NOVEMBER 2017 | EVALUATION REPORT #3

Administrators Matter in NGSS Implementation

How School and District Leaders Are Making Science Happen

Ashley Iveland
Burr Tyler
Ted Britton
Kimberly Nguyen
Steve Schneider

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NGSS EARLY IMPLEMENTERS

WestEd

NGSS Early Implementers Initiative: Bringing science to life as a core subject in K–8 classrooms

A diverse group of eight California school districts and two charter management organizations is actively implementing the Next Generation Science Standards (NGSS). Their progress, experiences, and lessons can inform others implementing the NGSS. The NGSS Early Implementers are supported by the K–12 Alliance at WestEd, and work in partnership with the California Department of Education, the California State Board of Education, and Achieve. Initiative funding is provided by the S. D. Bechtel, Jr. Foundation, with the Hastings/Quillin Fund supporting participation by the charter organizations.

The Initiative spans 2014 to 2018. It focuses on NGSS implementation in grades K–8 and incorporates the integrated course model (preferred by the California State Board of Education) for middle school.

Teachers are supported with strategies and tools, including an instructional framework that incorporates phenomena-based learning. This framework aligns with the NGSS three dimensions: encompassing disciplinary core ideas, crosscutting concepts, and science and engineering practices. Using science notebooks, questioning strategies, and other approaches, students conduct investigations, construct arguments, analyze text, practice descriptive skills, articulate ideas, and assess their own understanding.

Teachers engage in science lesson studies twice each year through a Teaching Learning Collaborative. In each district, the Initiative is guided by a Core Leadership Team of Teacher Leaders and administrators who participate in additional professional learning and coaching activities. Together, this core team and an extended group of Teacher Leaders are the means for scaling NGSS implementation throughout the district.

Learn more about this multi-year initiative and access evaluation findings as well as instructional resources at k12alliance.org/ca-ngss.php.

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Evaluation of the NGSS Early Implementers Initiative

The S. D. Bechtel, Jr. Foundation commissions WestEd's STEM Evaluation Unit to evaluate the NGSS Early Implementers Initiative in the eight participating public school districts. This independent evaluation is advised by a technical working group that includes representatives of the California Department of Education and the State Board of Education. Evaluators investigate three main aspects of the Initiative's NGSS implementation:

- districts' local implementation,
- implementation support provided by K–12 Alliance, and
- the resulting science teaching and leadership growth of teachers and administrators, as well as student outcomes.

In addition to this current Report #3, evaluators previously released:

Moving the Needle (Report #1, October 2016), which describes the Initiative's early progress on three implementation goals: integrating science and ELA, integrating the sciences in middle school, and making science a core school subject.

The Synergy of Science and English Language Arts (Report #2, October 2017), which updates and expands the topic of integrating science and ELA, including describing what such integration can look like in the classroom.

Evaluators plan future reports on these topics:

- District NGSS implementation plans (winter 2018)
- Guide to tools and strategies for NGSS implementation (winter 2018)
- What middle school science integration looks like in the classroom (summer 2018)
- Teacher leadership (summer 2018)
- Changed student interest in science (summer 2018)

Executive Summary

The K–8 NGSS Early Implementers Initiative has consistently enlisted and empowered administrators in eight participating California districts and two charter management organizations. Over time, the Initiative has increased administrator involvement and professional learning related to implementation of the Next Generation Science Standards (NGSS). Indeed, administrators need learning opportunities if they are to adequately understand the substantial shifts of the NGSS and support teachers' implementation of these changes.

This third evaluation report in a series is intended for site and district administrators and state leaders. The report findings highlight:

- How administrators are advancing NGSS implementation in their schools and districts.
- How teachers are benefitting from administrators' support.
- How the Initiative is empowering administrators' efforts.

Findings

Impressively, over half of the Initiative's dozens of core administrator participants report spending over 20 percent of their work time on supporting science instruction. Administrators are spurring NGSS implementation most often in the following ways:

Communicating science as a priority
Many administrators are communicating that science is a priority subject, as described by this elementary school principal:

> *The district has told principals, "We want your teachers teaching science, and they're saying verbally and out loud, "Science is core!" They have given release time for teachers to do PD, and said that administrators should watch NGSS lessons.*

Providing flexibility for teachers to try the substantial instructional shifts of the NGSS
Because the phenomenon-based, practices-oriented science instruction called for by the NGSS is a substantial change for many teachers, it is critical for administrators to allow them flexibility to try new approaches. One middle school principal remarked:

> *As an administrator, I know that this is the biggest fear of teachers. They're thinking, "If my principal walks in and the kids are giving these crazy answers that aren't right, then what will happen?" My teachers know it's okay to take risks, it's okay to fail, it's all part of the process of being a good science student or a scientist.*

Another kind of flexibility is the latitude to integrate science with other school subjects. Many interviews with teachers revealed that unless administrators endorse integrating science with English language arts (ELA) and other subjects, some teachers will not address NGSS science in their classrooms in any significant way. (The means and mutual benefits of science–ELA integration at both elementary and middle school levels is described in evaluation report #2, *The Synergy of Science and English Language Arts*, found at http://k12alliance.org/docs/NGSS-EII_Synergy-Report_2_FINAL.PDF.)

Increasing teacher–teacher and administrator–teacher collaboration

Teachers also need time to plan and share ideas about NGSS implementation. Collaboration opportunities are on the rise in every Early Implementer jurisdiction, both among teachers and between administrators and teachers:

- Two-thirds of the 20 administrators interviewed in 2017 cited that providing time for collaboration in science was a major way they support implementing the NGSS.
- Core administrator participants reported that they "frequently" discussed with teachers the "instructional philosophies, strategies, and/or ideas related to the NGSS" and "challenges associated with NGSS implementation."
- Administrators signaled the importance of science teacher professional learning by being present at district or site events; further, administrators often made presentations and/or engaged in science learning activities along with the teachers.

Providing resources for science instruction

Administrators are making available vital resources for science investigations, such as converting an unused elementary school classroom into a science resource room for the use of all teachers and students. In 2017, 75 percent of teacher leaders in the Initiative felt that their principals made sure they had the materials and supplies needed for teaching NGSS science.

The above findings and examples are arising in part due to the NGSS Early Implementers Initiative's learning opportunities and supports for administrators:

- The Initiative annually convenes superintendents and their deputies to strengthen support for administrators' NGSS implementation activities.
- In each district, a District Project Director, aided by a WestEd K–12 Alliance expert, leads monthly meetings of a Core Leadership Team of teachers and administrators to shepherd district NGSS implementation.
- In most districts, core administrator participants have made NGSS presentations to their peers during their district's regular administrator meetings.
- Across the Initiative, WestEd's K–12 Alliance annually convenes all districts' Core Leadership Teams, including their administrator members, for two three-day professional learning sessions; the Core Leadership Team members subsequently help facilitate week-long summer institutes for the Initiative's over 500 Teacher Leaders.

The Initiative added an Administrator Academy, required for every site administrator who has one or more Teacher Leaders in their school. In addition to attending 1–2 days of the 2017 summer institute, administrators are guided in observing NGSS lesson studies conducted by Teacher Leaders in their districts, and they receive 2–3 days of technical assistance customized for NGSS implementation issues at their school.

The evaluation findings suggest that if administrators are provided with professional learning and assistance, many of them will advocate and actively support their teachers' NGSS implementation.

Recommendations

The report concludes with a set of brief NGSS implementation recommendations, including:

- ***District administrators*** should provide school administrators with NGSS-sensitive protocols for classroom observations and include a regular focus on science in districtwide meetings of site administrators.
- ***Site administrators*** must convey that it is beneficial for teachers to teach science at the elementary level, encourage experimentation by all science teachers in shifting to NGSS science, support teachers in getting needed science supplies, and develop the ability to observe effective NGSS instruction in the classroom.

Introduction

> *The NGSS Early Implementers Initiative considers the role of the administrator key to successful NGSS implementation and the instructional shifts that will bring learning alive in the classroom. (Rammer, Hayes, & Woods, 2017)*

There is increasing urgency for administrators to embrace and support implementation of the Next Generation Science Standards (NGSS Lead States, 2013). These new standards provide opportunities for all students to learn science and 21st century skills, helping them become college and career ready. Because teachers will look to administrators for consent and encouragement to try out the substantial pedagogical and logistical shifts required, the success of the new standards depends on the expertise and support of administrators.

