Policy Research Initiative in Science Education – II

School, Program and Teacher Instruments
School, Program and Teacher Instruments

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INTRODUCTION

In 2005, the National Science Foundation (NSF) introduced a research initiative to address the critical issues and infrastructure needs threatening the career trajectories of K-12 science, technology, engineering, and mathematics (STEM) teachers. The goals of the initiative were “to improve the quality and coherence of teacher learning experiences across the continuum through research that informs teaching practice and development of innovative resources for the professional development of K-12 STEM teachers” (National Science Foundation, 2005). NSF called the initiative the Teacher Professional Continuum (TPC) Program.

A looming crisis identified in the science TPC was science teachers' retention in the profession. Research for a number of years has revealed that novice science teachers are the most likely to leave the profession (Patterson, Roehrig, & Luft, 2003). Research, however, indicated alarming increases in the attrition of a second group of science teachers, mid-career teachers. Research suggested that mid-career teachers are leaving the profession, often many years before reaching retirement age (Ingersoll, 2003). The trend indicated that novice teachers were replacing both groups (i.e., novice and mid-career), leaving schools with inexperienced teachers to prepare students in a high-stakes educational environment. An additional issue related to teacher attrition was the large number of teachers nearing retirement age. Finally, prior research indicated novice teachers are least prepared to work in a high-stakes education environment and that the students of these teachers are more likely to be unprepared for college level learning and life in the new century (Darling-Hammond, 2000).

Education researchers had identified several reasons for increases in attrition for science teachers (Ingersoll, 2003). Although working conditions and job satisfaction were contributors, few researchers had investigated these factors in depth (Bozeman and Stuessy, 2009). Additionally, little information existed in the research literature about the needs of novice, mid-career, and veteran teachers as they progressed through the TPC in terms of recruitment, induction, professional growth, retention, and retirement (Stuessy, 2009).

Proposing to address the potential crisis of high school (9-12) science teacher shortages due to attrition, Texas A&M University requested and received a $2.5M grant in 2005 from the NSF to study the TPC of high school science teachers in the state of Texas. At that time, more than 1,300 public high schools, exhibiting variation in size, minority student enrollment, and geographic location, were located in the state. Additionally, there was no consistent estimate (10,000 to 40,000) of the number of science teachers working in these schools. The Policy Research Initiative in Science Education-I (PRISE-I) Research Group at Texas A&M University randomly sampled 50 public high schools, investigated their school policies and practices, and generalized findings to all public high schools and science teachers in the state of Texas.
In the first study, PRISE-I researchers substantiated that schools with higher levels of TPC support had higher levels of teacher retention (Stuessy, 2009). They also found that these schools demonstrated higher levels of student academic success in science and college readiness (Bozeman & Stuessy, 2011; Stuessy, 2010; Stuessy & Bozeman, 2011). Findings of the PRISE-I investigations led researchers to a second study of high schools. This study specifically investigates high performing schools with proportionally large minority student populations (i.e., minority student enrollment proportion > 0.75). In this initiative, we propose to study the science TPC support within schools’ having large minority student populations that possess high science proficiency and college readiness. Specifically, the PRISE-II Research Group is investigating policies and practices within these schools, selectively choosing eight to ten of the 29 Texas high schools identified as having large minority student populations that are highly successful in science achievement and college readiness.

Framing High Schools with the TPC as the Bridge between Professional Culture and Student Success

The PRISE-II Research Group envisions the TPC as the “bridge” that connects the professional culture experienced by science teachers in high schools with student success in science proficiency and college readiness (see Figure 1). In PRISE-I investigations, an intensive review of the literature led us to examine relationships between the TPC, professional culture, and student success (Stuessy, 2009). This work in turn led us to describe connections within and between science teachers, science programs, and high schools' practices and policies associated with the recruitment, induction, professional development, and retention of high school science teachers. The guiding research questions were,

"Where are Texas high schools in supporting the professional continuum of science teachers? How does the school’s support of the professional continuum of science teachers connect with aspects of the school's professional culture and students' success in science and college readiness?"

The guiding research questions for PRISE-II parallels that of PRISE-I, except that they specifically address the TPC of schools with large minority student populations whose students demonstrate high levels of science proficiency and college readiness. The guiding research questions for PRISE-II are,

"Where are Texas high schools, having large minority student populations with high levels of student science proficiency and college readiness, in supporting the professional continuum of science teachers? How does the school’s support of the professional continuum of science teachers connect with aspects of the school's professional culture and students' success in science and college readiness?"
Figure 1. A systematic view of the high school learning environment, showing relationships between school, science program, and science teacher with the teacher professional continuum, professional culture, and student success.

**Teacher Professional Continuum**

The TPC of science teachers links Professional Culture with Student Success. Schools hire and retain highly qualified teachers who meet with students on a daily basis to encourage, guide, and monitor learning. In most schools, teachers with all ranges of prior experience and expertise are expected to contribute equally to the learning process. Expectations and responsibilities are the same for teachers in their first years as well as those with many years of experience. Often identified as the most vulnerable, novice teachers are often “presumed expert” (Kardos & Johnson, 2007), even though they have not had the opportunities to develop the expertise so essential in the learning process.

Expertise in teaching is complex. Expert teachers demonstrate many of the "general characteristics of expertise and differences between the performances of experts and novices across many domains of knowledge, skill, and practice" (Crawford, Schlager, Toyama, Riel, & Vahey, 2005). These domains include abilities to work flexibly within
complex environments; invent new procedures on the spot for solving unique problems, and engage in continuous learning that comes from reflection and revision about the consequences of one's own actions. “Creating a profession of teaching in which teachers who have the opportunity for continual learning is the likeliest way to inspire greater achievement for children” (Darling-Hammond in Kahle & Kronebusch, 2003).

The initial vision of the continual learning of teachers within the TPC was that teachers "enter" a linear, assembly-line type of professional continuum of teaching. The line begins with preparation and hiring of novice teachers, continues with induction experiences and professional development, and eventually results in the expert, "veteran" teacher. This “veteran” teacher is the individual who eventually retires from the profession after having completed a successful career trajectory from novice to expert teacher. Kahle and Kronebusch (2003) softened the assembly-line metaphor by referring to teacher development as a “seamless continuum of professional growth”. These authors stressed the need for teachers to move through the stages of the TPC with consistent, accountable assistance and support from individuals within and outside the walls of the school. Even newer models for the TPC embrace less linear notions of the TPC altogether. Sato, Roehrig, and Donna (2010) write about "bending" the professional teaching continuum through continuous teacher renewal where both "new entrants" and "seasoned veterans" connect. They mention the "wraparound" model for teacher involvement in the TPC that involves teachers working together in cross-generational learning teams:

We argue that intentionally blending the professional continuum can create opportunities for renewal of experienced teachers while simultaneously creating mechanisms for retaining beginning teachers, … ways that school, district, higher education, and state leadership can provide opportunities for experienced/master teachers to support the development of preservice and beginning teachers. (p. 182)

In the development of our understanding about the complex notion of TPC, then, we marked four significant ideas. First, teachers at different stages of the TPC exhibit different needs; novice science teachers should not be "presumed expert" in the first two or three years of their journey within the TPC. Second, all science teachers, regardless of their positions within the TPC, should experience continual growth and development with differentiated support. Third, newer wrap-around, cross-generational visions have replaced older linear visions of the TPC. Finally, schools demonstrating higher levels of support for science teachers within the TPC will inevitably show higher levels of science teacher retention and student science achievement and college readiness.

Professional Culture

The TPC contributes to the professional culture experienced by all science teachers working in the school. Professional culture refers to the “established modes of professional practice among teachers, their norms of behavior and interaction; and the prevailing institutional and individual values that determine what teachers do and how they do it” (Kardos & Johnson, 2007). The term refers to a school as a whole or to sub-
units within a school, such as in departments, grade levels, or teacher clusters. Regardless of the unit level, both formal and informal structures for teacher support influence the culture. Established modes of professional practice include activities that bring teachers together to establish and shape methods of communication, collaboration, and consensus. In science programs, the professional culture is particularly important in adopting professional learning models focused on reform-based strategies and instructional models to enhance learners' proficiencies in science (see Duschl, Schweingruber, & Shouse, 2007; Michaels, Shouse, & Schweingruber, 2008; Project 2061, 1998).

**Student Success**

We have investigated science teacher retention as a variable predicting student success. As a group, we approached the “slippery slope” of student success by adopting a vision much broader than the single score provided by the high-stakes, state-mandated Science TAKS (Texas Assessment of Knowledge and Skills) test. We chose to examine student success as a school aggregate score using both science proficiency and college readiness (SASS). Specifically, we used a number of student-level variables related to science, which we then aggregated to create a school-level measure. As a result, SASS became a score constructed to represent the science proficiency and college readiness of all students within a school.

