

Observing and Discussing Science Instruction: Administrative Guide for Powerful Teaching and Learning



“How to” guide for Observing and Discussing Science

1. Select a scope, focus and timeframe for the discussion and/or classroom observations:

Scope	Focus	Timeframe
Teacher(s)	Strand: Physical, Life, Earth Sciences and Investigation and Ex	Chapter/Unit
School (Elementary, Middle, High)	One Goal	Quarter
District	Multiple Goals	Year
Vertical articulation	Goals spiral across grade levels (K-12)	Across grades / Vertical teams

2. Examples:

- a All second grade teachers in the district focus on Strand 4: Investigation and Experimentation, area 4.d: Write or draw descriptions of a sequence of steps, events, and observations. All principals in the district focus on observing teachers instruction on this standard and share findings across schools.
- b All middle or high school science teachers in the district work on Strand 5: Investigation and Experimentation, 1.0 *Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other four strands, students should develop their own questions and perform investigations. Students will* [1.a] Select and use appropriate tools and technology (such as computer-linked probes, spreadsheets, and graphing calculators) to perform tests, collect data, analyze relationships, and display data.
- c All teachers select 2 students at different levels of scientific understanding and address a set of questions about those two students, such as:
 - How engaged are the students in the science lesson? What is the evidence of engagement?
 - How well is each student learning the current science standard being taught?
 - How do you know? How do your assessments help to plan next steps for instruction?
 - How is the learning the same or different for each student?
 - How are science literacy and critical thinking being introduced and learned?
 - How has your professional development enhanced your ability to teach this science standard/strand?

3. Review the standards for the grade level to be visited using the Standards Browser. If possible, have a pre-observation conference with the teacher to review the standards being taught and the supporting instructional materials.

Instructional questions can easily be modified for a principal-superintendent conference or walk through. Asking, “Tell me more” and “How do you know?” may extend each question and help to establish an action research focus. This model can also be used to support walk-through protocols.



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Goals for Teachers	Framework Goals	Observation Sample Questions	Conference Sample Questions
<i>Highly Qualified Teacher</i>	Increase teachers’ knowledge of science content through professional development focusing on standards based science.	What changes have you implemented to strengthen standards-based learning as a result of professional development?	What science professional development have you participated in during the past year or two? Give examples of how that professional development changed or enhanced your instructional practice to support student learning of standards.
<i>Rigorous Curriculum</i>	Provide an instructional program that preserves the balance of content knowledge, computational and procedural skills, conceptual understanding and problem solving.	What evidence is there that the instructional program and the learning environment incorporate all four types of knowledge? (Content knowledge, procedural skills, conceptual understanding and problem solving).	Think of a particular strand of science and of an individual student or instructional group. How is each of the four types of knowledge included? (Content knowledge, procedural skills, conceptual understanding and problem solving).
<i>Diagnostic Assessment</i>	Assess student progress Frequently, using multiple measures to show mastery of the science standards and to then adjust instruction accordingly, for either individual students or groups of students	In what ways do students frequently demonstrate their understanding using a variety of means, such as models, drawings, symbols and or presentations? How do teachers differentiate the instruction consistently based on ongoing assessment of student understanding – especially for English Language Learners or Special Education students?	What types of assessments are used to understand student progress during this instructional unit? How is the instructional program differentiated according to student need?
<i>Vertical Articulation</i>	Provide learning in each instructional year that lays the necessary groundwork for success in subsequent grades or subsequent science courses.	<ul style="list-style-type: none"> • What connections are included in the learning activities designed to build upon students’ prior knowledge? • Is the science of the lesson/unit important for learning the standards for the current year? • What connections are built into the learning activities that provide the foundation for the science skill standards for next year? 	<ul style="list-style-type: none"> • How does this instructional unit build upon the learning from last year? (i.e. graphing, data collection, observation) • How does this instructional unit provide foundational learning for next year’s standards while maintaining appropriateness for the current needs of students? • How is the teacher collaborating on key standards with the teacher of the grade below and the grade above, or as a department? • In what variety of ways do teachers share successful practices with each

			other?
<i>Engaging Environment</i>	Create and maintain a classroom environment that fosters a genuine understanding and confidence in all students that through hard work and sustained effort, they can achieve or exceed the science standards.	How are the learning activities scaffolded to build student understanding and confidence? In what variety of ways are all students encouraged to solve problems requiring sustained effort?	<ul style="list-style-type: none"> • Give an example of a challenging problem or topic that a student has worked on over time. • What strategies can students employ if they are having difficulty with a problem (ask a teacher, ask a peer, use science resource, etc.)?
<i>Challenging Learning Experience</i>	Offer all students a challenging learning experience that will help to maximize their individual achievement and provide meaningful opportunities for students to exceed the standards.	<ul style="list-style-type: none"> • Do all students have opportunities for extended learning and application of learning? • Are all students engaged with learning activities in a meaningful way? 	<ul style="list-style-type: none"> Select three students at different science levels (low, middle, high). • Determine what each student knew about this topic before instruction began and what has each student learned during the unit? • Does each student have a deeper level of conceptual understanding and a greater capability to successfully.