

# Nature Bowl in Your Neighborhood

## Lesson 1: Let's Look at Life



*Supplies needed: notebook or paper, pencil*

Objectives:

- define and determine what a biological species is
- observe, analyze and document biological species
- recognize diversity of biological species
- summarize field work findings

What is a biological species?

A biological species is something that is alive, or a life form. Biological species are born and die, each with its own life cycle and life span. They can be plants, mammals, birds, insects, etc. You are a biological species, and biological species are all around you!

Your task is to become a field researcher. Go outside and observe wild life forms in your yard or neighborhood. On a separate piece of paper, identify and write down a list of 20 different biological species you encounter. If you don't know the name of a species you find, you can look it up in a field guide or just give it a general name ("yellow flower" or "shiny insect"). Give a brief description of each.

**Example:**

Life Form

Description

Drawing

Squirrel

brown, fuzzy tail



**Questions (answer here or on another piece of paper, or just out loud with a family member):**

- What is the most unusual life form you found?
- Which one is your favorite?
- Which one were you surprised by?
- Which one looked odd?
- Was there one that smelled funny?
- Did any make noise?
- How many had fur?
- How many had feathers?
- How many moved? How many were stationary (unmoving)?

Summary:


When you've completed everything above, summarize your findings in a few sentences. Did you encounter many of the same species, or was there an assortment of species? Did you list more types of plant species than mammals or birds? Were you surprised by the life forms you found, and why?

Extra credit: Choose one of the species you documented. Research it, online or in books, to determine its life cycle and life span, and any other interesting information you can find.

## Nature Bowl in Your Neighborhood

### Lesson 1: Let's Look at Life ANSWER SHEET

#### Example:

Life Form	Description	Drawing
Squirrel	brown, fuzzy tail	

*Answers will vary. Ensure each one is alive.*

#### Questions (answer here or on another piece of paper, or just out loud with a family member):

What is the most unusual life form you found?

*Answer varies. Example: orange-brown beetle*

Which one is your favorite?

*Answer varies. Example: dog*

Which one were you surprised by?

*Answer varies. Example: oak tree*

Which one looked odd?

*Answer varies. Example: orange brown beetle*

Was there one that smelled funny?

*Answer varies. Example: sage plant*

Did any make noise?

*Answer varies. Example: squirrel, dog and bird*

How many had fur?

*Answer number varies.*

How many had feathers?

*Answer number varies.*

How many moved? How many were stationary (unmoving)?

*Answer varies. Example: moved 15; stationary 5*

**Summary:** When you've completed everything above, summarize your findings in a few sentences. Did you encounter many of the same species, or was there an assortment of species? Did you list more types of plant species than mammals or birds? Were you surprised by the life forms you found, and why? *Answer will vary. Look for rational findings being summarized based on individual data.*

## Nature Bowl in Your Neighborhood

### Lesson 2: Bird Talk!



#### Objectives:

- Students recognize that birds communicate continually with their flock, their family and other wildlife.
- Students compare human communication with animal communication.
- Students observe and draw inferences from birds communicating in their backyard, or local park or nature area.

Honk! Trill! Squeak! Tweet! Hoot!

Everyone loves a beautiful bird song! But what is that bird saying? Is he just singing to sing, or is he sending a message in bird talk?

Every day, birds--just like humans--need to connect to others for a variety of reasons. Birds communicate constantly with their flock, their family and even other wildlife. Birds, big and little, communicate in three ways: 1) singing, 2) calls and 3) body language.

Birds love to sing complex songs to announce their territory, courtship, and mating. But most of the sounds they make are calls that give specific messages to others. Birds also use body language, often together with song or calls, to further highlight what they are trying to communicate.

For example, male wild turkeys gobble loudly to attract females. Once attracted, the male puffs his tail out and up proudly. He coos as he struts slowly around the ladies, displaying his finely kept and healthy feathers. He is telling the females that he is a fine choice for a mate. "Pick me!" he is saying.

Let's Bird Talk!