For example, one of the significant shifts in the NGSS involves integrating three dimensions of instruction, as described in An Overview for Principals produced by the National Science Teachers Association:

> *A major difference between the NGSS and previous science standards is "three-dimensional" (3D) learning. 3D learning refers to the thoughtful and deliberate integration of three distinct dimensions: Scientific and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts. Through 3D learning, the NGSS emphasize that science is not just a series of isolated facts. This awareness enables students to view science more as an interrelated world of inquiry and phenomena rather than a static set of science disciplines (NSTA, n.d.).*

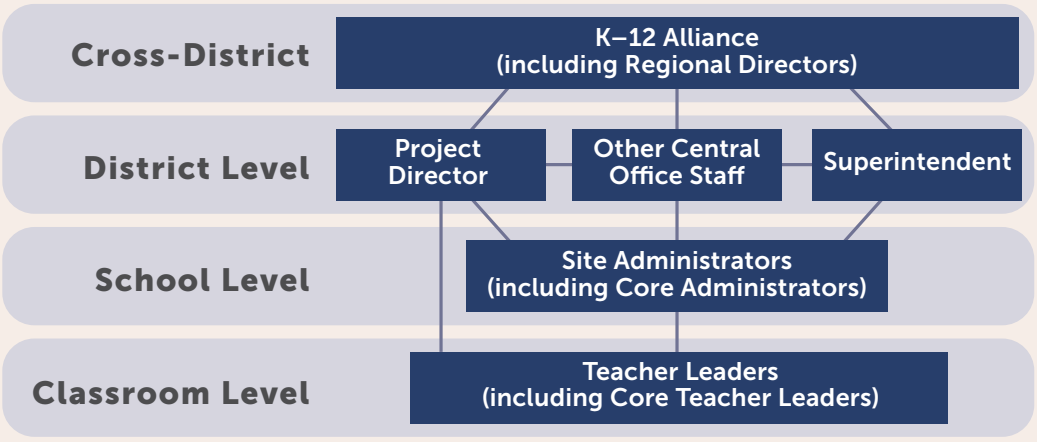
Like teachers, administrators need opportunities for professional learning to understand and begin to implement the NGSS. To help them lead their schools and districts in enacting the necessary shifts, the NGSS Early Implementers Initiative has enlisted and empowered administrators in the Initiative from the outset.[1] Over time, the Initiative has expanded opportunities for administrator involvement and professional learning.[2]

Adding to the urgency of ensuring that administrators support NGSS implementation is the fact that the California Science Test (CAST), which will be based on the NGSS, will become fully operational in the 2018–19 school year. The new test will be administered at grades 5, 8, and high school and will assess cumulative learning up to a student's current grade (as opposed to only testing content from a student's current academic year). CAST results are expected to be displayed on the

1 Similarly, other projects supporting implementation of the NGSS are recognizing the significant role that administrators play (for example, see Hayes, Heredia, Allen, Settlage, & Penuel, 2017; Kern, Bozack, & Whelan, 2017; Riedinger, 2017; Sandoval, Cournoyer, Eggleston, Modrek, & Kawasaki, 2017; and Vallett, Deniz, Carroll, Sibley, & Gilligan, 2017).

2 We use the term "professional learning" rather than "professional development." The professional learning community has shifted to this newer term to avoid a possible passive connotation. "Professional learning" conveys a more positive and active role by participants.

Figure 1. Diagram of Early Implementers Initiative district organizational structure



California School Dashboard when test scores are available, alongside results for Common Core subjects (ACSA, 2017; CSBE, 2016).

This report — intended for state and district leaders, including principals — discusses:

- How much attention site and district administrators in the Initiative are giving to NGSS implementation.
- Ways that district leaders are supporting NGSS implementation.
- How teachers are benefitting from district leader support.
- How the Initiative has enlisted and supported administrators.

Overview of District Participants in the Initiative

The Initiative created an organizational structure that supports NGSS implementation in participating districts at multiple levels — from teachers to site administrators to district leaders (see Figure 1).[3]

Each Early Implementer district has a Core Leadership Team, which includes five to ten teachers at multiple grade levels in primary, upper elementary, and middle school (called the Core Teacher Leaders) and three to five administrators (called the Core Administrators). These Core Administrators typically include site administrators at both the elementary and middle school levels, and sometimes include central office staff. The Core Leadership Team works with the Project Director in planning and carrying out NGSS implementation in the district.

This report discusses the work of the following district-level participants:

- **District Project Directors.** A full-time Project Director leads the overall local implementation in the district and acts as a liaison between the K–12 Alliance and the district (see Appendix A

3 In Achieve's *NGSS District Implementation Indicators* (2017), a foundational strategy they viewed as "essential to the transition [to the NGSS] is a central office leadership team coupled with site-based leadership…[and] education professionals" that together have a set of skills that facilitate successful implementation of the NGSS (p. 6). Additionally, administrators play an important role in science (Brunsell, Kneser, & Niemi, 2014) and teacher leadership in general (York-Barr & Duke, 2004).

for additional description of Project Director activities.)

- **District Administrators.** The report briefly describes how the Initiative has engaged administrators at the district level, including superintendents and assistant superintendents.
- **Site Administrators.** The report focuses most extensively on principals and assistant principals at both the elementary and middle school levels who have at least one Teacher Leader at their site. This group includes site leaders on the Core Leadership Team (Core Administrators).
- **Teacher Leaders.** All teachers who participate in Initiative events are referred to collectively as Teacher Leaders. This group of over 500 includes the Core Teacher Leaders on the Core Leadership Team.

Methods

This third report in a series of Early Implementer Initiative evaluation publications draws on the following primary data sources:

- Interviews with administrators in each Early Implementer district:
  - Core Administrators
  - Other administrators supporting NGSS implementation (not on the Core Leadership Team)
- Interviews with case-study Teacher Leaders in five focal Early Implementer districts
- Annual leadership surveys:
  - All Core Administrators
  - All Teacher Leaders
- Annual Classroom Science Teaching Surveys (all Teacher Leaders)

Interviews. Interviews with 20 case-study teachers in five Early Implementer districts were conducted in winter 2017 and again at the end of the 2016–17 school year. District Project Directors nominated the case-study teachers as ones who are making some of the most substantial changes in their teaching of science, spurred by their participation in the Initiative. Seventeen administrators, representing all eight Early Implementer districts, were interviewed in the summer of 2017 about the 2016–17 school year. Eleven were Core Administrators and the others were nominated by Project Directors as being supportive of NGSS implementation.

Annual Surveys. Each summer, the Initiative convenes the more than 500 Early Implementer Teacher Leaders as well as Core Administrators. The evaluation team surveys all these participants about their experiences in the previous school year (e.g., in the summer of 2017, they were surveyed about the 2016–17 year). Leadership surveys have been administered each year since 2014. The Classroom Science Teaching Survey has been completed since 2016.

Appendix B contains additional information about evaluation methods, survey response rates, and the specific questions from the interviews and surveys that evaluators examined for this report.

The evaluation team drew on the following secondary data sources for this report:

- Interviews with all district Project Directors and K–12 Alliance Regional Directors.
- Review of participating districts' annual grant reports for the 2016–17 year.
- Observation of key Initiative-wide professional learning sessions and meetings.
- Observation of select district professional learning sessions.
- Review of relevant articles written by Early Implementer Initiative participants.

Findings

How Much Attention Are Administrators Giving to NGSS Implementation?

The Initiative has been quite successful in gaining administrators' attention to NGSS implementation. Administrators report that they are:

- Learning more about the NGSS.
- Spending an increasing amount of their time on science.
- Increasingly encouraging elementary teachers in their districts to teach science, and, as a result, elementary teachers are spending more instructional time on science.

Learning About the NGSS

Ideally, administrators should be "learning about the NGSS alongside teachers" (Brunsell, Kneser, & Niemi, 2014, p. 20). Some Early Implementer administrators are doing just that:

> *Administrators have been so overwhelmed with the Common Core and all the other changes, but I think science is finally getting noticed. My principal is getting on board and is getting his mind wrapped around what the NGSS really are. I've been educating him, and now the grant has been reaching out to him, like at the principal meetings. Because of that education, my principal has been even more supportive and involved to help unify the middle grades at our site. (Grade 8 teacher)*

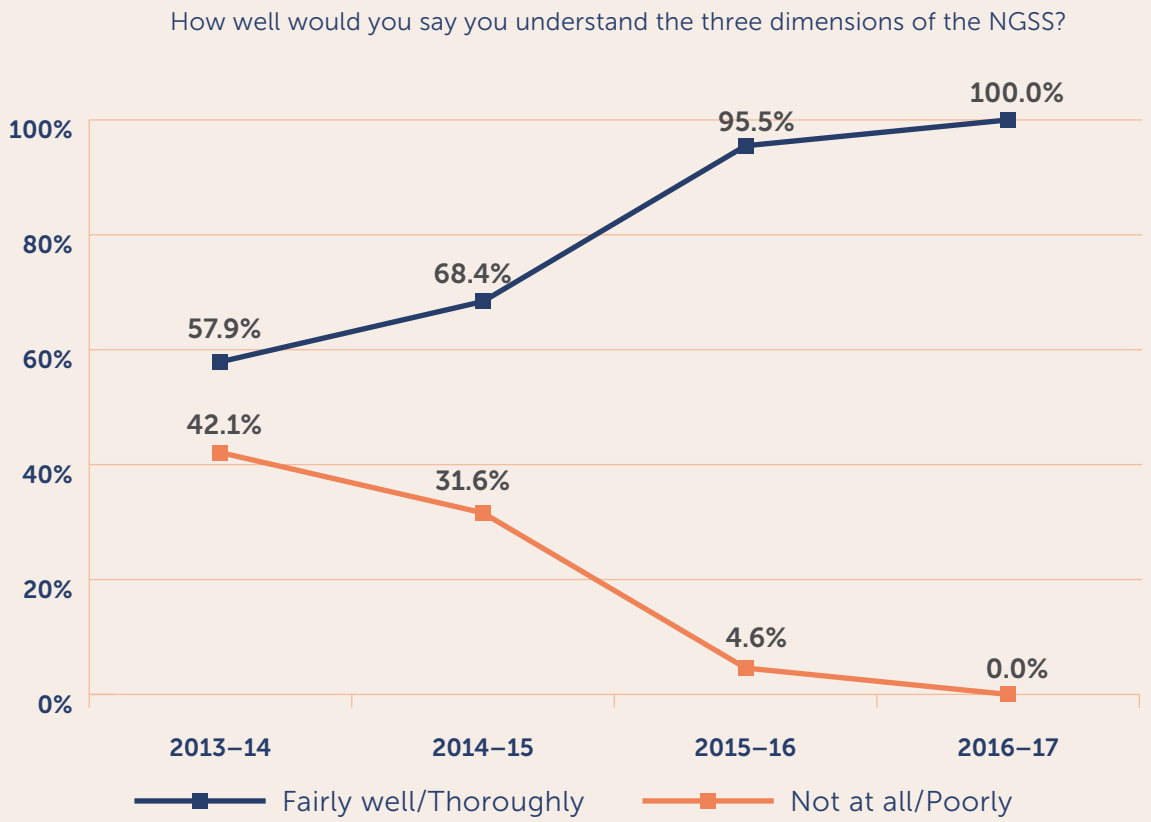
Core Administrators' perceived level of understanding of the NGSS has steadily increased since 2014, when only 58 percent felt they understood the three dimensions of the NGSS (i.e., scientific and engineering practices, disciplinary core ideas, and crosscutting concepts) "fairly well" or "thoroughly." By 2017, that increased to 100 percent (see Figure 2 on page 5).[4] As these administrators learned more about the NGSS, they also gained understanding of how to help teachers transition to NGSS implementation (with 100 percent understanding this in 2017, and only 47 percent doing so in 2014).

