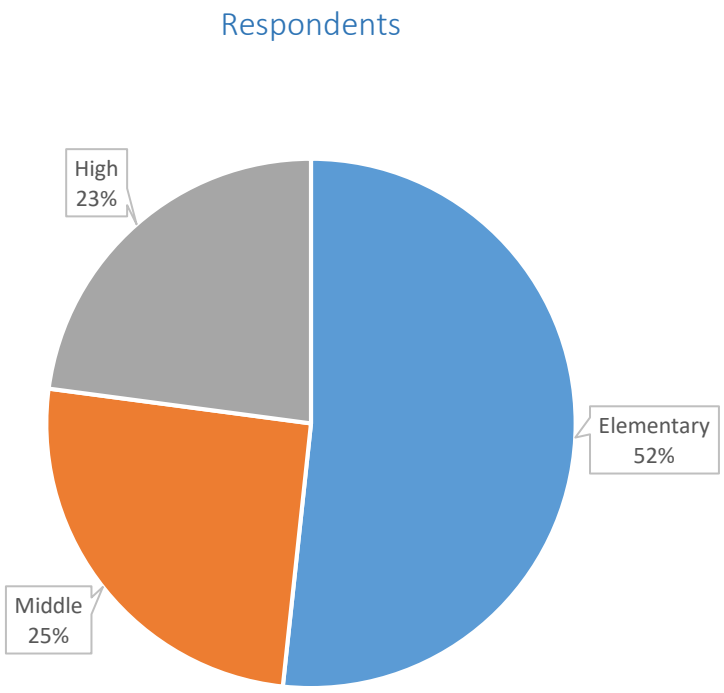
Results of the 2020 Science Survey Education

Core Content Areas – Accountability Program

The following is a summary of the survey of local school systems that were conducted pursuant to House Bill 1227: Education-Core Content Areas Accountability Program. The information was gathered through an online survey in the fall of 2020. The administration of the science survey contained questions to explore the legislatively mandated areas of focus: instructional time for science, availability and use of appropriate instructional materials, instructional technology, and teacher certification. There were 3,054 participants in the survey; over 1500 elementary school teachers, over 750 middle school teachers, and nearly 700 high school teachers.



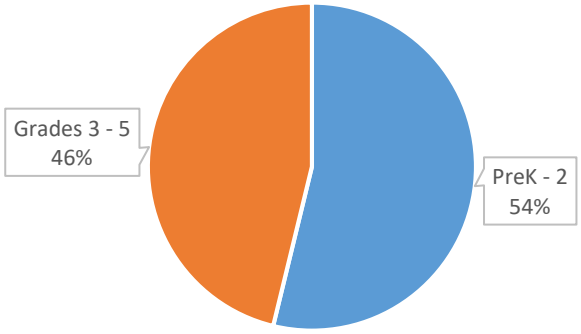
Answer Choices	Percentage	Respondents
Elementary	51.7%	1579
Middle	25.4%	777
High	22.9%	698

Summary

Summary: Participation in the 2020 teacher survey increased from the previous year with teachers from all 24 local school systems contributing and a 56% increase. The majority of elementary classrooms receive instruction two to three days per week. Some elementary classrooms never receive science instruction. The majority of elementary students receive science instruction from their classroom teacher for 30 minutes or more. Elementary teachers engage students in science and engineering practices in nearly 40% of the classrooms with science being a topic for reading in the majority of classrooms. Comparatively, the vast majority of middle school teachers spend four or more hours per week on science instruction focused on the Next Generation Science Standards (NGSS). A similar pattern exists at the high school level. Opportunities for students to engage in the science and engineering practice of planning and/or conducting an investigation in a laboratory environment varies between the elementary and middle school level. Although the majority of elementary teachers indicate they have the appropriate resources to engage in science instructional activities aligned to NGSS, most elementary teachers do not engage students in NGSS science and engineering practice of planning and/or conducting an investigation in a laboratory environment. Incorporating three dimensional assessments at the secondary level occurs at least once a month for the vast majority of students, 75%, whereas, at the elementary level, 55% of students have this opportunity. Commonly used instructional resources at the elementary and secondary level are science videos. Both elementary and secondary teachers utilize district-created materials and focus on using hands-on manipulatives whereas secondary teachers utilize online simulations more than elementary teachers. Teachers use a variety of instructional technology; over 80% of students have a laptop, Chromebook, or tablet. The vast majority of teachers develop their instruction with professional learning available from their district or and within professional learning communities.

