Chapter 11
Academic Language and Literacy in Every Setting (ALLIES+): Strengthening the STEM Learning Ecosystem

Susan O'Hara, Robert Pritchard, Deborah Pitta, Renee N. Newton, Uyen H. Do, and Lisa Sullivan

In order to succeed in school, all students need opportunities to develop the specialized academic language that is associated with content learning. For English learners (ELs) in particular, the development of academic language is one of the most important factors in academic success; where academic language is weak or missing, it is increasingly cited as a major contributor to gaps in achievement between ELs and native speakers of English (Anstrom et al. 2010; Francis et al. 2006). Academic-language development is also associated with student achievement as demonstrated by the correlation between measures of English-language proficiency and content-assessment scores (Cook et al. 2011; Echevarria et al. 2012).

Academic-language development is particularly problematic for ELs who enter the educational system in grades 4–8. With comparatively fewer years to master the English language than those who enter in the primary grades, these students have the dual task of learning complex course content and developing English-language proficiency (O'Hara et al. in press). In all classes and grade levels then, as ELs simultaneously learn, comprehend, and apply content-area concepts through their second (or third) language, they need skillful teachers armed with the knowledge and expertise necessary to facilitate language and literacy development in English (Achinstein et al. 2012; Genesee et al. 2006).

S. O'Hara (✉)
Resourcing Excellence in Education, University of California Davis, Davis, CA, USA
e-mail: spohara@ucdavis.edu

R. Pritchard • D. Pitta • R.N. Newton • U.H. Do • L. Sullivan
University of California Davis, Davis, CA, USA
e-mail: pritchard@csus.edu; debipitta@gmail.com; rnnewton@ucdavis.edu; uhdo@ucdavis.edu; lhsullivan@ucdavis.edu

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The task of teaching science content to ELs is especially complex and challenging in light of the science and engineering practices of the Next Generation Science Standards.

> These science and engineering practices are language intensive and require students to engage in classroom science discourse. For example, students must read and write, as well as view and represent visually, as they develop their models and explanations. They must speak and listen as they present their ideas or make reasoned arguments based on evidence. Science and engineering practices offer rich opportunities and demands for language learning at the same time as they promote science learning. Hence, these practices merit special attention in science classrooms that include ELs (Lee and Llosa 2015, p. 162).

For schools and districts, a related and equally important challenge is to develop a system of support for teachers within schools and across districts that will promote ongoing professional learning as part of an integrated professional development program that can have long-term impact on student learning. To address this challenge, we implemented the Academic Language and Literacy in Every Setting (ALLIES+) project. The overarching goal of ALLIES+ was to develop, implement, and test a user-centered, capacity-building approach for facilitating such a system. Toward that end, we sought to engage educators from both classroom and expanded learning[1] settings to work together in a professional learning community designed to develop a common language across these contexts, improve instructional coordination, reinforce key concepts, and provide more seamless learning environments for students. The specific goals and objectives of the ALLIES+ were:

1. Develop a high-quality, collaborative professional development model for teachers, administrators and expanded learning staff targeting high-leverage practices for promoting academic language and science learning;
2. Build capacity of principals and expanded learning coordinators to support teachers and expanded learning staff in the enactment of these practices;
3. Build capacity of instructional leadership teams within partner schools to support and sustain this work.

Setting

The ALLIES+ project was implemented in Youngstown(pseudonym), a school district that covers 150 square miles of rural, agricultural, and suburban areas in Northern California. The student population is 21.2 % EL, 61.5 % qualified participants in the federal School Lunch Program, 38.8 % Hispanic, and 16.6 % Asian. The predominant languages, other than English, are Spanish and Punjabi. The district serves nearly 14,000 students. The district was a participant in a grant that targeted teachers, administrators, and expanded learning educators of fourth through

[1] Expanded learning settings in this instance included after school and summer learning program staff.

eighth grade students at two district schools. Financial support from the grant provided stipends and/or release time for participants to attend professional learning sessions that focused on the enactment of a set of core teaching practices to develop the academic language and literacy of ELs in science classrooms and expanded learning programs.

Theory of Change and Design Principles

The research literature contains numerous examples of professional development efforts that have failed to impact student learning or that could not sustain their impact over time due to a failure to articulate a theory of change on which to base professional development (Casteel and Ballantyne 2010). Determined to avoid that pitfall, we adopted a multi-tier strategy in developing the ALLIES+ intervention that is aligned with our theory of change and attends to three key design principles for building instructional capacity for academic-language and literacy development.