The SASS algorithm (see Eqn.1) uses school-aggregated student data describing the quartile rank of each school for a number of school measures. These measures include: (a) percentage of students passing the 10th grade state science examination (SSE), (b) percentage of students taking a college entrance examination (CEET), (c) percentage of students passing or exceeding the criterion on a college entrance examination (PEET), (d) percentage of students completing an Advanced Placement course (APDE), and (e) overall state accountability (SR).

$$SASS = [(1.5 \times SSE – 0.5) + CEET + PEET + APDE + SR] \quad \text{Eqn.1}$$

Schools exhibiting high student success are those with SASS scores ranked in the 4th quartile, while schools exhibiting low student success are those with scores ranked in the 1st quartile. We identified 8 (16%) schools exhibiting high student success and 13 (26%) schools exhibiting low student success in the random sample of 50 Texas schools drawn for the PRISE-I study. In the purposive sample of eight to ten schools drawn for the PRISE-II study, all schools were identified as having a proportionally large minority student population (i.e., minority student enrollment proportion > 0.75) and a 4th quartile SASS score.

**School, Science Program, and Science Teacher**

Each School is a complex organization of interacting subsystems and individuals that serve the needs of communities residing outside and within the walls of the school. Examples of communities outside school walls include parents, professional organizations, local businesses, and informal science institutions. Examples of communities inside school walls include faculty, support staff, and students. These communities work together to support and strengthen the professional culture for science
teachers and the success of science students as they complete their high school education and enter the world to live, work, and continue to learn.

The Science Program (SP) is one subsystem within a school that provides an infrastructure of support for the needs of science students, of teacher communities within the walls of the school, and of communities existing outside the walls of the school. Of particular interest in the work of the PRISE Research Group is the role of the SP in assisting science teachers as they navigate the TPC. This assistance is critical in creating the professional culture that science teachers experience within the walls of the school.

Science Teachers (ST) are the primary actors within the SP. Of particular interest in the work of the PRISE Research Groups are the roles of ST as they contribute to and rely on others to advance through the TPC. Retention of ST within the TPC is a primary concern of schools and communities, as experienced teachers have demonstrated their expertise and pay-offs in terms of their students’ academic achievements in science and readiness for college.

Instrument Order

Readers will find the format of this document similar to existing instrument manuals used in mixed-methods research. In the design of our instruments, we did not restrict our thinking to either quantitative or qualitative approaches. Rather, we chose a pragmatic approach that includes both quantitative and qualitative measures and mixed them to answer complex questions about the relationships between and among a number of school, program, and teacher variables.

Practical issues in research data collection received early and serious consideration when preparing this manual. Consequently, we made hierarchical and linear choices in the order of presentation for the instruments. In terms of hierarchical choices, instruments requesting information about the school precede the instrument requesting information about the science program. Teacher instruments appear last and in the order of teachers’ progression through the TPC which reflects the professional lives of science teachers as they enter (i.e., Novice), navigate (i.e., New-to-School), participate (i.e., Texas Poll of Secondary Science Teachers), and exhibit mastery (i.e., Mentor) in the profession.

Overview of Chapters

In the first three chapters of this manual, we define the key terms within conceptual models that influenced the design of school (Chapter 1), science program (Chapter 2), and science teacher (Chapter 3) instruments. In Chapter 4, we offer guidelines for using interview instruments. Finally, we provide readers a copy of the nine interviews and single survey instrument designed to measure policies and practices occurring in high schools that are associated with Professional Culture, Student Success, and science teachers’ TPC.
ACKNOWLEDGEMENTS

As the editors of this manual, we assume full responsibility for the authorship of the text within the four chapters preceding the instrument section of this manual. However, we are only two participants in the PRISE Research Group. We share authorship of this manual and all instruments with PRISE group members, who conceptualized, designed, piloted, and/or revised the instruments. These instruments have supported the completion of a number of dissertations. These include dissertations by Dane Bozeman (job satisfaction and professional activity), Tyrone Blocker (culturally responsive pedagogy), Tori Hollas (working conditions), Toni Ivey (induction), Ra'sheedah Richardson (recruitment), Laura Ruebush (professional development), Sara Spikes (retention), and Caroline Vasquez Rosado (cases studies of TPCs in three border high schools). We acknowledge the support of many other colleagues as well as the high school principals and science teachers who have contributed to our collective understanding of the relationships between and among components and actors within the high school systems of Texas. With new knowledge about factors contributing to students' academic success in science and teachers' retention in the TPC, we hope to provide support through research findings for science teachers and their schools to improve policies, programs, and practices. Our vision is that our engagement in this research will benefit communities residing within as well as those extending far beyond the walls of high schools in Texas.

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CHAPTER 1

DESIGN OF SCHOOL-LEVEL INSTRUMENTS

The high school principal performs various duties that directly relate to the Teacher Professional Continuum (TPC) of science teachers in that school. Performance of these duties provides a principal with a unique perspective about the policies and practices that support science teachers in the school. Obtaining a principal’s perspectives about specific factors associated with the TPC for science teachers is the purpose behind each School-level instrument. This chapter outlines the design of these instruments.

Each school-level instrument elicits information from a principal about factors associated with the TPC of high school science teachers. Specifically, each instrument focuses on policies and practices occurring within a school associated with an individual teacher’s (a) introduction into the profession (i.e., Recruitment), (b) assimilation into the school culture (i.e., Induction), (c) development (i.e., Professional Development), and (d) decision to remain at the school (i.e., Retention). See Figure 2.

Figure 2. Four instruments (i.e., Recruitment, Induction, Professional Development, and Retention) designed to obtain school-level information associated with the TPC stages of high school science teachers.
Recruitment Interview

Recruitment is defined as the policies and practices occurring within a school to attract and hire a high school science teacher. Recruitment is the first stage in a teacher’s professional journey. Each of the questions in the Recruitment Interview elicits information about policies and practices specific to attract and hire a teacher.

Induction Interview

Induction is defined as the policies and practices occurring within a school to support a high school science teacher who is beginning a professional career (i.e., Novice). Induction is the second stage in a science teacher’s professional journey. Each of the questions in the Induction Interview elicits information about policies and practices specific to orient and support a teacher entering the profession.

Professional Development Interview

Professional Development is defined as the policies and practices occurring within a school to provide high school science teacher opportunities to improve their domain-specific and general knowledge and skills about science and science teaching. Professional Development is the third stage in a science teachers’ professional journey. Each of the questions in the Professional Development Interview elicits information about policies and practices specific to the development of a science teacher.

Retention Interview

Retention is defined as the policies and practices occurring within a school to encourage teachers to remain in the school as science teachers. Retention is the final stage in a high school science teacher’s professional journey. Each of the questions in the Retention Interview elicits information about policies and practices specific for keeping a teacher at a school.

Dimensions for School-Level Instruments

Information about the four TPC stages for a science teacher are described in three dimensions (see Figure 3). The dimensions are Instructor, Location, and Challenges and Changes. These dimensions encompass unique contributions to the recruitment, induction, professional development, and retention of science teachers.
Figure 3. *Three dimensions (i.e., Instructor, Location, and Challenges and Changes) contributing to each one of four (i.e., Recruitment, Induction, Professional Development, and Retention) TPC stages.*

**Instructor, Location, and Challenges and Changes Dimensions**

Instructor is the label for the dimension defining instructional practices identified by the principal as important or critical for a teacher. Location is the label for the dimension defining the policies and practices currently used in a school. Challenges and Changes is the label for the dimension defining the principal's forecasts regarding the recruitment, induction, professional development, or retention of science teachers at a school. Each of the questions within the Instructor, Location, and Challenges and Changes dimensions elicits information from a school’s principal about policies and practices related to the four stages within the TPC.

Each of the interviews discussed in Chapter 1 were designed to capture information regarding the science teacher TPC from the principal as the instructional leader of the high school system. Many subsystems exist within the school system. One of these is the Science Program, which includes actors and responsibilities associated with preparing students to become proficient in science and ready for college. In Chapter 2 we present the SP interview. The SP interview was designed to capture information about a school’s SP from a single science teacher, the school's "science teacher liaison," who was designated by the principal. This individual often held a science leadership position in the school, such as head of the science department or science lead teacher.
CHAPTER 2

DESIGN OF SCIENCE PROGRAM-LEVEL INSTRUMENT

The Science Program (SP) is a complex subsystem situated within the walls of a high school, charged with making and implementing decisions about issues associated with students’ science learning and college readiness. Another related purpose of the SP is to oversee practices and programs that assist science teachers as they navigate through the stages of the Teacher Professional Continuum (TPC). Additionally, the SP serves to foster a sense of collegiality and collaboration among science teachers within the school and district. This chapter outlines the design of the SP interview that the Policy Research Initiative in Science Education-I (PRISE-I) Research Group used to collect information of SP.

