



PROFESSIONAL DEVELOPMENT

C R I T E R I A



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A Study Guide for Effective Professional Development

Developed by

CONNECT

EVERYONE CAN DO MATH AND SCIENCE

**Colorado Statewide Systemic Initiative
for Mathematics and Science**

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INTRODUCTION

What is Effective Professional Development?

Although professional development can be defined in a number of different ways, we prefer the description Judith Warren Little gives in an article entitled “Organizing Schools for Teacher Learning”. Little describes professional development as “a focus on and responsibility for student learning and the formation of professional community inside and outside the school” (1996, p.1).

Linda Darling-Hammond and Milbrey W. McLaughlin define professional development as “deepening teachers’ understanding about the teaching/learning process and the students they teach,” which “must begin with pre-service education and continue throughout a teacher’s career.” They state that “effective professional development involves teachers both as learners and teachers, and allows them to struggle with the uncertainties that accompany each role” (1996, p. 203).

According to Willis D. Hawley and Linda Valli of the University of Maryland, effective continuing professional development for educators “...calls for providing collegial opportunities to learn that are linked directly to solving authentic problems that are defined by the gaps between goals for student achievement and actual student performance” (1996, p.1).

In Colorado, our approach to professional development is making certain educators have the best possible skills, content knowledge, and preparation for teaching in order to be prepared and supported to enable students to reach high standards.

Quality professional development is influenced by a variety of factors. Three that have a direct influence are the categories we used to organize this document. These categories are:

- ▲ **Context characteristics.** *Context characteristics address the organization and the nature of the system in which change will occur. Context characteristics refer to the “when,” “where,” and “why” of professional development. They are the underpinnings – the system foundation – upon which professional development occurs.*
- ▲ **Process variables.** *Process variables refer to the “how” of professional development. Process variables are the ways activities are planned, organized, carried out, and followed up. They are the ways new learning occurs.*
- ▲ **Content characteristics.** *Content characteristics are the “what” of professional development. These characteristics are primarily the new knowledge, skills, and understandings that are the foundation of academic disciplines and pedagogical processes.*

INTRODUCTION

Quality professional development is a dynamic and fluid process. If appropriate structures are in place (context), a variety of best practices (processes) are used, and appropriate knowledge and skill acquisition are occurring (content), then professional development will impact student achievement.

How to Use This Document

This document, *Professional Development Criteria, a Study Guide for Effective Professional Development*, has been developed by the *CONNECT* Professional Development Working Group, composed of representatives from each collaborative partnership (see page 23). *CONNECT* is a National Science Foundation funded statewide systemic initiative for mathematics and science. We believe that classrooms, schools, colleges and universities, businesses, and communities collectively ensure that all students achieve high levels of mathematical and scientific literacy. Twelve collaborative partnerships with K-12, higher education, business, and community representatives, serving 45% of Colorado students, exist throughout the state to support the goal that all students, regardless of gender or ethnic differences, will be successful in mathematics and science. This document represents the thinking of people in K-12, higher education, and community. Although created for a mathematics and science initiative, this document can be used to guide any professional development strategic plan, K-16. This document can be used to:

- ▲ *examine your professional development structures,*
- ▲ *develop a professional development plan for your site, and*
- ▲ *continually assess your professional development efforts and plans.*

This document is meant to be a study guide with a series of questions you can use to examine what you are doing. The questions may also help you decide how you want to change your professional development effort, as well as what might be added or deleted from your professional development practices. These goals are based on previous work reported by the National Staff Development Council, the Professional Development Standards of the National Council of Teachers of Mathematics, and the National Science Education Standards (see *Bibliography*).

You may want to convene a group to examine current professional development efforts or plan future approaches to professional development. Include those affected by professional development throughout the system as well as those who plan to facilitate professional development. Start with this end in mind: What improvements in student learning do you seek and what changes must occur to get those results? Then decide what professional development efforts need to be in place to make the changes necessary to get the desired results.