Targeting High-Leverage Practices

Our first design principle addresses the need to focus any instructional improvement process on a set of targeted, high leverage instructional practices (Windschitl et al. 2013; Fogo 2011; O'Hara et al. 2014). This design principle is predicated on the importance of providing instructional leaders and teachers with a common language around the instructional shifts needed to help ELs meet the challenges of the Common Core State Standards (2010).

Learning In and from Practice

The second design principle focuses on video examples of practice as a key resource for learning, because video can illustrate high-leverage practices in action, provide opportunities to distinguish stronger and weaker versions of them, and afford opportunities to examine the elements of these practices as they unfold in classrooms. Our professional learning model was predicated on the importance of providing video examples of teaching, and time for both teachers and expanded learning staff to practice new instructional shifts aligned with the ALLIES+ practices.

Building Capacity to Develop Sustainable Learning

The third design principle focuses on the importance of building the organizational infrastructure and conditions (e.g., knowledgeable leaders, instructional tools, facilitative organizational structures, and collegial professional relationships) to grow, sustain and spread the use of high-leverage practices that support the academic-language and literacy development of ELs (Jaquith 2013). (See Fig. 11.1) This design principle is premised on four central ideas: (1) instructional leadership is most effective when leadership is shared among a team of people who have different roles and expertise; (2) a shared understanding of the purpose for and value of academic language and literacy in content area teaching is essential for the implementation of new practices; (3) capacity can be built within a school to stimulate, support, and sustain learning about the use of core academic-language and literacy practices and (4) generating site-based capacity to use core academic-language and literacy practices and reflect upon their use creates the conditions for ongoing learning and sustained use of these core practices. In our project we focused attention on building school-based instructional leadership teams to drive the development of the conditions that were needed to support participants in enacting the ALLIES+ instructional practices in their teaching.

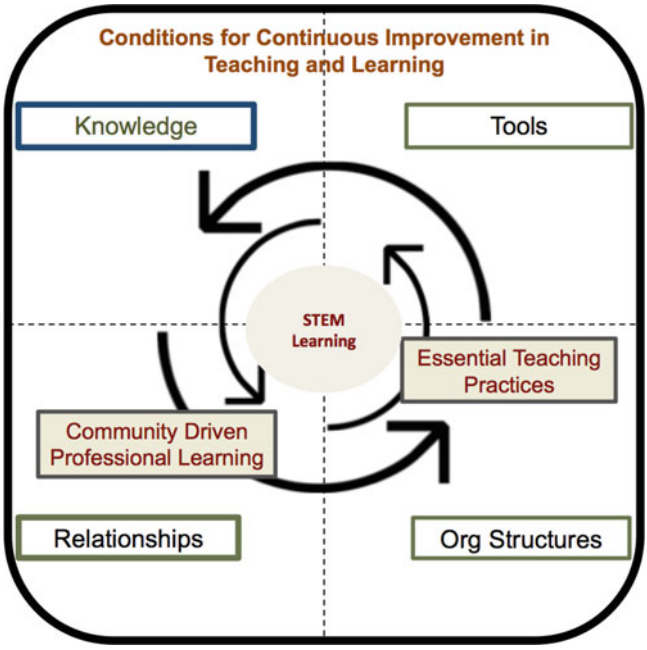


Fig. 11.1 Capacity building approach to proferssional growth

The Professional Development Model

ALLIES+ was designed so that participants became active learners in their own professional development and were provided with the resources – including the time, materials, and intellectual support – they needed to develop and implement more effective and innovative lessons. From January to May, 2015 a team of five university and public school educators provided five workshop sessions totaling 30 h to 24 design team members.[2] The first session took place in a Friday afternoon/all day Saturday format. The subsequent sessions, scheduled at 4–6 week intervals, took place on 4 week-day afternoons. Two representatives from the local County Office of Education also provided technical assistance support to the teams through presentations at some of the professional development workshops and participation in Professional Learning Communities (PLCs) at the school sites.

The workshops focused on how science content and learning activities could be modified to improve academic conversations in classroom and expanded learning settings. The workshops provided time for team members to share ideas, collaborate across classroom and expanded learning settings, and co-design learning activities and inquiry cycles that focused on areas of student need that teams identified. Over the 30 h, the facilitators balanced instruction with support as approximately one third of the face-to-face time was spent engaging participants in explicit instruction and guidance in the use of the ALLIES+ practices, one third afforded participants individual and collaborative experimentation time, and the final third – called studio time – was allocated to the participants designing lessons and sharing them with the group. Balancing explicit instruction, and both individual and collaborative experimentation, was achieved by the facilitators' regular attention to the interests and needs of participants. Additionally, as the skill sets of participants varied, peer support was critical to the group's knowledge development.

