

## Activity: “Becoming Experts—Trail Guide Preparation”

**Key Concepts:** Trail guides are useful tools because they allow people to identify plants along the trail.  
Transects and quadrants are useful techniques for collecting data.  
Accuracy and precision are important when recording and reporting your observations.  
Random sampling is, more often than not, *essential* when collecting data

**Lesson Objectives:** Students will be able to:

- Understand the purpose of a trail guide
- Understand the purpose of their respective tasks
- Perform their “expert” tasks without the help of others
- Teach their group members about the significance of their respective tasks

**Time Required:** 1 class period

**Materials Needed:** Transect Group: Tape measures or rope with 1 meter marks  
Flagging tape  
Clipboards  
Quadrant  
Compasses  
Quadrant Group: 1 meter square of PVC pipe or hula hoops  
Clipboards  
Photography Group: Digital Cameras  
Photography examples  
Clipboards  
Laptop to download test shots  
GPS Group: GPS units  
Clipboards  
Layout Group: Sample plant identification books  
Sample trail guides

**Standards Addressed:** Domain I: 1. Doing Scientific Inquiry  
2. Living the Values, Attitudes, and Commitments of the Inquiring Mind

**Introduction:** Begin the class period by explaining to the students that they are going to become experts in 1 of 5 areas. They will need to learn their tasks carefully because in Koke'e they will be responsible for their respective knowledge area in their groups.

The purpose of having the students create a trail guide is so that the students can create a product that:

- Communicates student ability to collect and present data in a written format
- Is useful for other users of the trail in plant identification
- Helps to teach student creators how to conduct a biodiversity survey
- And show future users of the guide to an example of a trend in biodiversity

## TRANSECT EXPERTS

Instruction Time = 35min

Instructor:

5 minutes:

- Give students a basic understanding what transects are, and why they are important. Add information about quadrants, but note that they are not the quadrant experts. They should know what they are, but not necessarily what they will be used for in Koke'e

Definition: a **transect** is a line used to survey the biota and abiota across the study area.

This method is useful to study sites that have varying vegetation and topography. The transect sampling method might be selected to survey coastal areas; a transect could run from the beach through the coast strand vegetation to dry shrub land. The method is also useful to survey large forests that range from low to high elevation (Felling).

Definition; a **quadrant** is simply an area of specific size delimited for sampling flora, fauna, and physical factors of the environment.

The size of a quadrant usually depends on the size of the site being studied. This method is useful in studying large areas with fairly similar vegetation and topography. Scientists often use the quadrant method to survey a forest, a field or meadow, a swamp or marsh, or a coral reef.

10 minutes:

- Brainstorm with students: What can we inventory with a transect study?
  - Examples include both biotic: flora, fauna and abiotic: soil type, soil temp, soil moisture, soil pH, elevation, temperature, wind velocity and direction, amount of sunlight
  - Discuss the importance of random sampling, inform them that they will be using random sampling in determining where the quadrant will be placed along the transect.

20 minutes:

- Out in the schoolyard:
  - Allow students to practice laying transects
  - Emphasize accuracy and precision (define terms if needed) when lining up transects one after another (on the trail, for example)
  - Have students practice recording data (including length, direction and biota observed along transect
  - Practice randomly placing the quadrant along their transects

## PHOTOGRAPHY EXPERTS

Instruction Time = 35min

Instructor:

5 minutes:

- Give students a basic understanding of photographic tools (rule of 3rds, balance, lighting conditions, etc.). Use examples.

5 minutes:

- Show students basic operation of digital camera. Let them follow along if # of cameras available permits. Emphasize safety and care of the camera

5 minutes:

- Discuss parts of the plant that may be useful to photograph and techniques (ex. Flower → close-up)

15minutes:

- Take students out in the schoolyard to photograph:
  - Use different lighting situations
  - Have students photograph other groups (GK-12 Documentation)
  - Have students practice different settings

5 minutes:

Time permitting: Return to classroom and constructively critique student work

## QUADRAT EXPERTS

Instruction Time = 35min

Instructor:

5 minutes:

- Give students a basic understanding what transects are, and why they are important. Add information about quadrants, but note that they are not the quadrat experts. They should know what they are, but not necessarily what they will be used for in Koke'e

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The size of a quadrant usually depends on the size of the site being studied. This method is useful in studying large areas with fairly similar vegetation and topography. Scientists often use the quadrant method to survey a forest, a field or meadow, a swamp or marsh, or a coral reef.

10 minutes:

- Brainstorm with students: What can we inventory with a quadrant study?
  - Examples include both biotic: flora, fauna and abiotic: soil type, soil temp, soil moisture, soil pH, elevation, temperature, wind velocity and direction, amount of sunlight
  - What do we use quadrants for? (as a way of generalizing the transect of land that they took the data on)

Discuss the importance of random sampling, inform them that the transect experts will be using random sampling when laying the quadrant that the quadrant experts will gather data from

20 minutes:

- Take students out in the schoolyard:
  - Have them drop random quadrants, and explain that the transect group will be placing the quadrant in Koke'e
  - Have them pick 3 plant species (if available) located within their quadrant to collect data on
  - Emphasize inquiry skills.
  - Have students practice collecting and recording data like % cover, canopy cover, species richness, soil moisture and type, general description.

## LAYOUT EXPERTS

Instruction Time = 35min

Instructor:

5 minutes:

- Discuss basic elements that trail guides or plant books usually contain. Use example books. Consider positive and negative of things they find.

5 minutes:

- Do a concept map of what information the students think is important for their own trail guide

5 minutes:

- Have each student design a draft layout of a trail guide page
- For example (students are not restricted to these elements or photo location):

Insert photo here

Scientific Name

Common Name

Habitat

Morphology/Characteristics

GPS location/trail location

Abundance

Cultural Uses

20 minutes:

- Regroup and share ideas. As a group decide on the final layout (or layouts) that the class will be using for the trail guide.

## GPS EXPERTS

Instruction Time = 35min

Instructor:

5 minutes:

- Give students a basic understanding of what a Global Positioning System is, how it works (and when it may not—ex. Too much canopy for satellite reception), and why it is useful

5 minutes:

- Explain and brainstorm with the students about how they can use it, and why it will be useful in Koke'e

20 minutes:

- Take students out in the schoolyard:
  - Have students take basic GPS readings
  - Talk to students about accuracy and precision of the readings
  - Move around to different locations to play with canopy interception with satellites