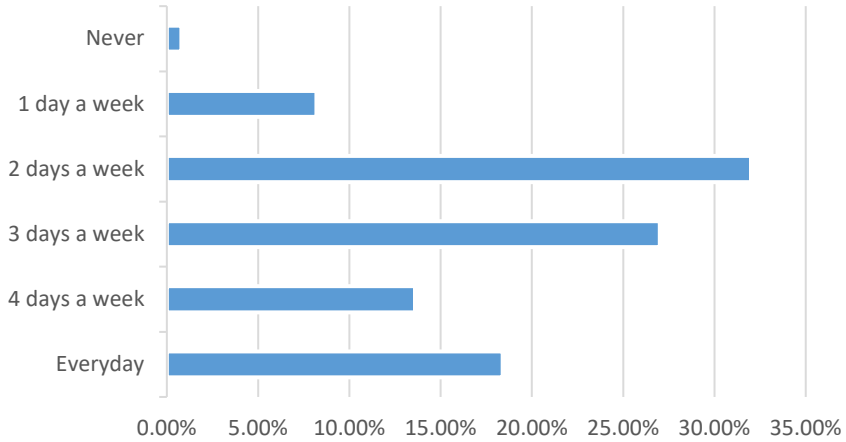
Elementary Science Instruction Overview

In which grade band do you teach?



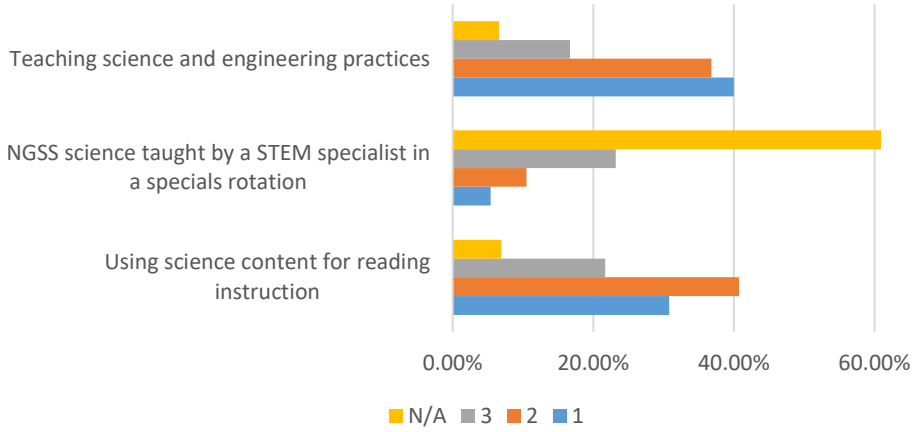
Answer Choices	Percentage	Respondents
PreK - 2	53.8%	849
Grades 3 - 5	46.2%	730

Approximately how often do you teach science in a typical school week?



Answer Choices	Percentage	Respondents
Everyday	18.4%	290
4 days a week	13.6%	215
3 days a week	27%	427
2 days a week	32%	506
1 day a week	8.2%	129
Never	0.8%	12

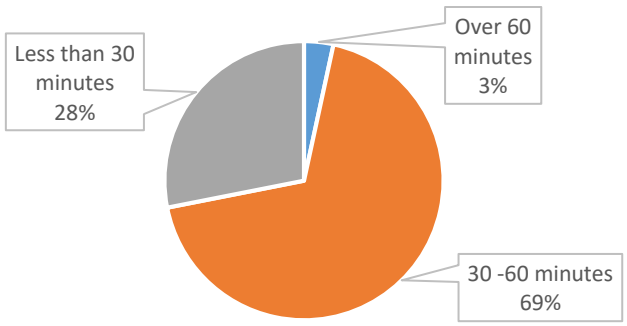
How do you teach science, when taught? Rank each option with #1 being the most used and #3 being the least used. Select N/A if not used in your class.



