



Science: Exploring Examples of the Science Domain in the Early Care and Education Setting

Focus Statement

Students explore the examples of foundations in the science domain and then engage in classroom observations to look for additional examples of the foundations in action. This learning experience is designed to help students understand that the examples in the foundations are not criteria and that children will demonstrate the foundations in many settings and ways.

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
- Principle and Practices of Teaching Young Children
- Observation and Assessment
- Practicum-Field Experience

Instructional Methodologies

- Brainstorming
- Class discussion
- Development of resource tool
- Observations
- 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
- Observation, Screening, Assessment, and Documentation
- Learning Environments and Curriculum
- Professionalism



Science: Exploring Examples of the Science Domain in the Early Care and Education Setting

Science Domain: Exploring Examples of the Science Domain in the Early Care and Education Setting

Before You Start

In this learning experience, students are asked to observe children in group settings and watch for examples of children's behavior that demonstrate foundations in the science domain. Because the content of this domain might be less familiar than other domains to students, it will be important to familiarize them with the strands and substrands of this domain and with some of the examples for each foundation before they are asked to observe in early care and education settings. One way to do this is to have students do Learning Experience 3 in this domain titled "Piecing Together the Science Domain Content Puzzle."

The first strand of the science domain is Scientific Inquiry, and it is highlighted in this learning experience so that all students have exposure to its content. This is done so that all students can become familiar with the underlying process that supports inquiry in the other science domains.

Building example banks is a feature of every domain in each of the instructional guides for the three volumes of the *California Preschool Learning Foundations*. This has been done to emphasize in each domain that the examples presented for each foundation are neither assessment to be used as a checklist nor curriculum suggestions. It is also designed to expand students' observation skills and to help students understand that what they see in early care and education settings are the foundations in action.

Two handouts are provided with this learning experience. Handout 1 is a list of the foundations for the science domain, and Handout 2 is an observation guide, which students can use when they do their classroom observations. Electronic versions of these handouts will be available when this instructional guide is online at www.wested.org/facultyinitiative.

Students also will review the examples provided for the foundations. If instructors have access to several copies of the *California Preschool Learning Foundations, Volume 3*, students could use them for this review. The publication is also available online at <http://www.cde.ca.gov/sp/cd/re/psfoundations.asp#psfoundvol3>. Students with electronic devices such as laptops or tablets may be able to view the downloaded publication during class.

Information Delivery

Direct students' attention to the first column of the text on page xiv in the Introduction to the *California Preschool Learning*



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Foundations, Volume 3. This text addresses the use of examples in the foundations and emphasizes that the examples are not to be used as assessment or curriculum but as ways in which children might demonstrate the attainment of a foundation. This text also stresses that children might demonstrate behaviors that show the foundations in action in a variety of early care and education contexts, such as “engaging in imaginative play, exploring the environment and materials, making discoveries, being inventive, or interacting with peers, teachers, or other adults (*California Preschool Learning Foundations, Volume 3*, p. xiv).”

Many of the foundations will be demonstrated through the use of language, and students should be prepared to observe children expressing themselves in any language or nonverbally.



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After discussing how examples are used in the foundations, review the strands and substrands in this domain in class before students do their observations. This can be done by asking students to read the foundations aloud in turn. A summary list of the foundations can be found in the science domain in Appendix B of the *California Preschool Learning Foundations, Volume 3* on pages 108–112 and as a handout for this learning experience.

Reviewing a few of the examples for each foundation as you go through them will also be helpful for many students. It will be important here to remind students again that examples are neither assessment nor curriculum suggestions. As you do this, you might ask students which of the early care and education contexts (from page xiv of the Introduction to the *California Preschool Learning Foundations, Volume 3*) an example represents. It is likely that many examples will represent more than one context.

Another way to familiarize students with this domain is to have them do Learning Experience 3 mentioned in the “Before You Start” section, “Piecing Together the Science Domain Content Puzzle.”

Active Learning

Getting it started

Organize students into pairs or groups of three. Assign each group or pair to the Scientific Inquiry strand and one other strand. It is important for each pair or group to work with the Scientific Inquiry strand because it is the fundamental process that is applied to and used in the other three strands. In addition, the substrands are different in the Scientific Inquiry strand from the substrands that are consistent in the other strands. Because of these variations, it is important for students to become familiar with the differing structures of the strands.



As students begin their work in pairs or groups, ask them first to concentrate on the foundations in the Scientific Inquiry strand. Ask them to read through the examples for this strand and discover examples that they have seen or heard young children demonstrate.

Next, again having them work in their pairs or groups, ask them to think of other ways they have observed, heard of, or can think of children possibly demonstrating each foundation in this strand. They can write down notes or examples on the summary handout or on other sheets of paper.

Guide them through this same process for their additional strand.

Keeping it going

Building an example bank can then be done to extend and further support students' understanding of the foundations in this domain and that the examples are neither assessment nor curriculum.