Spending Time on Science

Surveyed Core Administrators have reported devoting more work time to science education and NGSS implementation since the start of the Initiative. In the 2016–17 school year, over half of these administrators said they spent more than 20 percent of their overall time on science education. The average amount of time this group reported spending on science increased by over

4 When probed about their understanding of specific elements of the NGSS in 2014, a majority of Core Administrators indicated they understood the science and engineering practices and the crosscutting concepts "poorly" or "not at all" (53 percent and 58 percent, respectively). But in 2017, almost all (94 percent and 100 percent, respectively) felt they understood these aspects of the NGSS "fairly well" or "thoroughly."

Figure 2. Administrator understanding of the three NGSS dimensions



Source: Administrator Leadership Survey administered by WestEd in 2014 (N=33), 2015 (N=33), 2016 (N=34), and 2017 (N=33).
Note: The three NGSS dimensions are scientific and engineering practices, disciplinary core ideas, and crosscutting concepts.

10 percent from the 2013–14 school year to the 2016–17 school year (from 24 percent to 37 percent, respectively).

Communicating Science as a Priority

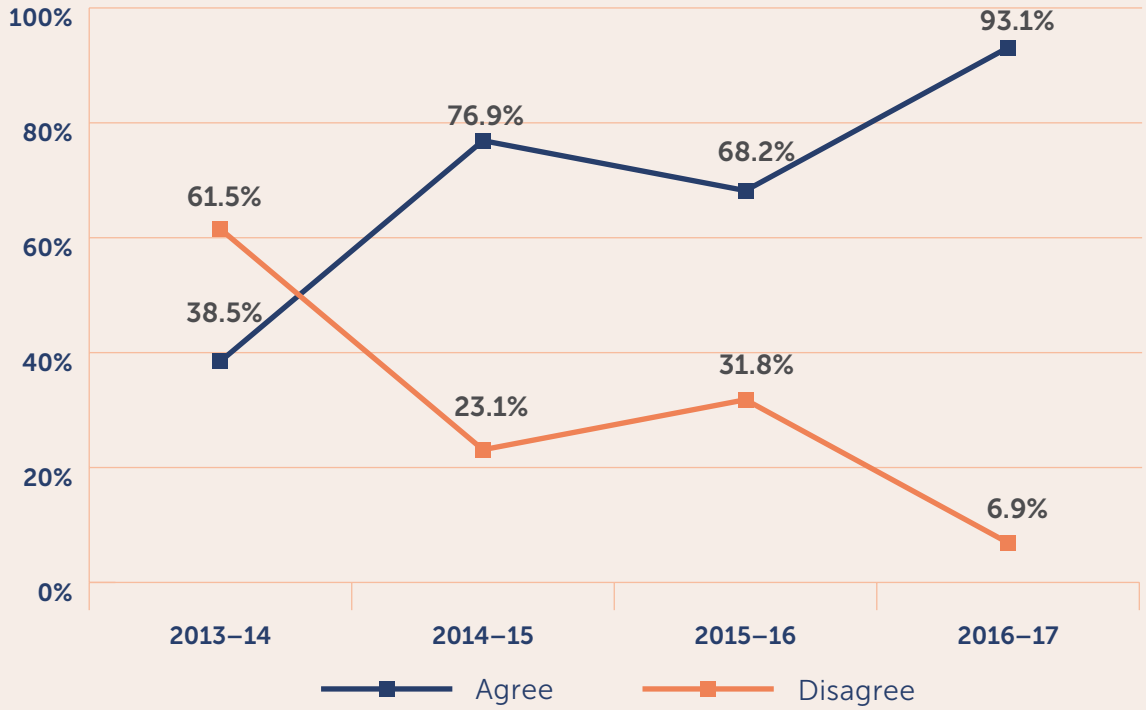
Not only are Core Administrators spending more time on science, but administrators in the Initiative at large are also communicating that science is a priority at their school and/or district. In the 2017 annual grant reports for the Initiative, Project Directors were asked to rate the level of support for NGSS implementation exhibited by principals that had one or more Teacher Leaders at their school. The reports indicated that, at both the elementary and middle school levels, a majority of these site leaders "are on board and highly committed" or "support the NGSS."

> More than half of Core Administrators in the Initiative report spending more than 20 percent of their work time on NGSS implementation.

According to Core Administrators, teachers have been increasingly encouraged to teach science by district administrators at large. When asked about the school year before the start of the Initiative (2013–14), only 38 percent of administrators said they believed teachers were encouraged by

Figure 3. Administrator views of district support for teaching science

Teachers in my district were encouraged by the administration to teach science.



Source: Administrator Leadership Survey administered by WestEd in 2014 (N=33), 2015 (N=33), 2016 (N=34), and 2017 (N=33).

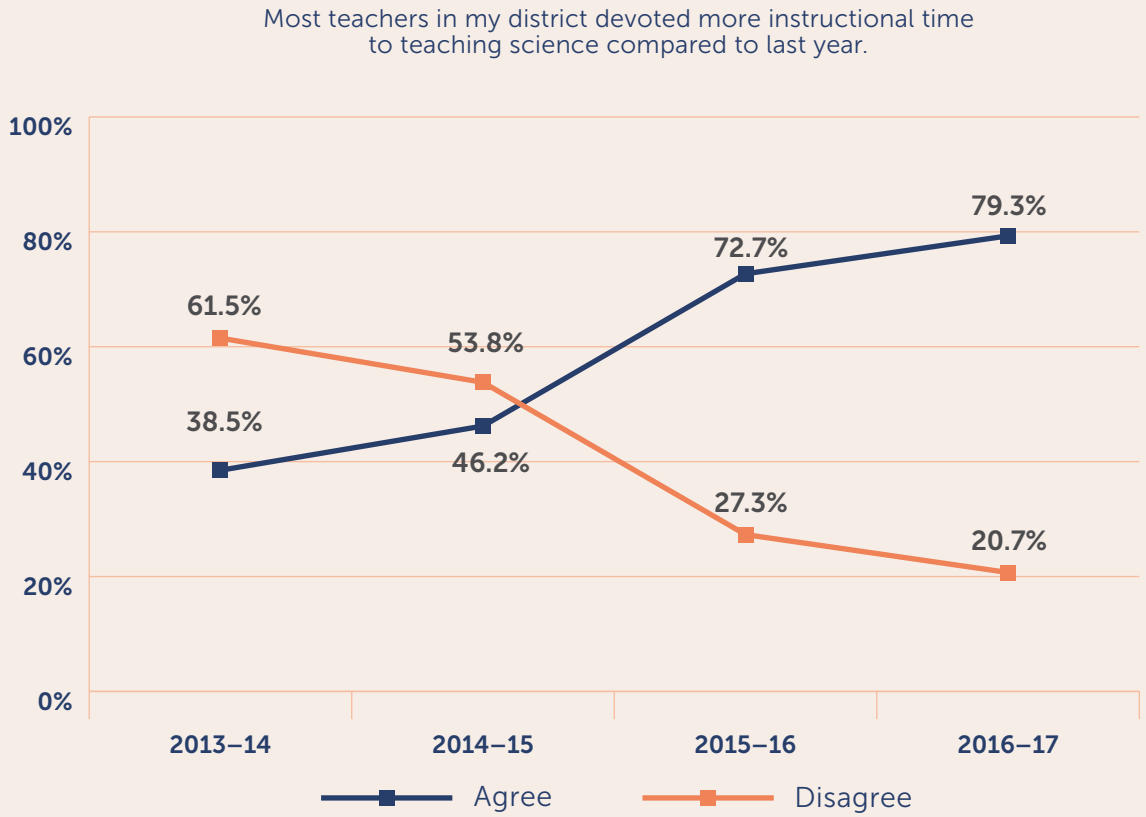
the district to teach science. By 2017, almost all administrators (93 percent) reported that teachers were encouraged to teach science (see Figure 3). An elementary principal energetically described how NGSS implementation is being prioritized in her district:

> *We are well on the path of spreading the NGSS. There's money for professional development and materials. The district has told principals, "We want your teachers teaching science," and they're saying out loud, "Science is core!" They have given release time for teachers to do professional learning, and said administrators should watch NGSS lessons. This encourages teachers. (Elementary school principal)*

The district has told principals, "We want your teachers teaching science," and they're saying out loud, "Science is core!"