Options	1	2	3	N/A
Using science content for reading instruction	30.8%	40.7%	21.7%	6.9%
NGSS science taught by a STEM specialist in a specials rotation	5.4%	10.5%	23.2%	60.9%
Teaching science and engineering practices	40%	36.8%	16.7%	6.6%

Instructional Time: Elementary School

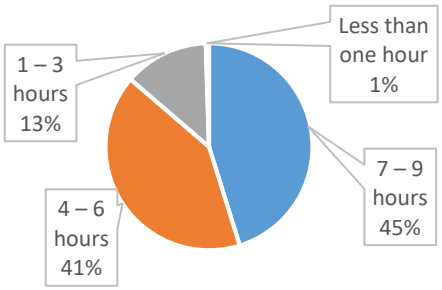
When taught, how much time do you dedicate to science focused on NGSS curriculum per day?



Answer Choices	Percentage	Respondents
Over 60 minutes	3.4%	54
30 -60 minutes	68.5%	1082
Less than 30 minutes	28.1%	443

Instructional Time: Middle School

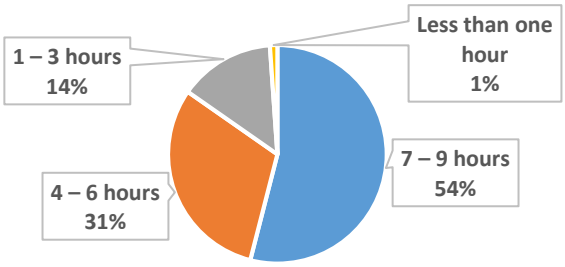
On average, how many hours of instructional time do you dedicate to science focused on NGSS curriculum per week?



Answer Choices	Percentage	Respondents
7 – 9 hours	45.2%	351
4 – 6 hours	41.1%	319
1 – 3 hours	13.2%	103
Less than one hour	0.5%	4

Instructional Time: High School

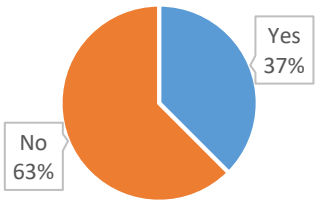
On average, how many hours of instructional time do you dedicate to science focused on NGSS curriculum per week?



Answer Choices	Percentage	Respondents
7 – 9 hours	54%	377
4 – 6 hours	30.7%	214
1 – 3 hours	14.2%	99
Less than one hour	1.1%	8

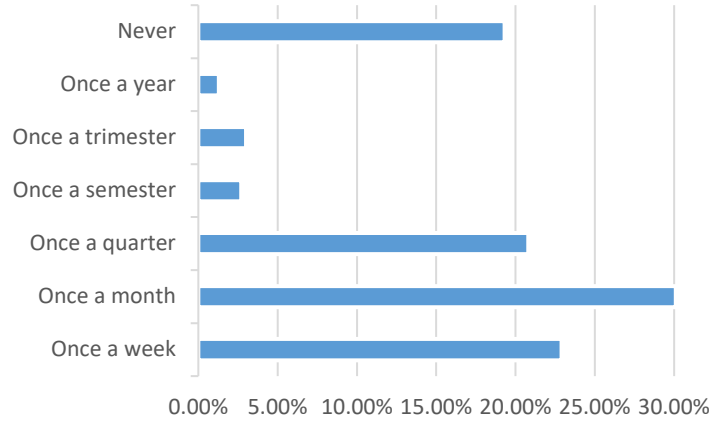
Disciplinary Literacy: Elementary Schools

Do your students engage in the NGSS science and engineering practice of planning and/or conducting an investigation in a laboratory environment?



Answer Choices	Percentage	Respondents
Yes	37.5%	592
No	62.5%	987

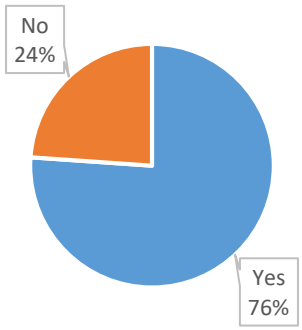
On average, how often do students participate in teacher created, multi-dimensional formative assessments aligned to the Maryland Integrated Science Assessment for the grade level that you teach?



