

# Ecology Field Trip Scientist's Notebook

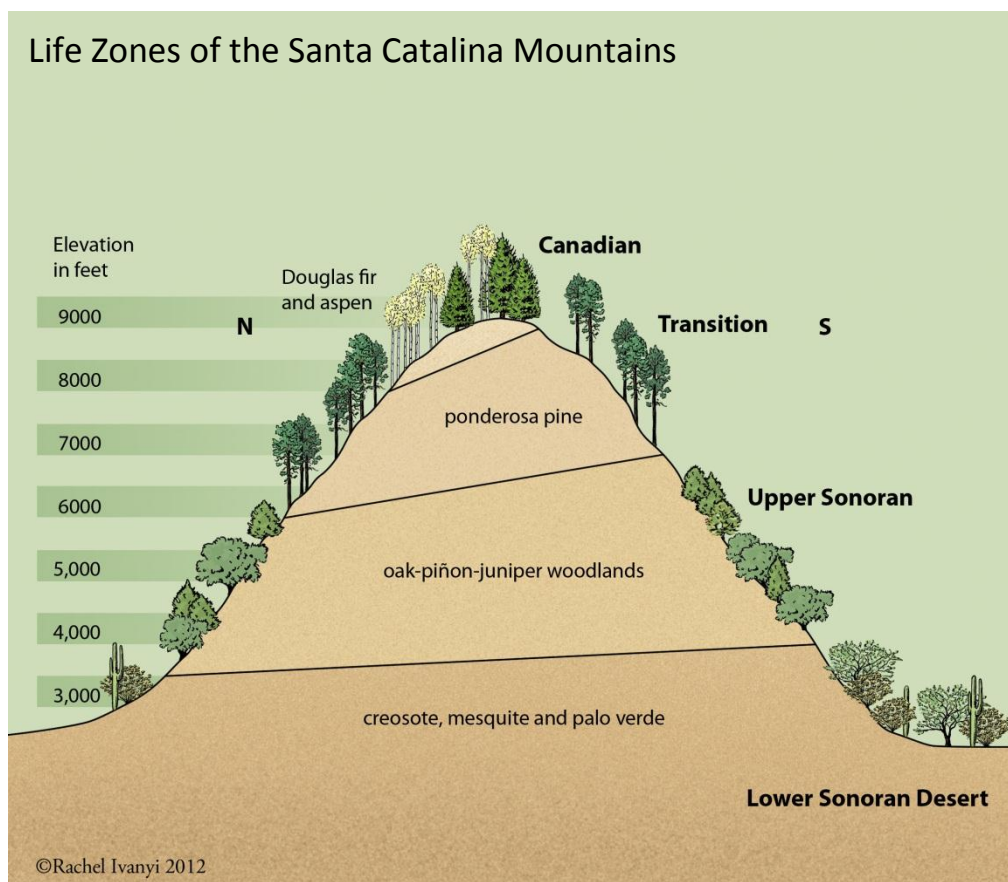
ARIZONA-SONORA  
**DESERT  
MUSEUM**

Welcome to scientific field research! Over the next several days, you will work to become an expert in an ecological field. Your teacher is head researcher. The teacher's job will be to facilitate your research, but you will be doing the data collection yourself. You will need to follow the guidelines of field researchers, including researching print and internet sources ahead of time, preparing and equipping yourself for the field, and respecting your research field.

The Arizona-Sonoran Desert Museum will be your research field. When you have finished your study, you will choose between two products:

- a product to teach younger students about your field
- a product to solve or alleviate a threat to a species in your field

The Scientist's Notebook in this guide coordinates with the Arizona-Sonora Desert Museum exhibits. You will be assigned a biotic community represented in the Museum, as well as a scientific field in which to specialize. You will work to complete a Scientist's Notebook, which includes **data collection sheets** before, during, and after your visit.



## Materials

When scientists do field research, they are well prepared. They take all the materials for data collection with them, as well as dressing appropriately and bringing the appropriate materials for the climate and weather of the area in which they will be collecting data. *To be fully prepared for data collection, including the research before the actual trip into the field, you will each need the following:*

- a copy of Scientist's Notebook
- pencils for sketching (possibly color)
- clipboard

*To be prepared for the climate and weather of your field of study, you will need to wear appropriate clothing and bring appropriate equipment. You will be outside most of the day, so depending on the season, you will need to dress accordingly. You should **wear sun screen**, even in winter, as you are in a desert. You will also need to take the following with you*

- water bottle (there are places to refill it on the trails)
- hat (preferably one that shades your face and neck)
- sun screen (for reapplication throughout the day)

*For the field trip, the adult in the group will function as a research head and will have the following:*

- a copy of the school group map
- a schedule with instructions for that group's biotic community
- tape measure
- thermometer
- disposable or digital camera

### ***Preparation for field trip***

- Decide which biotic community you want to study. Your teacher may assign you one.
- Decide what organisms you want to study. Your teacher may assign you one.
- Complete the research in the first part of your Scientist's Ecology Field Notebook.