Ask students to observe children in a preschool classroom. This could be where they are currently working or where they might have approved access to do an observation. If the observation can be done in pairs, it will increase the learning as each pair reviews and discusses its observations. Assign specific strands to individual students or pairs to focus their observations. Assigning the Scientific Inquiry strand with one other strand, as done in the "Getting it started" section, would be helpful for students to increase their familiarity with the Scientific Inquiry strand. Be sure students still have Handout 1, the summary of the science domain foundations, and Handout 2, the "Observation Guide" for this learning experience.



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Remind the students that, when they look for examples, they are looking for observable behaviors or actions that demonstrate the foundations in action. The point of this exercise is not to assess children's development but rather to explore the foundations and see where and how children demonstrate aspects of these foundations in their daily activities. Students might be unsure if something is an example or they might be reluctant to label the development that they are observing, but suggest that they just document what they see as examples of the foundations and bring their observations back to class for discussion. It is in the discussion that greater understanding and clarity will emerge.



Putting it together

Ask students to bring their list of examples to class. Give students chart paper or whiteboard space so that they can display the examples they observed. Each student can write the examples out on strips of paper or list the examples on chart paper so that the entire class can see them. Be sure the examples are arranged by the strands or substrands that were observed.

Give students time to walk about and see what has emerged. Remind students that it is unlikely that they will see all the science foundations in a single observation. Children will demonstrate behaviors related to the foundations over many activities and over repeated experiences over time.

Be sure that the examples are collected and made available as a resource to students. This can be their example bank.

Reflection



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Then ask students to reflect on their observations, using the following questions:

- Is there anything you particularly noticed about all the examples?
- Were there some contexts or routines in the classroom where it was easy to see certain foundations in action? Which ones?
- Did some foundations appear in some routines or contexts and not others? Which were they and when did they appear?
- Were there some contexts or routines in the classroom where it was difficult to see science foundations in action?
- What does this tell you about the importance of ongoing observation in early care and education settings?
- What are the implications of this for your current or future work with young children?

Online Options

Students could post their observations online for review by their classmates. If the class has online-discussion capability, the questions could be explored through an instructor led discussion online.



Science

Scientific Inquiry

1.0 Observation and Investigation

<i>At around 48 months of age</i>	<i>At around 60 months of age</i>
1.1 Demonstrate curiosity and raise simple questions about objects and events in their environment.	1.1 Demonstrate curiosity and an increased ability to raise questions about objects and events in their environment.
1.2 Observe ¹ objects and events in the environment and describe them.	1.2 Observe objects and events in the environment and describe them in greater detail.
1.3 Begin to identify and use, with adult support, some observation and measurement tools.	1.3 Identify and use a greater variety of observation and measurement tools. May spontaneously use an appropriate tool, though may still need adult support.
1.4 Compare and contrast objects and events and begin to describe similarities and differences.	1.4 Compare and contrast objects and events and describe similarities and differences in greater detail.
1.5 Make predictions and check them, with adult support, through concrete experiences.	1.5 Demonstrate an increased ability to make predictions and check them (e.g., may make more complex predictions, offer ways to test predictions, and discuss why predictions were correct or incorrect).
1.6 Make inferences and form generalizations based on evidence.	1.6 Demonstrate an increased ability to make inferences and form generalizations based on evidence.

1. Other related scientific processes, such as classifying, ordering, and measuring, are addressed in the foundations for mathematics.

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2.0 Documentation and Communication

<i>At around 48 months of age</i>	<i>At around 60 months of age</i>
2.1 Record observations or findings in various ways, with adult assistance, including pictures, words (dictated to adults), charts, journals, models, and photos.	2.1 Record information more regularly and in greater detail in various ways, with adult assistance, including pictures, words (dictated to adults), charts, journals, models, photos, or by tallying and graphing information.
2.2 Share findings and explanations, which may be correct or incorrect, with or without adult prompting.	2.2 Share findings and explanations, which may be correct or incorrect, more spontaneously and with greater detail.

Physical Sciences

1.0 Properties and Characteristics of Nonliving Objects and Materials

<i>At around 48 months of age</i>	<i>At around 60 months of age</i>
1.1 Observe, investigate, and identify the characteristics and physical properties of objects and of solid and nonsolid materials (size, weight, shape, color, texture, and sound).	1.1 Demonstrate increased ability to observe, investigate, and describe in greater detail the characteristics and physical properties of objects and of solid and nonsolid materials (size, weight, shape, color, texture, and sound).

2.0 Changes in Nonliving Objects and Materials

2.1 Demonstrate awareness that objects and materials can change; explore and describe changes in objects and materials (rearrangement of parts; change in color, shape, texture, temperature).	2.1 Demonstrate an increased awareness that objects and materials can change in various ways. Explore and describe in greater detail changes in objects and materials (rearrangement of parts; change in color, shape, texture, form, and temperature).
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2.0 Changes in Nonliving Objects and Materials (*continued*)

<i>At around 48 months of age</i>	<i>At around 60 months of age</i>
2.2 Observe and describe the motion of objects (in terms of speed, direction, the ways things move), and explore the effect of own actions (e.g., pushing pulling, rolling, dropping) on making objects move.	2.2 Demonstrate an increased ability to observe and describe in greater detail the motion of objects (in terms of speed, direction, the ways things move), and to explore the effect of own actions on the motion of objects, including changes in speed and direction.