Answer Choices	Percentage	Respondents
Once a week	22.9%	361
Once a month	30.1%	475
Once a quarter	20.8%	328
Once a semester	2.7%	42
Once a trimester	3%	48
Once a year	1.3%	21
Never	19.3%	304

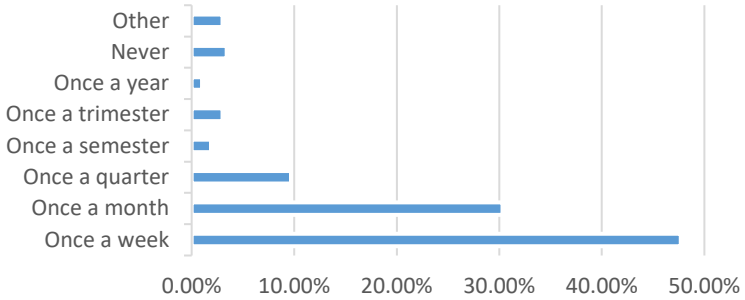
Disciplinary Literacy: Secondary Schools (Middle and High School)

Do your students engage in the NGSS science and engineering practice of planning and/or conducting an investigation in a laboratory environment?



Answer Choices	Percentage	Respondents
Yes	76.1%	1152
No	23.9%	361

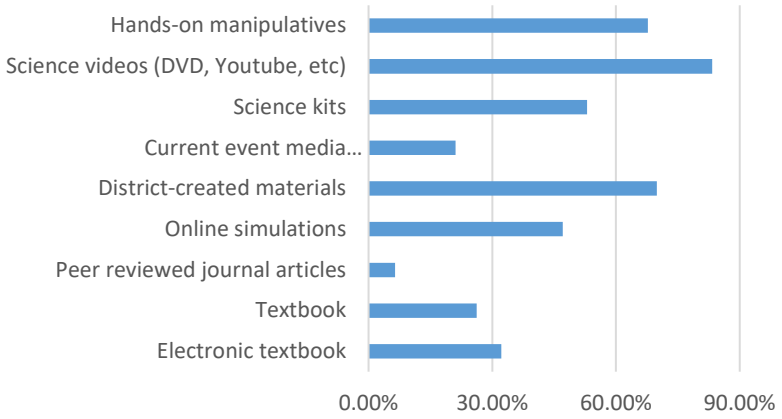
On average, how often do students participate in teacher created, multi-dimensional formative assessments aligned to the Maryland Integrated Science Assessment for the grade level that you teach?



Answer Choices	Percentage	Respondents
Once a week	47.7%	722
Once a month	30.3%	458
Once a quarter	9.7%	147
Once a semester	1.9%	29
Once a trimester	3%	48
Once a year	1%	15
Never	3.4%	52
Other	3%	42

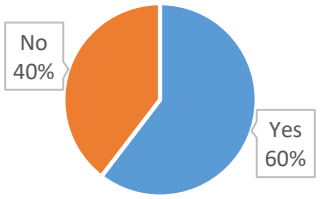
Instructional Resources: Elementary School

Select all of the instructional resources you use regularly as part of your science instruction.



Answer Choices	Percentage	Respondents
Electronic textbook	32.2%	508
Textbook	26.2%	413
Peer reviewed journal articles	6.4%	101
Online simulations	47.1%	743
District-created materials	69.9%	1103
Current event media (newspapers, magazines)	21.1%	333
Science kits	53%	837
Science videos (DVD, YouTube, etc.)	83.3%	1316
Hands-on manipulatives	67.7%	1069

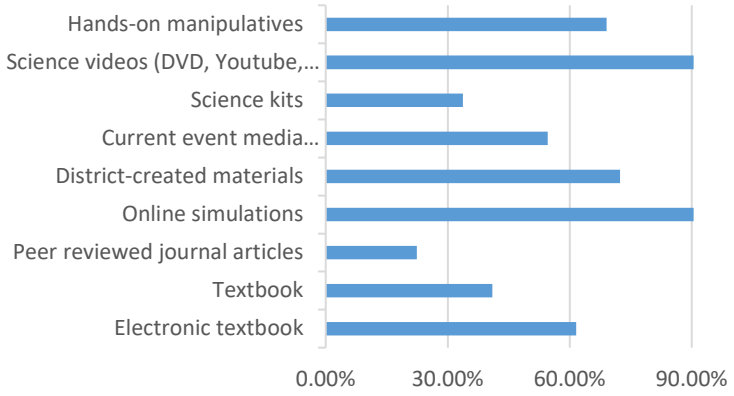
Are appropriate resources, such as safety equipment, lab equipment, etc., available to students while engaged in science instructional activities aligned to NGSS?