INTRODUCTION

The document is formatted so you can start with goals related to the categories of context, process, or content. You may want to start your dialogue with these goals rather than with the questions that accompany the goals. Begin with the category that will generate the most beneficial dialogue.

The second section of the document expands the goals for each category with several questions to stimulate dialogue. Again, you may want to focus on one category of goals at a time (with accompanying questions), selecting the category that will best advance your discussion of effective professional development.

Use the goals and/or questions in this document as a dialogue tool, rather than as a set of prescriptions. Think of the goals and questions as a flexible framework for examining professional development. Raising these questions and others will lead to a destination that enhances learning for educators as well as students.

If you answer “no” to any question, consider the validity of the policy or practice suggested by that goal or question in your own setting. If you decide it is valid, consider how you might implement a policy or practice suggested by the goal or question that would enhance professional development opportunities. As you work, you may notice some overlap of questions among the sections. This is purposeful, as similar questions apply in more than one category.

A Few Last Words

This document is your guide to setting up a quality structure for professional development so you can document the connections to improved student achievement. The connections between professional development and student achievement are not random and chaotic; there is a positive relationship that can be documented between teacher and student learning.

Remember, change is a process, not an event. Don't try to do it all at once. Decide what to emphasize, do it well, and you will discover both positive student learning results as well as greater satisfaction within your educational system. This document is not meant to be comprehensive and inclusive. Differences exist in systems and among people. Some goals and questions may be appropriate, others may not. Use whatever meets your needs.

CONTEXT

How do we work toward an environment (culture, norms, policies, roles, relationships) that supports adult learning for increased student achievement?

PROFESSIONAL DEVELOPMENT GOALS

- 1 System norms (individual school, school district, higher education institution, and collaborative partnership) value ongoing professional development. Learning is viewed as a lifelong process and embedded in the culture.
- 2 A high level of performance is expected of all educators to ensure high levels of learning for all students. Professional development is essential if educators and students are to perform at high levels.
- 3 Professional development efforts deliberately provide links to other parts of the educational system and among systems.
- 4 Planning anchors professional development as an essential part of the educational system.

LEADERSHIP DEVELOPMENT GOALS

- 5 Leadership is shared.
- 6 Professional development efforts prepare and support educators to serve in leadership roles.

POLICY DEVELOPMENT GOALS

- 7 Funds are clearly allocated for professional development.
- 8 Time is clearly allocated for professional development.
- 9 Policies and procedures support professional development efforts and the implementation of professional development goals.
- 10 Evaluation processes respect learning and growth.

PROCESS

How do we design, deliver and evaluate effective professional development focused on best practices?

RESULTS OF PROFESSIONAL DEVELOPMENT

- 1 Professional development is results-driven (that is, based on improved student achievement).
- 2 Data are critical for all aspects of professional development.
- 3 Professional development experiences include ongoing assessment.

EDUCATORS AS LEARNERS

- 4 Professional development experiences build or strengthen the learning community for science and mathematics in all parts of the system.
- 5 Professional development reflects the best available research regarding educators as learners.
- 6 A variety of processes are used to build educator capacity to bring about higher achievement for every student.

CHANGE PROCESS

- 7 Teachers of mathematics and science see themselves as professionals and take an active role in their own learning.
- 8 The implementation plan acknowledges that change is a process, not an event.
- 9 The change process addresses both individual and organizational change.

CONTENT

What do we, K-16 educators, need to know and be able to do to ensure that all students and all preservice teachers are proficient in mathematics and science?

KNOWLEDGE, STUDENT LEARNING, PEDAGOGY, MODELING AND ALIGNMENT OF CONTENT GOALS

- 1 Professional development ensures that educators are proficient in mathematics and science. K-16 educators are expected to possess the level of content knowledge needed to teach competently and with confidence.
- 2 Professional development experiences focus on helping educators know students as learners of mathematics and science.
- 3 Professional development promotes educators' knowledge of content-specific pedagogy in mathematics and science (curricular, instructional and assessment strategies, materials, and resources).
- 4 Professional development provides educators experiences in good science and mathematics teaching and learning.
- 5 Professional development aligns with school district, higher education and state goals, standards, and policies for science and mathematics.

