

SCIENCE ACTIVITIES AT TWO DIFFERENT SITES

Alhambra – Rockets

Alhambra is an elementary school, serving grades 1-6, located in a low-income neighborhood in a small urban area on California's north coast. Science was offered every Thursday for about one hour.

Two undergraduate volunteer facilitators led a rocket building activity. When they told the children that the rockets they were about to make would actually shoot up in the air, the children applauded.

One facilitator explained to the children that they were to color and cut out rocket parts pre-drawn on paper and then glue them onto an empty film canister. The children began coloring and cutting out the pieces of paper from the blueprint. Over the course of the activity, about a quarter of the children left intermittently as their parents picked them up. The children were highly engaged in the coloring activity, chatting with each other along the way.

When most of the children had finished coloring and cutting, the facilitators demonstrated how to wrap the paper parts around the canister. This became a difficult task for most of the children, who ended up waiting for their turn to have one of the facilitators wrap and tape the parts onto their canisters. The children would sit and wait passively, or chat with other students.

When the rockets - quite attractive in various colors and patterns - were finished, the children lined up to go outside, where they were asked to stand in line to have one of the facilitators pour soda into their canisters. Then, the other facilitator added a Mentos tablet, quickly plugged the canister and had the children place the rocket right side up on the table.

The first few rockets only fizzled and did not take flight. One rocket jumped a few inches into the air. Some children started asking why they didn't "explode," and others suggested adding more Mentos or more Coke. But there was no discussion and only a couple of minutes were left of the session. The remaining parents had started arriving, and the children began to leave. After all the children launched their rockets, the activity ended.

Lockhart - Airplanes

Lockhart is an elementary school in a predominantly Hispanic urban community in the Los Angeles metropolitan area. Science was offered 2-4 times a week to children in grades 3-5.

The facilitator led a group of 4th and 5th grade children through an activity exploring how airplanes fly. He began the activity with a question: "Can anybody give me an idea about how an airplane flies?" After the children shared their thoughts, the facilitator read from an activity sheet to inform them about the goals of the activity.

Bringing out Styrofoam plates and a sheet of instructions, the facilitator led the children, step by step, through the process of making an airplane. The steps involved measuring, drawing and cutting pieces of Styrofoam. For each step, the facilitator waited for all the children to finish.

When the children had finished building their planes, the facilitator told them to line up in the back of the room and to throw their airplanes one at a time. "Did it glide?" he said, and when they responded "no" he told them to add a paper clip to the nose of their planes. One boy asked the science facilitator why a paperclip would help. The facilitator responded, saying: "I don't know. We will discuss and see."

After the children tested their planes with paper clips, the facilitator discussed what they observed. In the discussion, the facilitator tied in children's observations of their planes to how a real plane flies. He asked them questions, such as, "Why do you think it flies in the air?" He explained how the wind carries the wings of the plane. He asked children what pulls the plane down, and shifted the discussion from airplane flying to gravity, asking them, for example, to think about the difference between how a crumpled piece of paper falls compared to a sheet of paper.

For the last 10 minutes of the session, the facilitator asked the children to explore and test their airplanes. During this exploration time, the children continued to modify their airplanes to make them fly farther. Some children competed with each other on how far their planes could fly. They exchanged ideas and techniques on the kind of modifications they made to their planes. One girl excitedly told the facilitator: "Look! I took off the tail wing; it went so fast." One boy told the facilitator how he took off the bottom of the wing, saying: "It goes way better."





The two activities were similar in certain respects:

- Partially scripted activities
- Simple set of materials and a set of instructions
- Children followed step-by-step instructions for putting together the flying vehicles
- About one hour long
- Facilitators did not have science backgrounds

But with regard to SCIENCE, they differed in significant ways:

Alhambra – Rockets

Not clear it was science - Even though the facilitator said they would do “some science stuff,” there were not other references for children to think they were doing anything science-related.

Children primarily followed directions

Children’s engagement not related to science - The Alhambra children were engaged, but primarily when they were coloring and cutting their rocket pieces

Children did not have opportunity to ask questions - The scripted nature of the activity did not leave room for the children to explore or ask questions.