Survey responses also showed gains in teacher perception of administrator support. Two-thirds of teachers in 2017 felt that science was a priority at their school, while only one-third of teachers felt that way at the beginning of the Initiative. One grade 3 teacher remarked, "Our school district is

Figure 4. Administrator views of instructional time spent on science



Source: Administrator Leadership Survey administered by WestEd in 2014 (N=33), 2015 (N=33), 2016 (N=34), and 2017 (N=33).

embracing science again. It is so motivating to both the teachers and students. The support of our district heads and administration is felt."

Core Administrators indicate that teachers in their district have been devoting more instructional time to science each year, with 79 percent in 2017 indicating as much, up from only 39 percent in 2014 (see Figure 4). In surveys, Teacher Leaders also report spending more time on science (see the "Supporting Integration with Other Subjects" section of this report for more details on this).

In What Ways Are District Leaders Supporting NGSS Implementation?

This section discusses how district leaders (primarily site administrators) in the Early Implementers Initiative have been doing the following:

- Increasing flexibility. Allowing teachers the necessary freedom to try the NGSS and make time to teach science, including through integration with English language arts (ELA) and other subjects.
- Increasing collaborations. Increasing opportunities for teacher-to-teacher collaboration

and collaborating with teachers on NGSS implementation.

- Increasing resources. Providing professional learning and funds or spaces for hands-on science.
- Engaging the community. Helping connect parents and science-oriented companies and organizations to the schools.

Increasing Flexibility

Hands-on, inquiry-oriented science instruction creates an active classroom for students to engage in science practices. Administrators report that they need to give teachers flexibility to experiment, including by integrating NGSS with other subjects and using assessment approaches other than traditional tests and quizzes to discover what students are learning.

Supporting New Approaches to Teaching Science. In 2017, 57 percent of Teacher Leaders indicated that administrators allowing them the "flexibility to try new things" was a major factor that supported their implementation of the NGSS. Administrators need to understand that, as one grade 6 teacher noted, when implemented as intended, "the NGSS can look like controlled chaos!"

Another grade 6 teacher explained the importance of allowing teachers to experiment:

> *My principal doesn't give you the feeling when she walks into your classroom that she is expecting to see a certain thing or that students need to be sitting this way or writing notes like this. NGSS is a little messy and she understands that and knows that kids are going to be all over the place and their notebooks are sometimes a disaster. We're all learning together and sometimes we fail. We've done a couple of lessons in NGSS that afterward we said, "Okay, well we won't do that one again." She kind of gives us the freedom to do that. (Grade 6 teacher)*

> My teachers know it's okay to take risks, it's okay to fail, it's all part of the process of being a good science student or a scientist.

A school administrator similarly described the need to allow teachers room to take risks:

> *As an administrator, I know that this is the biggest fear of teachers. They're thinking, "If my principal walks in and the kids are giving these crazy answers that are not right, then what will happen?" My teachers know it's okay to take risks, it's okay to fail, it's all part of the process of being a good science student or a scientist. (Middle school principal)*

Administrators remarked that they knew giving teachers flexibility was important, but it is better if they also reward and recognize the teachers' efforts.

Supporting Integration with Other Subjects. Both the NGSS and the Common Core State Standards (CCSS) advocate cross-content instruction. Indeed, Teacher Leaders have found integration, particularly of science and ELA, to be an effective and beneficial strategy for heightening engagement of all students and for finding time for science

at the elementary level.[5] In order to feel free to pursue integrated instruction, many Teacher Leaders expressed a desire for principal "permission" to teach science during designated ELA time. Following are some highlights related to integrated instruction gleaned from the evaluation's 2017 Classroom Science Teaching Survey:

- By the most recent project year (2016–17), 83 percent of elementary school teachers indicated that their principal was "very" or "somewhat" supportive of their integration of science with ELA — even when it was during "ELA time."
- Seventy-one percent of Teacher Leaders reported that integrating science with another subject (either English language development, ELA, or mathematics) was a major influence in how the amount of time they spent on science increased during the Initiative.
- Nearly half (45 percent) of all elementary and middle school Teacher Leaders indicated teaching more than 60 minutes of science integrated with ELA per week, compared with only 22 percent when the Initiative began three years ago. In contrast, a third of the elementary-level teachers at the start of the Initiative were teaching *no* science integrated with ELA.

Of course, the Initiative does not recommend that *all* science instruction should be a concerted blending of science and ELA. Indeed, Teacher Leaders reported that about half (51 percent) of their science instructional time during the 2016–17 school year was stand-alone science.

Using Varied Science Assessment. As Core Administrators learn about the "messy" nature of NGSS science, they are relying less on traditional science assessments. In 2013–14, 100 percent of Core Administrators whose districts assessed science instruction said that they did so by looking at test scores, typically from the California Science Test (CST), which was based on the old standards. However, as that test was discontinued in 2017 and administrators worked towards NGSS integration in their districts and schools, they began implementing more and different methods for assessing science.[6]

Most Core Administrators in 2017 indicated using district- or site-specific assessments, teacher surveys (such as needs assessments), classroom observations, and attendance at school science events (such as science fairs or science nights) in addition to, or in place of the CST (Figure 5 on page 10). Additionally, many described using a team approach in which teachers and/or administrators look at student work together to reach a conclusion about the status of science; this activity results in a clearer understanding of NGSS science and establishes common instructional goals among team members.

Increasing Collaboration

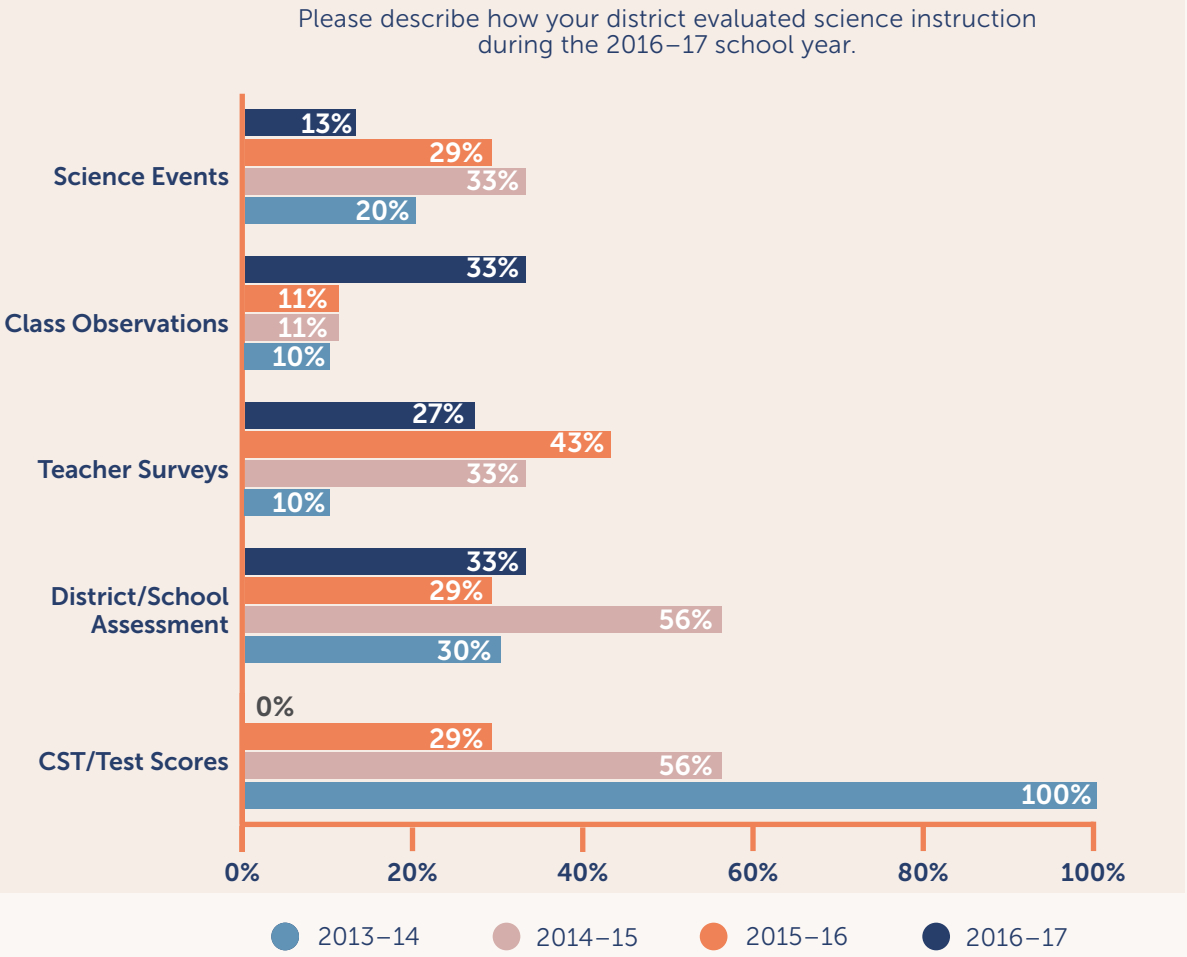
Collaboration is a critical strategy for learning about and implementing the NGSS (Brunsell, Knewser, & Niemi, 2014). Administrators in the Initiative are enabling more collaboration among teachers and they also are deepening their own collaboration with teachers.