In addition to the five professional development sessions, the teams also established PLC's at their school sites with the goal of coming together to plan, design, implement and modify lessons. During the 1-h PLC meetings held between each workshop, school teams discussed successes and challenges as well as any modifications that needed to be made to their lessons. Each team also developed an inquiry question and identified specific teaching strategies and student evidence to examine. The inquiry question drove the process of continual reflection and quality improvement. The design teams' questions were:

- How can we improve students' ability to communicate verbally what they have learned? (school A)
- How can we improve students' ability to communicate using scientific, academic language? (school B)

[2] Design teams comprised science teachers, expanded learning coordinators and line staff, and site administrators.

Our professional development model had four unique elements to foster participants' ability to create and implement innovative lessons and help them to develop a repertoire of instructional strategies to meet the needs of ELs in science classes: (1) Sessions were designed in collaboration with the district and aligned with the district's strategic goals; (2) Teachers and district instructional leaders worked side-by-side learning how to implement ALLIES+ practices in support of ELs' academic-language development; (3) Teachers and expanded learning educators were provided with "studio time" to rehearse new instructional practices in a low-risk environment; and, (4) Ongoing inquiry was sustained over time focusing teachers' attention on experimenting with new practices, engaging in cycles of inquiry utilizing artifacts of practice, discussing and adapting lessons plans, and analyzing student work – all supported by the district's instructional leaders and the professional development team.

Materials

We launched the program by developing a set of tools, videos, and instructional resources that serve to illustrate the ALLIES+ practices and facilitate enactment of these practices in science classes in grades 4–8. These resources included a networked website for ALLIES+ participants and school partners with access to all workshop materials on Trello boards for site level use (see appendices for examples of resources described below).

The materials emerged from research on effective instruction to foster the academic-language and literacy development of ELs (Anstrom et al. 2010; August et al. 2010; Baker et al. 2014; Brisk and Proctor 2012; Echevarria et al. 2011; Jiménez et al. 2015; Moschkovich 2012; Kibler et al. 2015; Van Lier and Walqui 2012; Wong Filmore and Filmore 2012; Zwiers et al. 2014). From the research review we generated a list of effective instructional practices. Next, we analyzed a set of videos of exemplary teaching from classrooms in which practices that specifically addressed the academic-language development of ELs were being enacted. The teachers in these classrooms were randomly selected from schools with which we had partnered and volunteered to videotape lessons in which they were engaged in academic-language instruction. We used these to develop a description of the instructional practices that best reflect their enactment in teaching. Then, we repeated this process with an additional set of videos of classrooms to further refine the language of what we began to call the ALLIES essential practices.

This process revealed three essential practices identified as high impact for academic-language and literacy development: Foster Academic Interactions (structuring and strengthening student-to-student interactions that use academic language and literacy); Fortify Academic Output (structuring, strengthening, and supporting the quantity and quality of students' production of original, extended oral and written academic messages which require complex language); and Interact with Complex Text (developing students' overall abilities to practice with and process the language of complex texts).

These essential, high impact practices, although central to effective academic language instruction, alone do not get to the core of academic language teaching. Effective academic language teachers enact another set of instructional practices in support of these essential, high impact practices. We labeled these Cross-Cutting Practices: Facilitate Acquisition of Academic Language, Foster Metacognition, and Monitor and Guide Language Learning. Finally, in preparation for enactment of high-impact and cross-cutting practices, teachers employ the foundational practice: Design Instruction of Academic Language and Literacy Development. This practice focuses on how clearly and directly a teacher aligns academic-language objectives with content objectives, which in turn should align with the lesson's texts and tasks.

Our research also revealed, not just a list of practices, but ways in which the essential instructional practices support one another. For professional learning purposes we organized the practices into three "frames", each consisting of a high impact essential practice supported by three cross-cutting practices and a foundational practice that are common across the three frames. (See Fig. 11.2 for an example.)