Answer Choices	Percentage	Respondents
Yes	60.4%	954
No	39.6%	625

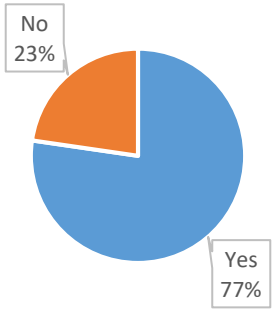
Instructional Resources: Middle and High School

Select all of the instructional resources you use regularly as part of your science instruction.



Answer Choices	Percentage	Respondents
Electronic textbook	61.6%	932
Textbook	41%	620
Peer reviewed journal articles	22.4%	339
Online simulations	93.9%	1420
District-created materials	72.4%	1096
Current event media (newspapers, magazines)	54.6%	826
Science kits	33.7%	510
Science videos (DVD, YouTube, etc.)	91.6%	1386
Hands-on manipulatives	69.1%	1045

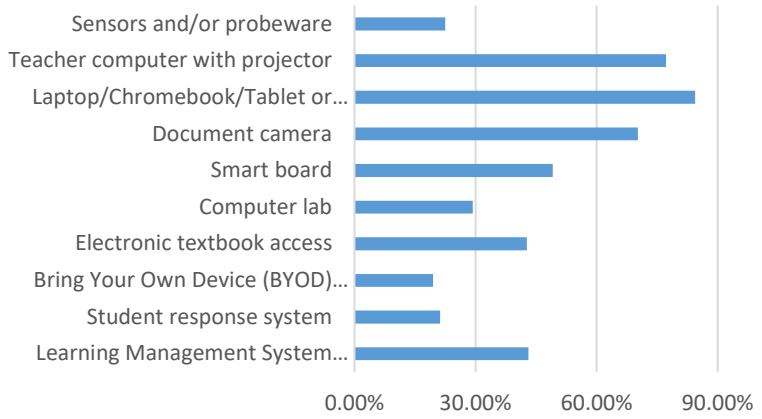
Are appropriate resources, such as safety equipment, lab equipment, etc., available to students while engaged in science instructional activities aligned to NGSS?



Answer Choices	Percentage	Respondents
Yes	77.3%	1169
No	22.7%	344

Instructional Technology: All Levels

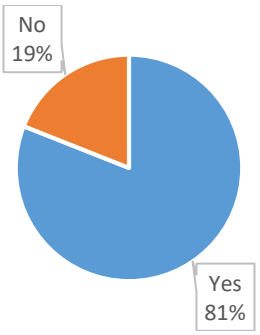
Select all the types of technology available to you for science instructional purposes.



Answer Choices	Percentage	Respondents
Learning Management System (LMS)	43.1%	1333
Student response system	21.2%	655
Bring Your Own Device (BYOD) policy	19.5%	604
Electronic textbook access	42.7%	1320
Computer lab	29.3%	907
Smart board	49.1%	1519
Document camera	70.2%	2171
Laptop/Chromebook/Tablet or other electronic device for students	84.4%	2610
Teacher computer with projector	77.2%	2388
Sensors and/or probeware	22.5%	695

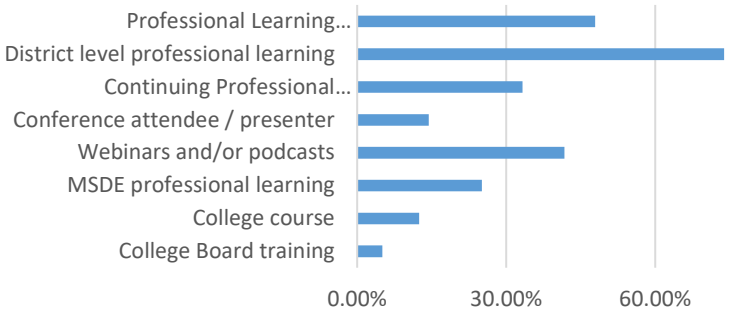
Professional Learning: All Levels

Is professional learning focused on NGSS curriculum and assessments provided by your LSS available to you?



