Unit 3 – Science:
Key Topic 1: Organization and Rationale of the Science Domain

Focus Statement

Students become familiar with the rationale and guiding principles for the science domain in the *California Preschool Curriculum Framework, Volume 3*. They also explore how the domain is organized.

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.

- Child Growth and Development
- Child, Family and Community
- Introduction to Curriculum
- Principles and Practices of Teaching Young Children
- Practicum-Field Experience

Instructional Methodologies

- Class discussion
- Creation of a visual representation
- Notetaking outline or guide
- Pairs or small groups
- 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
- Relationships, Interactions, and Guidance
- Family and Community Engagement
- Dual-Language Development
- Special Needs and Inclusion
- Learning Environments and Curriculum
- Leadership in Early Childhood Education
- Professionalism
- Administration and Supervision

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Before You Start

This key topic has three subtopics:
Subtopic 1: Rationale for the Science Domain. This subtopic introduces students to the rationale for addressing science in the early years. Through a brief discussion, students will explore why it is important to intentionally plan science experiences for young children.

Subtopic 2: Organization of the Science Domain. Students are introduced to the unique organization of four strands, with three strands having the same substrands. They will be asked to work in pairs to outline the three strands that relate to specific content areas: physical sciences, life sciences, and earth sciences. Then they will form groups of four and outline the strand for Scientific Inquiry. As they proceed through this subtopic, they will discover some of the differences and similarities in how these strands are organized and have time to reflect on why they might be this way.

As students are working with the organization of this domain, it will be important for them to see that there are some elements that are consistent to all strands and some that are not. An alternative way to explore the organization of the domain is also addressed in this subtopic. This approach assigns certain organizational elements to students and ask them to find these across substrands and describe them to their peers, who have been searching for different elements.

Subtopic 3: Guiding Principles for the Science Domain. Here students are assigned 1 or 2 of the 11 guiding principles for the science domain and asked to develop an expressive representation of the assigned principle. This could be a visual art product such as a drawing or collage, a short video, or a slide show, depending on the students' familiarity and skills with those products and the resources that are available. Approaching this work through visual representation provides an opportunity for students to experience communicating about a concept using images. These are then presented during a class time for all to explore.

Information Delivery

Students will need to have read, or read in class, pages 136–38 and pages 151 and 152 of the *California Preschool Curriculum, Volume 3*. These pages provide a brief rationale for science learning in the

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early years and a brief summary of the strands and substrands in the science domain.

Students will have a chance to explore the guiding principles in Subtopic 3 of this key topic and will encounter the pages relating to environments and materials in Unit 3, Key Topic 2 in this instructional guide.

Active Learning

Subtopic 1: Rationale for the Science Domain

Getting it started

Faculty can begin a discussion of pages 136–38 of the *California Preschool Curriculum Framework, Volume 3* by asking students what stood out for them as they read these brief sections. Point out that the stated purpose of preschool science is on page 136.

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Keeping it going

Continue the conversation with the following questions:

1. Why is it important that children's natural curiosity be nurtured in preschool? What is the long-term advantage of that for the child?

2. Why is it important to organize sciences experiences and think about intentionally teaching science with young children?

   These questions could spark some interesting discussions and follow-up questions such as these two examples: How much of what is already done in many preschools could be called science? How is what this framework is suggesting different from that?

Online Options

Students could list the highlights from their reading and write a one- or two-paragraph response to each of the questions and post their responses online. Faculty could then ask students to review their classmates' postings in preparation for an in-class discussion.

If online-discussion capacity such as a chat room is available, faculty could facilitate an online discussion of the two questions.

Subtopic 2: Organization of the Science Domain

Getting it started
Organize students into pairs and assign one of the three content area strands to each pair of students. These strands are physical sciences, life sciences, and earth sciences.

Ask students to outline the strand they are assigned. Though some students might have electronic devices available with which they can do this, it is recommended that this is done with paper and pencil. This will facilitate the next step.


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Outlining should be done using the following elements:

- Substrand title
- Vignette
- Teachable moment
- Interactions and strategies
- Planning opportunities
- Research strategies
- Bringing it all together
- Engaging families

Online Options

Students could work individually to develop an outline of one of the strands and then post their outlines online. Students could then compare their outlines with those of their peers in preparation for an in-class discussion. If online-discussion capacity such as a chat room is available, faculty could facilitate an online discussion of the students outlines of the strands.

Keeping it going
After the three content area strands have been outlined, ask students to recombine into groups of three, with one student from each strand in each group. Ask them to briefly compare their outlines, looking for differences and similarities. Then ask them to continue working in their groups and produce an outline of the first strand, Scientific Inquiry.

Putting it together
Reconvene the whole group, and begin a discussion about the organization of the science domain with these questions:


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1. Why do you think there are four strands, with Scientific Inquiry being so different from the other three?

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2. Why would the three content area strands have the same substrands? Does this help you think about how to organize science learning experiences for young children?

3. Are there other ways this domain could have been organized? For example, what if there were three strands and a scientific inquiry substrand in each one. Would that have worked? Why or why not?

Subtopic 3: Guiding Principles for the Science Domain

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Getting it started

Direct students to pages 138–142 of the *California Preschool Curriculum Framework, Volume 3.* On these pages, they will find the 11 guiding principles for the science domain. Remind students that these principles support active learning and habits of inquiry and critical thinking.

Suggest to students that they need to think about how they can communicate these principles to parents. Provide students, individually or in pairs, with materials needed to produce a poster that describes or illustrates a principle. The materials could include posters, markers, old magazines, and any other art materials available. Students can be assigned to one principle or they can choose which principle they would like to work with, as long as all principles are covered. The poster should describe or illustrate the principle in such a way that it could be explained to peers or parents of young children.

Putting it together

When they are finished, display the posters around the room. Ask students to first walk around and view the posters. Then ask each student or pair to discuss their poster, with emphasis on how they could describe the principle to parents.

Reflection

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For any of the subtopics, the following questions can be used to reflect on their experiences:

- What stands out for you in this experience?
- What did you learn about your connection to science in your life?
- What is something that you would like to learn more about? How can you do that?