High-Impact Practice	**Foster Academic Interactions** • Build conversation skills • Provide extended and supported opportunities for student-to-student interactions		
Cross-Cutting Practices	**Facilitate Acquisition of Academic Language** • Provide multiple, rigorous and supported opportunities for students to acquire and use all three dimensions of academic language • Use a variety of communication strategies to make target academic language understandable	**Foster Metacognition** • Visibly enact metacognitive processes students are expected to use in support of academic language learning • Deconstruct metacognitive strategies that support academic language learning	**Monitor and Guide Language Learning** • Monitor academic language learning and adjust instruction, supports and tasks to meet the needs of students • Provide written and/or oral feedback to promote academic language use
Foundational Practice	**Design Instruction of Academic Language and Literacy Development** • Set academic language and literacy learning targets that are aligned with ELA/Literacy CCSS and the target high-impact practice • Structure and connect tasks that support the academic language and literacy learning targets • Design supports to help students meet the academic language demands of texts and tasks		

Fig. 11.2 Foster academic interactions teaching frame

Because the science and engineering practices of the Next Generation Science Standards (2013) are language intensive and require students to engage in classroom science discourse, the professional development team, in consultation with district representatives, decided to focus on Foster Academic Interactions. The emphasis in the first session was helping design teams develop an understanding of this practice, so we introduced them to videos depicting classroom teachers' use of this high-impact essential practice at varying levels of enactment. We also introduced and demonstrated a variety of instructional resources that they could use with students, including the Constructive Conversation Skills Poster and the Conversation Analysis Tool (See Appendix A.) During Studio Time in the first session, design teams worked together to integrate these materials into already existing lessons. In the sessions that followed teams developed new lessons that incorporated these tools.

Another important emphasis in the early sessions was helping each design team understand how to utilize effectively the PLC structure that existed at each site. One aspect of this work was developing Inquiry Questions and using them as the focus during PLC meeting time. Tools we used during this component appear in Appendix B.

Graphic organizers were also developed for use by teams in collecting evidence of the effectiveness of their science learning activities with embedded essential practices that were implemented in classrooms and expanded learning programs. Data collected through use of the graphic organizer tool were brought to PLC meetings for discussion, reflection and refinement with fellow team members. An example of a graphic organizer appears in Appendix C.

During the final session, we shared *Introducing Robotics with Scribbler*, a robotics curriculum that was purchased for teacher and expanded learning staff use. We also demonstrated where the essential instructional practices could be woven into lessons plans for classroom and expanded learning program enactment.

Outcomes

Participant interviews were used to gather information and help us understand how successful our efforts were in supporting and engaging school-based design teams in implementing science learning activities across school and expanded learning contexts. A case study approach was taken with the interviews, which were conducted with the principals, teachers, expanded learning site coordinator, district expanded learning director, and county office of education staff. The interview format was modified slightly to reflect the context and role that each individual had on the team.

When asked to describe what the team had accomplished over the year, all of the interviewees spoke of the team co-designing a series of science lessons that incorporated ALLIES+ strategies. This included participating in joint professional learning workshops about ALLIES+ practices and selecting a science content area and accompanying lessons for expanded learning staff to implement. The principal and

expanded learning coordinator highlighted how valuable it was to have joint collaboration and planning time with teachers and expanded learning staff during both the formal professional learning workshops and the PLCs. Team members described how the PLCs provided time to debrief after the lessons to talk about what went well and what should be modified or changed for the next lesson.

Bridging Expanded Learning and Expanded Learning Contexts When asked whether the project had successfully brought classroom teachers and expanded learning staff together all of the individuals interviewed responded that it had definitely opened a dialogue and broken down barriers. For example, the principal said, "It made a huge difference last year… I saw the connections build and saw that expanded learning staff was more comfortable asking teachers questions and teachers were more open to sharing resources with expanded learning staff." In addition, the regional leads described how the project had begun to break down barriers and bring the two communities together. Initially they noticed that expanded learning staff was tentative in meetings with teachers and administrators but they gradually began to feel comfortable and by the end they were participating fully. They also felt that teachers had gained a new understanding of some of the challenges that expanded learning staff face.

Academic Language and Literacy and Science Practices The interviewees were asked if the project led to increased use of academic literacy practices and science content in classrooms or expanded learning contexts. All of the interviewees responded that there was definitely an increase in the use of ALLIES+ practices in the expanded learning setting. The principal spoke of a "huge increase in the expanded learning program use of the ALLIES+ practices." The regional leads observed several science lessons being taught and described how EL staff used specific ALLIES+ strategies (e.g. sentence stems, academic vocabulary, finding evidence to support claims). The expanded learning coordinator described how the team had learned both science content and new ways to incorporate ALLIES+ strategies in to lessons. Likewise, the expanded learning director noted, "I saw science and math teachers provide their expertise to expanded learning program staff and then later saw it implemented in the expanded learning program. It was pretty amazing."