Here are some examples of bird talk. Pick the best choice:

1. A goose is approached by another goose. The goose spreads its wings out, stretches its neck long and low, and hisses at the approaching goose. What is the goose saying?  
A. Get away from my nest  
B. Howdy friend  
C. Let's go get food  
D. I like you
2. There's a male mockingbird perched in a tree with his feathers fluffed, singing complex songs, all day and all night. What is he saying?  
A. I can't sleep  
B. I like waking up the neighborhood  
C. I'm lost  
D. I'm happy because my babies have hatched
3. A young blackbird sits on the tree limb. As its parents fly by, the young bird hollers and flutters its wings. What is the bird saying?  
A. I'm hungry  
B. Look at me  
C. I need you mom and dad  
D. All of the above
4. A flock of crows is flying by. They stop abruptly near a large tree and start cawing loudly. Then, in turn, they fly up, swooping down and dive bombing a certain part of the tree. What are they saying?  
A. Check out my flying skills  
B. I like to be noisy and noticeable  
C. Watch out! There's a predator hiding in the tree  
D. I want to live here
5. A single sandhill crane flies over the wetland. He calls to those cranes below who have landed. They call back. Back and forth the calls go. What are they saying?  
A. Come on down, it's safe  
B. Where are you? I am here  
C. I can't find my family group  
D. All of the above
6. It's a springtime dawn, and the sun is rising. A great-horned owl sits atop a tree and hoots his heart out. What is he saying?  
A. Wake up humans  
B. I own this territory  
C. What a beautiful sunrise  
D. I'm handsome

Try to Bird Talk!

Using only bird calls and bird body language (no human words), how would you convey these messages to your parents and/or siblings?

Use these bird sounds and body language:

singing

squeak

squawk

gurgle

trill

rattle

whine

click

honk

croak

whistle

howl

thump

caw

chirp

coo

chasing

wing flapping

diving

puff feathers

strutting

- A. I'm happy
- B. I'm hungry
- C. Watch out!
- D. Get out of my room
- E. Where are you family?
- F. I'm in trouble!
- G. I love you
- H. I'm gorgeous
- I. Let's go!

Once you've decided how to convey each message as a bird, try them out with your parents or siblings. Did they understand you? Why or why not?

#### Look Who's Talking Investigation

What birds are talking in your neighborhood, and what are they saying? You do not need to know the name/species of a bird to figure out what they're talking about.

Go outside in your backyard, or to a local park or nature area. Sit quietly, look around and listen.

What do you hear?

What do you see?

What are the birds saying?

Extension: Pick a bird you observed. Find out its species name. Research the bird to find out about its life. Write a short story from a bird's point of view. Include songs, calls and body language.

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#### Lesson 2: Bird Talk ANSWERS:

Let's Bird Talk: 1-A, 2-D, 3-D, 4-C, 5-D, 6-B

Try to Bird Talk and Look Who's Talking answers will vary.

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## Nature Bowl in Your Neighborhood

### Lesson 3: Here We Are! We Are Here!



*Supplies needed: pencil, California map, field guides (paper copies or digital are both fine!)*

#### Objectives:

- examine natural aspects of California
- determine natural features of California that make us unique in the world
- test knowledge of California ecology, including geography, geology, hydrology and more
- utilize state map and field guides to research, when needed

#### Eureka! I have Found It!

California is unique in many ways, especially in its ecological diversity. Mountains, valleys, deserts, coast—we've got it all. And we have all the wonderful wildlife and plants that live in these places.

Let's test your overall knowledge of California: (If you don't know the answer, look it up on a California map and/or in field guides.)

1. You are a researcher studying bears in the high country.  
What mountain range are you in?  
What species of bear are you researching?  
What kind of rock are the mountains mostly made of?

Draw a picture of what you would see:



2. You are a migrating bird flying over the Great Central Valley.  
What migratory bird species might you be?  
What two major rivers flow here?  
What is the name of the migratory flyway you are using?

Draw a picture of what you would see:

3. You are a botanist studying California's endemic trees (endemic means native only to a certain place—in this case, California!). They are three tree species that are highly special and world record breaking. Name them and where they occur in California.

Tallest tree:

Heaviest tree:

Oldest tree:

Draw a picture of each tree:

4. You are surfing in the waves on the coast, north of San Francisco.  
What ocean are you in?

Are you wearing a wetsuit? Why?

You spot a large fish swimming nearby. What species could it be?

You see a large mammal swimming nearby. What species could it be?

Draw a picture of what you would see:

5. Name an endangered species in California:  
Where does it live and why is it endangered?

Draw a picture of that species in its habitat:

6. You are a researcher studying desert life. We have three deserts in California: Great Basin, Sonora and Mohave.

Which desert are you in, if you see:

- A. Joshua trees?
- B. Saguaro cactus?
- C. Big sagebrush?