CONTEXT

How do we work toward an environment (culture, norms, policies, roles, relationships) to support adult learning for increased student achievement?

QUESTIONS

PROFESSIONAL DEVELOPMENT

1 GOAL

System norms (individual school, school district, higher education institution, and collaborative partnership) value ongoing professional development. Learning is viewed as a lifelong process and embedded in the culture.

- ▲ Is professional development perceived as part of educators' ongoing work?
- ▲ Is professional development seen as an opportunity for individual growth and organizational improvement?
- ▲ Is professional development the norm?
- ▲ Is professional development based on identified needs and relevant to site goals?
- ▲ Are professional development plans related to licensure requirements?
- ▲ Is professional development part of contract time?
- ▲ Is ongoing professional development embedded in the structure and goals of individual schools?

2 GOAL

A high level of performance is expected of all educators to ensure high levels of learning for all students. Professional development is essential if educators and students are to perform at high levels.

- ▲ Is professional development expected of *all* educators within the system?
- ▲ Is a professional development plan for improvement expected of every educator?
- ▲ Are the expectations for implementation of the knowledge and skills acquired through professional development clearly defined?
- ▲ Do educators have meaningful choices in shaping their professional development?
- ▲ Do educators have equal access to professional development opportunities?

CONTEXT

- ▲ Are the appropriate personnel involved in professional development? Are these additional questions asked: “Who needs to be here? Who else?”
- ▲ Does professional development draw on the unique experiences of both educators and community resource people?

3 GOAL

Professional development efforts deliberately provide links to other parts of the educational system and among systems.

- ▲ Does professional development support the priority initiatives of individual schools, school districts, higher education institutions, and collaborative partnerships?
- ▲ Does the system as a whole use resources including time, space, and staff to support professional development related to the priority initiatives?
- ▲ Do policymakers, administrators, parents, and community members support professional development activities for educators? Are there clear channels for these groups to provide input and assistance to educators whenever possible and appropriate?

4 GOAL

Planning anchors professional development as an essential part of the educational system.

- ▲ Is professional development a priority within individual schools, school districts, higher education institutions, and collaborative partnerships?
- ▲ Is a long-term (at least three-year) professional development plan in place?
- ▲ Is there an action plan for each year?
- ▲ Does the plan make explicit the classroom changes that will take place to increase student achievement?
- ▲ Does the plan provide processes for evaluating the implementation of classroom changes?

CONTEXT

LEADERSHIP DEVELOPMENT QUESTIONS

5 GOAL

Leadership is shared.

- ▲ Have participants been given the opportunity to take a leadership role in designing and implementing professional development?
- ▲ Is expertise “within the room” acknowledged and utilized effectively?
- ▲ Do those in traditional leadership roles also see themselves as learners?
- ▲ Do school district and higher education personnel participate together in professional development?

6 GOAL

Professional development efforts prepare and support educators to serve in leadership roles.

- ▲ Do educators have opportunities to learn the knowledge and skills they will need to work confidently and competently with others?
- ▲ Are educators with acknowledged expertise encouraged to share their expertise and work for the improvement of the education system?
- ▲ Are the educators who are key players in shaping professional development experiences also recipients of professional development opportunities?
- ▲ Do individual schools, school districts, higher education institutions, and collaborative partnerships create formal roles for educators as mentors, department and committee chairs, peer coaches, lead teachers, study group facilitators, and/or resource teachers? Are educators prepared and encouraged to assume those roles by being provided materials, time, and other resources?
- ▲ Do individual schools, school districts, higher education institutions, and collaborative partnerships encourage educators to support each other in less formal ways by engendering an atmosphere of cooperation and providing time for them to work together?

CONTEXT

POLICY DEVELOPMENT QUESTIONS

7 GOAL

Funds are clearly allocated for professional development.