The SP interview elicits information from a single teacher, identified by the school principal to be the “science liaison.” Specifically, the interview focuses on policies and practices of four factors associated with the SP: Organization, Curriculum, Instructional Priorities, and Vision (see Figure 4).

Figure 4. Four factors (i.e., Organization, Curriculum, Instructional Priorities, and Vision) associated with a high school’s Science Program.
Organization

Information about the Organization of the SP comes from three dimensions (see Figure 5). The three dimensions are Players, Communication, and Collaboration. Each of these dimensions provides unique perspectives from which to describe the Organization of a high school’s SP, which include the design and implementation of a school’s policies and practices.

Figure 5. Three dimensions (i.e., Players, Communication, and Collaboration) contributing to the Organization of a high school’s Science Program.

Players, Communication, and Collaboration

The Players dimension identifies and describes the individuals within a school’s SP. The Communication dimension describes the information pathways and how they work within a school’s SP. The Collaboration dimension describes the support structures within a school’s SP. Policies and practices determine how these three dimensions contribute to the Organization of a school’s SP.
Curriculum

Information about the Curriculum in a SP comes from two dimensions (see Figure 6). The dimensions are Locus of Deliberation and Resources. Each of these dimensions provides unique perspectives from which to describe the Curriculum of a high school’s SP, which include the design and implementation of a school’s policies and practices.

![Diagram showing two dimensions: Locus of Deliberation and Resources, connected to Curriculum]

Figure 6. Two dimensions (i.e., Locus of Deliberation and Resources) contributing to the Curriculum of a high school’s Science Program.

Locus of Deliberation and Resources Dimensions

The Locus of Deliberation dimension describes the methods used to generate conclusions within a school’s SP. The Resources dimension describes the materials used by teachers to support student learning with a school’s SP. Policies and practices determine how these two dimensions contribute to the Curriculum of a school’s SP.

Instructional Priorities

Information about the Instructional Priorities in a SP will come from three dimensions (see Figure 7). The dimensions are Process, Engagement, and Assessment. Each of these dimensions provides unique perspectives about the Instructional Priorities of a high school’s SP, which include the design and implementation of a school’s policies and practices.
Figure 7. Three dimensions (i.e., Process, Engagement, and Assessment) contributing to the Instructional Practices of a high school’s Science Program.

**Process, Engagement, and Assessment Dimensions**

The Process dimension describes instructional techniques chosen and used by teachers within a school’s SP. The Engagement dimension describes the connections that students make within a school’s SP. The Assessment dimension describes the evaluation methods used by teachers of a school’s SP. Policies and practices determine how these three dimensions contribute to the Instructional Practices of a school’s SP.

**Vision**

A school’s SP has a Vision, which provides direction for the SP and includes both implicit and explicit goals. The Vision can also suggest a self-awareness of the strengths, weaknesses, and uniqueness of the SP itself. Questions in the SP interview make specific reference to the dimensions within each of the four factors associated with the high schools' SP: Vision, Organization, Curriculum, and Instructional Priorities. Overall, the SP interview is designed to capture information about the school’s SP that plays a role in the science teacher TPC.
CHAPTER 3

DESIGN OF TEACHER-LEVEL INSTRUMENTS

A high school science teacher performs various duties in a school that directly relate to the Teacher Professional Continuum (TPC). Performances of these duties provide teachers with unique perspectives about a school’s policies and practices. Obtaining individual teachers’ perspectives about the school in which they teach is the purpose behind each of the teacher instruments.

Each teacher instrument elicits information about factors associated with the TPC. Specifically, each instrument focuses on policies and practices occurring within a school associated with an individual teacher’s (a) introduction into the profession (i.e., Novice); (b) movement from one school environment to another (i.e., New-to-School); (c) participation and attitudes about the profession and the professional environment in which they work (i.e., TPSST); and (d) assumption of responsibility for other teachers’ development (i.e., Mentor). See Figure 8.

Figure 8. Four instruments (i.e., Novice, New-to-School, TPSST, and Mentor) designed to obtain teacher-level information associated with the TPC of high school science teachers.
Novice Interview

Novice teachers gain expertise in domain-specific and general knowledge about science and science teaching as they learn the “tools of the trade.” The level of expertise of the science teacher contributes to his/her students’ science proficiency and college readiness. The progressive mastery of these factors provides a Novice teacher with a unique perspective about a school’s policies and practices designed for teachers new to the profession.

The Novice Interview elicits information from high school science teachers in their first three years of teaching experience about their professional experiences as they begin their careers. Specifically, the instrument focuses on policies and practices associated with four aspects of their new positions: Recruitment, Working Conditions, Collegiality, and Induction/Mentoring. See Figure 9.

![Diagram](image)

Figure 9. *Four factors (i.e., Recruitment, Working Conditions, Collegiality, and Induction/Mentoring) associated with the TPC of a Novice science teacher.*

**Recruitment**

Recruitment is defined by the policies and practices a school uses to attract and hire teachers. Recruitment is the first step in a Novice teacher’s professional journey. Each of the Recruitment questions elicit information about a school’s policies and practices specific to the hiring of a Novice science teacher.
**Working Conditions**

Working Conditions (WC) is defined by the multiple environmental and structural conditions within the school that directly affect the science teacher's abilities to be effective in the classroom. WC include barriers to teaching time and space; adequacy of facilities, equipment and safety; school support for teachers’ professional development; and community support outside the walls of the school.

**Collegiality**

Collegiality is defined by the multiple interactions that occur between and among teachers that are related to modes of professional practice, learning, and collaboration among science teachers within the walls of the school (Kardos & Johnson, 2007). Collegiality refers to engagement with others through activities that support professional learning and growth. Each of the Collegiality questions elicit information about the school’s policies and practices specific to the collegial environment of the school in which the Novice science teachers works.

**Induction/Mentoring**

Induction/Mentoring (IM) refers to the support provided for Novice teachers to move towards more advanced levels of professionalism and expertise. IM recognizes the growth of both Novice teachers and their Mentors as they together grow in their abilities to learn from one another and increase their effectiveness in the science classroom. Examples of IM include provisions for informal and formal meetings between Novice teachers and their Mentors and with the principal; meetings with other teachers; training for Mentor teachers; opportunities to observe or be observed by other teachers; and opportunities to provide feedback regarding current induction methods.

**Three Dimensions of IM.** Information about IM in a school is obtained in three dimensions (see Figure 10). The dimensions are Mentor’s Role, Principal’s Role, and Evaluation. The Mentor’s Role describes techniques used by a teacher to induct or mentor a teacher into both the profession and the school. The Principal’s Role describes techniques used by a principal to induct or mentor a teacher into the profession as well as into the school. The Evaluation dimension describes the inclusion of provisions for teachers to evaluate and improve the existing IM of a school.
New-to-School Novice Teacher

PRISE-I researchers defined Novice science teachers as teachers who are in their first three years of professional experience. A special type of Novice teacher is the New-to-School Novice teacher. New-to-School Novice teachers are in their first year at the school and in their first three years of teaching. These teachers possess certain habits of mind, perceptions, and attitudes unique to a teacher who is new to both the profession and a school. The New-to-School section in the Novice interview is the same for all New-to-School teachers, which appear in the description below.

New-to-School Interview

New-to-School teachers become familiar with many aspects of their new work environments while teaching a full course load and managing other aspects of their personal and professional lives. Professional aspects include domain-specific and general knowledge about the subject matter of science and science teaching. Regarding the latter, this knowledge includes abilities to manage science classrooms and laboratories, employ alternative assessment strategies, work with parents, assume non-teaching responsibilities (e.g., science club sponsorship, coaching, hall duty, after-school detentions), work within multicultural environments, and adjust to the professional culture of the school and school district. Continued mastery of these aspects provides
New-to-School teachers with unique perspectives of the policies and practices at a school designed specifically for them. The New-to-School interview elicits information from high school science teachers in their first year as a science teacher in that school building with specific reference to the activities and practices of Recruitment and Orientation (see Figure 11).

Figure 11. Two factors (i.e., Recruitment and Orientation) associated with the TPC of a New-to-School teacher.

**Recruitment and Orientation**

Recruitment has been previously defined as the policies and practices a school uses to attract and hire science teachers. Furthermore, Recruitment is the first step in a Novice teacher’s professional journey. Orientation is defined as the policies and practices a school uses to familiarize the teacher to the policies and procedures of both the school and the school district.

**Texas Poll of Secondary Science Teachers**

The TPSST is a paper-and-pencil instrument designed to elicit information from high school science teachers about their professional participation in the TPC. Specifically, the instrument focuses on policies and practices associated with three aspects of their participation. These three factors are Professional Actions, Equity Pedagogy and Job Satisfaction (see Figure 12).
Figure 12. Three factors (i.e., Professional Actions, Equity Pedagogy, and Job Satisfaction) associated with a teacher’s Professional Participation.