The principal and expanded learning coordinator described student presentations that were the culminating activity of the science unit taught by the expanded learning staff. Students presented on the STEM unit to a panel of teachers and the principal. The regional leads felt this was a powerful activity that engaged students as well as the entire ALLIES+ expanded learning team.

Successes One of the primary successes mentioned by interviewees was a shift in how teachers and expanded learning staff communicate and interact. All of the interviewees described how important it was that the entire team (teachers, expanded learning staff, principal) consistently attended all of the workshops and PLC's together. This resulted in the team gaining momentum and setting realistic and actionable goals. Another success related to this was that the principal was able to

carve out common planning time for the team to meet. All of the interviewees mentioned how valuable it was to have the principal be an active and engaged member of the team. This, in turn, resulted in significant steps towards bridging the gap between regular day and expanded learning programs.

Another success identified in the interviews was that expanded learning staff gained confidence in their ability to implement both the ALLIES+ strategies and the science content. As the expanded learning director described this shift, "It was great to see the expanded learning program staff taking the activities to the next level, and seeing the pride they had when they implemented the activities." Several interviewees noted that this increase in confidence resulted in students being more engaged and interested in the content as well. In a related comment, one of the COE staff noted the success of the project in giving English learners more opportunities to speak and use academic language – something that they do not typically get enough time to do during the school day.

Continued Supports Needed All of the interviewees noted the importance of continuing to give teachers and expanded learning staff the dedicated time to meet and collaborate. Specifically this involves both financial support and the organizational structure to set aside joint planning time. Expanded learning staff and teachers need additional training in the ALLIES+ strategies and science content in order to effectively collaborate and teach the content. The interviewees mentioned that the team needs to have access to high quality resources and materials that will engage students. This requires giving expanded learning staff the time to properly prepare the materials for students so that they are ready to teach the lesson in the most effective way.

Conclusions

Findings from this study suggest that professional development models that are responsive to the needs and interests of the participating educators, schools, expanded learning programs and districts hold great promise for authentic and generative teacher knowledge development. Specifically, models of professional development designed around the key, research-based practices of effective professional development, can positively impact teacher knowledge and practice. As such, the following features characterize our professional development model:

- *Situated in Practice:* Teams of educators from schools and expanded learning programs came to the professional development sessions and worked collaboratively on science curriculum and artifacts of practice from their contexts. Between sessions and meetings they implemented new lessons and activities in their settings and then they came back together to reflect on implementation and refine these products.

- *Focus on Student Learning:* The professional development sessions were all designed to focus on student learning (i.e., academic-language, science learning, and grade level concepts).
- *Model Instructional Strategies:* The professional development team modeled instructional strategies throughout the professional development sessions. In addition, teachers and expanded learning staff modeled various instructional strategies for each other.
- *Engage Educators in Active Learning:* The design studio components of the professional development meant that teams were active participants in the professional development sessions.
- *Build Professional Learning Communities:* Many activities in the professional development sessions were designed to build learning communities, both among the teams of teachers from each school, expanded learning staff, and among teachers and expanded learning staff.
- *Integrate with Other Aspects of School Change:* This initiative was developed in response to the district's emphasis on NGSS and CCSS. The professional development team met with the district leaders to elicit their goals for the professional development program and to understand the bigger strategic goals for the district. The professional development team then worked to design the professional development sessions such that they aligned with district goals.
- *Sustainable:* The professional development program was offered over an extended period of time consisting of activities that were ongoing and sustainable over time, and that provided the opportunity for participants to engage in cycles of experimentation and reflection. In addition, district instructional leaders participated in the professional development sessions so that they would have the knowledge and skills needed to sustain the work beyond this project.

Learning how to use ALLIES+ practices across educational contexts requires expert instruction, explicit modeling, and ongoing support. Learning to integrate these practices into an existing schema for teaching students in support of STEM learning requires time to practice and collaborate with colleagues. This professional development model, designed around the key principles for building instructional capacity, provided time for teachers and expanded learning staff to learn how to use the practices in support of academic language and science learning through explicit modeling, individual and collaborative experimentation, and expert and peer mentoring. The professional development providers' ability to determine and respond to the needs of design teams, by balancing modeling with appropriate support, were the critical components in what participants reported were authentic and generative learning experiences that promise to impact positively student academic language and their understanding of science concepts.

