 93.88 | .50 | 6.12 |
| Montgomery | 736.05 | 703.16 | 95.53 | 32.89 | 4.47 |
| Prince George's | 590.33 | 472.75 | 80.08 | 117.58 | 19.92 |
| Queen Anne's | 37.11 | 28.67 | 77.26 | 8.44 | 22.74 |
| St. Mary's | 66.50 | 62.50 | 93.98 | 4.00 | 6.02 |
| SEED School | 4.00 | 4.00 | 100.00 | 0 | 0 |
| Somerset | 15.36 | 13.09 | 85.17 | 2.28 | 14.83 |
| Talbot | 22.40 | 16.15 | 72.10 | 6.25 | 27.90 |
| Washington | 101.42 | 87.10 | 85.88 | 14.32 | 14.12 |
| Wicomico | 55.00 | 54.00 | 98.18 | 1.00 | 1.82 |
| Worcester | 32.79 | 32.79 | 100.00 | 0 | 0 |