### ***Immediately before leaving for field trip***

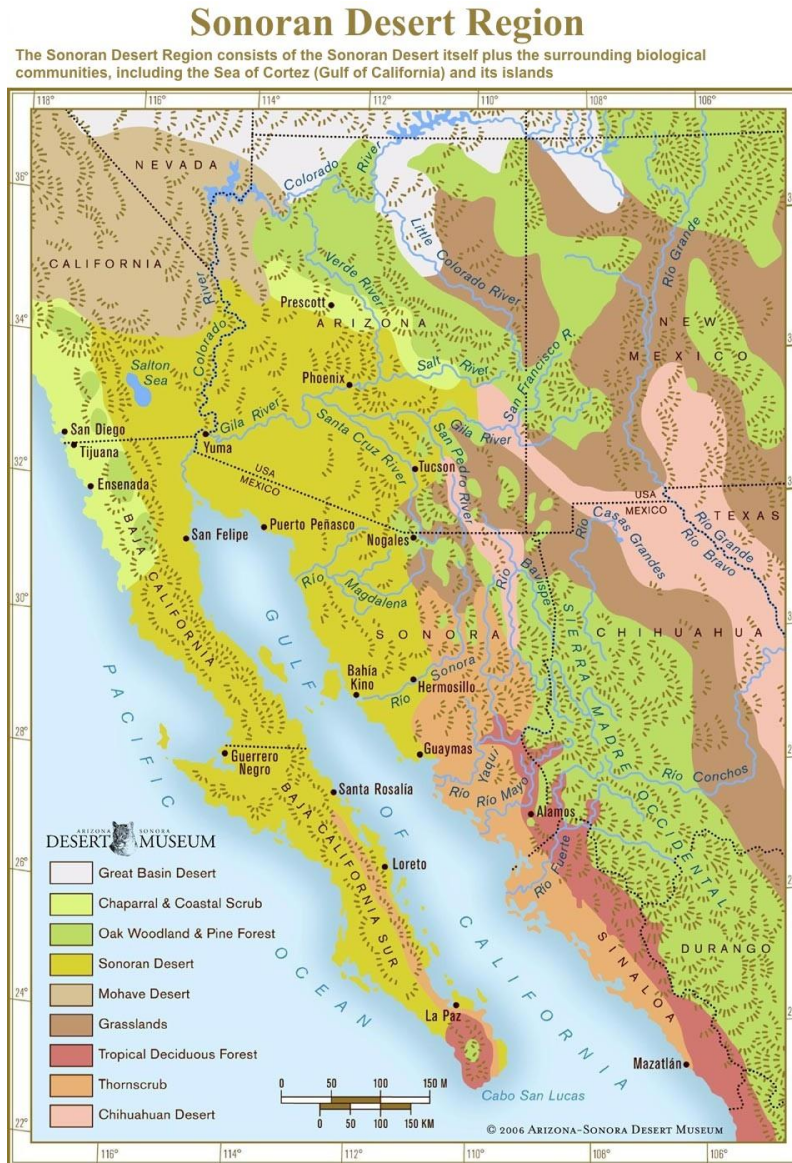
Be sure you know who your chaperone is, who your fellow scientists are, and review what data you need to collect. You may have already divided the duties.

### ***Upon arriving at the museum***

Remember, you are a scientist who is interested in finding ways in which these organisms have adapted to their particular biotic community. You do not want to disrupt or disturb them in any way. Following the rules will make your visit a positive experience for the Desert Museum's wildlife and for you.