Answer Choices	Percentage	Respondents
Yes	81%	2504
No	19%	588

Select all the types of science-specific professional learning you engaged in during the past 12 months.



Answer Choices	Percentage	Respondents
College Board training	5.1%	159
College course	12.5%	387
MSDE professional learning	25.1%	775
Webinars and/or podcasts	41.7%	1289
Conference attendee / presenter	14.4%	446
Continuing Professional Development (CPD) course	33.3%	1031
District level professional learning	73.9%	2286
Professional Learning Communities (PLC)	47.9%	1480

Science Supervisor Survey Results

Every local school system (LSS) science supervisor completed the survey. One-third of middle and high school science sections are taught by teachers within their certification area. All but one LSS provided district-level professional learning for science teachers at all grade levels. Most common topics of professional learning were NGSS Curriculum Implementation, Using Science and Engineering Practices and Crosscutting Concepts in the Science Classroom, Engaging in Argument with Evidence, and the Three Dimensional Assessment.

Professional Learning Topics

Answer Choices	Percentage	Respondents
NGSS Curriculum Implementation	86.2%	25
NGSS Curriculum Development	65.5%	19
Three Dimensional Assessment	69%	20
Engaging in Argument with Evidence (Claim, Evidence, Reasoning)	69%	20
Writing in Science	65.5%	19
Using Complex Texts in Science	41.4%	12
Using Science and Engineering Practices in the Science Classroom	75.9%	22
Using Cross Cutting Concepts in the Science Classroom	75.9%	22
Developing and Using Storylines	34.5%	10
Phenomenon Based Instruction	62.1%	18

Middle School Science Teacher Certification

Local School System	Number of teachers that are teaching middle school science	Number of teachers that are elementary certified (Grades 1 – 6)	Number of teachers that are middle school science certified	Number of teachers that are secondary science certified	Number of sections of middle school science	Number of sections taught by teachers who are teaching a majority of classes out of their area of certification
Allegany	27	8	16	11	76	4
Anne Arundel	213	58	100	100	866	87
Baltimore City	284	0	0	218	870	208
Baltimore County	240	64	204	182	1092	95
Calvert	36	0	13	17	157	10
Caroline	14	2	14	5	108	0
Carroll	57	10	31	38	285	0
Cecil	44	8	15	11	148	9
Charles	44	15	12	11	264	30
Dorchester	13	8	9	4	47	0
Frederick	79	1	33	45	401	0
Garrett	10	1	1	3	80	0
Harford	81	8	25	59	89	4
Howard	127	19	27	83	655	0
Kent	6	2	1	3	30	0
LEA 24 School	2	1	0	1	8	1
Montgomery	309	2	154	145	2081	72
Prince George’s	416	96	233	154	946	386
Queen Anne’s	18	5	10	8	79	13
Somerset	8	2	2	3	34	8
St. Mary’s	29	10	8	13	161	33
Talbot	12	2	10	0	43	5
Washington County	45	17	23	21	222	11
Wicomico	27	4	7	16	158	0
Worcester	18	9	13	9	92	0

High School Science Teacher Certification

Local School System	Number of teachers that are teaching high school science	Number of sections of high school science	Number of sections taught by teachers who are teaching a majority of classes out of their area of certification
Allegany	27	136	4
Anne Arundel	147	713	154
Baltimore City	193	819	397
Baltimore County	321	1186	479
Calvert	43	186	14
Caroline	14	42	0
Carroll	65	381	0
Cecil	38	228	0
Charles	75	450	378
Dorchester	11	41	2
Frederick	94	225	0
Garrett	12	1	51
Harford	89	477	6
Howard	149	867	6
Kent	4	31	0
LEA 24 School	2	6	0
Montgomery	454	4446	400
Prince George's	405	3330	827
Queen Anne's	18	108	0
Somerset	8	38	8
St. Mary's	38	200	41
Talbot	14	67	4
Washington County	56	314	3
Wicomico	28	31	9
Worcester	22	120	0