Enabling More Teacher Collaboration. Core Administrators have increasingly created opportunities for their teachers to "discuss the NGSS and its impact on science instruction with each

5 The topic of integrating science with ELA was discussed in detail in the Early Implementers Initiative Evaluation Report #2, *The Synergy of Science and English Language Arts* (Tyler, Britton, Iveland, Nguyen, Hipps, & Schneider, 2017) and was also discussed in Evaluation Report #1, *The Needle Is Moving in CA K–8 Science* (Tyler, Britton, Iveland, Valcarcel, & Schneider, 2016).

6 For more information about the CST, see https://www.cde.ca.gov/ta/tg/ca/caasppscience.asp (California Department of Education, 2017a).

Figure 5. Major types of district science assessments used, as reported by Core Administrators



Source: Administrator Leadership Survey administered by WestEd in 2014 (N=33), 2015 (N=33), 2016 (N=34), and 2017 (N=33).

other" throughout the years of the project. While only 21 percent of Core Administrators indicated "frequently" providing opportunities for teacher collaboration in the 2013–14 year, over 72 percent "frequently" did so in 2016–17. Two-thirds of administrators interviewed in 2017 cited that providing time for collaboration in science was a major way they support implementing the NGSS, as illustrated by one middle school principal:

> *We've been giving teachers extra paid time on the weekends, or planning time after school to come up with storylines, look at the framework, and study it for themselves before they even plan units. And I think that has been crucial — for them to have time to bounce ideas off each other, to think about, "Well, if this is what our lessons and units look like, then how are we assessing*

Two-thirds of administrators interviewed in 2017 cited that providing time for collaboration in science was a major way they support implementing the NGSS.

students? How do we know what they understand?" (Middle school principal)

Collaborating with Teachers. There have been consistently high numbers of teachers who felt safe sharing their ideas and challenges with administrators at the school level (ranging from 84 to 87 percent for all years of the Initiative). In contrast, there have been substantial gains in the number of teachers who felt safe sharing with administrators at the district level (from 63 percent in 2013–14 to 80 percent in 2016–17).

Many administrators and Project Directors talked about the NGSS with teachers or worked alongside them. Increasing numbers of Core Administrators have reported that they frequently discussed with teachers the "instructional philosophies, strategies, and/or ideas related to the NGSS" and "challenges associated with NGSS implementation."[7] Teachers similarly have described how administrators are engaging with them about the specifics of implementing the NGSS:

My principal, who is on the Core Leadership Team, always shared what he learned about the NGSS with us and we applied it in our class. (Grade 7 teacher)

One of our assistant principals is on the Core Leadership Team, and she's been really great and supportive, coming in and helping out with lessons if you're doing NGSS. And she frequently sends along relevant information that she finds. (Grade 7 teacher)

Increasing Resources and Support

Early Implementer districts are attending to increasing resources and support for NGSS implementation by providing professional learning, funding science materials and supplies, and creating science spaces at their sites.

Providing Professional Learning. The NGSS necessitate a transformation in science teaching. Professional learning opportunities are vital, as teachers cannot substantially undertake the required changes on their own. To spread learning about the NGSS to teachers beyond those directly involved in the Early Implementer grant, in 2016–17 districts created their own professional learning opportunities for teachers, sent teachers to professional learning outside their district, and supported administrator professional learning.

For example, two Early Implementer districts devoted an entire day in fall 2016 to the NGSS and required every elementary teacher and all middle school science teachers to participate in professional learning on science. One veteran elementary administrator remarked, "This is the first time in a decade that I remember any of the district's release-time professional learning focusing on science."

One elementary school principal required all teachers on an early-release-day afternoon to participate in a hands-on science lesson led by a Teacher Leader in the Initiative. At first, there were a few vocal skeptics, claiming that while the Teacher Leader could teach NGSS science, the rest of them never could. By the end of the science investigation, the most skeptical teachers voiced enthusiasm about trying. The principal was on hand for the entire session, making occasional remarks such as, "I understand this could be scary.

7 Comparing administrator survey responses over the years, the percentages who reported discussing these two NGSS specifics "frequently" with teachers jumped from 16 and 5 percent in 2014 to 55 and 41 percent in 2017, respectively.

I don't feel like I'm a science person either. But I really believe we can do this if we give it a try. We've obtained the supplies so that everyone has the chance to try it."

Administrators are functionally involved in districts' emerging NGSS roll-out efforts (these roll-out efforts will be described in detail in a summer 2018 evaluation report). Many administrators took active roles in planning district professional learning events, including both logistics and moral support of Teacher Leader presenters. It should not be overlooked that observers saw administrators signaling the importance of science professional learning by being present themselves, typically for the entire event. Often, administrators played brief presenting roles and/or engaged in science learning activities along with the teachers.

Additionally, some administrators have supported their teachers in attending professional learning outside of the school or district. A grade 7 Teacher Leader told evaluators, "Our principal paid for five of us to go to the California Science Education Conference. That was really, really wonderful. We went to so many different sessions related to the NGSS!"

Beginning as early as the second year of the Initiative, some districts began to provide professional learning about the NGSS for their site administrators at large (i.e., beyond the Initiative's Core Administrators). For example, at one district's regular quarterly convening of elementary school administrators, the district Project Director was given the floor to explain "NGSS 101"; at a later quarterly meeting, two Core Administrators shared the NGSS implementation strategies used at their schools. In year four of the Initiative, all principals of schools having at least one Teacher Leader are required to participate in the equivalent of five days of professional learning (this is described more fully in "The Principal Academy" section of the report).

Science Materials and Supplies. In 2017, 75 percent of surveyed teachers felt their principals made sure they had the supplies and materials they needed to teach NGSS science. Similarly, 58 percent of administrators we interviewed in 2017 cited providing funding and resources for science at their schools as a key factor in supporting teachers in implementing the NGSS. In an interview, one principal described her efforts to provide resources as follows:

> *As principal, I can ensure funds are channeled to provide the resources that support the specific science standards that hinge on them, such as online access, the availability of digital devices such as Chromebooks, and a generous selection of library texts. (Elementary school principal)*

One district indicated in their 2017 district report that "NGSS implementation has become part of the LCAP [Local Control and Accountability Plan], which ensures that funds will be provided to make professional learning and resource support possible." In an interview, an administrator from another district described that she and her district colleagues worked together to support implementing the NGSS:

> *Our Project Director got on the LCAP committee and we've done some tug-o-wars. The Project Director, myself, and another principal need to consistently collaborate with each other and be as strategic as possible to get science specifically supported in our district's LCAP. (Elementary school principal)*

Creating Science Spaces. Multiple Early Implementer principals have already created or are working toward creating dedicated science spaces at their schools. One elementary principal helped create a mini working farm on campus where students learn and apply the NGSS. Other principals are working with Teacher Leaders to create designated "science rooms" in their schools and are buying new supplies and equipment. One teacher describes an increase in support for the school's science spaces:

> *The school has placed emphasis on redesigning our science lab. This is the first year we've had access to money for more resources to update our four science spaces. Administration has been really supportive about getting us new technology, getting things that we need for engineering, trying to help us build a maker space. And they let us generate a list of wants and needs for our spaces and have been moving forward on that. (Grade 8 teacher)*

Similarly, an elementary principal supported teachers in transforming an unused classroom into a science classroom that can be used by any teacher. She provided two days of release time for a Teacher Leader to work with the district Project Director to rearrange the room and add science supplies.

Engaging the Community

Initiative leaders have recognized the importance of building support from and connections to parents and the community at large. Administrators can play a key role in reaching those constituents (Achieve, 2017). Of the Early Implementer administrators interviewed, one-third mentioned doing some kind of community outreach as a way to support the implementation of NGSS in their school or district. A Core Administrator is quoted in a *California Classroom Science* article (Rammer, Hayes, & Woods, 2017):

> *Administrators can help establish the bridges that connect teachers to resources throughout the community. They can devote time to making the phone calls and weaving through the possibilities for community connections that will partner with the teachers to make their work relevant to students and the community. (Elementary school principal)*

Administrators can help establish the bridges that connect teachers to resources throughout the community.

Project Directors often reach out to science-oriented companies, museums, and other organizations in the community. One Project Director convened over a dozen such local organizations to discuss the NGSS and how the organizations might support teachers with NGSS implementation. In addition, some Early Implementer districts indicated in their 2017 district reports that they are creating family science nights to help introduce the community to the NGSS in addition to coordinating with local businesses to support the NGSS by providing resources or information about local science topics.

Implementation Challenges

In addition to the positive results reported throughout this section, there are still implementation challenges and room for more progress at this point in the Initiative, even among the strongly supported participants such as Core Administrators and Teacher Leaders. For instance, 11 percent of teachers still view a "lack of support from administrators" as a major barrier to their implementation of the NGSS.