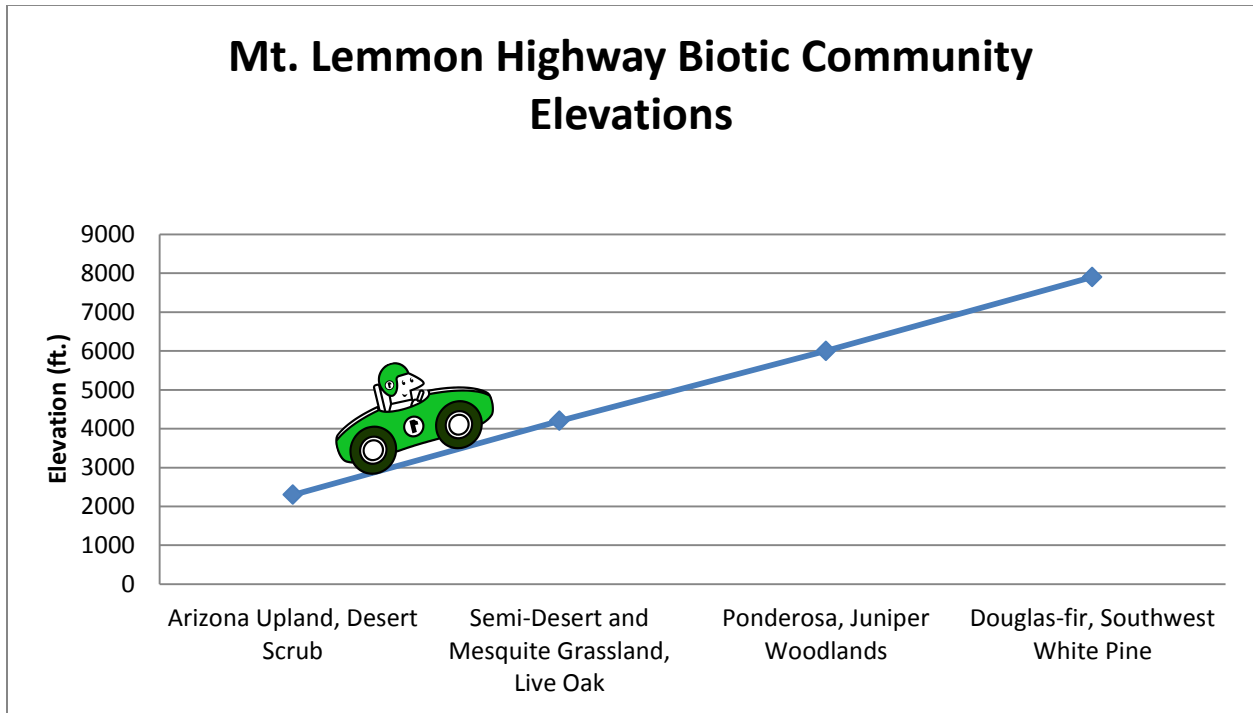
## Webquest for Pre-visit to Arizona-Sonora Desert Museum Biotic community research project

You are a scientist assigned to research a biotic community. Before doing field research, scientists need some general knowledge. You will use this webquest to gather data before going out in the field.



(The Sonoran Desert Region spreads across two US states ( \_\_\_\_\_ and \_\_\_\_\_ ) and three Mexican states ( \_\_\_\_\_ and \_\_\_\_\_ and \_\_\_\_\_ ). It is \_\_\_\_\_ square kilometers large.

Within the biotic communities are isolated mountainous areas often thousands of feet higher in elevation. They are often referred to as sky islands. The temperatures and climate can vary greatly within a sky island at different elevation levels. Mt. Lemmon in Arizona is a great example of this! A variety of biotic communities can be identified from the bottom of Mt. Lemmon highway all the way to the top. Refer to the figure below and to your internet research to complete the sentences below about the different biotic communities as seen during a drive up Mt. Lemmon Highway.



The elevation of my biotic community at Mt. Lemmon is about \_\_\_\_\_ feet. The elevation range of my biotic community is \_\_\_\_\_

As a group, find examples of living organisms commonly found within the biotic community being studied by using the digital resources page at the Arizona Sonoran Desert Museum website. Identify each individual within the group as one of the following scientist: botanist, mammalogist, entomologist, ornithologist, or herpetologist. Scientists will need to find living organisms that they would study as researchers within the assigned biotic community.

The type of plants/animals I will study are \_\_\_\_\_. My scientific specialty is called a(n) \_\_\_\_\_. The biotic community I am studying is \_\_\_\_\_.

Predict what animals or plants would commonly be found within the biotic community you are studying. Confirm your predictions by using the Sonoran Desert Museum Digital Library, and

research the adaptations that have helped the plant or animal species thrive within the biotic community.