Life Sciences

1.0 Properties and Characteristics of Living Things

<i>At around 48 months of age</i>	<i>At around 60 months of age</i>
1.1 Identify characteristics of a variety of animals and plants, including appearance (inside and outside) and behavior, and begin to categorize them.	1.1 Identify characteristics of a greater variety of animals and plants and demonstrate an increased ability to categorize them.
1.2 Begin to indicate knowledge of body parts and processes (e.g., eating, sleeping, breathing, walking) in humans and other animals. ²	1.2 Indicate greater knowledge of body parts and processes (e.g., eating, sleeping, breathing, walking) in humans and other animals.
1.3 Identify the habitats of people and familiar animals and plants in the environment and begin to realize that living things have habitats in different environments.	1.3 Recognize that living things have habitats in different environments suited to their unique needs.
1.4 Indicate knowledge of the difference between animate objects (animals, people) and inanimate objects. For example, expect animate objects to initiate movement and to have different insides than inanimate objects.	1.4 Indicate knowledge of the difference between animate and inanimate objects, providing greater detail, and recognize that only animals and plants undergo biological processes such as growth, illness, healing, and dying.

2. The knowledge of body parts is also addressed in the *California Preschool Foundations (Volume 2)* for health. In science, it also includes the knowledge of body processes. Knowledge of body parts is extended to those of humans and other animals.

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2.0 Changes in Living Things

<i>At around 48 months of age</i>	<i>At around 60 months of age</i>
2.1 Observe and explore growth and changes in humans, animals, and plants and demonstrate an understanding that living things change over time in size and in other capacities as they grow.	2.1 Observe and explore growth in humans, animals, and plants and demonstrate an increased understanding that living things change as they grow and go through transformations related to the life cycle (for example, from a caterpillar to butterfly).
2.2 Recognize that animals and plants require care and begin to associate feeding and watering with the growth of humans, animals, and plants.	2.2 Develop a greater understanding of the basic needs of humans, animals, and plants (e.g., food, water, sunshine, shelter).

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Earth Sciences

1.0 Properties and Characteristics of Earth Materials and Objects

<i>At around 48 months of age</i>	<i>At around 60 months of age</i>
1.1 Investigate characteristics (size, weight, shape, color, texture) of earth materials such as sand, rocks, soil, water, and air.	1.1 Demonstrate increased ability to investigate and compare characteristics (size, weight, shape, color, texture) of earth materials such as sand, rocks, soil, water, and air.

2.0 Changes in the Earth

2.1 Observe and describe natural objects in the sky (sun, moon, stars, clouds) and how they appear to move and change.	2.1 Demonstrate an increased ability to observe and describe natural objects in the sky and to notice patterns of movement and apparent changes in the sun and the moon.
2.2 Notice and describe changes in weather.	2.2 Demonstrate an increased ability to observe, describe, and discuss changes in weather.
2.3 Begin to notice the effects of weather and seasonal changes on their own lives and on plants and animals.	2.3 Demonstrate an increased ability to notice and describe the effects of weather and seasonal changes on their own lives and on plants and animals.
2.4 Develop awareness of the importance of caring for and respecting the environment and participate in activities related to its care.	2.4 Demonstrate an increased awareness and the ability to discuss in simple terms how to care for the environment, and participate in activities related to its care.

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Observation Guide:

Exploring Examples of the Science Domain

Science Domain:
Learning Experience 9
Handout 2 – Observation Guide

<i>Strand: Scientific Inquiry</i> Substrand: Observation and Investigation	
Setting:	
Examples:	
<i>Strand: Scientific Inquiry</i> Substrand: Documentation and Communication	
Setting:	
Examples:	
<i>Strand: Physical Sciences</i> Substrand: Properties and Characteristics of Nonliving Objects and Materials	
Setting:	
Examples:	



Observation Guide:

Exploring Examples of the Science Domain (Continued)

<i>Strand: Physical Sciences</i> Substrand: Changes in Nonliving Objects and Materials	
Setting:	
Examples:	
<i>Strand: Life Sciences</i> Substrand: Properties and Characteristics Living Things	
Setting:	
Examples:	
<i>Strand: Life Sciences</i> Substrand: Changes in Living Things	
Setting:	
Examples:	



Observation Guide:

Exploring Examples of the Science Domain (Continued)

<i>Strand: Earth Sciences</i> Substrand: Properties and Characteristics of Earth Materials and Objects	
Setting:	
Examples:	
<i>Strand: Earth Sciences</i> Substrand: Changes in the Earth	
Setting:	
Examples:	