We developed the TPPST through a process of design, field-testing, revision and final administration with 385 science teachers from the 50 sample schools, with a survey return rate of 89.2%. Standardized methods for addressing issues of teacher non-response were used (Grooves, Fowler, Couper, Lepkowski, Singer, & Tourangeau, 2004). Finally, Cronbach's alpha ($a = 0.862$) was calculated as a measure of internal consistency, supporting the research group's claim that the instrument was reliable. A modified version of the TPPST is presented in this manual. (After full administration with PRISE-II teachers, the return rate and Cronbach's alpha values will be calculated.)

**Professional Actions**

Professional Actions is defined as the practices performed by a teacher to progress through the stages of the TPC. Information about a teacher’s participation in Professional Actions were obtained using six dimensions (see Figure 13). These six dimensions are Recruitment, Induction/Mentor, Leadership, Professional Development, Knowledge about Domain-Specific Science Teaching (DSST), and Knowledge about Non-Domain-Specific Teaching (NDST). Each of these dimensions provides unique perspectives about a science teacher’s Professional Actions.

**Six Dimensions of Professional Actions.** Recruitment describes a teacher’s participation in activities designed to hire new science teachers at the school. Induction/Mentor describes a teacher’s participation in activities designed to assist Novice science teachers in the development of expertise as a science teacher in the
school. Leadership describes a teacher’s participation in activities that involve the guidance, decision-making, and problem-solving of other teachers in the school or the profession. Professional Development in Science describes a teacher’s participation in activities designed to train a teacher in professional methods. Knowledge about Domain-Specific Science Content and Science Teaching (DSST) refers to methods and venues for increasing a teacher’s knowledge in the content of science or about science teaching. Knowledge about Non-Domain-Specific Content and General Teaching (NDST) refers to methods and venues for increasing a teacher's knowledge in subjects other than science.

Figure 13. Six dimensions (i.e., Recruitment, Induction/Mentor, Leadership, Professional Development, Knowledge about Domain-Specific Science and Science Teaching, and Knowledge about Non-Domain-Specific Content and Teaching) contributing to a teacher’s Professional Actions.

**Equity Pedagogy**

Equity pedagogy is defined as the practices of teachers that enable students from diverse cultural backgrounds to become science proficient and college ready. Information about teachers’ use of equity pedagogy was obtained in three dimensions (see Figure 14). The dimensions are Teacher Strategies, Student Assessment, and Congruency. Each of these dimensions provide unique contributions to a teacher’s use of equity pedagogy.
**Three Dimensions of Equity Pedagogy.** Teacher Strategies describes the methods used by a teacher in the classroom to instruct students in the sciences. Student Assessment describes the methods used by a teacher to determine student mastery of scientific knowledge. Congruency describes the methods used by a teacher to create, influence, or conform to the standards of equity pedagogy in their school.

![Diagram of three dimensions contributing to Equity Pedagogy](image)

Figure 14. Three dimensions (i.e., Teacher Strategies, Student Assessment, and Congruency) contributing to a teacher’s Equity Pedagogy.

**Job Satisfaction**

Generally, job satisfaction is a term used to describe how content an individual is with his/her job. Going beyond a general description of Job Satisfaction to operationally define the term for science teachers in their work environments has been difficult for the PRISE Research Group, which is not uncommon among researchers who have examined worker satisfaction in a number of occupational fields (Weiss, 2002). Our research group finally reached agreement on an operational definition for job satisfaction when we identified two criteria that must be satisfied to include as an aspect that contributes to teacher satisfaction at the school level: First, the aspect had to be one over which the school, science program, and/or teacher had some control. Second, the aspect had to have some evidence from previous research as being important in affecting teachers’ ultimate decisions to either stay or leave their current teaching position. (For example, satisfaction with salary was not included as an aspect of teachers’ job satisfaction. We understood that nearly all teachers perceive themselves as underpaid and that teachers do leave their
teaching positions for occupations that provide bigger salaries. However, we also understood that neither the school’s administrators nor the science program has any control over what science teachers at the school are paid.) A variety of a were chosen within the domain of Job Satisfaction in the PRISE-I research. These factors are clustered into four dimensions: Administrative Support and Communication, Laboratory Facilities and Equipment, Personal Satisfaction, and Collegiality (see Figure 15).

**Four Dimensions of Job Satisfaction.** Administrative Support and Communication describes the relationship between a teacher and the administration of a school. Laboratory Facilities and Equipment describes the physical environment that supports the teaching and learning that occurs within the teacher's classroom. Personal Satisfaction describes the teacher's performance of professional duties. Collegiality describes working with other teachers at a school.

![Four Dimensions of Job Satisfaction](image)

Figure 15. *Four dimensions (i.e., Administrative Support and Communication, Laboratory Facilities and Equipment, Personal Satisfaction, and Collegiality) contributing to a teacher’s Job Satisfaction.*
Mentor Interview

A Mentor teacher performs various duties in a school that directly relate to the TPC of teachers. Performance of these duties provides a Mentor with a unique perspective about the policies and the practices within their school. The Mentor Interview elicits information from a teacher about the induction and/or mentorship of high school science teachers. Specifically, the questions focus on policies and practices affecting four factors associated with the induction and/or mentorship of a teacher at a school. These four factors are Identification, Training, Working Conditions, and Induction/Mentorship (see Figure 16).

Figure 16. Four factors (i.e., Identification, Training, Working Conditions, and Induction/Mentorship) associated with a Mentor teacher.

Identification

Identification is defined as the policies and practices a school uses to inform a specific teacher that he/she is a Mentor to a Novice or New-to-School teacher. Identification provides Mentor teachers with the knowledge that they are responsible for the induction or mentorship of another teacher. Each of the Identification questions elicits information from a Mentor teacher about a school’s policies and practices to recognize a Mentor teacher.

Training

Training is defined as the policies and practices a school uses to prepare a teacher to mentor a Novice or New-to-School teacher. Training provides a Mentor teacher with the necessary skills to guide a Novice or New-to-School teacher into the profession and/or into a specific school culture. Each of the Training questions elicits information
from a Mentor teacher about a school’s policies and practices used to prepare a Mentor teacher.

**Working Conditions**

Working Conditions is defined as the policies and practices a school uses to provide all teachers a physical environment in which to effectively teach. Working Conditions provide a Mentor teacher with a framework to mentor Novice or New-to-School teachers into the profession and/or into the new school working environment. Each of the Working Conditions questions elicit information from a Mentor teacher about a school’s policies and practices specific to the physical environment of a school.

**Induction/Mentoring**

An Induction/Mentoring provides a Novice teacher with the tools necessary to become a productive member of both the profession and a school. These tools are typically provided to the Novice teacher by either a principal and/or by a Mentor teacher. Both of these individuals typically have experience in both the profession and the school. Information about the IM in a school will be obtained using three measures (see Figure 10). The measures are Mentor’s Role, Principal’s Role, and Evaluation. Each of these measures provides a unique contribution to the IM of a school.

The Principal Interview, discussed in Chapter 1, was designed to capture information about the science teacher TPC from the perspective of the school’s principal. The Science Program interview, discussed in Chapter 2, was designed to capture information regarding the science teacher TPC from the perspective of the school’s Science Program. The survey and interview instruments presented in Chapter 3 were designed to capture information about the teacher TPC from every teacher within the school. As a result of the mixed-methods research design and variation in administrator and teacher profiles, PRISE researchers chose to use multiple interview instruments. In Chapter 4 we present some of the guidelines we used when implementing the interviews.
CHAPTER 4
GUIDELINES FOR INTERVIEW INSTRUMENTS

Effective interviewers within a group have a common understanding of all interview instruments. This understanding includes information about three key interview structures: (1) definitions of terms, (2) conceptual models, and (3) question format. By understanding these structures, interviewers can ask questions in a conversational manner that promotes validity. For example, when asking a teacher how a school’s science program encourages students to think about their social interests, effective interviewers first define social interests. Additionally, the interviewers realize that the definition for social interests fits the PRISE – II conceptual model. Finally, they realize that placement of the question occurs at a specific time and place within the interview.

Definitions of Terms

The definitions of terms in this manual promote the validity of response data by helping interviewers develop a conversational manner when interviewing individuals. A conversational manner assists an interviewer to ask and probe for valid information. Definitions in this manual reflect a review of the literature relevant to factors associated with the Teacher Professional Continuum (TPC) of science teachers.

Conceptual Models

The conceptual models in this manual promote the validity of response data by providing interviewers a framework to understand a question’s purpose within an interview. Models in this manual reflect current understanding of the relationships between various dimensions within the TPC. An understanding of a question’s purpose substantiates the need to ask all questions for an interviewer.