Prioritizing Science Instruction. At the elementary level and in some classes in the middle grades, a foundational issue is spending sufficient instruction time on science.[8] In 2016–17, 24 percent of Teacher Leaders reported that "school schedule" was a major barrier to NGSS implementation, and nearly half (47 percent) reported that a "prioritization of other subjects over science" was a major barrier, as illustrated by remarks made by a grade 5 teacher:

> *There was a strong push from the administration to focus on the language arts and math curriculum in addition to about an hour of designated English language development instruction. Last year was the first year in my entire career that I had to abandon the teaching of social studies and science to a certain degree. (Grade 5 teacher)*

Two administrators also discussed the low prioritization of science instruction in their districts:

> *My district's getting scores already on Common Core literacy and math, and if the scores are low, they want to try to fix that problem. And since science hasn't really been tested, I don't know if they feel it's important to support science right now. (Elementary school principal)*

> *The district effort is really focused on math and ELA, and that's evidenced in some of the budget prioritization decisions that they've made. It's really been up to the science team to do any kind of advocating for science as a core subject. (District office staff)*

Collaboration and Planning Time. Having enough collaboration time also remains an issue for some teachers. In 2017, 21 percent of Teacher Leaders still viewed a lack of collaboration time as a significant barrier to their implementation of the NGSS. Similarly, over half of teachers (56 percent) indicated a lack of planning time as a significant barrier. As a science prep teacher noted in an interview:

> *Other teachers are interested in NGSS, but they have had no training. The only training they will get in my district will come from the Teacher Leaders at each school, and those Teacher Leaders need*

8 In their national survey of science and mathematics education, researchers at Horizon Research found that in grades K–2, only 20 percent of elementary teachers spend "all" or "most" days every week on science, and in grades 4–6 there is only a modest increase to 35 percent of teachers. Compare this to 99 percent of K–3 teachers and 98 percent of grade 4–6 teachers teaching mathematics "all" or "most" days every week. They also found that elementary teachers who teach all subjects in self-contained classrooms teach approximately four times more reading or language arts compared to science per day (Banilower, Smith, Weiss, Malzahn, Campbell, & Weis, 2013, pp. 53–54).

to talk with their principals about allowing time for that. It will take a big time commitment to bring untrained teachers up to speed on NGSS. (Elementary science prep teacher)

Instructional Materials. Additionally, while many administrators interviewed in 2017 report that providing materials and supplies is critical to supporting implementation of the NGSS, when asked to identify major barriers to their ability to implement the NGSS, 26 percent of Teacher Leaders chose a "lack of access to equipment or supplies," and 35 percent chose a "lack of instructional materials or curriculum."

How the NGSS Early Implementers Initiative Is Empowering Administrators

The Initiative began by providing professional learning for the Core Administrators. The Initiative then added a Principal Academy to engage administrators of all Teacher Leaders and an annual Superintendents' Roundtable to engage the superintendents in the Initiative.

Leadership Growth: Core Administrators

Administrators on the Core Leadership Team receive the following professional learning on an annual basis, led by the K–12 Alliance:

- **Summer Institutes.** These regionally located events kick off each year of the Initiative with a week of NGSS-aligned pedagogy and adult-level science content sessions for Teacher Leaders. Core Administrators attend to participate in district team meetings and to support teachers who are receiving and/or delivering professional learning. During the final two days of the week, Core Administrators present to other principals attending the Principal Academy (see description of the Principal Academy below).
- **Biannual Leadership Trainings.** Every January and June, the Core Leadership Teams convene for three to four days of focused leadership training and planning activities. Administrators attend general sessions as well as those geared to their specific needs and interests.

The Principal Academy: Site Administrators

The K–12 Alliance discovered early-on that, in the absence of explicit "permission" from their administrators, some Teacher Leaders were unwilling to experiment with the NGSS in their classrooms. To address the lack of understanding about the NGSS on the part of these influential site leaders, K–12 Alliance Regional Directors and district Project Directors planned an Academy for principals, vice principals, and other administrators whose schools have at least one Teacher Leader.

Beginning in 2015, two days of Principal Academy workshops were instituted during the annual project-wide Summer Institutes. In these sessions, principals learn and talk with their peers about the pedagogical shifts of the NGSS and how to support the NGSS in their schools and districts. Academy sessions such as the following have been offered:

- Ensuring equity and access to quality science instruction for all students
- Linking science assessment and instructional strategies
- Identifying characteristics of an NGSS classroom
- Implementing the NGSS at the middle school

- Supporting NGSS and CCSS integration
- Building a culture of change and innovation
- Supporting science as a core subject

Site leaders who have Teacher Leaders at their school are invited to spend three more days in NGSS professional learning in their districts over the course of the following school year. All are encouraged to spend one of those days sitting in on a Teaching Learning Collaborative (TLC), the Early Implementers Initiative's lesson study that bring together same-grade teachers, typically from different schools within the district. With an Initiative-trained facilitator, these teachers spend one day planning an NGSS-aligned lesson and another day co-teaching, debriefing, revising, and re-teaching it. Administrators usually attend the teaching day because they can see how students react to the lesson and they can listen to the debrief after each lesson is taught.

The Early Implementers Initiative has developed an "Evidence of Learning" protocol, which is used by principals when observing TLC lessons. The protocol assists teachers and observers in understanding and communicating about observed NGSS instruction. Prior to the observation, the district Project Director and the principal discuss the lesson plan with the teachers to help the principal gain maximum appreciation of the lesson. The tool prompts them to notice and discuss the following:

- Key concepts (main and supporting) included in the lesson
- The focus phenomenon and how it will be used to engage student understanding
- How the NGSS three dimensions are addressed
- How students' prior knowledge will be activated
- How students' critical thinking skills will be prompted so that they may possibly revise their understanding of the phenomenon
- How students will demonstrate their new understanding
- The CCSS-ELA or CCSS-mathematics standards the learning sequence will address and how students will integrate or use the CCSS to deepen their understanding of the phenomenon

A second part of the tool may be used by the administrator to record specific evidence observed that relates to the above list. After the lesson, the administrator typically engages in a follow-up discussion with the Project Director or another Early Implementer participant. Many administrators find strong value in hearing the debrief conversations held by teachers after each lesson is collaboratively taught. Some have expressed surprise at the depth of teacher analyses and insights revealed in these conversations.

The remaining days of each administrator's Principal Academy can be spent on NGSS-related activities such as:

- Conducting classroom lesson walkthroughs (in collaboration with the district Project Director or members of the Core Leadership Team and using the Evidence of Learning protocol)
- Participating in a study group with other administrators to further explore a topic about which they started to learn at the Summer Institute
- Seeking assistance from a mentor on the Core Leadership Team on a specific issue

The overarching goal of such intensive engagement by these site leaders is support for Teacher Leaders as they both implement the NGSS in their own classrooms and fulfill their leadership roles by sharing their learning about the NGSS with

other teachers in their schools and districts. The ultimate goal of the Initiative is the districtwide spread of NGSS implementation to all teachers.

Superintendent Roundtable: Reaching the Top

The Initiative instituted an annual Superintendents' Roundtable to make direct contact with these influential district leaders. The roundtables bring together the superintendents, district Project Directors, K–12 Alliance Regional Directors, and sometimes additional district-level personnel from all of the districts participating in the Initiative, with the goal of increased involvement and support from upper levels of district administration. These meetings also provide opportunities to exchange ideas across districts and with Initiative leadership. They further provide an opportunity for superintendents to recommit to the prioritization of science as a core subject and to NGSS implementation in their districts.

Recommendations

We conclude by summarizing recommendations raised explicitly or implicitly by the data in this report, as listed in Table 1 on page 20. The first entry in the table — to actively advocate science and permit science within designated ELA time at the elementary school level — is an important foundational step in supporting NGSS implementation. Some teachers will not address NGSS science in any significant way unless administrators do the following: project that it is both beneficial and essential for teachers to teach science in all elementary and middle school grades; give teachers flexibility to experiment with the NGSS; and endorse integration of science with ELA and other subjects. If administrators actively advocate the recommendations outlined in Table 1, the positive changes to science instruction are likely to be stronger.

Witnessing the effects of the NGSS on students' engagement and learning can influence how administrators feel about NGSS implementation and their willingness to support it. For instance, an elementary school principal noted that a teacher had requested doing an integrated science–ELA lesson for her required annual performance observation.[9] The principal was delighted to see that not only were students engaged but they were also speaking in ways that explicitly fulfilled expected ELA standards:

> *They were talking in complete sentences, listening to what each other said, and building upon each other's comments. You have to realize that our students score well below district average on ELA. I was happily surprised to see them speaking this well. Earlier, I had heard the teachers discussing science and ELA integration during the lesson-planning day that I observed as part of the Initiative. But seeing these students and the teacher in action made it sink in for me. (Elementary school principal)*

Some teachers will not address NGSS science in any significant way unless administrators do the following: project that it is both beneficial and essential for teachers to teach science in all elementary and middle school grades; give teachers flexibility to experiment with the NGSS; and endorse integration of science with ELA and other subjects.

Overall, the evaluation findings suggest that when administrators are provided with professional learning and assistance, many will advocate for and actively support their teachers' NGSS implementation. The recommendations above and the ideas throughout this report give administrators an initial roadmap of things to consider for the NGSS implementation journey — a journey to promote better science teaching that provides all students with more engaging and effective science learning opportunities.

9 Over two-thirds (69 percent) of teachers last year reported that they would be "very" or "somewhat" comfortable with teaching a science lesson for their elementary school principal's observation for their annual performance evaluation.