- ▲ What are the sources of revenue for professional development and how are they coordinated?
- ▲ How much of the total budget is allocated for professional development? (10 percent of total is recommended by the National Staff Development Council)
- ▲ How is money allocated? Who decides how the money will be spent?
- ▲ Do professional development expenditures move individual schools, school districts, higher education institutions, and collaborative partnerships toward their goals?
- ▲ Are professional development expenditures tied to student achievement goals?

8 GOAL

Time is clearly allocated for professional development.

- ▲ Do the yearly calendar and school and college schedule provide for continuous professional development opportunities related to individual school, school district, higher education institution, and collaborative partnership goals?
- ▲ Does the allocated time accommodate substantive and reflective learning to help ensure application of the learnings in the classroom?
- ▲ Does the time allocation communicate that professional development is integral to teaching and learning at all levels and across departments? (25 percent of educators' work time is recommended by the National Staff Development Council)
- ▲ Is professional development part of contract time?

CONTEXT

9
GOAL

Policies and procedures support professional development efforts and the implementation of professional development goals.

- ▲ Are appropriate places available for both the professional development experience and the ongoing application of the new practices?
- ▲ Are appropriate human and material resources available for professional development and its application in the classroom?

10
GOAL

Evaluation processes respect learning and growth.

- ▲ Is the performance appraisal system focused on educator growth for student achievement?
- ▲ Are there incentives for professors' professional development? What are they?
- ▲ Does teacher evaluation connect with student achievement as demonstrated through multiple indicators? Are educators allowed to demonstrate student achievement in various ways?
- ▲ Are there incentives for collaboration between higher education and K-12? Are they sufficiently attractive?

CONTEXT SELF ASSESSMENT

<i>Goal Number</i>	<i>Rarely Occurs</i>	<i>Sometimes Occurs</i>	<i>Frequently Occurs</i>	<i>Always Occurs</i>
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PROCESS

How do we design, deliver and evaluate effective professional development focused on best practices?

RESULTS OF PROFESSIONAL DEVELOPMENT QUESTIONS

1 GOAL

Professional development is results-driven (that is, based on improved student achievement).

- ▲ Do data collected on student learning tell how well students are achieving in mathematics and science?
- ▲ Have the desired improvements in student learning of science and mathematics been identified?
- ▲ Does looking at data about student achievement raise questions about implications for students, for teachers, for instruction, and for the system?
- ▲ Are student achievement data analyzed through reflection and discussion, focusing on results?
- ▲ Are professional development opportunities based on these discussions?
- ▲ Does the professional development process begin with determining the knowledge and skills to be acquired and lead to an analysis of the level of use of the new knowledge and practices?

2 GOAL

Data are critical for all aspects of professional development.

- ▲ Is there ongoing feedback from student achievement data and other sources?
- ▲ Are the feedback and data about student achievement used to plan professional development?
- ▲ Are the assessment tools multi-dimensional and are results related to diverse learning needs?
- ▲ Is appropriate technology used to help manage and evaluate results of student learning?

PROCESS

3 GOAL

Professional development experiences include ongoing assessment.

- ▲ Are data about teacher implementation and student growth used to evaluate professional development?
- ▲ Are data used to focus the inquiry that serves as the basis for professional development?
- ▲ Are participant satisfaction and engagement used to make short-term adjustments?
- ▲ Is longer-term impact on teacher effectiveness, student learning, and leadership also used to evaluate the outcomes of professional development and to make necessary modifications?
- ▲ Are data collection results broadly shared with the community and students?

EDUCATORS AS LEARNERS

QUESTIONS

4 GOAL

Professional development experiences build or strengthen the learning community for science and mathematics in all parts of the system.

- ▲ Does the process bring together key players from within the system that is trying to change, and allow them to work in a collaborative manner?
- ▲ Do the key learners represent a broad base of affected groups (e.g., parents, business, non-certified staff)?
- ▲ Are effective strategies used for involving under-represented populations?
- ▲ Are collaboration and shared decision making key components of the system?
- ▲ Do communication efforts sustain and expand shared understanding?
- ▲ Are collegial and collaborative professional exchanges valued and promoted?
- ▲ Are educators encouraged to take risks and provided opportunities for experimentation?
- ▲ Are science and mathematics educators encouraged to reach beyond their own communities to make connections with other professionals?

