

## ECOS Inquiry Template

1. **Contributor's Name:** Sarah Bisbing

2. **Name of Inquiry:** The Expert Naturalist: Experience Through Observing (A Treasure Hunt)

3. **Goals and Objectives:**

**a. Inquiry Questions:** What is a naturalist? What can we find in our local ecosystems? In looking closely at specific elements of the ecosystem, do we see things we would otherwise have missed? What type of diversity do we see? Are you surprised with the amount of diversity?

**b. Ecological Theme(s):** Naturalist Skills: Obtaining information on an area (ecosystem) through observation and investigation

**c. General Goal:** Help students develop naturalist skills for observation of the natural world and encourage them to take a closer look at their natural surroundings

**d. Specific Objectives:**

1. Give students the opportunity to make observations on their schoolyard and become more aware of their natural surroundings.
2. Students will use naturalist skills (journaling and sketching) to make observations in the field.
3. Students will learn how to observe the unique traits/characteristics of an individual species. In order to reinforce this skill, students will take notes and make sketches in their nature journals.
4. Students will act as detectives to find specific things in the natural world

**e. Grade Level:** 3-8

**f. Duration/Time Required:**

→ **Prep time** None

→ **Implementing Exercise During Class** One afternoon

→ **Assessment** Included in activity (worksheets act as the form of assessing student progress)

4. **Ecological and Science Context:**

**a. Background (for Teachers):**

A naturalist studies nature to understand how it works and shares this knowledge with others. In order to be a naturalist, you need only your senses, your curiosity, and the ability to spot clues and ask questions. A good observer uses their ears, nose, hands, and mind when looking at an organism.

The study of nature as a science began during the era of Lewis and Clark. Lewis made very careful observations of animals and plants found on their journey across the western United States. As Lewis studied a plant, he made use of as many senses as possible and was able to notice changes in vegetation. Lewis wrote extensively in his journals and gave detailed descriptions of many plant species. He noted the habitats preferred by specific species. Whenever he could, Lewis collected and dried specimens. Lewis first collected the bitterroot (*Lewisia rediviva*), Montana's state flower, and is credited with this through the plant's scientific name. He often contrasted the plants he found with their eastern counterparts. As a result of his thorough observations and journaling, we now have vital information about the geology, geography, animals, and plants of western North America before its settlement by Europeans.

## **b. Background (to present to Students):**

A naturalist studies nature to understand how it works. In order to be a naturalist, you need only your senses, your curiosity, and the ability to spot clues and ask questions. A good observer uses their ears, nose, hands, and mind when looking at an organism. Naturalists look closely at natural elements and take notes/make sketches on what they see. Naturalists use their own natural curiosity to ask questions and find out more about the organisms in their area.

**5. Motivation and Incentive for Learning:** Students are given the opportunity to act as detectives and seek out specific elements of their local ecosystem. The investigation acts as a treasure hunt, so students are constantly challenged and moving from place to place. In the end, members of the group with the most complete worksheet are crowned “expert naturalists.”

Basic worksheets can be limited in terms of developing observational skills and understanding scientific processes. These worksheets encourage students to think about what they are observing before filling in an answer. In addition, the “crowning” can make the inquiry more engaging for children. This reward makes the inquiry more like a competitive game, enticing children to answer the questions as well as they can.

## **6. Vocabulary:**

- **Naturalist** = a scientist who makes observations directly from nature  
= a student of natural history, especially a field biologist
- **Ecosystem** = the complex of a community of organisms and its environment functioning as an ecological unit
- **Habitat** = the place or environment where a plant or animal naturally or normally lives and grows
- **Species** = a category of taxonomic classification consisting of a group of organisms that resemble one another closely  
= applied to one or more groups (populations) of individuals that can interbreed within the group but cannot exchange genes with other groups  
= in terms of plants, this group does not normally interbreed in nature, but do have the ability to exchange interbreed/hybridize
- **Organism** = a living thing
- **Observation** = a record of something noted or seen
- **Biodiversity** = biological diversity in an environment as indicated by numbers of different species of plants and animals, including species richness, ecosystem complexity, and genetic variation

**7. Safety Information:** Make sure students are aware of any restrictions/limitations on areas of the schoolyard. Be sure to monitor children as they are collecting and wandering around the area. Remind children of the old adage: “Leaves of three, let them be.” Also, tell children to stay away from plants with thorns, spines, etc.

## **8. Materials List (including any handouts or transparency masters):**

- Field guides (plant, animal, insect)
- Clipboards
- Plastic or paper bags
- Worksheets (attached)

## **9. Methods/Procedure for students:**

**a. Pre-Inquiry Journaling Discussion:** Present the idea of journaling (through note-taking and sketching) as a means of making observations of the natural world. Tell them that a naturalist is a scientist who studies nature to understand how it works. They need only their senses, their curiosity, and the ability to spot clues and ask questions. Tell them that in their journaling they should look closely and take notes on what they see. Students can use their journals to press flowers/leaves, make sketches, and write down their observations. They should date all entries and label all pictures. Tell them to use their own “natural” curiosity to ask questions and find more about the natural world in their area. Remind students that it’s okay if their drawings are not perfect. Mistakes are all part of the learning process, and they will improve as they begin drawing.

