Unit 3 – Science:
Getting Ready for the Unit and Connecting to Experience

Focus Statement

Students explore the terminology of the science domain and reflect on ways in which they encounter aspects of the physical sciences, life sciences, earth sciences, and scientific inquiry in their everyday lives.

Curriculum Alignment Project (CAP) Student Learning Outcomes

The Curriculum Alignment Project's (CAP) lower division eight courses and student learning outcomes are mapped onto each instructional guide learning experience. See Appendix A for the specific student learning outcomes, objectives, and examples of course content and topics for the courses listed below.

- Introduction to Curriculum
- Principles and Practices of Teaching Young Children
- Observation and Assessment
- Practicum-Field Experience

Instructional Methodologies

- Class discussion
- Pairs or small groups
- Personal reflection
- Reflective discussion

California Early Childhood Educator Competency Areas to Consider

The Faculty Initiative Project will undertake a comprehensive process in the future to map the content of the instructional guides to the California Department of Education, Early Education and Support Division's *California Early Childhood Educator Competencies*. The "Competency Areas to Consider" below are listed in this instructional guide as a preliminary exploration of how particular competency areas might be addressed through these learning experiences.

- Child Development and Learning

- Observation, Screening, Assessment, and Documentation
- Learning Environments and Curriculum
- Professionalism

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Getting Ready for the Unit

The science domain in the *California Preschool Curriculum Framework, Volume 3* provides resources for the support of active learning experiences in the early years that "nurture children's habits of inquiry, critical thinking, creativity, and innovative problem solving . . . " (page 136).

The domain consists of four strands: Scientific Inquiry, Physical Sciences, Life Sciences, and Earth Sciences. The substrands in Scientific Inquiry are 1.0 Observation and Documentation and 2.0 Documentation and Communication. These relate to the process of scientific inquiry. The other three strands share the same substrands. These shared substrands relate to properties and characteristics and to change in the three areas of scientific inquiry. There is a glossary of scientific terms used in the domain on pages 244–246. Because many of these terms are specific to this domain, it is recommended that faculty be familiar with these terms before introducing students to this domain.

It will be important to help students become aware of the relationship of this *California Preschool Curriculum Framework, Volume 3* to the foundations in the *California Preschool Learning Foundations, Volume 3*. The foundations are goal-like statements that describe what children—at 48 and 60 months of age—typically learn and develop with optimal support. The curriculum framework provides guidance for how teachers can intentionally support this learning and development in young children.
Faculty can familiarize students with the foundations in the science domain through Learning Experience 3 in the science domain of the instructional guide for the *California Learning Foundations, Volume 3*. This is available on the Faculty Initiative Project Web site at http://facultyinitiative.wested.org/.Familiarity with the foundations will support students in understanding the resources and recommendations in the *California Preschool Curriculum Framework, Volume 3.*

Unit 3 in this instructional guide is designed to provide resources for faculty as they prepare their students to work with the science domain. The California preschool curriculum framework is available to be used as a resource for teachers of young children. As a resource, the framework will be most useful if students are well acquainted with its content. The key topics in this unit are intended to provide students with learning experiences that will increase their familiarity with the science domain in the curriculum framework so that students are able to use the framework as a resource as they plan and implement curriculum for young children.

The unit begins with a learning experienced designed to highlight the extent to which we all have connections to science content and scientific inquiry in our lives. Key Topic 1 provides opportunities to explore the rationale, organization, and guiding principles of the domain with three different subtopics. Key Topic 2 explores the environments and materials that are recommended as supports for planning and delivering science curriculum for young children. Because scientific inquiry is fundamental to science curriculum, the environments and materials are presented in the framework for the physical environment in the classroom and also for the social environment. Students will have an opportunity to work with both these aspects of science curriculum. Key Topic 3 then provides students an opportunity to work with the recommended interactions and strategies for this domain and look for examples in vignettes or identify other examples. Key Topic 4 addresses the important issues of individualization, universal design, and partnering with families through three separate subtopics. Key Topic 5 can be used for furthering students' understanding of the resources available to deepen and strengthen their understanding of science curriculum with young children.

Motivator and Connection to Experience

Before You Start

Faculty and students will bring a variety of experiences with science learning to this domain. It will be important to acknowledge that this domain may represent experiences that have been challenging as well as fascinating in students' own experiences. In addition, many family and community approaches to science may vary in their choices regarding explanations and descriptions. These must be recognized and respected as students navigate this domain, but keep in mind that, as stated on page 142 of the *California Preschool Curriculum Framework, Volume 3*, "science bridges across different cultures and languages." Phenomena can be described in different languages but are the same.

Information Delivery

Slides 2-7

A good way to begin exploring this domain would be by asking students to read the introduction to the science domain. Take a few minutes in class to read pages 136, 137, and the first column of 138. Remind students of the difference between foundations and curriculum framework. This might be a good time to review the foundations of the science domain if students have not encountered them previously. The foundations can be downloaded from the California Department of Education Web site at http://www.cde.ca.gov/sp/cd/re/psfoundations.asp.

Active Learning

Getting it started

Remind students that we all have experiences every day with scientific objects and events. Take a few minutes to ask:

Slide 8

"Where have you encountered science in your life today?"

Physical Sciences:
- Computers
- Video
- Other technology

Life Sciences:
- Attention to nutrition
- Medications
- Gardens

Earth Sciences:
- Highway construction
- Dressing for current weather

Once this conversation begins, there might be many examples.

Keeping it going

Slide 9

Direct students to the glossary on page 244–46 of the *Preschool Curriculum Framework, Volume 3*. Ask students to work in pairs and review the glossary for terms that are very familiar or not at all familiar. Ask them to note up to three terms that were new or had definitions that were new and three that they use quite a bit.

Ask students to reconvene as a whole group and discuss their experiences with the glossary. Did they have "aha" experiences? Or did they respond with "I didn't know that" or "Oh, that's what that means"?

Online Options

Students could post their familiar and new glossary terms online and review their classmates' postings in preparation for an in-class discussion.

If some form of online-discussion capability such as a chat room is available, faculty could facilitate an online discussion of the students' experience with the glossary.

Taking it further

Slide 10

Ask students to find terms that relate specifically to scientific inquiry. These would be terms that refer to observation, investigation, and documentation. As you identify these together, note how many of the terms in the glossary relate to the process of inquiry that is important to nurture in young children.

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Ask students to think of times during the day that they use these practices. For example, do they use estimating when cooking? When do they compare and contrast materials or events?

Remind students that these processes are ones that we use every day but that we make them systematic and intentional when working with young children to strengthen their use of them.

Online Options

If some form of online-discussion capability such as a chat room is available, faculty could facilitate an online discussion of the students' identification of terms related to scientific inquiry and their everyday use of scientific inquiry practices.

Another approach

This exploration of the glossary can be done as an informal conversation, as suggested in the "Keeping it going" and "Taking it further" sections, or in a written format. Familiar and unfamiliar terms could be written on chart paper and compared. Similarly, the terms relating to process could be listed with examples written below them. Charting the terms would make them visible for analysis and reflection.

Reflection

After students have worked through the active learning segments, ask them to reflect on their connection to science with the following questions:

Slide 11

- Did anything surprise you as you thought about your experiences with science on an everyday basis?
- Where did you find connections to terms in the glossary?
- What would you look forward to doing with young children that might relate to your experiences?
- What do you want to find out more about? How could you do that?