PROCESS

5 GOAL

Professional development reflects the best available research regarding educators as learners.

- ▲ Does the process integrate new learning with established practices?
- ▲ Does the process incorporate a variety of professional development models and approaches (e.g., action research, coaching, mentoring, support groups, dialogue groups)?
- ▲ Does the process value dialogue, conversation, inquiry, and self study?
- ▲ Does the process encourage educators to construct their own understanding of science and mathematics principles?
- ▲ Does the process recognize participants' needs?
- ▲ Does the process help participants take responsibility for their own learning?
- ▲ Does the process make appropriate use of technological resources?
- ▲ Does the process utilize expertise within the community of learners as well as external resources when appropriate?
- ▲ Does the process encourage changing one another's conceptions of content, learning, and teaching through giving and accepting feedback for improved instruction?
- ▲ Does the process reflect best available research and practice regarding student learning and teaching?
- ▲ Does the process include follow-up and support for changing practice?

6 GOAL

A variety of processes are used to build educator capacity to bring about higher achievement for every student.

- ▲ Is professional development embedded in the daily work of educators?
- ▲ Does professional development provide opportunities for everyone to take leadership roles on the basis of their developing expertise?
- ▲ Does professional development have an “each one reaches others” approach, so that learning spreads?
- ▲ Does professional development keep its focus on higher student achievement?

continued on next page

PROCESS

- ▲ Does professional development look at student work in terms of better attainment of standards?
- ▲ Does professional development provide choice and differentiated learning opportunities for educators?

QUESTIONS CHANGE PROCESS

7 GOAL

Teachers of mathematics and science see themselves as professionals and take an active role in their own learning.

- ▲ Do educators experiment thoughtfully with alternative approaches and strategies?
- ▲ Do educators reflect on teaching and learning both individually and with colleagues?
- ▲ Do educators participate actively in the professional community of mathematics or science educators?
- ▲ Do educators read and discuss ideas presented in professional publications?
- ▲ Do educators discuss with colleagues issues in science and mathematics teaching and learning?
- ▲ Do educators participate in proposing, designing, and evaluating programs for professional development specific to science and mathematics education?
- ▲ Do educators participate in school, community, and political efforts to effect positive change in mathematics and science education?

8 GOAL

The implementation plan acknowledges that change is a process, not an event.

- ▲ Is the implementation of the change systematic and incremental?
- ▲ Does the change deal with a variety of responses and needs of individuals in the system?
- ▲ Have the leverage points that help change occur been identified?

PROCESS

- ▲ Have the changes been clearly explained and understood, including how they will bring about the desired results in student learning?
- ▲ Throughout the system is there both support as well as pressure to make the expected change?
- ▲ Have both the processes for change and the new practices been adequately addressed?

9 GOAL

The change process addresses both individual and organizational change.

- ▲ Is attention given to the stages of concern for individuals involved with change?
- ▲ Do people understand that change takes time and affects all parts of the system?
- ▲ Does the planned change take into account individual differences regarding implementing a change?
- ▲ Does the planned change acknowledge the complexity of change?
- ▲ Are the three phases of the organizational change process – initiation, implementation, and institutionalization – familiar to change agents and addressed in the plan?

PROCESS SELF ASSESSMENT

<i>Goal Number</i>	<i>Rarely Occurs</i>	<i>Sometimes Occurs</i>	<i>Frequently Occurs</i>	<i>Always Occurs</i>
1	_____	_____	_____	_____
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6	_____	_____	_____	_____
7	_____	_____	_____	_____
8	_____	_____	_____	_____
9	_____	_____	_____	_____

CONTENT

What do we, K-16 educators, need to know and be able to do to ensure that all students and all preservice teachers are proficient in mathematics and science?