Question Format

The format of questions in this manual reflects current Mixed Methods research techniques. The question format for all interview instruments promotes the validity of response data by presenting interviewers a similar style across all instruments. A similar style across all instruments promotes uniformity in the application by multiple interviewers.

General Question

Each general question is **numbered and bolded**. Interviewers should ask each question, defining terms, so that the subject completely understands the question. Affirmative comments such as “That is really interesting” and quick probing questions like “What do you mean by…?” will help individuals interviewed elaborate on responses to the general question.
Follow-Up Question

Each follow-up question is lettered. Each question provides an important point(s) that an interviewer wants to listen for and check off. For validity, follow-up questions should be used when individual interviewed does not talk about the points in the general question.

Final Statement

A consensus exists among science education stakeholders about the importance of a sustained and professional science teacher population. At issue is the identification of the mechanisms by which science teachers enter, mature, and provide the necessary leadership and skills to contribute to and benefit from the professional culture within the school. Outcomes of a successful TPC include a professional culture that supports learning and leadership throughout all stages in the life of a science teacher. Outcomes of a successful TPC also include the preparation of a population of high school students who are proficient in science and college ready as they graduate from high school and enter new avenues in which they learn, live, and work in the dynamic, rapidly changing landscape of the 21st century.

Research from PRISE-I studies provides evidence that a significant gap exists in science proficiency and college readiness between schools that serve primarily white students and schools that serve student populations with high levels of cultural diversity. Research from PRISE-I studies also provides evidence that the Teacher Professional Continuum (TPC) is an important pathway linking teacher professionalism with student success. Research from PRISE – I also provides evidence that schools with low levels of TPC support also exhibit lower rates of teacher retention and positive student outcomes. Consequently, we have chosen a mixed methods study to investigate relationships between and among the TPC, Professional Culture, and Student Success in a special group of schools for which we have no data from the PRISE-I studies: high schools serving student populations with high levels of cultural diversity that demonstrate high levels of student science proficiency and college readiness.

In the Introduction to this manual, we provided a short historical description of the PRISE-I and II research groups. Specifically, we discussed research agendas and guiding research questions, a conceptual model linking Professional Culture and Student Success, and theoretical considerations used to create and present the instruments contained in the manual. In Chapters 1 through 3, we presented our conceptual models and definitions for stages, factors, and dimensions related to the TPC of science teachers. In Chapter 4, we presented a short discussion on guidelines used by PRISE-II researchers during implementation of interview instruments. The remainder of this manual provides copies of PRISE-II instruments.
Recruitment consists of the policies and practices a school uses to attract and hire highly qualified teachers.

1. How does recruitment of teachers work at your school?

2. How does recruitment of science teachers work at your school?

   A. Explain your school’s current recruitment policies and practices for science teachers.

   B. What would be the 3 most important things you look for in a science teacher when you are recruiting?

   C. Identify “what works best” in your school’s current recruitment policies and practices for science teachers.

   D. What do you think attracts science teachers to your school?
E. Explain any challenges that your school faces when recruiting science teachers.

F. What science teacher recruitment issues are emerging in the immediate future at your school?

G. What 3 things would you change about your school’s current recruitment policies and practices for science teachers?

H. How would you describe the relationship between teacher recruitment and student achievement?

I. Is there anything else that you would like to tell us about recruitment of science teachers at your school?
INDUCTION INTERVIEW

**Induction** consists of policies and practices a school uses to both orient and support novice and/or new-to-school teachers to the professional school environment.

**Note:** Novice describes a teacher with no more than three years teaching experience. New-to-school describes a teacher in their first year of teaching at a school who is NOT a Novice teacher.

1. **How do you support the induction of teachers at your school?**

2. **How do you support the induction of science teachers at your school?**

   A. Explain your school’s current induction policies and practices for science teachers. (Please clarify any differences specific to novice and new-to-school teachers).

   B. Explain the policies and practices you have in place for selecting and training mentors for science teachers at your school?

   C. Identify “what works best” in your school’s current induction policies and practices for science teachers. (Please clarify any differences specific to novice and new-to-school teachers).

Answers to questions should be audio taped on speaker phone. Use these sheets for field notes and file them in the corresponding school folder.
D. Explain any challenges you believe your school faces when inducting science teachers?

E. Do you see any induction issues for science teachers emerging in the immediate future at your school? (Elaborate these issues and concerns; please clarify any differences specific to novice and new-to-school teachers).

F. What 3 things would you change about your school’s current induction policies and practices for science teachers? (Please clarify any differences specific to novice and new-to-school teachers).

G. How would you describe the relationship between teacher induction and student achievement?

H. Is there anything else that you would like to tell us about induction of science teachers at your school?

Answers to questions should be audio taped on speaker phone. Use these sheets for field notes and file them in the corresponding school folder.
Professional Development consists of the policies and practices a school uses to provide teachers opportunities to improve knowledge and skills.

1. How do you support the professional development of teachers at your school?

2. How do you support the professional development of science teachers at your schools?

   A. Explain your school’s current professional development policies and practices for science teachers.

   B. Identify “what works best” in your school’s current professional development policies and practices for science teachers.

   C. Explain any challenges that your school faces regarding professional development for science teachers.

Answers to questions should be audio taped on speaker phone. Use these sheets for field notes and file them in the corresponding school folder.
D. What science teacher professional development issues are emerging in the immediate future at your school?

E. What 3 things would you change about your school’s current professional development policies and practices for science teachers?

F. How would you describe the relationship between teacher professional development and student achievement?

G. Is there anything else that you would like to tell us about professional development of science teachers at your school?
RETENTION INTERVIEW

Retention consists of the policies and practices a school uses to retain teachers.

1. How do you support retention of teachers at your school?

2. How do you support retention of science teachers at your school?

   A. Explain your school’s current retention policies and practices for science teachers.

   B. How do you evaluate your science teachers effectiveness in the classroom? (Elaborate the decision-making process).

   C. Identify “what works best” in your school’s current retention policies and practices for science teachers.

   D. Explain any challenges your school faces when retaining science teachers.

Answers to questions should be audio taped on speaker phone. Use these sheets for field notes and file them in the corresponding school folder.
E. What science teacher retention issues are emerging in the immediate future at your school? (Elaborate these issues and concerns).

F. What 3 things would you change about your school’s current retention policies and practices for science teachers?

G. How would you describe the relationship between teacher retention and student achievement?

H. Is there anything else that you would like to tell us about retention of science teachers at your school?
Organization

*Players* describes the individuals within a school’s SP. Policies and practices determine who the individuals are within an SP.

1. Describe the people in your school’s SP and what do they do.

2. Describe the leaders in your school’s SP.

3. What is the general structure of the SP?
   A. Science department with a department head
   B. Teachers grouped according to subject disciplines, e.g. chemistry
   C. Science placed within an interdisciplinary team structure
   D. Other

4. Describe a typical SP meeting.
   A. Generally, what is the purpose(s) of these meetings?
   B. Who leads SP meetings?
   C. Does the SP typically meet as a whole group or in small subgroups?
   D. How often do SP meetings occur?
   E. Are these meetings regularly scheduled or do they occur more intermittently?
   F. Where do the meetings occur?

Answers to questions should be audio taped on speaker phone. Use these sheets for field notes and file them in the corresponding school folder.
Communication describes the information pathways within a school’s SP. Policies and practices determine how pathways work within an SP.

5. How do SP members provide input about SP management issues (e.g., staffing and training, facility use, and budget)?
   A. Do SP members provide input about staffing and training?
   B. Do SP members provide input about the facility needs of science teachers?
   C. Do SP members provide input about the SP budget?

6. Would you describe the decision-making process in the SP as top-down, bottom-up, or a balanced process?

Collaboration describes the support structures within a school’s SP. Policies and practices determine how structures provide support within an SP.

7. Describe how the SP supports science teachers’ professional development.
   A. How does your SP support professional development within the school?
   B. How does your SP support professional development outside the school?

8. How does the SP document Continuing Professional Education (CPE) hours?
Curriculum

*Locus of deliberation* describes methods used to generate conclusions within a school’s SP. Policies and practices determine how curriculum conclusions are made within an SP.

9. **Describe how your SP makes decisions about what is taught in your science curriculum.**
   A. Describe the level of autonomy that science teachers have in shaping the school’s science curriculum?
   B. How is the SP involved in the textbook selection and adoption process?
   C. How does the SP at your school address vertical alignment?

10. **How does the SP implement the school’s science curriculum?**
    A. How does the SP provide teachers with a method for reflecting on their “teaching experiences”?

Resources describes materials used by teachers to support student learning with a school’s SP. Policies and practices determine how curriculum materials are provided to and implemented within an SP.