Draw a picture of each plant and desert:

7. Government owns and manages lands in California protect our valuable wild places and important ecology. Name an example of each of the following in California and give your best answer on why each site has been protected.

A national park:

A state park:

A state ecological reserve:

Draw a picture of one of your examples:

8. You are a cartographer, or map maker, trying to figure out state elevations.

You discover that:

The highest place in California is:

The lowest place in California is:

What are the elevations of each?

Draw a picture of the highest or lowest place in California:

9. Write three questions of your own about California to quiz your family or friends.

A.

B.

C.

## Nature Bowl in Your Neighborhood

### Lesson 3: Here We Are! We Are Here! ANSWER SHEET

Let's test your overall knowledge of California: (If you don't know the answer, look it up on a California map and/or in field guides.)

1. You are a researcher studying bears in the high country.  
What mountain range are you in? *Sierra Nevada*  
What species of bear are you researching? *California brown bear*  
What kind of rock are the mountains mostly made of? *Granite*
2. You are a migrating bird flying over the Great Central Valley.  
What migratory bird species might you be? *Answers vary. Sandhill crane to yellow warbler*  
What two major rivers flow here? *Sacramento and San Joaquin*  
What is the name of the migratory flyway you are using? *Pacific Flyway*
3. You are a botanist studying California's endemic trees (endemic means native only to a certain place—in this case, California!). They are three tree species that are highly special and world record breaking. Name them and where they occur in California.  
Tallest tree: *Coast redwood, along the north coast*  
Heaviest tree: *Giant Sequoia, in the middle part of the western Sierra*  
Oldest tree: *Bristlecone pine, on the east side of the Sierra*
4. You are surfing in the waves on the coast, north of San Francisco.  
What ocean are you in? *Pacific Ocean*  
Are you wearing a wetsuit? Why? *Yes! Water is too cold to survive long without one.*  
You spot a large fish swimming nearby. What species could it be? *Great white shark, chinook salmon, etc.*  
You see a large mammal swimming nearby. What species could it be? *Grey whale, sea lion, etc.*
5. Name an endangered species in California. *Can vary. California condor*

Where does it live and why is it endangered? *Lives in central and southern California, east to Arizona. Endangered due to loss of habitat, reckless killing by early settlers and lead poisoning.*

6. You are a researcher studying desert life. We have three deserts in California: Great Basin, Sonora and Mohave. Which desert are you in, if you see:

- A. Joshua trees? *Mohave*
- B. Saguaro cactus? *Sonora*
- C. Big sagebrush? *Great Basin*

7. Government owned and managed lands in California protect our valuable wild places and important ecology. Name an example of each of the following in California and give your best answer on why each site has been protected.

A national park: *Can vary. Yosemite National Park, natural beauty*

A state park: *Can vary. Donner State Park, historic significance*

A state ecological reserve: *Can vary. Pine Hill Ecological Reserve, rare plants*

8. You are a cartographer, or map maker, trying to figure out elevations. You discover that:

The highest place in California is: *Mount Whitney*

The lowest place in California is: *Death Valley*

What are the elevations of each? *14,505 feet and -282 feet*

9. Write three questions of your own about California to quiz your family or friends.

*Questions and answers will vary*

## Nature Bowl in Your Neighborhood

### Lesson 4: Nature Relay—Match Up!

*Supplies Needed—these pages, pencil; dictionary or nature guides if desired*



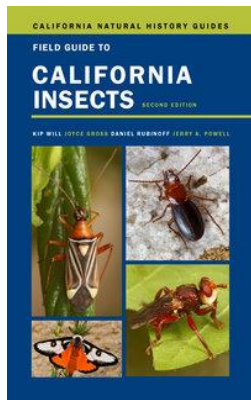
Objectives:

- review and test students' knowledge of ecological words and concepts
- match ecological terms with real world examples
- practice 'best guess' method of answer selection

Match 'em up!

Match the following nature words and concepts with a picture. Write the concept next to the picture. If you are unsure of the answer, take your best guess. Each picture is used only once.