Appendices

Appendix A

Conversation Analysis Tool

The following scoring tool is meant to help you reflect on two key dimensions of effective interactions. You will fill in the online version of this tool when you complete Assignments 1.1 and 3.1. You can use this for practice and notes.

DIMENSION 1: Turns build on previous turns to build up an idea

4 Half or more of the turns build on previous turns to effectively build up a clear and complete idea

3 Half or more of the turns build on previous turns to adequately build up an idea, which may be incomplete or lack clarity.

2 Few turns build on previous turns to build up an idea.

1 Turns are not used to build up an idea.

DIMENSION 2: Turns focus on the knowledge or skills of the lesson's objectives

4 Half or more of the turns effectively focus on the lesson's objectives and show depth or fostering of the intended learning.

3 Half or more of the turns sufficiently focus on the lesson's objectives, but this focus may be superficial or lack clarity.

2 Few turns focus on the lesson's objectives.

1 Turns do not focus on the lesson's objectives.

Dimension 1: Turns build on previous turns to build up an idea	*Score* 4-3-2-1
Rationale for score	
Dimension 2: Turns focus on the knowledge or skills of the lesson's objectives	*Score* 4-3-2-1
Rationale for score	

Appendix B

Process for Developing Inquiry Questions

What is it that your students struggle with the most?

What do many of your students experience difficulty doing? (*Brainstorm on post-its.)*

What ideas go together? (*Prioritize.)*

What evidence do we need?

How are we going to teach it? (*Fill in Inquiry Question chart.)*

Write it as an inquiry question: *How can I develop my students' _____evidenced by _____by using_____?*

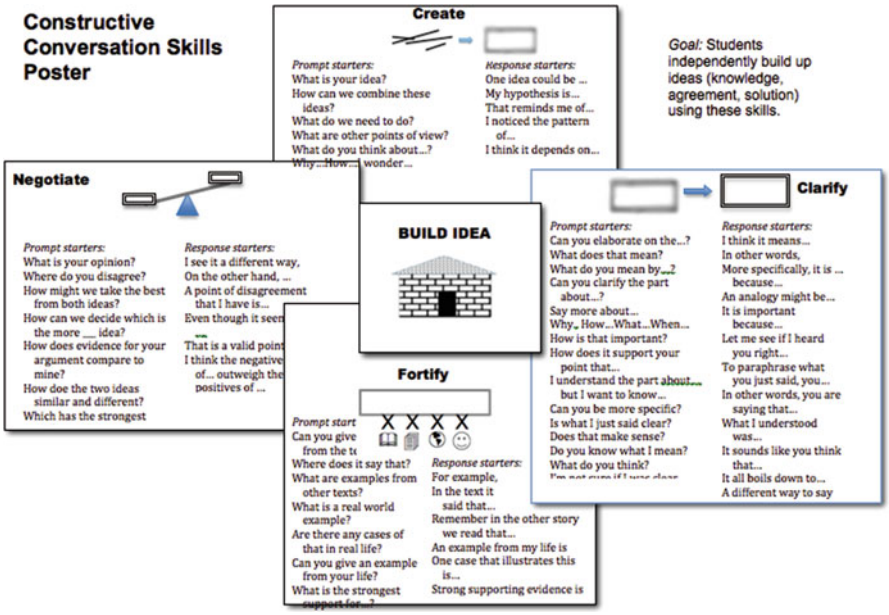
Question	Response
What do we want students to know and be able to do?	
How will we know? What evidence will we use to determine they met the learning target?	
What strategies or instructional practices will we use to help our students reach the learning target?	

Appendix C

School A: How can we improve student's ability to communicate using scientific, academic language?
Evidenced by written and spoken conversations: presentations with peers, teachers, and classroom guests and parents using Kate Kinsella's 4Ls for academic conversations; PBL; ALLIES frames and survival.

Which strategies were your focus? Sentence stems; Think pair share; Anchor charts

What does the evidence tell us? What students are doing well; What areas are students having difficulty? Patterns? Trends?	Next Steps:
Inquiry Question:	Evidence:
Timeframe:	Next PLC:



Source: Zwiers, J., O'Hara, S., & Pritchard, R. (2014). *Common Core Standards in diverse classrooms: Essential practices for developing academic language and disciplinary literacy.* **Portland, ME: Stenhouse**

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