11. **How does the SP select and acquire resources?**
    A. How does that process work?
    B. Where are these resources kept?
    C. What kinds of resources are they?

12. **How does the SP encourage science teachers to use national reform documents?**

Answers to questions should be audio taped on speaker phone. Use these sheets for field notes and file them in the corresponding school folder.
13. How does the SP support the sharing of resources (e.g., pedagogical, curricular, mentoring, and assessment) among its members?

Instructional Priorities

*Process* describes techniques used by members to teach science within a school’s SP. Policies and practices determine how instructional techniques are chosen and used within an SP.

14. How does your SP encourage teachers to use reform-based instructional methods?
   A. How does the SP support the professional development of science teachers in inquiry-based instruction?
   B. How does the SP encourage science teachers to include the history and the nature of science in their lessons?
   C. How does the SP support inclusion of informal science activities?
   D. How does the SP support out-of-school science participation (e.g., UIL)?

15. How does the SP support the integration of laboratory experiences into science curricula?

16. How do SP members support a teacher's individuality in the classroom?
   A. How do SP members support individual teaching styles?
   B. How do SP members support individual personal practices?

Answers to questions should be audio taped on speaker phone. Use these sheets for field notes and file them in the corresponding school folder.
Engagement describes the connections that students make within a school’s SP. Policies and practices determine how student connections are created within an SP.

17. Describe how your SP encourages students to think about science in relation to developing career plans.
   A. How does the SP encourage teachers to develop career-related experiences for students within the school’s walls?
   B. How does the SP encourage teachers to develop career-related experiences for students outside the school’s walls?

18. Describe how your SP encourages students to think about science in relation to personal interests.
   A. How does the SP encourage teachers to provide students with personally relevant learning experiences within the school’s walls?
   B. How does the SP encourage science teachers to provide students with personally relevant learning experiences outside the school’s walls?

19. How does your SP encourage students to think about science in relation to social issues?
   A. What social issues are emphasized by the SP?
   B. How does your SP integrate these issues within the school’s science curriculum?
   C. How does your SP encourage teachers to raise these issues with students?

20. How are students encouraged to take advanced or college prep science courses?

Answers to questions should be audio taped on speaker phone. Use these sheets for field notes and file them in the corresponding school folder.
21. How does the SP assist students in matching their academic interests to the different science courses offered at the school?

Assessment describes the evaluation methods used by members of a school’s SP. Policies and practices determine how evaluation methods are generated and used within an SP.

22. How does your SP assess students’ overall achievement in science?
   A. Does your SP encourage the use of benchmark-type tests?
   B. How does your SP support science teachers to prepare students for state-mandated tests?

23. How does your SP use assessments to inform future decisions?

24. How does your SP enable teachers to customize instructional practices to suit the unique learning needs (e.g., ESL, LD, giftedness, socio-economic status, and gender) of students in their classroom?

Vision

25. What is the greatest strength of your school’s SP?

Answers to questions should be audio taped on speaker phone. Use these sheets for field notes and file them in the corresponding school folder.
26. What is the greatest weakness of your school’s SP?

27. What professional practices are most commonly shared by teachers in the SP?
   A. Describe the group participating in the practice.
   B. Describe the practice in which the teachers participate.

28. What professional philosophies are most commonly shared by teachers in the SP?

29. Finally, is there anything special or unique that you would like to share with us about your school’s SP?
NOVICE INTERVIEW

Recruitment

1. How did you first find out about your science position?

2. Thinking about your interview process for this school, with whom did you interview with for your current teaching position?

3. Did you do any of the following before accepting your current science teaching position?
   A. Tour the campus
   B. Meet other science teachers on campus
   C. View available teaching and laboratory equipment
   D. Review the curriculum scope and sequence for your teaching assignment
   E. View available instructional technologies

4. What are the top three reasons that affected your decision to accept your current position?

5. Overall, do you feel that you received a rich and accurate description of your work environment?

Answers to questions should be audio taped on speaker phone. Use these sheets for field notes and file them in the corresponding school folder.
Working Conditions

6. How soon before the start of the school year were you notified of your teaching assignment?

7. In what type of extra-curricular, outside-of-the-regular-classroom-teaching activities (e.g., lunch and/or hall duty, club sponsorships, and academic decathlon) did you volunteer to participate in?

8. In what type of extra-curricular, outside-of-the-regular-classroom-teaching activities (e.g., lunch and/or hall duty, club sponsorships, and academic decathlon) were you assigned to participate in?

Professional Culture

9. Describe your interactions with the other science teachers in the building.

10. Do you participate in professional activities during the school year for all science teachers?

11. When are the best times for you to ask other teachers for help or information?
12. What events have occurred during science department meetings that specifically address the new science teacher(s) in the school?

13. Do you feel like a contributing member of the science department?

14. How often do other science teachers observe you while you are teaching?
   A. Daily
   B. Weekly
   C. Monthly
   D. By the semester
   E. Once a year
   F. Never

15. How often do you receive feedback from science teachers who observe you?
   A. Often
   B. Sometimes
   C. Rarely
   A. Never

16. How often do you observe more experienced science teachers in their classrooms?
   A. Daily
   B. Weekly
   C. Monthly
   D. By the semester
   E. Once a year
   F. Never

Answers to questions should be audio taped on speaker phone. Use these sheets for field notes and file them in the corresponding school folder.
17. Are you formally provided with release time to observe the teaching of more experienced science teachers?

18. How do you socialize with other science teachers at your school?

Induction/Mentoring Program

19. Would you say that your school has an induction/mentoring program?

20. If your school has an induction/mentoring program, for how many years are beginning teachers involved in the program?

21. Do you currently have a mentor? (Note: if this teacher's answer is "no," please go directly to #36) If this teacher's answer is "yes," please ask the following for a "yes" or "no" answer. Was your mentor…
   A. Formally assigned to you?
   B. Someone you found on your own?
   C. Someone who volunteered or assigned himself to help you?
   D. Someone outside the school or district who mentors you?

Answers to questions should be audio taped on speaker phone. Use these sheets for field notes and file them in the corresponding school folder.
22. How important is it to you to have a mentor that teaches the same content you do?
   A. Very important  
   B. Important  
   C. Somewhat important  
   D. Not at all important

23. How important is it to have a more experienced science teacher close to your classroom?
   A. Very important  
   B. Important  
   C. Somewhat important  
   D. Not at all important

24. Please answer these questions to explain more about your mentor.
   A. Is your mentor teacher also a classroom teacher?  
   B. Does your mentor teach in the same building where you teach?  
   C. Is your mentor teacher's classroom in close proximity to your own?  
   D. Does your mentor teacher also teach science?  
   E. Does your mentor teach the same science course that you teach?  
   F. Does your mentor have more teaching experience than you do?  
   G. If your mentor has more teaching experience than you do, how many years has he/she been teaching?

Mentor’s Role

25. Does your mentor observe you while you teach?
   A. Is your mentor required to observe you?  
   B. How often are you observed?  
   C. How long do observations last?  
   D. Is the mentor required to report on his/her observations of your teaching?  
   E. Does the school provide your mentor with release time to observe your teaching?

Answers to questions should be audio taped on speaker phone. Use these sheets for field notes and file them in the corresponding school folder.
26. Do you observe your mentor while he/she is teaching?
   A. Are you required to observe your mentor teacher?
   B. How often do you observe your mentor teacher?
   C. How long do your observations last?
   D. Are you required to report on your observations of your mentor’s teaching?
   E. Does the school provide you with release time to observe your mentor?

27. Does your school require that you meet with your mentor?

28. Whether meetings are required or not, how often do you meet with your mentor?
   A. Daily
   B. Weekly
   C. Monthly
   D. By semester
   E. By year
   F. On an as-needed basis

29. When and why do you meet with your mentor?

30. What are the top three things that you discuss with your mentor?
31. Have you discussed any of the following topics with your mentor?
   A. Classroom management
   B. Laboratory management
   C. Science content/curriculum
   D. How to teach science

32. What has been most helpful to you as a beginning teacher in having these meetings with your mentor?

33. Overall, how satisfied are you with the mentoring you have received at this school?

34. If there is release time for mentoring at your school, how does it work?
   A. For you and your mentor to observe each other's teaching?
   B. For you and your mentor to have meetings with each other?

35. If the school does not provide you with release time for mentoring, how does that work?
   A. For you and your mentor to observe each other's teaching?
   B. For you and your mentor to have meetings with each other?

