



Science: Connecting to Children’s Experience with Scientific Inquiry Through Ramp Exploration

**Science Domain:
Connecting to Children’s Experience with Scientific
Inquiry Through Ramp Exploration**

Focus Statement

Students explore the Scientific Inquiry strand by experiencing firsthand an activity that children often do in early care and education settings—playing with ramps. Students will identify and reflect on the different elements of scientific inquiry they use during their play.

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

Instructional Methodologies

- Pairs or small groups
- Problem solving
- 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



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Before You Start

This learning experience gives students a chance to experience scientific inquiry as it is described in the science domain. It will help if students have some familiarity with this domain. This can be done through either of the learning experiences in this domain that are designed to acquaint students with this domain. These are Learning Experience 3 "Piecing Together the Science Domain Content Puzzle" and Learning Experience 4 "Exploring the Content and Vocabulary of the Science Domain."

For this experience, you will need to gather some materials and supplies that students will use to carry out their inquiries. The experience is explored here with a particular example from the Physical Sciences strand of this domain.

There are other examples that can be explored as well, and these will be discussed in the learning experience. For the example described here, the instructor will need the following materials:

- A ramp - This can be made using a board or a piece of strong, smooth cardboard with something to put under one end to raise it up, such as books or a box. It will be helpful to have the ability to set the ramp at different heights and angles.
- Objects and materials that will roll down the ramp - Include objects that will roll such as toy vehicles with rolling wheels that are different sizes and weights, balls of different sizes, marbles, balls of yarn or twine, pencils, plastic bottles, or anything you can find that will roll. Try to include objects that will not all roll at the same rate and some that will not roll in straight lines.
- Materials for students to record predictions and observations - These can be paper and pencil, electronic tablets, or laptops.

Set a tone of curiosity and enjoyment at finding out about things. There is a great deal of room in this activity for creativity on the part of both faculty and students, and be prepared to support and invite that. Students should experience this as a playful activity and then discuss how many of the foundations in the Scientific Inquiry strand they were actually carrying out.



Information Delivery



Slide 2-3

Let students know that they will be building their own connection to the science domain, and especially the strand of Scientific Inquiry, by carrying out their own scientific inquiry. Review the foundations in this strand, either through one of the learning experiences mentioned in the “Before You Start” section or by reading through the foundations in class.

Note these important behaviors that indicate use of scientific inquiry by young children:



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- Describing objects and events
- Raising questions about objects and events
- Using observation and measurement
- Comparing and contrasting objects and events
- Making predictions and checking them
- Making inferences and forming generalizations
- Recording information
- Sharing findings and explanations

Active Learning



Slide 6

Getting it started

Let students know that they will be experiencing something that young children experience frequently in their early care and education settings—playing with ramps. This is an activity that engages children in the behaviors of the science foundations during their active play and explorations. Students will be asked to record some of their thinking and observations, but none of these will be collected or reviewed. They are solely for the students’ own experience and exploration.

Set up the ramp so that everyone can see it. Form small groups of two to four, depending on the size of the class. Give every group two or three objects. Begin by asking each group to record what they think will happen when they roll their objects down the ramp. Have groups take turns rolling their objects down the ramp. Before each group rolls its objects, the instructor might ask the other groups what they think will happen. Remember to check predictions with the evidence of what did occur.

Keeping it going

Once all the objects have been used, vary the conditions of the ramp rolling. Here is where instructors and students can get creative. Try to come up with ways that objects would not be able to



roll, like changing the height of the ramp, or putting tape on the ramp at intervals to make bumps. Set up races or challenges between objects to see which will go fastest, farthest, or roll off the side.

Instructors can go through the groups again, but perhaps rotate the objects or even bring in some new ones. Ask students to think of other things they have or can find in the room that might roll down the ramp.

Before doing each of these variations, remember to ask students to make predictions and/or compare and contrast the properties of the objects such as size and weight and predict how that will affect their travel down the ramp. Following any of these variations, ask students to give descriptions of what happened and why.

Remember that it is the process of inquiry that matters here, and students need not come up with detailed explanations.

Putting it together

After they have explored variations and different conditions of this experience, ask students when in this experience they were able to do each of the following skills:

- Describe objects and events
- Raise questions about objects and events
- Use observation and measurement
- Compare and contrast objects and events
- Make predictions and check them
- Make inferences and form generalizations
- Record information
- Share findings and explanations

Online Options

Students could work individually or in small groups to conduct their ramp experiments outside of class. Students would then write brief responses to the questions in “Putting it together” and post them online. Students could then compare their own experiences with those of some of their classmates, noting which skills were reported most frequently. If the class has online-discussion capability, instructors could also ask students to discuss what they learned about the scientific inquiry process that relates to young children.



If there were any of these skills that they did not remember doing, ask them to think about times when they might have done them without realizing it. For example, they probably were making inferences and forming generalizations when they explored how weight or size would affect an object rolling down the ramp.

Point out that they have fully explored the Scientific Inquiry strand and also explored much of the strand of Physical Sciences. Instructors might also point out how much language development would be involved and also how many mathematical concepts important to young children were used in this activity.

Reflection



Slide 7

Ask students to reflect on their experience with the following questions:

- What most surprised you about this exercise?
- What did you enjoy most?
- What did you learn?
- What questions did this exercise raise for you?
- How did this experience affect your ideas about science and young children?

Online Options

If the class has online-discussion capability, the reflection questions could be discussed online between the students and the instructor.