1. Raptor adaptation
2. Reusable resource
3. Woodland herbivore
4. Nocturnal insectivore and pollinator
5. Contributes to climate change
6. Migrating bird hazard
7. Seed holder for a conifer
8. Decomposer
9. Plant protective adaptation
10. Part of the water cycle
11. Vertebrate
12. Endangered species
13. Extinct species
14. Found in a breeding rookery
15. Source of geothermal energy
16. Travels from the ocean to river to breed
17. A biodegradable product
18. A limiting factor for wild animals
19. Has a pupa stage
20. Carnivore that eats salmon







## Nature Bowl in Your Neighborhood

### Lesson 4: Nature Relay—Match Up! ANSWER SHEET

1. Raptor adaptation
2. Reusable resource
3. Woodland herbivore
4. Nocturnal insectivore and pollinator
5. Contributes to climate change
6. Migrating bird hazard
7. Seed holder for a conifer
8. Decomposer
9. Plant protective adaptation
10. Part of the water cycle
11. Vertebrate
12. Endangered species
13. Extinct species
14. Found in a breeding rookery
15. Source of geothermal energy
16. Travels from the ocean to river to breed
17. A biodegradable product
18. A limiting factor for wild animals
19. Has a pupa stage
20. Carnivore that eats salmon



7



8



5



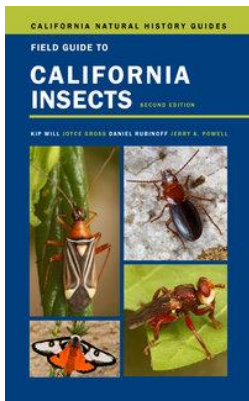
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2



15



18



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12



10



1



4

## Nature Bowl in Your Neighborhood

### Lesson 5: Count those species up!



#### Objectives:

- Students hone their nature observation skills
- Students learn and use methods of scientific surveying
- Students create and tally scientific data, using math skills
- Students discover what an educated guess, or estimation, is
- Students use their data to determine current status for five wildlife species

Knowing the overall population of individuals of a certain wildlife species is a key ingredient to successful natural resource conservation and management!

How many chinook salmon are spawning in the American River this year? What is the number of nesting bank swallows at your refuge? How many Mexican free-tailed bats are living at Yolo Basin? Are the numbers higher this year for monarch butterflies? How many snow geese overwinter at Gray Lodge Wildlife Area?

By answering these population questions, scientists gather and use the best current data available to make the best decisions for wildlife and wildlands, now and in the future. Collecting data is an important and primary task of a scientist.

While it's nearly impossible to tally a species population to an exact number, there are surveying methods you can use to find a best estimate, or educated guess, for a population.

One method used by scientists to count specific species is a matrix, or quadrant, overlaid on photographs. Photographs must be taken when that species is gathered in large groups. Every fish, bird, bat, etc (or portion of) within a quadrant should be counted. Let's try it out!

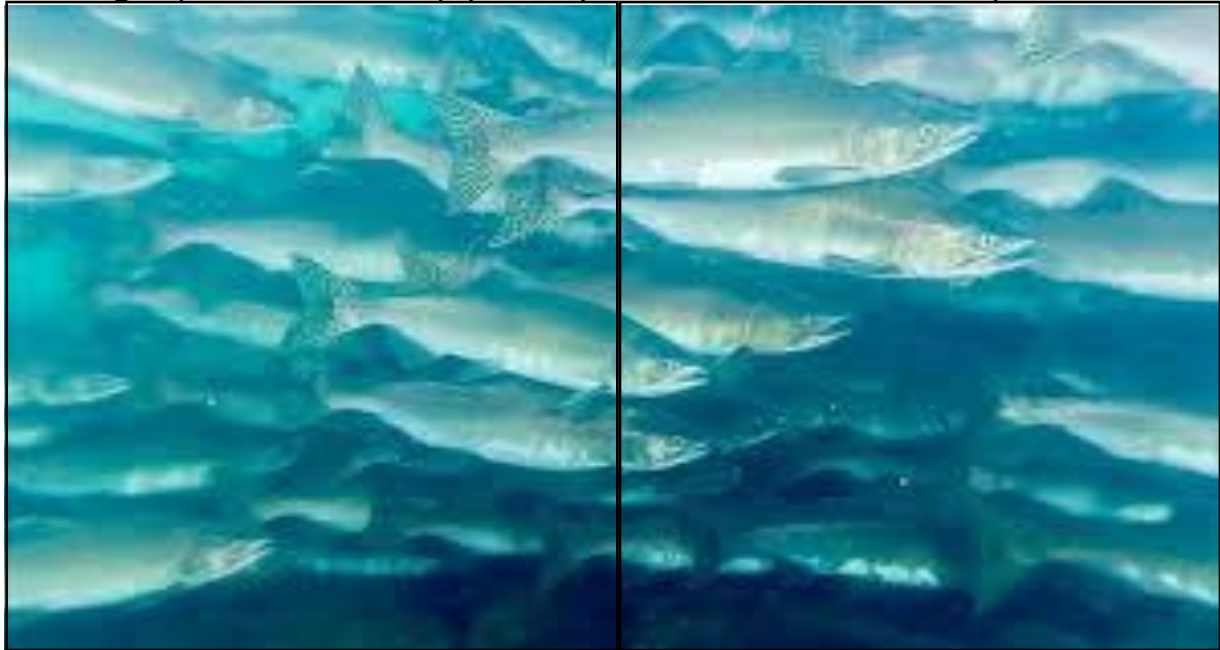
## How many chinook salmon are spawning in the American River this year?