KNOWLEDGE, STUDENT LEARNING, PEDAGOGY, MODELING AND ALIGNMENT OF CONTENT QUESTIONS

1 GOAL

Professional development ensures that educators are proficient in mathematics and science. K-16 educators are expected to possess the level of content knowledge needed to teach competently and with confidence.

MATHEMATICS

- ▲ Do educators know mathematical concepts and procedures, including concepts of number systems and number sense, geometry, measurement, statistics and probability, and functions and use of variables?
- ▲ Do educators know how to present mathematical concepts and procedures in a variety of ways?
- ▲ Do educators reason mathematically, solve problems, and communicate mathematics effectively at different levels of formality?
- ▲ Are educators able to make mathematical connections within the discipline and to its uses in the world?
- ▲ Do educators have a perspective on the nature of mathematics and the contributions to the advancement of mathematics by people in different cultures at different times in history?
- ▲ Do educators have a perspective on the changes in the nature of mathematics and the ways we teach, learn, and do mathematics resulting from the use of technology?
- ▲ Do educators have a perspective on the changing nature of mathematics, its relationship to other subjects, and its application in society?
- ▲ Do educators have the disposition to do mathematics and the confidence to learn mathematics?
- ▲ Do educators have fluency in mathematical language and symbolism?
- ▲ Do educators view mathematics as a study of patterns and relationships?
- ▲ Do secondary and postsecondary educators know concepts and procedures that include number theory, algebraic structures, and concepts of calculus and discrete mathematics?

CONTENT

SCIENCE

- ▲ Do educators know major science concepts, principles, skills, scientific habits of mind, and use of scientific equipment/tools?
- ▲ Do educators know key scientific concepts in the life, physical, and earth-space sciences?
- ▲ Do educators have a perspective on the changes in the ways we teach, learn, and do science as a result of the use of technology?
- ▲ Do educators make scientific connections within the discipline and to scientific uses and applications in the world?
- ▲ Do educators have a perspective on the nature of science and the contributions to the advancement of science made by people in different cultures at different times in history?
- ▲ Do educators have a perspective on the relationship of science to other disciplines and its applications in society?
- ▲ Do educators have the disposition to do science and the confidence to learn science?
- ▲ Do educators have fluency in scientific language and symbolism?
- ▲ Do educators have knowledge of different kinds of scientific investigations as determined by the questions they are trying to answer?
- ▲ Do educators view science as a particular way of knowing, i.e., as a particular way of generating and testing knowledge?
- ▲ Do secondary and postsecondary educators have knowledge in science content areas beyond their main area of expertise that includes the ability to make connections?
- ▲ Do secondary and postsecondary educators have comprehensive knowledge of at least one major content area: physics, chemistry, biology, earth-space sciences?

2 GOAL

Professional development experiences focus on helping educators know students as learners of mathematics and science.

- ▲ Do educators have an image of students as learners of mathematics and science?
- ▲ Can educators interpret research related to instructional issues to impact classroom practice?

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CONTENT

Instructional issues include:

- *The role of calculators, computers, and information technologies*
 - *The implications of children's informal science and mathematics concepts*
 - *The use of concrete materials and experiences to engage students in active learning*
 - *The ability to formulate approaches to finding answers to problems*
 - *The skills to diagnose students' prior knowledge*
- ▲ Do educators know the influence of students' maturity levels, abilities, interests, and experiences on learning mathematics and science?
 - ▲ Do educators take into account the influence of students' gender, linguistic, ethnic, racial, and socioeconomic backgrounds on learning?
 - ▲ Do educators know and implement ways to affirm and support full participation and continued study of mathematics and science by all students?
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3 GOAL

Professional development promotes educators' knowledge of content-specific pedagogy in mathematics and science (curricular, instructional and assessment strategies, materials, and resources).