PLANTS	INVERTEBRATES	BIRDS	MAMMALS	REPTILES
acacia	brown spider	acorn woodpecker	American beaver	Arizona coral snake
African sumac	bark spider	American kestrel	American black bear	Arizona mountain kingsnake
Alamos barrel	swallowtail butterfly	ash-throated flycatcher	antelope jackrabbit	blacktail rattlesnake
alligator-bark juniper	black widow spider	barn owl	Arizona black-tailed prairie dog	coachwhip
Arizona Ash	desert centipede	Bell's vireo	bighorn sheep	desert spiny lizard
Arizona fishhook cactus	desert hairy scorpion	Brewer's sparrow	bobcat	desert tortoise
Arizona grape	desert millipede	broad-billed hummingbird	coyote	giant spotted whiptail
Arizona live oak	stink beetle	brown-crested flycatcher	desert cottontail	gila monster
Arizona poppy	tarantula	cactus wren	gray fox	gopher snake
Arizona sycamore	green lynx spider	cassin's finch	gray wolf	Tucson banded gecko
Baja fairy duster	honeybee	Clark's nutcracker	hooded skunk	diamond-backed rattlesnake
basin sagebrush	Arizona walking stick	dark-eyed junco	javelina	
blue palo verde	pepsis wasp	elegant trogon	long-tongued bat	
blue yucca	palo verde beetle	elf owl	mountain lion	
brittle bush	stripe-tailed scorpion	European starling	mule-deer	
buckhorn cholla		golden eagle	white-tail deer	
century plant		great horned owl	ocelot	
creosote		hepatic tanager	ringtail	
desert datura		nighthawk	rock squirrel	
desert scrub oak		Lucy's warbler	white-nose coati	
desert spoon		mountain chickadee		
Engelmann prickly pear		northern cardinal		
Emory oak		peregrine falcon		
golden oak		prairie falcon		
hopbush		pygmy nuthatch		
mountian cottonwook		redtailed hawk		
night-blooming cereus		Steller's jay		
ponderosa pine		summer tanager		
douglas fir		vermillion flycatcher		
southwest white pine		Harris's hawk		

Find out about the adaptations by visiting the following links. They provide excellent information, but do not limit your research to just these sites. You could also use an approved search engine to facilitate further research.

- <http://www.desertmuseumdigitallibrary.org/kids/Animals.html>
- <http://www.desertmuseumdigitallibrary.org/kids/Plants.html>
- <http://www.desertmuseum.org/kids/oz/long-fact-sheets/>
- <http://www.desertmuseumdigitallibrary.org/public/index.php>

## Arizona-Sonora Desert Museum Scientist's Notebook

Name: \_\_\_\_\_

Biotic community: \_\_\_\_\_

Scientific role: \_\_\_\_\_

Examine the picture in your webquest carefully. Use the graphic organizer below to record the data about the organisms. Each person should collect three organisms with various adaptations. You should draw an organism that you would study within your scientific role.

<b>Organism</b> (sketch and label)	<b>What characteristics do you observe that allow your plant to thrive in its biotic community?</b>
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### Role of Riparian Habitats within a Biotic Community

Name: \_\_\_\_\_

Biotic community: \_\_\_\_\_

Scientific role: \_\_\_\_\_

Link to the following website to complete the essay frame:

[http://www.desertmuseum.org/books/nhsd\\_riparian.php](http://www.desertmuseum.org/books/nhsd_riparian.php)

One characteristic defines a riparian habitat \_\_\_\_\_. Riparian habitats need that substance to maintain their biotic and abiotic specimens. Some riparian habitats exist that have water only certain times a year or used to have water but no longer do. These are called \_\_\_\_\_ riparian areas.

The biotic community I am studying is the \_\_\_\_\_; riparian habitats are likely to exist near the following structure(s) in my biotic community:

\_\_\_\_\_. Many urban structures have replaced some of the roles riparian habitats used to perform within my biotic communities; a few of them are \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.

Three examples of organisms that are more likely to live within a riparian habitat than others are \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_. Plant species that live in riparian habitats are likely to have the following adaptative characteristics:

\_\_\_\_\_. The animal species that are likely to live in riparian habitats will have these characteristics:

\_\_\_\_\_  
\_\_\_\_\_.

Congratulations. You have completed the necessary background research to begin your field work at the Museum!

## Arizona-Sonora Desert Museum Scientist's Field Notebook

Biotic Community: \_\_\_\_\_

Date/Time \_\_\_\_\_

Temperature (C) \_\_\_\_\_

1. Draw and describe biotic and abiotic features you observe for your assigned biotic community at the Lifezone exhibit. Draw with detail by “zooming in” on the features you notice about the plants. For example, draw a stem with a few leaves as opposed to the whole plant.
2. Label the features with a brief description. For example, label small leaf, thorn, waxy surface, seed pod, measurement of feature, if possible.



3. Prediction: What characteristics of the living organisms might help this organism survive within its biotic community? Explain with complete sentences how the characteristics might be helpful.

