

# **Lesson 3: Designing a User-Friendly Community Tool**

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## **Grade Level(s)**

Grades 6-8

## **Lesson Overview**

Students will visit a local, community nature area to understand what they (the “users”) might need when visiting to help them to identify the living things present. Upon returning, they will interview each other to begin the Design Thinking process in order to design a SCRATCH program with a dichotomous key for one specific community locale of their choice. Finally, students will field test their prototypes before returning to class to redesign their programs.

## **Learning Objectives**

- To make observations of the natural world and identify at least ten different species of related organisms
- To collect data related to these organisms traits and characteristics
- To synthesize data and observations
- To create a dichotomous key
- To prototype a user-friendly computer program
- To test their prototypes and re-design

## **Standards**

Next Generation Science Standards: MS-ETS1A Defining and Delimiting an Engineering Problem, MS-ETS1B Developing Possible Solutions, MS-ETS1C Optimizing the Design Solution

## **Preparation**

Plan field trips to one or more local outdoor natural destinations (look for locales with biodiversity in terms of plants, birds, insects, etc., as well as an established schedule for elementary school field trips).

## **Materials and Resources**

- Clipboards for each student, pencils, cameras, student copies of Field Trip Guiding Questions worksheet
- Computer with SCRATCH programming capabilities for each pair of students
- Post-it notes

## Activity 1: Field Trip (90 Minutes)

- This step involves bringing students to an outdoor nature area in which they will be able to explore somewhat independently. In small, teacher-led groups, with clipboards, pencils, and Field Trip Guiding Questions, they will collect data based on their experience with the natural environment. The goal is to put yourself in the shoes of the most inquisitive young person you know (maybe a younger sibling, or yourself as a nature-loving 7-year old), and make a detailed list of all of the things that you wish you could learn right at that moment. Write down the questions you would ask a naturalist as well as organisms you would look up in a field guide if you had one.
- After 30 minutes (when worksheet is complete), students regroup for a Naturalist-led conversation around exactly what species of organisms are commonly found in this area. For example, if students have listed several types of birds on their worksheet, they can interview the Naturalist to find out exactly which species are present during certain times of the year so that they can take this data home to research further. Students should leave the field trip with a list of 10-12 species to take back to school. They will use this list to create a dichotomous key.

## Activity 2: Design Thinking (120 Minutes)

- Upon returning from their field trip, students will be paired and begin designing and programming a SCRATCH tool using the design thinking process. Students will be asked to create a **Needs Statement** in which they state who will use their scratch tool and for what purpose. An example needs statement might be: “Clueless Third Grade students need a way to identify birds at the Batiquitos Lagoon because they are curious about the environment.”
- Using the technical knowledge about SCRATCH programming that they learned in Lesson 2, students will work in pairs to create a new SCRATCH classification program that relates to a nature area of their choice: Emphasis will be placed on empathizing with the end user identified and building a prototype that will enhance and inform that person’s experience when visiting their chosen local nature area.
- Students will be responsible for:
  - Describing their intended user
  - Identifying the specific location and species for which their program will be used
  - Programming and designing an accurate and appropriate prototype program
  - Testing each other’s prototypes.
- For further information on the Design Thinking process and how activities can relate to them, see the resources at <http://www.k12lab.org>.

## Activity 3: Community Share/Redesign (20-60 Minutes)

- Students will have the opportunity to have their programs field tested by actual young people. Students will bring a tablet or iPad out to their site during a scheduled elementary school field trip and ask for feedback from the users.

Students should let elementary students interact with the entire program, and ask questions such as: Was there an organism that you weren't able to identify? Did you understand all of the questions? What did you think of the look and sound of the program? What did you like best about the program? What didn't you like about the program? How would you change it? Students should take notes on their interviews.

- Upon returning to the classroom, students will take the suggestions and redesign their programs. If possible, teacher should work with the community locale to make the SCRATCH program available for community use.

## Troubleshooting

Be sure to get the appropriate permission slips from parents for the field trips signed and collected.

## Assessment

- As students are working through the project, have them demonstrate to you a few steps of their SCRATCH program. Homework assignment can be to test the program with a family member.
- As an exit ticket after returning from the second field trip (testing day), students should post a Post-It with their biggest take-away from the day; fill in this Mad Lib:

After talking to the users today, I need to

\_\_\_\_\_ my SCRATCH  
program.