Answers to questions should be audio taped on speaker phone. Use these sheets for field notes and file them in the corresponding school folder.
Principal’s Role

36. Did an administrator explain his/her expectations for your teaching before this school year began?

37. How has the principal been involved in your experiences as a beginning teacher?

38. Has a principal ever observed you while teaching?

39. Describe what happens when a principal observes you while teaching.

40. How often would you say an administrator observes you while teaching?
   D. Often
   E. Sometimes
   F. Rarely
   G. Never
41. How often does an administrator give you feedback about those classroom observations?
   H. Often
   I. Sometimes
   J. Rarely
   K. Never

42. What kinds of feedback do you receive from administrators?

43. Overall, how satisfied are you with the support you have received from your administrator as a beginning teacher?
   A. Very satisfied
   B. Satisfied
   C. Somewhat satisfied
   D. Not satisfied at all

Evaluation

44. If the administration of this school were to ask you what three things were the best supports for you as a beginning teacher, what three things would you tell them?

45. If the administration were to ask you how to improve the induction/mentoring program at this school for a beginning teacher, what three things would you recommend?

Answers to questions should be audio taped on speaker phone. Use these sheets for field notes and file them in the corresponding school folder.
46. Overall, how satisfied are you with your induction/mentoring experiences at this school?
   A. Very satisfied
   B. Satisfied
   C. Somewhat satisfied
   D. Not satisfied at all

47. Are you in your first year of teaching at this school?

   -----------------------------
   If Yes, Go to Question 48
   If No, You Have Completed the Interview
   -----------------------------

Novice and New-to-School

48. This year, have you participated in any events (e.g., programs, seminars, or meetings) designed specifically for teachers in their first year at this school?

49. How did these events help you?

50. What about events designed specifically for science teachers?

51. How did these events help you in your experiences as a science teacher?

Answers to questions should be audio taped on speaker phone. Use these sheets for field notes and file them in the corresponding school folder.
52. At this school, are there individuals specifically assigned to provide support for teachers in their first year at this school?

53. What do these individuals do to help new teachers at their first year at this school?

54. Has the administration ever asked your opinion about how to make your first year at this school better?

55. If the administration were to ask you what three things have helped you the most in your first year at this school, what would you tell them?
NEW-TO-SCHOOL INTERVIEW

Note: These questions are the same questions asked of Novice teachers in their first year at a school. These questions are embedded in the Novice Teacher Interview and do not need to be asked again of Novice teachers.

Identification

1. The science teacher liaison at this school identified you as a science teacher who is in his/her first year of teaching at this school. Were you accurately identified?

2. How many years altogether have you taught science?

3. How many years altogether have you taught high school science?

4. Have you taught in other schools in this district?

Recruitment

5. How did you first find out about your science position?

Answers to questions should be audio taped on speaker phone. Use these sheets for field notes and file them in the corresponding school folder.
6. Thinking about your interview process for this school, with whom did you interview for your current teaching position?

7. Did you do any of the following before accepting your current science teaching position?
   A. Tour the campus
   B. Meet other science teachers on campus
   C. View available teaching and laboratory equipment
   D. Review the curriculum scope and sequence for your teaching assignment
   E. View available instructional technologies

8. What are the top three reasons that affected your decision to accept your current position?

9. Overall, do you feel that you received a rich and accurate description of your work environment when you were hired for this teaching position?

Orientation

10. This year, have you participated in any events (e.g., programs, seminars, or meetings) designed specifically for all teachers in their first year at this school?

Answers to questions should be audio taped on speaker phone. Use these sheets for field notes and file them in the corresponding school folder.
11. How did these events help you?

12. What about events designed specifically for science teachers?

13. How did these events help you in your experiences as a science teacher?

14. At this school, are there individuals specifically assigned to provide support for teachers in their first year at this school?

15. What do these individuals do to help teachers in their first year at this school?

16. Has the administration ever asked your opinion about how to make your first year at this school better?

17. If the administration were to ask you what three things have helped you the most in your first year at this school, what would you tell them?

Answers to questions should be audio taped on speaker phone. Use these sheets for field notes and file them in the corresponding school folder.
TEXAS POLL OF SECONDARY SCIENCE TEACHERS

1. (a) Have you formally participated in recruiting new science teachers since the fall of 2010? (Please enter a check on just one line below.)

   ____ Yes (If yes, go to question #1b.)
   ____ No (If no, go to questions #2.)

   (b) Please indicate all of the ways that you have formally participated in the recruitment of new science teachers. (Please check all that apply).

   ____a. Formal interviews at the school site
   ____b. Informal visits with perspective science teachers
   ____c. Recruitment trips outside school walls
   ____d. Policy meetings specific to science
   ____e. Review job applications for prospective science teachers
   ____f. Other (Please briefly explain).
2. (a) Have you participated in the induction/mentoring of new science teachers since the fall of 2010? (Please enter a check on just one line below.)

___ Yes (If yes, go to question #2b)
___ No (If no, go to question #3)

(b) Please indicate all of the ways that you have participated in the induction/mentoring of new science teachers. (Please check all that apply.)

___ a. Assisted with orientation to school policies
___ b. Assisted with classroom management
___ c. Observed a new science teacher teaching
___ d. Modeled teaching for a new science teacher
___ e. Provided a new science teacher with a science lesson
___ f. Developed a science lesson with a new science teacher
___ g. Performed formal mentoring duties with a new science teacher
___ h. Other (Please briefly explain.)
3. (a) Since the fall of 2010, have you served in a leadership role? (Please enter a check on just one line below.)

  ____ Yes (If yes, go to question #3b)
  ____ No (If no, go to question #4)

(b) Please indicate the leadership roles you have held since the fall of 2010. (Please check all that apply).

  ____ a. Science department chair
  ____ b. Science curriculum writer
  ____ c. Science club/organization sponsor
  ____ d. Mentor to a science teacher
  ____ e. Member of a science teacher professional organization
  ____ f. Presenter at a science workshop, conference, or training session
  ____ g. Mentor to a teacher who is not a science teacher
  ____ h. Subject team leader in a subject other than science
  ____ i. Member of a teacher professional organization that is not specifically science-related
  ____ j. Member of a district-level decision-making committee
  ____ k. Other leadership role. (Please specify below.)
4. Since the fall of 2010, in which of the following professional development activities have you participated? *(Please enter a check in all lines below that apply to you.)*

___ a. Strategies for teaching science content
___ b. Strategies for teaching science using technology
___ c. Strategies for teaching science using the Texas Essential Knowledge and Skills (TEKS)
___ d. Strategies for preparing students to master the Texas Assessment of Knowledge and Skills (TAKS) objectives
___ e. Strategies for teaching science to students with special needs
___ f. Strategies for the use of laboratory in teaching science
___ g. Strategies for teaching science by inquiry
___ h. Strategies for assessing students’ prior knowledge
___ i. None of the above.
5. Since the fall of 2010, in which of the following activities have you engaged that were specific to science or science education? (Please enter a check in all lines below that apply to you.)

   ____ a. Teacher research on innovative practice in science
   ____ b. Peer observations of other science teachers
   ____ c. Graduate studies in a science field
   ____ d. Educator study groups
   ____ e. Professional science teaching associations
   ____ f. Curriculum writing
   ____ g. Mentoring of science student teachers
   ____ h. Other (Please specify below.)

6. When teaching a class, how often do you use questioning strategies? (Questioning strategies refer to the varying of timing, positioning, or cognitive level of questions given to students.)

   ____ a. Very often
   ____ b. Sometimes
   ____ c. Seldom
   ____ d. Not often at all

7. When teaching a class, how often do you use enhanced context strategies? (Enhanced context strategies refer to linking student prior experience with new knowledge.)

   ____ a. Very often
   ____ b. Sometimes
   ____ c. Seldom
   ____ d. Not often at all
8. When teaching a class, how often do you use collaborative learning strategies?
(Collaborative learning strategies refer to the arrangement of students in groups to work on tasks.)

___ a. Very often
___ b. Sometimes
___ c. Seldom
___ d. Not often at all

9. In a typical weeks’ instruction, how often do you use manipulation strategies?
(Manipulation strategies refer to student use of physical objects in their learning.)

___ a. Very often
___ b. Sometimes
___ c. Seldom
___ d. Not often at all

10. In a typical weeks’ instruction, how often do you use multiple assessment strategies?
(Multiple assessment strategies refer to the type, frequency, purpose, or cognitive levels of testing/evaluation.)

___ a. Very often
___ b. Sometimes
___ c. Seldom
___ d. Not often at all
11. During a semester, how often do you use scientific inquiry strategies? (Scientific inquiry strategies refer to the use of learner-centered instruction that integrates scientific process and content.)

____ a. Very often
____ b. Sometimes
____ c. Seldom
____ d. Not often at all

12. During a semester, how often do you assess learning by project strategies? (Project strategies refer to the use of student projects as assessment of learning.)

____ a. Very often
____ b. Sometimes
____ c. Seldom
____ d. Not often at all

13. During a semester, how often do you assess learning by performance strategies? (Performance strategies refer to the use of student performance as assessment of learning.)