There was no discussion about the science

Lockhart - Airplanes

Explicitly framed as SCIENCE - Lockhart facilitator framed the activity as a science activity and incorporated science concepts into the children’s experiences with the planes.

Children were asked to think about what the activity meant - The Lockhart facilitator framed the activity from the very beginning with a question about what makes airplanes fly

Children’s engagement characterized by exploration and curiosity – Children were given time to experiment, observe, and playfully explore without specific instructions.

Children asked questions - Children were encouraged to think for themselves and they asked a lot of questions

Facilitator supported conversation about the science ideas - the facilitator did not lecture the children, but asked open-ended questions

The sites also differed in the SUPPORT they had for science:

NO science-related professional development

Facilitators had access to extensive science-related professional development workshops on how to lead science activities.





1. REFLECTING ON YOUR SCIENCE PROGRAM

1a. PURPOSE Why do you offer science?	1b. LEARNING GOALS What do you want children to learn or take away from their experiences?	1c. ACTIVITIES What experiences do you want them to have? What do you want them to do?
<input type="checkbox"/> To make up for the lack of science in school <input type="checkbox"/> To supplement what children are learning in school <input type="checkbox"/> To support content learning <input type="checkbox"/> To give children science experiences they don't get in school (e.g., hands-on) <input type="checkbox"/> Because of program requirements <input type="checkbox"/> To offer diverse activities and topics	<input type="checkbox"/> Science concepts and ideas <input type="checkbox"/> Science vocabulary <input type="checkbox"/> That science can be fun <input type="checkbox"/> Identify with science or see themselves as scientists <input type="checkbox"/> See the relevance and application of science <input type="checkbox"/> How to do science inquiry	<input type="checkbox"/> Have fun <input type="checkbox"/> Do hands-on activities <input type="checkbox"/> Do projects <input type="checkbox"/> Be exposed to science phenomena <input type="checkbox"/> Collaborate <input type="checkbox"/> Have discussions <input type="checkbox"/> Do experiments <input type="checkbox"/> Do investigations <input type="checkbox"/> Collect data
<input type="checkbox"/> Others:	<input type="checkbox"/> Others:	<input type="checkbox"/> Others:

Reality Check!

Do the purpose, learning goals, and activities, align? If they don't, try to re-write them so that they do, using the space below:

PURPOSE	LEARNING GOALS	ACTIVITIES

2. CONSIDERING YOUR RESOURCES FOR DOING SCIENCE

2a. What resources do you have?

2b. Do the resources allow you to do the activities you indicated in Worksheet 1?

2c. If the answer is NO:

Write down what you can do to address it

OR

If nothing can be done, modify your purpose, goals, and activities

Time for science

YES!

NO! →

Space for science

YES!

NO! →

Materials for science

YES!

NO! →

Curriculum, lesson plans, activity ideas

YES!

NO! →

Staff Capacity

- Science knowledge
- Leading science activities
- Confidence in science
- Interest in science

YES!

NO! →



3. FINDING MORE RESOURCES

Look at your list in (2c) and write down some key things you want to address below (3a). Then, think about people, organizations, or places in your community that you might access to help you address those (3b). Finally, in the last column, write down what you need to do (3c).

3a. Resource or change needed
(Time, space, materials, curricula, professional development, etc.)

3b. Potential Partners and Places
(Museums, organizations, government agencies, gardens, field trip sites, etc.)

3c. To Do List
(Searching online, calling people, asking colleagues, taking a drive around town, etc.)

4. THINKING ABOUT THE FUTURE

THE WAY THINGS ARE NOW

Here, you may write down modified objectives based on the resources you presently have. Be clear about what you are able to do given your present situation. It might be the same or different.

PURPOSE	LEARNING GOALS	ACTIVITIES

WHERE YOU WOULD LIKE TO GO

What if you had more resources? If you were able to access some of the potential partners and places you listed, what would you be able to do? These could be goals for you and your colleagues to work toward!

PURPOSE	LEARNING GOALS	ACTIVITIES

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REFLECT!

Think about a moment when you saw that your science program was having an impact...

What were the children and staff doing?

What factors led to that success?