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4. Discussion: Look at the desert museum map. Where do you think you most likely will find abiotic and biotic features of your assigned biotic community? (Example: I think we will find plants commonly found in our biotic community at the \_\_\_\_\_ exhibit.)



**Arizona-Sonora Desert Museum Scientist's Notebook**

Biotic Community: \_\_\_\_\_

Date/Time \_\_\_\_\_

Temperature (C) \_\_\_\_\_

Decide which biotic and abiotic characteristics best represent your assigned biotic community. Draw and describe them. Draw with detail by “zooming in” on the characteristics of the plants and animals you notice. Label your drawings with brief descriptions as done on the first page.



Prediction: What would happen to the plant and animal species within this biotic community if an invasive species were suddenly introduced? Provide an example.

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Discussion: What would happen to the biotic community if a natural disaster, such as a fire, suddenly happened? Choose a natural disaster that is likely to affect your biotic community. Consider immediate impacts as well as longer-term effects.

Summary of discussion:

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**Arizona-Sonora Desert Museum Scientist's Notebook**

Biotic Community: \_\_\_\_\_ Date/Time \_\_\_\_\_

Name of exhibit: \_\_\_\_\_ Temperature (C) \_\_\_\_\_

Examine each assigned exhibit and determine what living organisms are commonly found in the biotic community you have studied. Predictions are okay and encouraged! Be ready to explain your reasoning.

Use the graphic organizer below to list and describe a living organism commonly found in your biotic community. Each person should draw a different organism. If you have been assigned a scientist role draw an organism that you would study as that type of scientist.

<p><b>Organism (measure when appropriate, sketch, and label)</b></p>	
<p><b>What characteristics do you observe that help you place this organism in your assigned biotic community?</b></p>	
<p><b>How does it interact with the abiotic structures within its community?</b></p>	
<p><b>How does it use other organisms to thrive within its community?</b></p>	

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## **Final Project: Post Visit to Arizona-Sonora Desert Museum Biotic Community Research Project**

You have done a great job of collecting your data. Congratulations! You will now use all that data and hard work to complete a project.

### *A Solution to an Environmental Challenge*

You do not have to work with your fellow researchers to complete these projects. You will choose your groups based on fellow junior scientists who have a similar interest in a human-caused problem that challenges at least one species in your biotic community.

- Choose a human-caused environmental challenge to at least one species in the Sonoran Desert Region. Find other junior scientists who have a similar interest and form a group.
- In your groups, discuss the environmental challenge you chose and determine the main cause: urban sprawl causes loss of habitat; introduced species competes with native species; roads fragment habitats; overexploitation of one or more resources, etc. You might also choose one species that has multiple challenges (urban sprawl and overexploitation) or a challenge that threatens the entire biotic community.
- Research what has already been done by a group to protect or manage that species. See the list of environmental groups below for examples; you may come up with your own.
  - Tucson Audubon Society
  - Arizona-Sonora Desert Museum
  - Herpetology Center
  - Tucson Botanical Gardens
  - Sky Island Alliance
  - Arizona Wildlife Coalition
  - Sierra Club
  - Bat Conservation International
  - Native Seed Search
  - Tucson Clean and Beautiful
  - Nature Conservancy
  - Coati Rescue
- Once you have researched what is being done, work with your group to develop a solution (or partial solution).
- Write a proposal for an effort that supports or adds a different element to the effort by the group or groups already established to protect or manage the chosen species.
- Create a product that showcases your solution (game, physical model, kit, presentation, simulation, etc.).

*Expert Guide to Your Biotic Community*

- With your fellow junior scientists from your biotic community, create a product that teaches a younger grade level about the biotic community.
  - The following concepts should be addressed in their product:
  - The elevation at which the biotic community occurs
  - Major species of each type of organism in the biotic community
  - The average annual rainfall in the community
  - The role of riparian habitats in the biotic community
  - At least three major environmental threats to the biotic community
- The product can be a comic or coloring book, a game, a simulation, printed materials that present the community, artifacts from the biotic community, or any other product that is appropriate.
- You should think and plan carefully. You will all be responsible for contributing in your area of scientific expertise (botanist, mammalogist, entomologist, ornithologist, herpetologist). You should also consider the abilities and skills of your fellow junior scientists. If you have at least one strong artist in your group, for example, then a hand-drawn comic book may be a great choice for you; if not, but you strongly think that product is a great idea for you, you may be able to create one online.
- Your teacher may make arrangements for you to present your products to a genuine audience to see if the products are effective; he or she may also want you to produce them with a specific grade level in mind: first, third, or fourth graders, for example.
- When you have completed your products, your teacher may decide to put them into a kit that other teachers can use to teach younger students about your biotic communities.