____ a. Very often
____ b. Sometimes
____ c. Seldom
____ d. Not often at all
14. During a semester, how often do you talk with the principal about facilitating the academic achievement of students from diverse racial, ethnic, or social class groups?

___ a. Very often  
___ b. Sometimes  
___ c. Seldom  
___ d. Not often at all

15. During a semester, how often do you talk with other teachers about facilitating the academic achievement of students from diverse racial, ethnic, or social class groups?

___ a. Very often  
___ b. Sometimes  
___ c. Seldom  
___ d. Not often at all

16. What are the three biggest challenges you face in implementing science instruction?

a. _________________________________________________________________

b. _________________________________________________________________

c. _________________________________________________________________
17. Overall, how satisfied are you with your decision to become a high school science teacher? *(Please enter a check on just one line below.)*

___ a. Very satisfied  
___ b. Satisfied  
___ c. Dissatisfied  
___ d. Very dissatisfied

18. How much do you agree with this statement: Improving student achievement in science is a team effort at this school? *(Please enter a check on just one line below.)*

___ a. Strongly agree  
___ b. Agree  
___ c. Disagree  
___ d. Strongly disagree

19. How satisfied are you with the level of cooperation and collegiality among all the teachers at this school? *(Please enter a check on just one line below.)*

___ a. Very satisfied  
___ b. Satisfied  
___ c. Dissatisfied  
___ d. Very dissatisfied
20. How satisfied are you with the way your science program contributes to the career development of students at this school? *(Please enter a check on just one line below.)*

___ a. Very satisfied
___ b. Satisfied
___ c. Dissatisfied
___ d. Very dissatisfied

21. How satisfied are you with the decisions you can make about the instructional methods you use in your own science classroom? *(Please enter a check on just one line below.)*

___ a. Very satisfied
___ b. Satisfied
___ c. Dissatisfied
___ d. Very dissatisfied

22. How satisfied are you with the support you receive from the school to have your students attend informal science activities, such as field trips, visits to museums, and off-campus activities at informal science institutions? *(Please enter a check on just one line below.)*

___ a. Very satisfied
___ b. Satisfied
___ c. Dissatisfied
___ d. Very dissatisfied
23. How satisfied are you with the options that you have at your school for participating in science-specific professional development? *(Please enter a check on just one line below.)*

___ a. Very satisfied  
___ b. Satisfied  
___ c. Dissatisfied  
___ d. Very dissatisfied

24. How satisfied are you with the support provided by your school for you to participate in professional development? *(Please enter a check on just one line below.)*

___ a. Very satisfied  
___ b. Satisfied  
___ c. Dissatisfied  
___ d. Very dissatisfied

25. How satisfied are you with your science laboratory facilities? *(Please enter a check on just one line below.)*

___ a. Very satisfied  
___ b. Satisfied  
___ c. Dissatisfied  
___ d. Very dissatisfied
26. How satisfied are you with your science laboratory equipment? *(Please enter a check on just one line below.)*

- ____ a. Very satisfied
- ____ b. Satisfied
- ____ c. Dissatisfied
- ____ d. Very dissatisfied

27. How satisfied are you regarding the recognition you receive for your science teaching efforts at this school? *(Please enter a check on just one line below.)*

- ____ a. Very satisfied
- ____ b. Satisfied
- ____ c. Dissatisfied
- ____ d. Very dissatisfied

28. How satisfied are you with your current teaching assignment? *(Please enter a check on just one line below.)*

- ____ a. Very satisfied
- ____ b. Satisfied
- ____ c. Dissatisfied
- ____ d. Very dissatisfied
29. How would you rate your personal level of safety at this school? (Please enter a check on just one line below.)

   ____ a. Excellent personal safety
   ____ b. Good personal safety
   ____ c. Fair personal safety
   ____ d. Poor personal safety

30. How satisfied are you with the administrative communication you receive about expectations for your teaching in this school? (Please enter a check on just one line below.)

   ____ a. Very satisfied
   ____ b. Satisfied
   ____ c. Dissatisfied
   ____ d. Very dissatisfied

31. Do you have an undergraduate degree in a biological or physical science field?

   _____ No
   _____ Yes

32. Do you have a graduate degree in a biological or physical science field?

   _____ No
   _____ Yes
33. Including this year (2011-2012) as one year, how long have you taught science at this school? (Please enter the number of years in the box below.)

34. Please provide your full name.

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MENTOR INTERVIEW

Identification

1. You were identified as a mentor for science teachers by the science teacher liaison at this school. Is this identification accurate?

2. Do you mentor novice science teachers?

3. Do you also mentor science teachers, regardless of number of years of teaching, who are new-to-school?

4. How many science teachers who are new-to-school do you mentor?

Training

5. How many years have you been a mentor for science teachers?

6. About how many hours per week do you spend mentoring other science teachers?

Answers to questions should be audio taped on speaker phone. Use these sheets for field notes and file them in the corresponding school folder.
7. What kind of training have you received to be a mentor?

8. Are there any meetings for just mentors that occur during the school year in your school or at the district level?

Working Conditions

9. How are you compensated for being a mentor to a novice and/or new-to-school science teachers?
   A. Stipend
   B. Release time
   C. Paid attendance at science teacher conferences
   D. Other

10. What other types of extra-curricular duties are you assigned to (i.e., lunch and hall duty, club sponsorships, academic decathlon, etc.)
    A. Were you assigned to these duties or did you volunteer?
    B. On a weekly basis, how much time do you spend in extra-curricular activities?

Induction/Mentoring Program

11. How does the induction/mentoring of novice and/or teachers new-to-school work at this school?

Answers to questions should be audio taped on speaker phone. Use these sheets for field notes and file them in the corresponding school folder.
12. Would you say there is a formal induction/mentoring program at this school?

13. How many years in this school are novice science teachers involved in a induction/mentoring program?

Mentor’s Role

14. Does the science teacher (or teachers) you are mentoring observe you while you teach?
   A. Is the mentored teacher required to observe you?
   B. How often does he/she observe you?
   C. How long do observations last?
   D. Are there specific reasons for these classroom observations (i.e., to learn more about classroom management, teaching a lesson, how to teach a laboratory?)

15. Do you observe the teacher you are mentoring while he/she is teaching?
   A. Are you required to observe the teacher you are mentoring?
   B. How often do you observe the teacher?
   C. How long do observations last?
   D. Are you required to report your classroom observations to an administrator?

16. Does the school provide you or your mentee with release time to observe each other teach?
   A. How does this release time work for mentors?
   B. How does this release time work for mentees?

Answers to questions should be audio taped on speaker phone. Use these sheets for field notes and file them in the corresponding school folder.
17. Does the school provide you with release time to meet with your mentee?

18. Are you required to have meetings with your mentee?

19. Are you required to write and submit reports of your mentoring meetings?

20. Does the school schedule allow a designated time for mentoring meetings?

21. How often do you meet with the teacher(s) you are mentoring?
   A. Daily
   B. Weekly
   C. Monthly
   D. By semester
   E. Once a year

22. What are the three most common things that you discuss with your beginning science teacher(s) during mentoring meetings?

Answers to questions should be audio taped on speaker phone. Use these sheets for field notes and file them in the corresponding school folder.
Teacher Instrument: MENTOR INTERVIEW  
School Number: ______
Date Completed: ______________________  
Teacher Number: ______

Principal’s Role

23. What role does your principal play in science teacher induction/mentoring?

24. What expectations did your principal relay to you about your role as a science teacher mentor?

25. How do you report to the administration about your mentoring of new science teachers?

26. Has the administration ever asked your opinion about how to make mentor teachers' experiences at this school better?

27. If the administration of this school were to ask you what three things were the best supports for you as a mentor, what three things would you say?

28. If the administration of this school were to ask you how to improve the induction program at this school, what three things would you recommend?

Answers to questions should be audio taped on speaker phone. Use these sheets for field notes and file them in the corresponding school folder.
Evaluation

29. If another teacher were to ask you about the benefits of mentoring for you, what would you tell them?

30. If another teacher were to ask you about the benefits of mentoring for the beginning teacher or teacher new-to-the-school, what would you tell them?

31. Overall, how satisfied are you with your experiences as a mentor at this school?
   A. Very satisfied
   B. Satisfied
   C. Somewhat satisfied
   D. Not satisfied at all

32. On a scale of A, B, C, D, or F, how would you grade this school’s mentoring program?
   A. Mentor-mentee matching
   B. Mentor training
   C. Support for teachers new to the school
   D. Support for teachers for novice (beginning) teachers
   E. General support for mentors
   F. General support for beginning teachers (i.e., mentees)
   G. Support specifically from the administration for mentors
   H. Design of the mentoring program
   I. Evaluation process for the mentoring program

Answers to questions should be audio taped on speaker phone. Use these sheets for field notes and file them in the corresponding school folder.
REFERENCES


