

Lesson 2: The Scientific Question

Lesson Context: In this lesson, students will **begin their scientific study** by reading a short background synopsis in order to state the purpose of the study and formulate the *scientific question* (or overall problem) to be investigated. They will become familiar with the steps, based on “the scientific method”, of the research study, as well as this study’s web-based format.

Time Frame: 1 class period

Objectives:

Student will be able to:

1. State a scientific question to be investigated as part of a long-term research study.
2. Identify the standard steps of a scientific study.

Procedure:

1. Ask the students to brainstorm aloud what a scientific “study” or “investigation” is, and generally what is involved in conducting one. The general idea might be:

The scientist (or student scientist) begins with interest about a topic or event. They formulate a question, and then make some educated prediction about what the answer might be. They determine what kind of activity or experiment they’ll need to do to “test their prediction”. They conduct the activity, analyze the results, and then find out if their prediction is right or wrong, or what more information is needed.

Can the students think of an example of how this kind of investigation might be used in everyday life?

2. Ask the students to get into their teams which they formed in Lesson 1. Have each team designate a recorder whose job will be to fill out the team’s **Stream Study Research Report**. Have each team recorder open and then save their **Stream Study Research Report** to their computer.

Briefly discuss each of the research steps listed on the form. Explain that they will be recording all parts of their research study on the form. They will do this by recording their team’s answers in the designated yellow boxes (*Remember that this is the preliminary Stream Study Report form to give students an idea of the scope of the unit. Additional features will be added to this report at a later time*).

3. Ask the students to read over the **Background** section of the Stream Study Website and then discuss what they think is the purpose of the study. Ask the students to formulate the scientific question to be investigated.

Some helpful prompts:

- Overall, what do you want to find out by doing this study?

- What is the main question that you want to answer? [It is best expressed as an open-ended question, which is a question that is answered with a statement, not just a yes or a no.]

The Scientific Question formulated by the students should be similar to:

What is the impact of restoration of the Lālākea stream on stream flow, water quality, habitat and biota?

4. Ask the students to read the following assertion made in a scientific study of post-hurricane stream conditions on Kauai and consider whether the Scientific Question they have posed will test this assertion:

(from "Recovery of Three Kaua'i Streams from Hurricane Iniki and Implications for the Restoration and Regeneration of Freshwater Ecosystems in Hawai'i" by J. Michael Fitzsimons and Robert T. Nishimoto, Louisiana State University, Baton Rouge, Louisiana 70803)

"Once an altered stream is returned to a condition favorable for aquatic life, a return of native freshwater animals will occur automatically as long as the *mauka-makai* connection (mountain-ocean) is maintained."

5. Ask the team recorders to fill in their Scientific Question in the first section of the Stream Study Research Report form.
6. Have each team recorder save their Stream Study Research report. Ask them to name the file using their school and team name as part of it. For example:

Kamehameha_Oopunakea_Report.doc

7. Send each of the three team files to Heather Eijzenga, Bishop Museum Research Specialist, at heather.eijzenga@bishopmuseum.com so that she can post them to the web.