- ▲ Do educators diagnose students' prior knowledge to guide instruction?
- ▲ Do educators teach for in-depth understanding of core concepts in science and mathematics, not just breadth of coverage?
- ▲ Do educators make informed decisions about curriculum, pedagogy, and assessment to ensure that all students meet mathematics and science content standards?
- ▲ Do educators evaluate and use instructional materials and resources, including technology?
- ▲ Do educators select materials, strategies, and perspectives that are sensitive to diverse cultures, languages, learning styles, and gender?
- ▲ Do educators have the knowledge and ability to evaluate and use instructional strategies and classroom organizational models?
- ▲ Do educators use a variety of ways to model and represent scientific and mathematical concepts, procedures, and processes?

CONTENT

- ▲ Do educators have the knowledge and ability to evaluate and use means of assessing student understanding of mathematics and science?
 - ▲ Do educators create a culture of ongoing learning in their classrooms?
 - ▲ Do educators emphasize inquiry-based learning, problem solving, student investigation and discovery, and application of knowledge?
 - ▲ Do educators have the knowledge and skills needed to help students construct new knowledge and meaning?
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-
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4 GOAL

Professional development provides educators experiences in good science and mathematics teaching and learning.

- ▲ Do educators participate in worthwhile scientific and mathematical tasks in their professional development?
- ▲ Does professional development engage educators in mathematical and scientific discourse that is enhanced through the use of a variety of tools, including calculators, computers, and physical and pictorial models?
- ▲ Does the learning environment for educators support and encourage mathematical and scientific reasoning and dispositions and abilities to do mathematics and science?
- ▲ Does professional development expect and encourage educators to take intellectual risks in doing science and mathematics and to work independently and collaboratively?
- ▲ Does professional development help educators view mathematics and science as ongoing human endeavors?
- ▲ Does professional development build on educators' current science and mathematics knowledge, skills, and attitudes?
- ▲ Are educators encouraged to construct and test their own knowledge through immersion in scientific and mathematical processes?
- ▲ Are educators provided opportunities to work in collaborative teams; to engage in discourse about science, mathematics, teaching, and learning; and to experience the modeling of effective teaching strategies?
- ▲ Does professional development provide educators opportunities to examine and revise assumptions about the nature of science and mathematics, how students learn these subjects, and how science and mathematics should be taught?

CONTENT

- ▲ Does professional development provide educators with opportunities to observe and analyze a range of approaches to science and mathematics teaching and learning, focused on tasks, discourse, environment, and assessment?
- ▲ Does professional development provide opportunities for educators to enhance their attitudes toward teaching science and mathematics?

5 GOAL *Professional development aligns with school district, higher education and state goals, standards, and policies for science and mathematics.*

- ▲ Do educators see their own growth affecting increased achievement for all students in science and mathematics?
- ▲ Does professional development increase achievement for all students in mathematics and science?
- ▲ Does professional development support science and mathematics standards (national, state, and local)?
- ▲ Does professional development support alignment of curriculum, instruction, and student assessment with science and mathematics content standards?
- ▲ Are teacher preparation and advanced degree programs in science and mathematics education aligned with science and mathematics standards?

CONTENT SELF ASSESSMENT

<i>Goal Number</i>	<i>Rarely Occurs</i>	<i>Sometimes Occurs</i>	<i>Frequently Occurs</i>	<i>Always Occurs</i>
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3	_____	_____	_____	_____
4	_____	_____	_____	_____
5	_____	_____	_____	_____

ASSESSMENT

Overall Self-Assessment of Goals

CONTEXT

<i>Goal Number</i>	<i>Rarely Occurs</i>	<i>Sometimes Occurs</i>	<i>Frequently Occurs</i>	<i>Always Occurs</i>
1	_____	_____	_____	_____
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10	_____	_____	_____	_____

PROCESS

<i>Goal Number</i>	<i>Rarely Occurs</i>	<i>Sometimes Occurs</i>	<i>Frequently Occurs</i>	<i>Always Occurs</i>
1	_____	_____	_____	_____
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CONTENT

<i>Goal Number</i>	<i>Rarely Occurs</i>	<i>Sometimes Occurs</i>	<i>Frequently Occurs</i>	<i>Always Occurs</i>
1	_____	_____	_____	_____
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