Table 1. Administrator recommendations for supporting NGSS implementation

Recommendations	Site administrator	District office staff
Actively advocate science and permit science within designated ELA time at the elementary school level.	X	X
For prescriptive district ELA programs, allow site flexibility for integrating science.		X
Support and fund teachers in getting needed hands-on science supplies.	X	X
Observe some effective science instruction onsite or at another school.	X	
Actively encourage regular elementary-teacher PLCs to spend time on science.	X	X
Give teachers freedom to experiment; recognize that active NGSS science instruction can be noisy, messy, etc.	X	
Provide school administrators with classroom observation protocols (not for teacher performance review) that are sensitive to NGSS science instruction; provide professional learning for using them.		X
Regularly put science on the agenda for standing, districtwide meetings of site administrators.		X
Provide collaboration time on science for teachers.	X	X

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Appendix A. Actions of Project Directors and Core Administrators

Implementation Activities of District Project Directors

The K–12 Alliance directly supports Project Directors in their leadership roles by convening them face-to-face with the Alliance's Regional Directors for two days per month of strategic planning. Observed district Project Director actions include the following:

Strategic Planning

- Recruit Early Implementer participants in the district.
- With K–12 Alliance Regional Directors, schedule, plan, and facilitate monthly technical assistance days for the district's Core Leadership Team.
- Help arrange substitutes for participants in professional learning, Core Leadership Team meetings, and more.[10]
- Conduct occasional needs assessment of the teachers in the district.
- With the Core Leadership Team, develop, carry out, and revise the district plan for NGSS implementation.
- Working with district personnel and stakeholders at district meetings, provide input on LCAP funding-related decisions and documents.
- Present to the school board about the implementation of the NGSS in the district.

Professional Learning

- Schedule, plan, and facilitate Teaching Learning Collaboratives (i.e., the Initiative's lesson studies).
- Empower Core Teacher Leaders (i.e., teachers on the Core Leadership Team) to facilitate Teaching Learning Collaboratives.
- Help plan and deliver twice-per-year, Initiative-wide professional learning sessions for Core Leadership Team members.
- Help plan and prepare annual Summer Institutes for all Teacher Leaders in the Initiative.
- Coach Core Leadership Team members in preparing and presenting sessions at the Summer Institutes.

10 In most of the districts, it has been critical for Project Directors to work with other central office staff to ensure a project priority for substitutes in the face of a substitute shortage. This has often been a greater than expected challenge, as described in Evaluation Report #1, *Moving the Needle* (Tyler, Britton, Iveland, Valcarcel, & Schneider, 2016).

- With the Core Leadership Team, develop and coordinate trainings for teachers, schools, and administrators outside of those provided by the grant.
- Provide one-on-one advice onsite for individual teachers, including modeling NGSS science lessons.

Resources

- Work with district office personnel and site leaders on issues related to funding for materials and supplies for participating teachers.
- Help with modifying and redistributing current science resources for alignment with the NGSS.
- Assist with setting up science spaces in schools.

Dissemination

- Field requests for information from districts outside the Early Implementers Initiative.
- Participate in and support Teacher Leaders in delivering NGSS sessions at state or regional conferences.

Implementation Activities of Core Administrators

Core Administrators have a range of responsibilities within and beyond the district, such as the following:

- First and foremost, foster and support NGSS implementation in their schools (for site administrators).
- Meet monthly with the rest of the Core Leadership Team for technical assistance days facilitated by their K–12 Alliance Regional Director and district Project Director.
- Collaborate with the Project Director and the Core Leadership Team in developing and carrying out a district plan for NGSS implementation in the district.
- Present to fellow administrators about the NGSS, provide updates on progress and plans related to the Initiative, and share opportunities for further NGSS training available to both teachers and administrators in the district.
- Attend and participate in districtwide professional learning events to help spread the NGSS to all teachers in the district.
- Prepare and lead sessions for other administrators during the Summer Institute.
- Prepare and lead sessions at Administrator Symposia (events convened by K–12 Alliance to share Early Implementer learnings with administrators from non-Early Implementer districts).
- Help to spread Early Implementer learnings by fielding inquiries from teachers and administrators outside the districts participating in the Initiative. This might entail answering emails, hosting visitors interested in observing classes, or meeting with groups to discuss specific areas of need or interest such as the middle school integrated model or engineering design in the classroom.

Appendix B. Evaluation Methods and Tools

Case Study Teacher and Administrator Interviews

Two sets of interviews with case study teachers as well as administrators in the Early Implementers Initiative were also used as primary sources of data for this evaluation report.

Interviews with 20 case study teachers in kindergarten through grade 8 at five of the eight participating Early Implementer districts were conducted in winter 2017 and again at the end of the school year (in May or June of 2017). These interviews were on multiple topics, the most relevant being teachers' perceived support by administrators and other district leaders. Please note that district Project Directors in the Initiative nominated the case study teachers as ones who are making some of the most substantial changes in their teaching of science, spurred by their participation in the Initiative.

The final set of interviews drawn upon for this report are those of administrators from Early Implementer districts. Seventeen administrators representing all eight Early Implementer districts were interviewed in the summer of 2017 about the 2016–17 school year. Eleven of these administrators were members of their district's Core Leadership Team. These interviews asked about the administrators' understanding of the NGSS, how they are supporting NGSS implementation, their experiences during the prior school year, and their thoughts about their district and/or school's implementation of the NGSS.

Case Study Teacher Interview Protocol (Relevant Questions)

Questions from Case Study Teacher Interview #1 Protocol (Winter 2017)

1. Is your school administration supportive of your teaching NGSS? What role, if any, has your principal played in supporting NGSS implementation in your school or district? **Ask only Core TLs:** Have you and your principal used the observation protocol from the K–12 Alliance? (Follow up: May we have the contact information for your principal to inform them of what your participation will involve?)
2. Are there any issues that affect the amount of time you are able to devote to science? *(If they need examples: lack of support from admin, other teachers, competing initiative(s), new curriculum, CCSS, scheduling)*

Questions from Case Study Teacher Interview #2 Protocol (May/June 2017)

1. Please describe how, if at all, your school administration affected your teaching of science this year. How about the district administration?
2. How do you get the consumable materials you need to teach NGSS science AND who pays for it? **[get concrete details]**
    a. **Probe:** Do you have access to the NON-consumable supplies and equipment you need?
    b. **Probe:** Is there district money or school money available for these materials? What is the process to access those funds? Is the

access to those funds equitable (all teachers can use them)?

3. Please describe how, if at all, your EII Project Director has affected your teaching of science this year.
    a. **Probe:** Have you had any one-on-one interaction with the Project Director to help with your own teaching?

Administrator Interview Protocol

CA K–8 NGSS Early Implementation Initiative Evaluation
EII Administrator Interview #1 Protocol

May-June 2017

Timing: 1 time per year, May 2017 and May 2018

Sampling: Two admins per district. Each district: 1 CLT and 1 non-CLT. We want admins that are proactive in supporting NGSS implementation.

Recruiting: Recommendations from PDs. If possible, one admin of a CST in focal districts.

Expected duration of interview: 45–60 mins

INTERVIEW

Background

1. (For central office only) What is your role in the district?
2. Are you a member of the EII CLT?
    a. If so, how did you come to be part of it?
    b. If not, when and how did you first become aware of the EII?
3. What is your background in teaching and/or science? (Probe: Does your background help you relate to science teachers' issues in teaching science and implementing NGSS?)

What They Know

4. Which of these project events have you attended?
    a. Summer institute 2015 (admins were invited for a day, to get some background and see Ts in Cadre) (no probe)
    b. (CLT only) Administrator Symposia (March/April or Nov 2016) (Probe: What was your role at the event?)
    c. Principal Academy in Summer Inst 2016 or during 2016–17 school year (Probe: What was your role at the event? What do you remember/what did you learn from it?)
    d. District or school PD about NGSS (Probe: What was your role at the event? What do you remember/what did you learn from it?)
    e. TLCs (Probe: What was your role at the event? What do you remember/what did you learn from it?)
5. In the last three years, have you received PD or info about NGSS or supporting science in general from any other source(s)?
6. Please briefly describe your understanding of:
    a. What you feel are important differences between NGSS instruction and traditional science instruction
7. Please briefly describe your understanding of:
    a. What support or conditions teachers need in order to teach science and the NGSS (Note how many of these they include: time to plan, time/opp'ty to collaborate with other teachers, permission to experiment, access to NGSS-aligned curriculum/lessons, access to materials to use in class)
8. What are some things you are doing to support science teaching and NGSS implementation *because of this project?*

   a. How does this compare to how you were willing or able to support science before this project?

   b. Are there any additional things that you hope to do next year?

9. Are there things about how YOUR performance is evaluated that make it difficult for you to support science teaching? (Probe: How about your working conditions? Work load?)

   a. Things that empower you to support it?

Teachers and Students

10. Are any of the teachers at your school on the CLT? Are there any TLs? If yes:

   a. How many?

   b. What, if any, impact from the Initiative have you seen on these individuals? (Probe re leadership, instructional practices, collaboration.)

   c. Have you heard other admins talking about the impact of NGSS on teachers or students?

11. Have you seen NGSS science lessons being taught? If yes:

   a. Where/how?

   b. Did you notice the infusion or integration of ELA or math?

   c. What was your impression of the NGSS lesson? [probe re content, activity (level)]

   d. How did students respond? (Listen for: Were students learning?)

12. Have you seen science being used as the context for teaching ELA or math, that is, an ELA or math lesson that used science as a context? If yes:

   a. Where/how?

   b. What was your impression? (Probe re how different from "regular" ELA/math lesson without use of science.)

   c. How did students respond? (Listen for: Were students still learning ELA/math?)

13. (For building administrators only). Has obtaining, paying for, or preparing supplies or consumables to teach science affected the willingness of teachers to teach science?

District and School Process

14. How well do you think the district is promoting science as a core subject?

   a. What strategies have worked best so far to advance this effort?

   b. What funding avenues, if any, have been explored to support this effort? (with principals, probe re school level as well as district)

   c. What still needs to be done?

   d. What have been the biggest barriers or challenges?

   e. What are some things a principal or an administrator can do to support the school in making science a core subject?