### **b. Investigation work:**

With this investigation, students will go on a “treasure hunt” to answer a series of questions related to items found on the schoolyard. Students will fill out worksheets which will guide them through the investigation and teach them a little about local, natural elements. These worksheets require students to not only fill in information about plants but also make sketches and notes on their own observations. There are really no right or wrong answers. In order for a student to successfully finish the inquiry, he/she must turn in a completed worksheet (to include both sketches and observations for each question).

The goal of this inquiry is to encourage students to take a closer look at their natural surroundings. The student(s) who has the most complete worksheet will be “crowned” an “Expert Naturalist.” Teachers may decide the prize (sitting next to the classroom pet for a week, becoming the “helper” of the ECOS fellows for the next week, adding an extra star or two to the progress chart, etc).

**10. Assessment:** Use attached worksheets as a means of assessing student progress throughout the activity.

**11. Extension Ideas:** In the winter months, these same worksheets may be used to do a “treasure hunt” through the ECOS Natural History Guide. Have students spend some time finding these elements of ecosystems within the guide. The teacher may then have students select a species to report on and present to the class. This would give students the opportunity to learn a little about their surrounding ecosystems and the organisms within them. In addition, this inquiry may be twice during the school year. For example, implement the inquiry once in the fall and once in the spring. Doing so would give students the opportunity to look at change over time in the surrounding ecosystems.

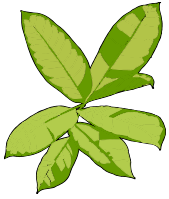
**12. Scalability:** Lists may need to be directed at more basic elements of ecosystems and organisms. Teachers may also need a few more chaperones to help control and guide the groups through the activity.

### **13. Science Standards Accomplished:**

- Structure and Function in Living Systems
- Populations and Ecosystems
- Diversity and Adaptations of Organisms
- Populations, Resources, and Environments

### **14. References**

Patent, Dorothy Hinshaw. *Plants on the Trail with Lewis and Clark*. Clarian Books, New York, NY. 2003.



## The Expert Naturalist: A Treasure Hunt

Make notes and sketches on the items found.

For example:

1) Find a plant with an egg-shaped leaf:



- egg-shaped leaves at base of plant
- low-growing, small plant
- small, yellow, saucer-shaped flower with 5 petals
- found on dry, open site along the Clark Fork in Missoula, Montana

Please find the following:

1) A tree with smooth bark and a tree with rough bark:

2) Evidence of animal tracks:

3) A deciduous plant (loses its leaves in the winter):

4) An evergreen plant (keeps its leaves in the winter):

5) A tree/area that is used as an animal's home:

6) A critter living under something:

7) Evidence of burrowing (by insects or animals):

8) Sign of pollution or negative human impact:

9) Find a leaf that is wider than it is long:

10) Find a leaf that isn't green:

11) Something living in a crack in the sidewalk or trail:

12) A plant with thorns or spines to protect itself:

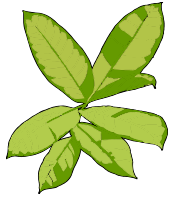


13) A insect whose color or shape blends in with its surroundings:

14) A mushroom or other fungus among us:

15) A spider web:

**16) An anthill:**



## The Expert Naturalist: A Treasure Hunt

Use your naturalist skills to observe your surroundings and find the following elements. Those with the most complete worksheets shall be crowned “Expert Naturalists” and will be rewarded. Do your best to fill in as many answers as you can.

Before checking off any element of the list, please make detailed notes and sketches on the items found.

For example:

1) Find a plant with an egg-shaped leaf:



- forb with egg-shaped leaves at base of plant
- low-growing, small plant
- small, yellow, saucer-shaped flower with 5 petals
- found on dry, open site along the Clark Fork in Missoula, Montana

Please find the following:

14) A tree with smooth bark and a tree with rough bark:

15) A plant species growing on an environmental gradient (two or more areas where the same plants species is growing . . . for example, a shrub that grows next to the river, on the other side of the trail, AND at the base of the hill):

Describe the areas and note any differences in the plants.

**16) Evidence of animal tracks:**

**17) A deciduous plant (loses its leaves in the winter):**

**18) An evergreen plant (keeps its leaves in the winter):**

19) A plant with a square stem (you can't roll it between your fingers):

20) A tree/area that is used as an animal's home:

21) A disturbed area (note your guess on type of disturbance and plants growing in the area):

22) A critter living under something:

**23) One weed and one native plant:**

**24) Evidence of burrowing (by insects or animals):**

**25) Sign of pollution or negative human impact:**

26) Find a leaf that is wider than it is long:

27) Find a leaf that isn't green:

28) Something living in a crack in the sidewalk or trail:

29) Something living in a place that is always shady:

30) A seed that can stick to hair or fur:

31) A plant with thorns or spines to protect itself:

32) A insect whose color or shape blends in with its surroundings:



**20) A leathery or waxy leaf (holds moisture in):**

**21) A mushroom or other fungus among us:**

**22) A spider web:**