Chinook salmon are a vital natural resource in California for humans and for wildlife. They are both predators and prey. In huge schools and using their nose to smell their way, salmon swim back from the Pacific Ocean to their exact home rivers where they were born. Here, they spawn, or breed, a new generation of salmon. Then, the adults' lifespan ends, and they die and decompose in the river. This leaves nutrients in the water to help their young and other species thrive.

Here's the fish you're studying:



Drawing 2 quadrants will help you tally the number of fish in this photo:



How many fish do you count in the quadrant on the left? \_\_\_\_\_

Now, multiple that number times the number of quadrants

\_\_\_\_\_ X 2 = \_\_\_\_\_

( number of fish times number of quadrants equals estimate)

B. Try this one yourself. Draw as many quadrants as you need.



How many do you count? \_\_\_\_\_ x \_\_\_\_\_ = \_\_\_\_\_ \*  
(number of fish in one quadrant times number of quadrants equals estimate)

**\*This is your scientific estimate, or best educated guess, of how many salmon are in the American River.**

## What is the number of nesting bank swallows at your refuge?

Bank swallows are currently an at-risk species with their populations dwindling due mainly to habitat loss and human disturbance. They nest in colonies with pairs digging holes for nesting sites into the dirt on stream and riverbanks. These swallows love eating insects and keep the populations of grasshoppers and gnats, among others, in check.

Here's what you're looking for:



Here's what you found and took a picture of:



How many do you count? \_\_\_\_\_ x \_\_\_\_\_ = \_\_\_\_\_  
(number of birds in one quadrant times number of quadrants equals estimate)



## How many Mexican free-tailed bats are living at Yolo Basin?

Bats are an important species of mammal in our environments. As an insect eater, a single bat can munch down 10,000 mosquitos in one night. One species is the Mexican free-tailed bat. They spend the winter in warm climates in Mexico and Central America. Then, they fly north in the spring in hugh flocks to California to breed in colonies. One large colony lives under the bridges in the Yolo Basin Wildlife Area.

Here's what you're looking for:



Here's what you found and took a picture of:



How many do you count? \_\_\_\_\_ x \_\_\_\_\_ = \_\_\_\_\_  
(number of bats in one quadrant times number of quadrants equals estimate)

## What are the numbers this year of overwintering monarch butterflies?

Monarch butterflies are a beautiful species that lives year-round in California. Other monarchs from across the western United States migrate to California to spend the winter along our central coast. These butterflies are essential pollinators. Without them, many plants cannot make seeds to reproduce. Monarchs rely solely on a plant called milkweed to lay their eggs and provide food for their caterpillars. The population of monarchs has declined dramatically due mainly to the loss of milkweed in our habitats.

Here is what you're looking for:



Here's what you found and took a picture of:



How many do you count? \_\_\_\_\_ x \_\_\_\_\_ = \_\_\_\_\_  
(number of butterflies in one quadrant times # of quadrants equals estimate)

## How many snow geese are overwintering at Gray Lodge Wildlife Area?

Snow geese breed in the far north (Canada, Alaska and the Arctic). They migrate down south in the fall using the Pacific Flyway to spend the winter in California. More than one billion birds travel on the Pacific Flyway. They do this not for fun, but for survival! Once winter snow sets into these northern habitats, resources of food and water vanish under the ice.

Here's what you're looking for:



Here's what you found and took a picture of:



How many do you count? \_\_\_\_\_ x \_\_\_\_\_ = \_\_\_\_\_  
(number of geese in one quadrant times number of quadrants equals estimate)

**GREAT WORK SCIENTIST! YOUR DATA IS HIGHLY VALUABLE!**