15. (FOR 6–8 ONLY, including admins of elementary school that include 6th grade) Where would you say the district (or your school) is in the process of transitioning to the Integrated Model?

   a. What have been the biggest barriers or challenges? (**Probe** re 6th grade)

   b. What still needs to be done?

16. Where would you say the district (or your school) is in spreading NGSS to all teachers (not just the Teacher Leaders)?

   a. What strategies have worked best so far to advance this effort?

b. What funding avenues, if any, have been explored to support this effort?

c. What have been the biggest barriers or challenges?

d. What still needs to be done?

Conclusion

17. Is there anything else you'd like to say about the role of administrators in NGSS implementation, relative to either your district or what other districts should know?

Thank you very much for your time!

Teacher and Administrator Surveys

Each summer, Early Implementer teachers and administrator members of the Core Leadership Team for each district are surveyed about their thoughts and experiences on the previous school year (most recently, they were surveyed during the summer of 2017 about the 2016–17 school year). The first survey completed by both teachers and administrators is the annual leadership survey. This survey reflects views and experiences of Core Teacher Leaders, Teacher Leaders, and administrator members of the Core Leadership Teams about their leadership and the leadership of others during the prior school year (see selected survey questions below). Prior to 2017, Teacher Leaders and Core Teacher Leaders were surveyed separately. Administrators always had a separate leadership survey that focused more on administrator factors over classroom teaching factors. See the response rate and number of total respondents for these surveys in Table B1 below.

The second survey completed by all Core Teacher Leaders and Teacher Leaders in the Early Implementers Initiative is the Classroom Science Teaching Survey. This survey was conducted in the summers of 2016 and 2017, reflecting the 2015–16 and 2016–17 years, respectively. The Classroom Science Teaching Survey asks teachers about their science teaching practices and

Table B1. Number of respondents and response rates for surveys used as primary data sources

	2013–14		2014–15		2015–16		2016–17	
	n	Response rate	n	Response rate	n	Response rate	n	Response rate
Teacher Leadership Survey								
Teacher Leaders	N/A	N/A	447	82%	399	80%	472	97%
Core Teacher Leaders	66	86%	70	81%	70	90%		
Administrator Leadership Survey	33	79%	33	74%	34	95%	33	82%
Classroom Science Teaching Survey	N/A		N/A		384	82%	546	96%

their experiences during the previous school year. However, in 2016 teachers were also asked questions about the year before as well (2014–15). The exceptionally high survey response rates (see Table B1) suggest that this report's discussions of survey data describe the responses of almost all teachers in the Initiative and a majority of administrators on the Core Leadership Teams.

Teacher Leadership Survey (Relevant Questions)

Teacher Leadership Survey (2013–14, 2014–15, 2015–16, 2016–17)

- To what extent do you disagree or agree with the following statements?
  - You felt safe sharing your ideas and challenges with administrators at the school level.
  - You felt safe sharing your ideas and challenges with administrators at the district level.
- Please indicate extent to which you disagree or agree with the following statements:
  - Improving science instruction was a priority at this school in 201X–201X.
  - In 201X–201X, teachers at this school were encouraged by the administrators to teach science.

Administrator Leadership Survey (Relevant Questions)

Administrator Leadership Survey (2013–14, 2014–15, 2015–16, 2016–17)

- How well would you say you understand:
  - The structure of NGSS (the 3 dimensions)
  - The Science and Engineering Practices (SEPs) within NGSS and how they are used in instruction
  - The Crosscutting Concepts (CCCs) within NGSS and how they are they used in instruction
  - The steps involved in helping teachers transition to NGSS
  - The scope of transitioning to NGSS
- During the 201X–201X school year, how often did you do the following things?
  - Discussed instructional philosophies, strategies, and/or ideas related to NGSS with teachers
  - Discussed challenges associated with NGSS implementation with teachers
  - Formally presented about NGSS implementation to teachers at your school(s)/district (e.g., school/district meeting, professional development, etc.)
- In 201X–201X school year, approximately what percentage of your work time was devoted to science education?
  - 0%
  - 1–20%
  - 21–40%
  - 41–60%
  - 61–80%
  - 81–100%
- During the 201X–201X school year, how often did you do the following things?
  - Discussed the transition to NGSS with teachers
  - Discussed the 3 dimensions of NGSS (SEPs, CCCs, & DCIs) with teachers

- Created opportunities for teachers to discuss NGSS and its impact on science instruction with each other
- Shared with teachers examples of learning sequences illustrating the integration of NGSS with the Common Core State Standards

- To what extent do you disagree or agree with the following statements about your SCHOOL(S) during the 201X–201X school year?
  - Improving science instruction was a priority in my SCHOOL(S)
  - Teachers in my SCHOOL(S) were encouraged by the administration to teach science
- During the 201X–201X school year, how often did you do the following things?
  - Discussed instructional philosophies, strategies, and/or ideas related to NGSS with teachers
  - Discussed challenges associated with NGSS implementation with teachers
  - Formally presented about NGSS implementation to other administrators at your school(s)/district
- During the 201X–201X school year, did your DISTRICT evaluate science instruction (e.g., test scores, observation of science teaching, content coverage, level of participation in science fair)?
- To what extent do you disagree or agree with the following statements about your DISTRICT during the 201X–201X school year?
  - Improving science instruction was a priority in my DISTRICT
  - Teachers in my DISTRICT were encouraged by the administration to teach science
  - Most teachers in my DISTRICT devoted more instructional time to teaching science compared to last year

Classroom Science Teaching Survey (Relevant Questions)

Classroom Science Teaching Survey (2015–16, 2016–17)

- During the 201X–201X school year, which answer best reflects the average weekly time that you taught science integrated with English Language Arts (ELA)?
- During the 201X–201X school year, which answer best reflects the average weekly time that you taught stand-alone science (i.e., science integrated with another subject)?
- Did you teach notably more or less science this year (2016–2017) compared to last year (2015–2016)?
- If your answers changed for 2014–2015 versus 2015–2016, please describe the strongest reason(s) for the changes in science instruction time.
- Please identify up to FOUR of the strongest influences for this change:
  - Involvement in the Early Implementers Initiative (EII)
  - Involvement in another project related to science
  - Understanding of the Next Generation Science Standards (NGSS)
  - Understanding how to integrate science with English Language Development (ELD) standards
  - Understanding how to integrate science with Common Core English Language Arts (ELA) standards

- Understanding how to integrate science with Common Core Mathematics standards
- Understanding how to teach engineering design
- Change in school focus (e.g., increased/decreased focus on ELA, math, science, etc.)
- Change in district focus (e.g., new curriculum)
- Change in administrator (e.g., principal) support for teaching science
- Change in grade
- Change in classroom
- More/less opportunity to collaborate with other teachers
- Access to instructional materials and/or lesson ideas

› Which Common Core State Standards for English Language Arts did you address while integrating science with ELA during the 2016–2017 school year? (Select all that apply.)

- Reading: Literature
- Reading: Informational Text
- Reading: Foundational Skills (K–5)
- Reading: History/Social Studies (6–12)
- Reading: Science and Technical Subjects (6–12)
- Writing: Opinion Pieces (K–5)/Arguments (6–12)
- Writing: Informative/Explanatory Texts
- Writing: Narratives
- Writing: Production and Distribution of Writing
- Writing: Research to Build and Present Knowledge
- Writing: Range of Writing
- Speaking & Listening: Comprehension and Collaboration
- Speaking & Listening: Presentation of Knowledge and Ideas
- Language: Conventions of Standard English
- Language: Knowledge of Language
- Language: Vocabulary Acquisition and Use
- Unsure

› Please briefly describe the context factors in your district or school that most SUPPORT your day-to-day ability to implement NGSS instruction, if any.

› Please identify up to THREE context factor(s) in your district or school that most support your day-to-day implementation of NGSS instruction.

- NONE
- TLC planning and teaching days
- Training/PD on NGSS from Early Implementers Initiative (EII) events
- Training/PD on NGSS from District or other sources (outside of EII events)
- Freedom to try new things/explore with science in classroom
- Funding for or availability of materials/resources/supplies
- Collaboration with other teachers or educators
- Support from administrators
- Support from EII Project Director or Regional Director PLCs or department meetings
- OTHER:

- Please briefly describe the context factors in your district or school that are the biggest BARRIERS for day-to-day implementation of NGSS instruction, if any.
- Please identify up to THREE context factor(s) in your district or school that represent the biggest barriers to your day-to-day implementation of NGSS instruction.
  - NONE
  - Prioritization of other subjects over science
  - Lack of support from administrators
  - Lack of planning time
  - Lack of collaboration with other teachers/ educators
  - Lack of access to equipment/supplies
  - Lack of instructional materials/curriculum
- How supportive is your principal of you teaching NGSS science in your classroom?
- How supportive is your principal in making sure you have the supplies and materials you need to teach NGSS science in your classroom?
- How comfortable would you be teaching a science lesson for your elementary principal as part of your professional evaluation?
- How supportive is your elementary principal of you teaching science integrated with ELA during time allotted for ELA?
- If you have anything you would like to say that you feel you were not able to convey by answering the survey questions, or if you have a comment about the survey itself, please share it here:

NGSS EARLY IMPLEMENTERS

WestEd

Administrators Matter in NGSS Implementation

EVALUATION REPORT 3

How School and District Leaders Are Making Science Happen

Ashley Iveland
Burr Tyler
Ted Britton
Kimberly Nguyen
Steve Schneider